FULL DEMOCRACY
EN
THE MONETARY ECONOMY

FOREWORD

(Full Democracy in the Monetary Economy)

This treatise is two different treatises that are presented together for a good reason. The first paper is devoted to the study of democracy as a political system and a distinct form of creating a government, while the second paper is devoted to the study of the science of economics and the limitations it imposes on any system of government. Both are independent treatises that complement each other because they both speak basically of the same thing. They talk about how power is exercised within human society and how it is used by a minority to sustain their economic privileges. Although both treatises touch on reality from two very different points of view, they both touch on the same reality because reality is always the same.

In the first paper, the political part, we talk about Full Democracy and how it is substituted by one of the many manifestations adopted by Representative Democracy to remove citizens from the exercise of Political Power within society. However, the use of politics, and specifically the use of Representative Democracy to substitute Full Democracy, although being undoubtedly the main and most important way to avoid any threat to the interests of economically privileged people, is not, far from it, the only way used to achieve it. There is another way of doing it, much more subtle and much more perverse than the use of politics and almost as important as it, which uses the misrepresentation of science, specifically the science of economics, to limit the danger that any form of democratic government poses to an economic minority.

If the first document talks about how the privileged minority uses its control over political ideas to pass off as democracy what is only a substitute for it, the second treatise talks about how the same minority uses its control over economic ideas to achieve the same thing, with equal or even greater success.

If in ancient times it was the word of "god", and of those who spoke in his name, where we had to dig to find the origin of legitimacy that allowed a monarch to rule with the approval and benevolence of the religious oligarchy, nowadays it is "science", and the scientists who speak in its name, where we have to look for the origin of the legitimacy that the privileged minority intends to use to annul any decision taken by the social majority in defence of their interests. For this, of course, they need the approval and benevolence of the scientific community of economists, which is not easy to obtain, because, unlike the strong pyramidal structure with which the religious oligarchy is organized, the scientific oligarchy is very open and very little given to be dominated by ideological monopolies.

However, and this is what is explained in the second treatise, we cannot be naive and fall into the mystification of the scientific method and science, believing that scientists are immune to any attempt of manipulation and bribery. Scientists are people and they also have ideology and economic interests, and although it pains us to say it, the strength against corruption that we attribute to them does not come from their individual strength, which is no different from the rest of mortals, but arises from the strength of the collective methodology used by the scientific community to decide which statements are considered scientific truths and which are not. Therefore, it is possible, and much easier than it seems, to manipulate the scientific method and turn an essentially scientific discipline, such as economics, into a doctrine that is no different from any other religious doctrine.

We know that since the beginning of time human beings have been trying to free themselves from the slavery they exercise over their fellow human beings, without ever succeeding. Therefore, we would also be very naive if we thought that the incredible possibilities that scientific knowledge offers us today are a sign of success in this enterprise, because the truth is that half of the people who live on this planet suffer hunger, need and oppression because of our way of organizing ourselves and without us knowing why, whatever we do, we always seem to be equally far from the goal we have been seeking for thousands of years.

It is to shed some light on what is happening that these two treatises have been written, which should be read together even though they are so different. In both there is the answer as to how we can move forward and in both we explain what is the next step to take if we want to get closer, even if only a little, to the longed-for liberation that always seems so far away.

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March 30, 2021

FULL DEMOCRACY

Reality never changes. It is we who change by looking at it differently. Then and only then does reality change.

This work is the result of the dedication of many people. The ideas expressed here are only opinions that should not commit or oblige anyone. From the Movement of the City Councils for Change, which is represented in many cities and towns in Spain, we were asked to prepare a text that would serve as an explanation of the meaning of "The Right to Decide" and the reason why we went out to the squares on 15M.

This text gathers our thoughts in a simple explanation of the Right to Decide.

Pedro Rojas Sola
Circulo Derecho a Decidir
2019

FULL DEMOCRACY

Chapter I: FULL DEMOCRACY

1.1. The Island of Utopia

In a very distant country and in a very distant time there once existed a small island that was able to maintain its political independence for centuries despite being surrounded by very, very powerful neighbours. The name given to the place by its own inhabitants was the Island of Utopia, because the way they chose to make public decisions, those that affect all citizens, was very utopian. Here we are going to tell what was the historical process that pushed them to organize themselves in the peculiar way they did.

The inhabitants of Utopia Island were very clear about what democracy was and believed, with passion, in that reflection of Lincoln in which it is stated that *democracy is government of the people, by the people and for the people*, and perhaps for this reason, all public decisions that were taken on the island were taken by voting together by referendum. At the beginning there were few inhabitants on the island and they lived very spread out and isolated, so this system, although cumbersome, could be carried out without many problems. But, as time went by and the population grew, they saw how this way of making political decisions by referendum gradually became tedious and impractical. They found that, as the population grew, so did the frequency of referendums. People had their occupations, and leaving these to meet, discuss, agree and vote on any common problems that arose wasted more and more of their time. Besides, most of the many common problems that arose were mere administrative formalities that could be solved by a good manager endowed with enough political autonomy, thus eliminating the real need to summon the whole citizenship to solve them.

Therefore, and in view of the increasing paralysis of public decision-making due to the increase of referendum calls, citizens decided to appoint a Committee of Wise Men, mostly political scientists and jurists, to study the problem in depth, look for a feasible solution and present it to citizens for its study and approval by means of referendum.

After much thought, the group of wise men proposed to elect a limited number of public representatives through direct and periodic elections, with the intention, the wise men reasoned, that they would be the ones in charge of making the less important and more administrative decisions. In other words, so that they could govern by taking the decisions they considered most appropriate, without any limitations or restrictions, since it was thought that being elected by universal and direct suffrage guaranteed that their actions would be for the benefit of all. However, and this was made very clear, when there were doubts about which decisions should be taken or when the consequences of the decision were important enough, the representatives had the obligation to call a referendum so that all citizens, and not them, were the ones who finally took it.

The proposed system was studied in depth and put into practice without delay with the prior consent of all the inhabitants of the island in a referendum. The new system was very well received by all the island's citizens, who set down in a written document, the Constitution, the complex and laborious procedure regulating public decision-making and the distribution of functions among the elected representatives.

Everything seemed to go very well at first and the new political system more than lived up to all the expectations that had been placed in it. But, when more time passed and contrary to expectations, the system began to show the many shortcomings and defects it concealed. Constitutional Democracy, which was the name given to the political system implemented on the island, ended up being, in fact, a total fiasco whose memory still lingers with regret and regret in the memory of the people.

As the wise men had foreseen, referendums were reduced to almost disappear because also the reasons why a referendum was called were reduced to disappear. The great majority of decisions were taken without problems by the representatives, and for those which could have serious consequences, the mandatory referendum was called so that the whole population could solve it to their liking, if not of all, at least of the majority of the population.

But with the passage of time the situation changed. The representatives were reducing more and more, and without any apparent justification, the referendums called to solve the problems considered of special importance. So much the representatives went up to the grapevine and so much they clung to the power, that they even changed the Constitution and declared non-binding the few referendums called.

The whole process was experienced on the Island of Utopia as a real coup d'état.

As the Constitution delegated to the representatives the responsibility to call a referendum when they considered it convenient, the citizens themselves could not call a referendum to change the articles of the Constitution and revert the situation that had been created. The citizens discovered incredulously that they themselves had tied their hands and feet

and could do nothing without the permission of their representatives. They understood, too late, that all political power had remained in hands of representatives, who now acted as guardians of citizens, and the only role of citizens in Constitutional Democracy was to elect periodically their guardians, that is, people who were going to govern them.

At that point, and understanding the dangerous political situation that had been created, citizens had no choice but to get angry and take action, to skip the Constitution and call again the Committee of Wise Men to study the political problem created by the Constitutional Democracy and to propose a solution. What was very clear, and what everybody was aware of, was that it was not possible to go back to the old system where everything was decided by referendum.

The wise men did not want to make any more mistakes and thought long and hard about the possible solutions before deciding on one of them and putting it forward. Finally, and after much meditation, they proposed a democracy based on the "Principle" where public decision-making must always be exercised by the citizens. Therefore, and to avoid any future problem that could appear, it was declared as a universal, individual and inalienable Human Right, the right to call a referendum to decide about any subject of interest of the citizenship, at any time and in the terms that the citizenship thought convenient. The procedure was named Binding Citizens' Initiative, and it would be carried out when a minimum number of signatures were collected among population, so that it would be easy to call them, but their number would not be high, to avoid tiring people with unimportant issues. It was also proposed that referendums would be held every three months, and in dates previously appointed for it.

Besides, in the new proposal made by the sages, the old representative model was going to be kept unchanged, so that the representatives elected by means of periodical elections would go on making without any restrictions or limitations, as it was done before, the public decisions they thought convenient. The wise men reasoned that the calling of binding referendums by the citizenship allowed the citizen to exercise a real and effective guardianship over the decisions taken by the representatives and to avoid any abuse of power by them in the exercise of the public functions entrusted to them.

Citizens of the Island of Utopia thought, discussed and approved, not without misgivings, the new proposal presented by the wise men and decided, by means of a binding referendum, to govern themselves from then on with the new democratic system that mixes representation with direct decision making. They named the system Full Democracy.

End of the story.

The curious thing about this story is that the Island of Utopia really exists. The political system that is reflected in it has been practiced in Switzerland for more than a century and a half and it doesn't seem that the Swiss are doing badly, neither politically nor economically. Their

powerful neighbours also exist and they are, nothing more and nothing less, than the European Union, a country where 500 million people are governed with a Representative Democracy in which all the political power is given to the representatives who exercise an effective guardianship over the citizens that prevents them from taking any political decision by themselves.

What we propose in this short paper is to show the reasons and logic which have led citizens living in every country of the world to believe that Representative Democracy is the least bad political system to be governed in democracy. Throughout this paper we will show why Representative Democracy is a very unstable and deficient political system, but, above all, we will make very clear the reason why experts in political science, law and constitutionalism have ignored the existence of Full Democracy with which Switzerland is governed, to the point of never being mentioned in any university textbook.

1.2. Political Power

A very common belief, and one that we all tend to take for granted without giving it much thought, is the belief that a society should aspire to be made up of free people. According to this belief, individual freedom is more than an abstract concept that is theorized about, and becomes a real aspiration of any person that the whole of society is obliged to respect and protect. This doctrine is usually called "liberalism" and is so well established in today's democratic societies that society as a whole is required to be structured and organized in a way that respects the right to individual freedom, even above many other human rights that we also consider fundamental.

However, what defines and characterizes any human society is the lack of freedom of the people who are part of it. To even think that a society formed by free people can exist is simply ridiculous, despite the fact that there are thinkers who are recognized as "great thinkers" for having defended and taken this belief for granted, despite the fact that a society formed by free people cannot exist, just as a democratic king, the rain that doesn't wet, the wind that doesn't blow or the silence of the person who speaks cannot exist. In fact, the phrase -*a society formed by free people*- is a contradictory semantic construction

that expresses something that cannot exist. A person who is part of a society cannot be a free person because the term society refers to a set of rules that any person who is part of it is obliged to comply with.

It can then be understood without too much difficulty that there must be something within any society that prevents people from behaving freely, or if you prefer, that forces people to comply with certain rules:

> *We call "Political Power" that which must exist within any society in order to prevent the people who form it from being free, or behaving freely.*

So, to speak of the group of people who organize themselves to create a society is the same as speaking of the group of people who organize themselves to create the "Political Power" that will govern society. "Society" and "(Political) Power" are then synonymous words that refer to and describe one and the same reality, since one cannot exist without the other.

Let us observe that there is no causal link between Political Power and society, since both are the same. In spite of this, some doctrines break the circular dependence and assign a causal line between the two. This, although wrong, allows defining "Political Power" as that which restricts and limits the freedom of people within society, so now they correctly conclude that it is the existence of "Political Power" that is creating society:

The exercise of "Political Power" is what is creating society.

Although the conclusion itself is correct, the way in which the phrase is interpreted by anarchists and liberals is wrong, since they blame the existence of "Political Power" for the absence of individual freedom, and mistakenly believe that by reducing or eliminating political power, individual freedom can be achieved, without understanding that only when there is no society can the individual be free.

However, although there is no such thing as individual freedom within a society, the same is not true of society as a whole and it is possible to define when a society is free and when it is not:

> *"We say that a society is free when each and every person who is part of the society decides what are the rules by which the society is governed. Or in other words, a society is free when political power is exercised by all the people who make up the society."*

A person who is part of a society cannot be a free person, but the society to which he belongs can be a free society and, in fact, it is a free society when each of the persons who are part of the society exercises political power.

Perhaps, to understand something so obvious, we must first explain what the nature of political power is and how political power is exercised within society.

1.3. The Principle of Legality

We have accepted that "Political Power" exists and must necessarily be exercised within any society, so the next question we must answer is how it is exercised within any society in order to identify it.

Fortunately, political power has been exercised in any society in the same way and using the same means for at least 10,000 years, although probably much earlier. The answer, therefore, to the question of how it is exercised within any society has a very simple answer that has always been the same throughout history, whatever society we look at and whatever the moment in its history in which we ask the question:

"In any society, Political Power is always exercised by law."

This answer may surprise us by its simplicity and, of course, it will be very difficult for us to discover anything new to anyone with it. But we should not let the answer deceive us and prevent us from seeing how much lies behind the apparent simplicity with which political power has been exercised in our societies since ancient times. The statement declares a true fact, which has been a constant in all societies and in all ages, and sums up what is called in law the "Principle of Legality".

What the "Principle of Legality" tells us is that all the laws that regulate coexistence within any society must be complied with by all, both by citizens and by any public or private institution, without any exception. It is the obligatory fulfillment of the laws, what allows the Political Power to be exercised and, therefore, what is creating the society.

A law would be meaningless if it were not enforced, and it would be meaningless if we were not all equal before the law. In fact, the set of laws that are mandatory for all people who are part of a society is what creates the Rule of Law, which is only the way "Political Power" is called in law (perhaps because the two words manage to scare citizens a little

less and allow them to identify with it, probably out of ignorance). All societies, from the most atrocious dictatorship to the Full Democracy with which they are governed in Switzerland, passing through the Parliamentary Monarchy with which we govern ourselves in the Kingdom of Spain, are constituted in "Rule of Law" and are governed by the Principle of Legality, which can be stated as: "Rule of Law":

> *"It is through laws and the enforceability of laws that "Political Power" is exercised within any society."*

We can hear King Felipe VI of Spain, as in the speech commemorating the 40th anniversary of the elections of 1977, in which the Congress and the Senate of the Constituent Legislature that gave birth to the Monarchic Constitution that left behind the 40 years of dictatorship were elected, mentioning the Principle of Legality without naming it:

> *"Outside the law, history teaches us, there is only arbitrariness, imposition, insecurity and, in the end, the very negation of freedom itself".*
>
> *Philip VI*
> *(June, 2017)*

The statement made by King Felipe VI is so obviously true that it makes us blush to hear such a learned person say it. It is as if we were listening to an eminent physicist:

> *"Science teaches us that objects always fall down."*

The statement is so obvious that we would blush to hear it said to someone in a Congress on Quantum Gravity, so we must ask ourselves why King Felipe VI refers to the Principle of Legality in such simple terms and in a speech encouraging the Congressmen to obey the Monarchic Constitution.

The reproach we can make to King Felipe VI is not the possible falsehood of the phrase, since the phrase is manifestly true, but what the king hides when he says it. Because:

History teaches us that "*...arbitrariness, imposition, insecurity and, in the end, the very denial of freedom..."* have always been exercised within legality and within the Rule of Law.

Arbitrariness, imposition, and, ultimately, the very denial of freedom so well exists within legality and within the rule of law. The Nazi regime was built on the rule of law, just as the Spanish monarchy is built on the rule of law, and all the barbarities committed by the Nazi government, including the creation of the racist and anti-Semitic laws that eventually led to the creation of the extermination camps, were done within legality and the rule of law.

The "law", as any jurist knows very well, and neither ignores King Felipe VI, is no guarantee for anyone, since it is only the way how the "Political Power" is exercised within any society; from the most ancient, to the most modern; from the most atrocious and unjust, to the most humanitarian and just. King Felipe VI forgets that in the Roman Republic or in the ancient Greek Democracy slavery was legal and "The Rule of Law" protected the right of citizens to own slaves and to kill them.

The phrase of King Felipe VI is misleading because it makes the listener believe that where the law is complied with there is no arbitrariness, imposition, insecurity and lack of freedom. King Felipe VI should ask the Catalan political representatives who are imprisoned if the law is a guarantee for their freedom or a threat to it. What King Felipe VI should and should have said in his speech in front of the deputies was:

> *"Within the law, history teaches us, there can be arbitrariness, imposition, insecurity and, in the end, the very negation of freedom."*

We understand the falsity of the Principle of Legality, as the basis on which society is built, when we realize that the Principle of Legality is sustaining the Rule of Law of very diverse forms of government. From a pure and hard dictatorship, passing through the monarchy whether it is parliamentary or not, the representative democracy, the republic, until arriving to the Full Democracy with which Switzerland is governed. All of them have in common the creation of the Rule of Law and the Principle of Legality as physical materialization of political power, but not as the basis on which society and coexistence are constituted.

If we accept the Principle of Legality as the basis for building a society, we will be legitimizing on an equal footing authoritarian regimes that are repugnant to all of us with democratic regimes that we consider desirable. There must be a principle prior to the principle of legality, and more fundamental than it, that allows us to differentiate between the forms of government that we judge to be repugnant and those other forms of government that we consider desirable. Such a principle exists, it is called the "Principle of Legitimacy" and it is what differentiates one rule of law from another.

1.4. The Principle of Democratic Legitimacy

It is evident that China, the USA, the Kingdom of Spain or Switzerland are societies that have in common that the Political Power is exercised by means of the construction of a State of Law, but it is also very evident that the form that the government adapts in each of them is very different. The criterion that allows us to differentiate some States of Law from others, or if we prefer, the criterion that allows us to differentiate some forms of government from others, receives the name of "Principle of Legitimacy" and its essential characteristic, and the reason why it exists within society, is to point out who is exercising the "Political Power" within society.

What differentiates China, the USA, the Kingdom of Spain or Switzerland, is who is exercising Political Power within each of these societies.

The function of the Principle of Legitimacy within a society is not difficult to understand when we ask ourselves who decides which laws become part of the Rule of Law and which do not. It is very evident that within any society there must be some procedure or some criteria not only to elaborate laws, which is also the case, but above all to decide which specific laws are approved and which are not. The curious thing is that when we follow the procedure by which laws are selected, we always find someone at the end, whether it is a single person, a more or less extensive group of people or the whole of society as a whole.

The Principle of Legitimacy is the criterion that indicates to whom it corresponds to decide whether a law is or is not legitimate before it becomes part of the set of laws on which the Rule of Law is based, and which will be of obligatory compliance by the Principle of Legality. The person on whom the function of legitimizing the laws falls is called the "active subject" of the Principle of Legitimacy and is, in the end, the one who is exercising the Political Power within society.

It is very well understood that a law is always "legal" and of obligatory compliance in any society by the Principle of Legality, but it is equally easy to understand that a law before becoming "law" must be legitimized by the active subject that the Principle of Legitimacy indicates for it. Laws, before being "legal", must be "legitimate" and when society as a whole feels that laws are "not legitimate", because they do not accept the active subject that is legitimizing them, then citizens will feel neither bound nor obliged by these laws and society, together with the Rule of Law on which its government is based, will disappear sooner or later. Societies that are stable over time are those whose citizens accept the Principle of Legitimacy that indicates who is the active subject that "legitimizes" the laws with which the Rule of Law is built.

> *Laws must first and foremost be legitimate and whoever legitimizes them must be accepted by the whole of society.*

The Principle of Legitimacy implies the existence of an active subject within society on which the function of legitimizing laws falls. This subject is necessary since all the laws created by the Legislative Power, in the different forms it can adopt within a society, must be legitimized before being incorporated to the set of laws that form the Rule of Law. It is easy to understand that it is this active subject who really exercises the "Political Power" within society, since it is he who is deciding which laws are legitimate and become part of the Rule of Law, and which are not.

To understand this, let us take the example of an absolute monarchy. In this system, which still survives in many countries and is by far the form of government that has been chosen most frequently throughout history, the active subject on whom the capacity to legitimize the laws rests is the king himself. This legitimating capacity is usually attributed to him by tradition by divine right and, unlike a pure and simple dictatorship, it is hereditary in nature. Historically it is shown that it must have the complicity of the religious patriarchs to recognize the hereditary monarchy as the political system chosen by God to govern men... (and women).

> *In an absolute monarchy the Principle of Legitimacy points to the king as the person upon whom the function of "sanctioning" the laws falls and, therefore, it is the king who exercises Political Power in a monarchy, as everyone knows.*

The term "sanction" is the technical word with which the Theory of Law hides the word "legitimise", which it rarely mentions and when it does mention it, it always associates it with the false legitimacy created by the Principle of Legality.

The "sanctioning" capacity of the king can be seen in the current Spanish Parliamentary Monarchy when, after the parliament approves a Decree Law, it needs to be signed... (sanctioned)... by King Felipe VI before entering into force and being published in the Official State Gazette. In Spain, without the prior "sanction" of the king, no law can be enacted. The same happens with the appointment of any public office, including judges, professors or doctors, which must be sanctioned by King Felipe VI to be valid.

That the Principle of Legitimacy exists and is the basis on which any society is based is a truth so unquestionable that no professor of Constitutional Law will ever dare to deny it, although he or she will have no problem ignoring it either. That any democratic system is based on the Principle of Democratic Legitimacy is also an unquestionable truth, whatever the constitutionalists, the Constitutional Court or King Felipe VI may say.

The question we citizens must ask ourselves is, therefore, who is the active subject in whom the capacity to legitimize the laws in the Democratic System lies? ...or if you prefer... what is the Principle of Democratic Legitimacy?

"In a democratic system, each citizen is the active subject of the Principle of Democratic Legitimacy and it is on him/her that falls, by means of binding referendum, the capacity to legitimize the laws that create the Rule of Law with which the Political Power is exercised and with which coexistence is regulated".

What differentiates the Rule of Law created by a Democracy from the Rule of Law created by a Monarchy, though many may not like it, is that the active subject of the Principle of Legitimacy in a democracy is the ordinary citizen, and not the king. This statement is evident in itself, besides being very easy to prove it is true, taking as an example the Spanish democracy, which is the political system we are especially interested in studying.

In the necessary Constituent Act of 1978 that opened the way to the Parliamentary Monarchy, it was the whole Spanish citizenship that legitimized, by means of binding and universal referendum, the Spanish Monarchic Constitution recognizing in that act that:

"It is all Spanish citizenship the active subject of the Principle of Democratic Legitimacy, and it is on all Spanish citizenship that falls, through the binding referendum, the ability to legitimize the laws that create the Rule of Law".

If the Spanish citizenship were not the active legitimating subject, then the Spanish Monarchic Constitution approved in 1978 would lack legitimacy and it would not differ at all from the Laws of Movement imposed by the dictator Franco during 40 years to the Spaniards. What differentiates the Spanish Constitution from the Movement Laws of the dictator is that the Spanish Constitution was legitimated by the whole Spanish society by means of binding referendum, and the Movement Laws were legitimated by the dictator with the legitimating capacity granted by the use of force. What differentiates the Rule of Law in a democracy from the Rule of Law in a dictatorship is who is acting as active subject of the Principle of Legitimacy.

If you think about it a little you will realize that everything we are telling you is completely coherent and absolutely logical:

"Whoever has the actual ability to decide what laws are passed and what laws are not passed is who has and who exercises "Political Power" because it is through laws that "Political Power" is exercised within any society."

"What differentiates some States of Law from others is who exercises Political Power within society, which is just what the Principle of Legitimacy points out."

All this is well known to King Felipe VI. The members of the Constitutional Court also know it. The Deputies and Senators who govern in the Representative Institutions also know it.

The professors who teach Constitutional Law in the Spanish universities also know it. But all of them hide it and conceal it from the only ones who still do not know it, the ordinary citizens who are kept in ignorance because it is they, and not others, who should legitimately exercise the "Political Power" in a democracy.

It is very similar to what happens in the story of Cinderella, who, under the tutelage of the evil stepmother, does not seem to realize that she is the owner of the house in which she lives and not the servant, as some people would have her believe. Only the fairy godmother can get her out of her melancholy lethargy and turn her, although only until twelve o'clock, into the queen of the ball.

1.5. The Binding Citizens' Initiative

Democracy implies a conceptual change in the active subject that makes public decisions that affect us all with respect to other political systems such as, for example, monarchy. The Principle of Democratic Legitimacy points to the citizens themselves as the active subject responsible for legitimizing the laws and, therefore, also on whom the exercise of "Political Power" falls within society:

"Political power is vested in and exercised by the citizenry in a democracy. ”

There is nothing new in this statement and already Abraham Lincoln, perhaps the most valued president of all times by the Americans, defined democracy very well in the early years of 1863 as follows:

"Government of the people, by the people and for the people. ”

A short sentence that contains the more than 50 pages that we are using here to say the same thing. Abraham Lincoln was one of the clearest minds that ever lived and his greatest gift was his amazing ability to explain very complex ideas in very few words in a way that everyone could understand.

Following the idea contained in the brief definition of democracy enunciated by Lincoln, we ask ourselves now, how can a normative system be implemented in the Constitution that empowers and guarantees that it will be the citizenship who will be the active subject in the taking of public decisions, as it is recognized by the Principle of Democratic Legitimacy. Such a political system is known as Full Democracy and it is quite different from the Constitutional Democracy with which the countries are governed nowadays because the active subject that names one and the other form of government is different.

> *"We call Full Democracy to the political system where the ordinary citizen is the active subject of the Principle of Legitimacy and, therefore, the one who exercises the Political Power".*

The first difficulty that appears when we try to implement a political system that responds to what we understand by Full Democracy is the number of referendums that should be called if we want the citizenship to legitimize any law and any political decision. This is impossible to put into practice and that is the reason why in Full Democracy Representative Institutions are created which, together with the election of representatives who lead them, are in charge of carrying out both the legislative function, creating laws which become part of the Rule of Law, and the executive function, taking the public decisions they consider appropriate.

As far as representation is concerned, Full Democracy is not different from Constitutional Democracy in any way, and has, like it, the same periodical elections where representatives are elected to perform legislative and executive functions.
The difference between one and the other appears later and is deeper than it seems, because the exercise of the functions entrusted to it, and carried out by the Representative Institutions, will be protected by the whole citizenship by allowing it to reject decisions and laws adopted by the representatives, besides allowing the citizenship to propose the creation of laws and to take executive decisions itself. All this, thanks to the fact that the citizen retains the possibility of calling a binding referendum, by himself, on any subject and at any time.

The way Political Power is exercised in a Full Democracy is:

1) Through representatives elected in periodic elections. It is they, the representatives, who enact the laws and make public decisions following the procedure set out in the Constitutional Text.
2) By means of calling binding referendums by citizens, without limitation of subject and whenever they think it is convenient. It is citizens who, by calling referendum to reject decisions taken by representatives, to propose laws and executive acts, and to change Constitutional Text, protect, limit and control decisions taken by representatives.

We see that in Full Democracy executive and legislative functions have been delegated to democratically elected representatives as it happens in Constitutional Democracy, but, unlike in Constitutional Democracy, any act carried out by representatives must be legitimated by citizens in one of two possible ways:

1) *"Legitimation is carried out directly by calling a binding referendum to decide whether the act is legitimate or not."*
2) *"The legitimation is carried out indirectly by the absence of the proposal of calling a binding referendum to decide whether the act is legitimate or not."*

If a President of Government, or any other Representative Institution, takes a legislative or executive decision in the normal exercise of his functions, citizens can always call a referendum to clarify the legitimacy of the act, but, and here is the crux of the matter, the fact of not calling a referendum, when it can be called, is legitimizing the act carried out by the representatives and considering it as good, as legitimate.

It is exactly the same as how a monarchy works, in which a king chooses his ministers so that they can make the laws and take the public decisions that they deem convenient on his behalf. As long as the king does not intervene and lets his ministers act, he is legitimizing, by doing so, the public decisions that his ministers are making. It is only when

the sovereign considers that the acts they carry out are not what he would carry out as king that he intervenes and delegitimizes them.

The citizens, as well as a king, as long as he does not call a referendum to delegitimize the acts carried out by his representatives will be considering them as good, he will be legitimizing them by absence.

> *It is by means of absence of referendum, as any law or act carried out by representatives or any Representative Institution is being legitimated by citizenship in a Full Democracy.*

The capacity of legitimating laws, granted to citizens by the Principle of Democratic Legitimacy, is being carried out either directly by calling a binding referendum or by absence of such referendum, and that is the reason why a Full Democracy as Switzerland is being ruled by the Principle of Democratic Legitimacy.

Therefore it is very important that referendum has no limitation in subjects to be endorsed, can be called periodically (every 3 months in Switzerland), it is easy to collect necessary signatures for calling it, and it is not called in excess, because its main function is to allow citizens to control and guard the Representative Institutions, and not to carry out the work delegated to them. Besides, citizens have the possibility to propose laws and executive acts without any restrictions, also by means of calling binding referendums.

Full Democracy is not a utopian and unrealizable political system.

We know that its implementation will find a strong opposition from those who now exercise and possess the Political Power, as it happens in Spain with the king Felipe VI or as it happens in France with the political caste which creates the Constitutional Democracy, but its implementation is far from being utopian. Switzerland, as a country and as a society, has been exercising Full Democracy for more than 150 years with an enviable political stability and a very good economic situation.

We know that societies will always have political problems within them and Full Democracy is not going to change that, but we think that Full Democracy is a much better political system to address them than the Representative Democracy we are currently governed by.

1.6. The Principle of Constitutional Legitimacy

Democracy is closely linked to the Principle of Democratic Legitimacy which, by means of the use of the binding and universal referendum, recognizes and grants to all citizens the right, both to legitimize laws and to create them. However, we observe that, in all democracies of the world, except in the Swiss Constitution, the Principle of Democratic Legitimacy does not appear anywhere, and it is the Constitutional Court, protected by the Constitutional Legitimacy, who has the right to legitimize the laws which are going to be part of the Rule of Law with which we regulate our coexistence.

To understand how the Principle of Democratic Legitimacy is substituted by the Principle of Constitutional Legitimacy, which implies substituting the citizen by the Constitutional Court as the active legitimizing subject within the society, it is necessary to analyze the Constituent Act with which Constitutional Democracy is created as a system of government.

When citizens approve by referendum the Constitution of any democratic country, in what is called the Constituent Act, they are accepting a set of declarations that citizens are not aware of what they imply:

1) It is recognized that it is the citizen who has the capacity to legitimize the laws that create the Rule of Law, since its approval by referendum is required for the Constitutional Text to become the Rule or Law with which society is regulated from then on.
2) The referendum is recognized, binding and universal, as the mechanism with which the citizen exercises the legitimating capacity granted by the Principle of Democratic Legitimacy. This is the reason why a referendum is called to approve the Constitutional Text.
3) The Constitutional Text approved by citizens by means of a referendum, becomes the Rule or Law regulating coexistence from then on.

The Constituent Act, and the approval of the Constitution it implies, does not suppose in itself the substitution of the Principle of Democratic Legitimacy by the Principle of Constitutional Legitimacy when the approved Constitutional Text continues recognizing the citizen with the active subject with the capacity to legitimize the laws and with the capacity to change by himself the own Constitutional Text. In such a case, the Constitutional Text approved in the Constituent Act is only reflecting the Principle of Legality that establishes the Rule of Law in any society, and that is the reason why the Constituent Act is made, but it would not be altering the nature of the Principle of Legitimacy on which democracy is based.

This is exactly the situation created by the Swiss Constitution when it declares, in articles 138, 139, 140, 141 and 142, the right of Swiss citizens to call binding referendums which, among

other things, allow the change of the Constitutional Text at will and without limitations of any kind. But this is not what happens when the Constitutional Text is approved in the rest of the democracies of the world:

4) Unlike what the Swiss Constitution states, in other Constitutions of the world what the Text declares is the illegality of calling any kind of binding referendum from citizenship, even declaring that referendums called from Representative Institutions are not binding, as it happens in the Spanish Monarchic Constitution.
5) Not only that, the Constitutional Text declares that the active subject of the Principle of Democratic Legitimacy stops being the citizenship and becomes the Constitutional Court, which will be from then on, who will decide which executive or legislative acts carried out by the Representative Institutions are, or are not, legitimate. Substitution of citizen by Constitutional Court as active subject of legitimation process opens way to Constitutional Democracy and Principle of Constitutional Legitimacy by which it is ruled. Whichever way you look at it, it is a coup d'état in full rule with which the citizen is denied his legitimate right to exercise the Political Power granted by the democratic system and the Full Democracy.
6) The aberration represented by the Constitutional Democracy is shown now with all its crudeness. The Constitutional Text itself declares the Constitutional Court as the unappealable arbiter of the interpretation of the Constitutional Text approved by the citizenship in the Constituent Act, so that any doubt about what the text says or does not say, will be interpreted by the Constitutional Court. Something very difficult to understand when it is observed that it was the citizens who approved the Constitution and it is the citizens who know what they wanted to say or what they did not want to say when they approved it, so it should be them, who are present and not absent, who should declare whether a legislative or executive act is Constitutional or not.
7) As a consequence of all the above, the Constitutional Text has reduced the exercise of democracy to electing in periodic elections those who govern us. It is they, our representatives, who are in charge of exercising the Executive and Legislative functions under the attentive supervision of the Constitutional Court, which is who really governs in a Constitutional Democracy.

As the members of the Constitutional Court are appointed by the elected representatives, it is very difficult to avoid the creation of a political caste that rules the country, thanks to the control and management of the political parties, the Constitutional Court, and indirectly the whole judicial system of the country.

Now we can see very well what the result of substituting the Principle of Democratic Legitimacy for the Principle of Constitutional Legitimacy is:

> *"The Constitutional Court, and the political caste that appoints it, become the real holders of Political Power in Constitutional Democracy, since its members are the ones who legitimize the laws and public decisions taken by the representatives".*

As collective decisions affecting us all must be taken, it will be the caste controlling political parties who in practice will take them. Since political representatives are the ones who appoint members of Constitutional Court, a dangerous endogamy takes place, which often makes Constitutional Democracy drift towards a de facto dictatorship. People economically favoured by productive structures only need to merge with the political caste forming political parties for Constitutional Democracy to become the ideal means to set up an oligarchic dictatorship ruling in fact, though not in form.

The citizen, and as a consequence of all the process described, will have to attend the grotesque spectacle of hearing the people who form the caste of political parties, shouting at them from a tribune:

Vote for me! I promise to do what I won't let you do!

A mockery that is repeated periodically and in which it seems that we citizens do not get tired of participating, without realizing that it was in the Constituent Act when we ourselves accepted the institutionalization of the media circus that is Constitutional Democracy.

The citizen has to be very conscious that it was in the irresponsible Constituent Act when he gave his consent to the substitution of the Principle of Democratic Legitimacy by the substitute Principle of Constitutional Legitimacy, which opens the way to Constitutional Democracy and closes the way to the exercise of Political Power granted by democracy to the ordinary citizen:

> *"The citizen renounced in the Constituent Act to his legitimate right to exercise the political power that allows him to decide collectively what is done and what is not done in his country".*

Looking for false culprits makes no sense, and we're not going to fool anyone here. If Cinderella wants to be the belle of the ball and not a servant in her own house, she'll have to wise up.

1.7. The Three Phase Theory

Democracy became generalized in Europe since 19th century by eliminating privileges of aristocracy when replacing absolute monarchy which ruled until then, and it is necessary to explain, although very briefly, the reasons why, instead of a Full Democracy as it exists in Switzerland, it ended up being implanted everywhere Constitutional Democracy, or "Constitutionalism", which grants the Political Power to the Constitutional Court and to people who control and appoint it.

It does not seem normal that only one country in the world, Switzerland, is governed by means of Full Democracy and that no other country has even been interested in copying its political system in the last 150 years. Even stranger is the fact that Switzerland is in the centre of the universe and its peculiar political system can hardly have gone unnoticed.

For example, Lenin was exiled for a long time in the city of Berne, the capital of Switzerland, before returning to Russia to impose the dictatorship of the proletariat, without leaving any written record that he noticed the great difference between the Full Democracy existing in Switzerland and the rest of the Constitutional Democracies. Rosa Luxemburg, one of the most important german marxist thinkers of the beginning of the 20th century, studied simultaneously in the University of Zurich, philosophy, history, politics, economy and mathematics, but she never mentioned in her writings the peculiar democratic system with which Switzerland is governed. The world's most famous physicist, Albert Einstein, created the Theory of Relativity while working at the patent office in Berne, where he lived after studying in Germany, and he never says anything about the peculiar way in which the Swiss are governed when he writes about politics.

It is as if we were in the presence of an international conspiracy. Nobody seems to realise that Switzerland is governed very differently from the rest of the world. Why?

If we review the history of humanity we can interpret most of the great social revolutions as the struggle of a social minority to take over the political power that exists within any society. The reason for this, as we will explain a little further on, is because only those who possess political power can maintain and increase the productive structures that give them the economic privileges they enjoy.

> *Having or controlling political power is never an end in itself. It is the means used by those who exercise it to maintain the productive structures from which they obtain their economic privileges.*

When a social group takes political power in a society in order to maintain and increase its economic privileges, it always does so in three phases:

1) The delegitimization of those who are exercising political power and the announcement of a new legitimacy that grants political power to the new social group.
2) The physical seizure of political power justified by the new legitimacy.
3) The acceptance of the whole society of the government that is based on the new legitimacy.

The sequence of events that lead to great social changes and revolutions may seem frighteningly simple, but if we dive into History we realize that it has always been fulfilled without exception and with the regularity of a Physical Law, when there has been a change from one political system to another.

When the first democracies arrived in the European culture, they did it following the three phases described above.

Absolute monarchy gave political power, and therefore also economic power, to a dominant oligarchy that in the form of a landed aristocracy justified the exercise of political power on divine mandate and blood law (the ambiguous Principle of Monarchical Legitimacy based on kinship).

What always challenges the old legitimacy in the process of social change is the presence of a new group that begins to have economic power but lacks any political power. This is a social constant throughout history and the ultimate reason why social change is demanded.

Without the presence of a social group with economic power, but without political power, it will not be possible to create the necessary motivation for social change, which is sometimes reduced to a simple palace coup, but which in the case of democracy implied the greatest social revolution that has occurred in History... (if we do not want to include the social change that we are planning to begin now with this writing).

Trade with the new continent, the new landowners in the colonies and the technical production made possible by the nascent science, pointed to the bourgeoisie as the new social group where the economic motivation for the change of social regime would fall:

> *"The new bourgeoisie begins to have great economic power, but it lacks the political power necessary to maintain and increase it. The existence of the aristocracy exercising political power is a permanent threat, and not an imaginary one, to the nascent economic bourgeoisie, since it can arbitrarily dispossess it by means of laws and taxes of the profits it obtains from trade and business."*

Up to this point we all agree and the incipient bourgeois revolution follows, without deviation, the three phases described above to take the political power by means of Democracy:

1) The Monarchic Legitimacy is denounced and the new Democratic Legitimacy is announced.
2) Political power is seized, almost always in a more or less violent way.
3) The new Democratic Legitimacy is accepted by the citizenry.

Yes, of course, all this is true and history shows us very clearly that the Three-Phase Theory was unreservedly fulfilled in the change from monarchy to democracy. Although in all the countries of the world, except in the USA, the replacement of monarchical legitimacy by democratic legitimacy was more a slow process of ebb and flow between the two competing legitimacies than a rapid revolutionary process, the three phases are clear when we look at historical evolution.

This really happened in the French Revolution, in the American Revolution and in many other less violent revolutions like the English one, but there is something missing or wrong in all the analysis we are doing when, when we look in more detail at the historical development of countries, we observe that the establishment of Democratic Legitimacy was too often prevented by involutions that, by fits and starts, make Constitutional Democracy and not Full Democracy finally prevail in all the countries of the world as political system of what we understand by a democratic government.

We see then that what needs to be explained is not the fall of the monarchy and its replacement by democracy, which, although slow, is very well explained by the Theory of the Three Phases. Although nowadays it is not unusual to see non-democratic political systems, what is surprising to observe is that, wherever you look, the implementation of democracy in countries that are democratic does not respond to the Principle of Democratic Legitimacy as it would be logical to expect, but what has been implemented all over the world in a majority way as the basis of democracy is the substitute born from the Principle of Constitutional Legitimacy. What we have called Constitutional Democracy or "constitutionalism". What needs an explanation is why Full Democracy has not been implemented anywhere.

1.8. The arrival of democracy

To understand what has happened and continues to happen in the world in the open struggle for the implantation of democracy we must remember, together with Abraham Lincoln, that Democracy is ...*the government of the people, by the people and for the people....* which tells us that the Democratic Legitimacy comes to give the Political Power to the common people, to the normal and ordinary citizen, and not to the rising liberal bourgeoisie benefited economically that, lacking any political power in the monarchic system, tries to replace the aristocracy in the exercise of the Political Power.

Although it is the liberal bourgeoisie who need to make the social change to eliminate the threat posed by the monarchy, unfortunately, they are not the beneficiaries of the political power that the democratic revolution brings. Democracy comes to give power to the ordinary citizen, not to the economically wealthy bourgeois social minority.

This is the great underlying contradiction that conditions the political change from monarchy to democracy all over the world and that is behind the political instability that during the whole of the 19th century and the whole of the 20th century shows the establishment of democracy.

It is as if we wanted to carry out a palace coup by claiming that our neighbor has the right to the throne and, when we convince everyone to do it, and we carry out the coup d'état, we sit on the throne and leave our neighbor out. This last minute indefinition about who is the subject that should exercise the Political Power, it is very foreseeable that it will end very badly for someone; either it will end badly for my neighbor or it will end badly for me.

This is where the miscalculation of the nascent bourgeoisie, represented by the liberals of the 19th century, who pretend to attain political power through democracy, lies. The problem arises when the bourgeoisie becomes aware and realizes that it is not, nor can it ever be, the recipient of political power in a democracy and that it is, on the contrary, the common people who at that time were starving all over Europe.

Both in Europe and in colonies, the establishment of democracy along the unstable 19th century follows that contradictory pattern which creates the existence of the Principle of Democratic Legitimacy and which is not stabilized until the appearance of Constitutional Democracy, which is presented to citizens as the defender of Welfare State and Human Rights. Thanks to this belief, citizens allow and accept the Principle of Constitutional Legitimacy as the only basis to establish democratic system, and put truce, but not end, to the inner contradiction of Constitutional Democracy, well into the 20th century.

The whole process of the tug-of-war between the citizenry and the nascent economically advantaged minority, which Marxists disparagingly call the bourgeoisie, can be followed very well when one studies the political evolution of France after the Revolution of 1789.

Although later than the American Revolution, it was the French Revolution that decided the fate of the establishment of democracy on the continent when it showed dangers that the new political system implicitly entailed for the well-to-do.

At the end of the 10-year period of the First French Republic, we can see very clearly how the alliance between the old landed aristocracy and the new liberal bourgeoisie came about, when they agreed to eliminate universal male suffrage from the first elections and replace it with census suffrage. The arrival of Napoleon put an end to the democratic experiment when he became emperor and hid for history both the alliance between aristocrats and liberals and its immediate consequence: the limitation of citizens with the right to vote to those who possessed a minimum of patrimony. Napoleon's departure from power marks the beginning of the oscillating political organization that France shows throughout the nineteenth century between Republic, Empire and Monarchy and shows us three disparate political systems that follow each other in a carousel without apparent discontinuity.

The chronological sequence that follows France is very instructive because it is representative of the resistance that Democratic Legitimacy will find to be accepted in all corners of the world. It also shows very well the reluctance of liberals to use democracy to seize political power thereafter:

- 1789. Establishment of the Estates General leading to the First Republic.
- 1799. The Consulate is established, which gives way to the proclamation of Napoleon as emperor.
- 1814. Restoration of the monarchy. Louis XVIII ascends to the throne.
- 1824. Charles X ascends to the throne.
- 1830. The Three Glorious Revolutions and the accession to the throne of Louis-Philippe I.
- 1848. The Second Republic is established and Louis Napoleon is elected president.
- 1852. Louis Napoleon stages a coup d'état and is named Emperor Napoleon III.
- 1870. The Third Republic is established, which establishes democracy in France in the definitive form of Constitutional Democracy.

Not even Karl Marx, blinded perhaps by his hatred of the bourgeoisie, was able to realize the all-out struggle that was being waged around him when he tried to change the old monarchy for the young democracy. The social revolution that sought to change the old monarchical legitimacy for the new democratic legitimacy made a last and agonizing attempt with the Paris Commune of 1871. It is then, when liberals, already aware of the threat represented by the Democratic Legitimacy for their interests of minority economically benefited, seal with a bloodbath the alliance without fissures with the old aristocracy to stop the last real attempt of implanting the Full Democracy in France and in

the world. It is curious to observe that what gives way to Constitutional Democracy and the definitive fall of monarchy in France is the crushing of the Paris Commune in 1871.

When we compare the political evolution of France with the political evolution of other countries such as Spain, the vision of "*The Two Spains*" or the idea that "*Spain is different*" is ridiculous. There have never been "*Two Spains*", just as there have never been two France, nor two England. What there always was, in Spain and everywhere else, was an alliance between the landed aristocracy and the economically wealthy bourgeoisie to prevent the access to political power of the common people, as it happened ten years after the beginning of the French Revolution.

It was not until well into the 20th century, with the expulsion of the king and the arrival of the Second Republic in 1931, that the ordinary citizen gained power in Spain. The 1936 coup d'état, half clerical and half monarchist, put an end to the brief democratic experiment, showing the world that we were no different from the rest of Europe except, perhaps, a little behind the times.

We can fool ourselves all we want, but historical reality leaves no doubt. We can see how other countries that arrived late to democracy have also gone through the same involutionary processes that France or Spain went through.

Chile, for example, did not allow universal suffrage until the second half of the 20th century. In the presidential elections of 1970, won by Allende, the census had doubled compared to the previous elections and it was not until the municipal elections of 1973 when the longed-for universal vote arrived. Once again, the coup d'état of a military man, Pinochet, put an end to the exercise of the political power that democracy grants to the ordinary citizen, when they try to change the economic structures from the power, even if it is by means of Constitutional Democracy.

More recently, in the Republic of Egypt, after 30 years of continuous military rule, open presidential elections were held and won by Morsi. Less than two years later, a military coup d'état returned power to the oligarchy hiding behind the military leadership, ushering in an era of repression and judicial executions against opponents of the regime unprecedented in the country's history. Egypt has arrived later than many other countries to democracy, but it is showing the same regime of involutions that all other countries showed before it.

No country is different from any other country, and the human being is equal to any other human being, wherever he is born and whoever he is born to. Nowadays, the dictatorial Chinese regime demands respect from the West because of the different culture and different way of looking at politics in China. Apparently, China is also different from the rest of the world and that justifies in the eyes of the Chinese leadership that its people have no political rights whatsoever. It is also the case in Saudi Arabia that they too are

different and that justifies in the eyes of their leaders the establishment of gender apartheid. It seems that all the dictators of the world have agreed to justify their political regimes on the cultural difference of their people: *their dictatorship is not like other dictatorships, it is different*.

The involutions, coups d'état or even fascism that have accompanied and accompany the definitive establishment of democracy in any country in the world can be interpreted without difficulty as reactions from the economically favoured elites to prevent the exercise of political power by the common people from eliminating their regime of economic privileges. The inevitable reforms that democracy gives and consents to the ordinary citizen when elections allow their legitimate representatives to reach the government are always seen as a threat by the elites present in society. History tells us that these reforms, undertaken by the representatives of the people, are nipped in the bud by coups d'état backed by economically advantaged minorities in every country in the world.

As we have said, the origin of the problem of democracy lies in the Principle of Democratic Legitimacy:

> *The liberal movement conceived democracy, at first, as the political system with which to replace the aristocracy in the exercise of political power, without realizing that by embracing democracy they had opened wide the doors of access to political power, for the first time in history, to the underprivileged masses of society. By the time the 19th century bourgeoisie wanted to close the newly opened pandora's box, it was too late.*

How did the bourgeoisie manage to prevent the majority of the poor population from instantly displacing it from the exercise of political power?

As we have already said, by means of coups d'état when there was no other choice. The history of french political evolution is very eloquent in this sense, but this answer does not do justice to the gradual stabilization that the passage of almost two hundred years has allowed to present Constitutional Democracy as the only possible form of democracy.

In order to understand how democracy, which should represent a clear threat for minorities benefited by the economic system, has become its natural ally, it is necessary to understand what has been the final result of the slow and unstable process of implementation of the democratic system which has evolved, along two centuries, until creating what we know as Constitutional Democracy:

The Universal Declaration of Human Rights.

But we will see this later, when we talk about the Right to Decide and its profound meaning as an individual Human Right.

1.9. The instability of Constitutional Democracy

Let us remember what we have shown so far in these pages:

1) Political power exists in any society and must be exercised.
2) It is through the Principle of Legality, the law, that Political Power is exercised within any society.
3) It is through the Principle of Legitimacy that in any society it is indicated who has to be the active subject on whom the capacity to legitimize the laws falls and, therefore, it indicates who has to exercise the Political Power within society.
4) In Full Democracy, the Principle of Democratic Legitimacy points out the ordinary citizen as the active subject on whom the capacity of legitimating laws falls and, therefore, who must exercise the Political Power.
5) In Constitutional Democracy, the Constitutional Text is used to deprive the citizen of his legitimate right to exercise Political Power, naming the Constitutional Court as the Institution substituting him in the function of legitimating laws, and therefore, it is who exercises in fact the Political Power within the society.

It is perfectly observed how, by means of Constitutionalism, citizens are separated from the exercise of political power and prevented from protecting the Constitution against any change made by their representatives. They are also prevented from making any Constitutional change, solving in this way the serious problem posed by Full Democracy to the minority of people benefited by the economic system.

> *Once the citizenship was eliminated in the Constituent Act from the exercise of Political Power by its own will, the impossible dream that liberal bourgeoisie secretly embraces of reaching the Political Power becomes true in Constitutional Democracy with the passage of time. Now it is inevitable that persons forming the political caste and persons benefited by the economic system end up merging into a single undifferentiated group exercising the Political Power without problems or restrictions.*

But this procedure, which allows the favoured minority to seize power, creates in the process the serious problem afflicting Constitutional Democracy as a form of government since its establishment:

> *"Political Power remains without legitimate owner in Constitutional Democracy. As a consequence of the Principle of Constitutional Legitimacy, which is used to replace the Principle of Democratic Legitimacy, any oligarchic group able to take control of the Constitutional Court will, in fact, take the exercise of Political Power within society".*

The great mistake of Constitutionalism is that it erects a throne, the Constitutional Court, but it does not appoint a king to occupy it, so the Political Power is within reach of any oligarchic group able to control the Constitutional Court when it wins elections in a more or less majority and legal way. All political stability relies on intervention of Constitutional Court and numerous counterweights established within Constitutional Democracy when it institutionalizes separation of powers, Congress, Senate, the figure of president, Constitutional Court and judiciary are created in an attempt to distribute exercise of Political Power among a great number of persons and institutions. It is all the distribution of power among a large group of people that ends up creating the political caste so akin to the democratic system and that merges as an indistinguishable whole with the people favored by the economic system.

But History shows us that neither all these counterweights, nor the distribution of power among many, are enough to prevent Political Power from falling into the hands of a minority, which does not necessarily have to be the minority that benefits economically, and which will end up using Political Power for its own benefit.

Remembering that the Nazi regime reached the Political Power in a totally legal way within a Constitutional Democracy is not superfluous at this moment. Looking at the authoritarian drift that many current Constitutional Democracies are following is an exercise of responsibility that should make us think about if we want to go on risking our social future betting on Constitutionalism that has been so unstable in the past and in the present.

We have seen in the "Arab Spring", how the ordinary people, after gaining power in an election in Egypt, are swept away by a coup d'état without any European democracy saying anything about it. We have seen in Venezuela, how Maduro uses the constitutional levers to stay legitimately in power. We have seen in Spain, how King Felipe VI surrounds himself with the political caste and transforms the Constitutional Court into a criminal court to forcibly stop the referendum in Catalonia. We have seen in Turkey, how Erdogan is turning democracy into an undisguised elected dictatorship. We have seen in Russia, how Putin is forcing the Constitution to become the new Tsar of all Russias. We have seen Bouteflika turn the Republic of Algeria into a family monarchy.

All these true facts are impossible to ignore and show us, without any concealment, the high price to be paid for removing citizenship from exercise of Political Power in Constitutional Democracy. As it happens most of times when a patch is put to hide the problem without solving it, Constitutionalism has not been able to avoid showing its unstable nature consequence of the contradiction it has from its origin, when it shamelessly substitutes democratic legitimacy by constitutional legitimacy.

1.10. Full Democracy

We come to the end of the path started in the search of an explanation of why the Full Democracy existing in Switzerland has passed unnoticed without any country in the world in 200 years has ever tried to govern itself with it.

From the beginning of this document we have spoken of the necessary existence of Political Power and the need to exercise it, but we have never described it as something alien and different from the society to which it belongs. Although it may seem otherwise, if you reread what has been said so far you will see that we have never stated that Political Power is something different from the society to which it belongs. We have always referred to power as consubstantial to the very society where it exists, but never as something separate from it.

However, the idea we usually have of Political Power is the opposite.

Our most immediate experience, and history corroborates it, is that the only reason political power exists is so that someone will use it to govern us. Political power is conceived as an instrument used by the elites to impose limitations on our freedom and our rights. We tend to imagine political power as something alien to us and that it is used unceremoniously against us.

However, when we think of democracy, and the deeper meaning it holds as a form of government, we will have no choice but to agree that what is obviously true of a monarchy and many other forms of government must be completely false for a democracy. If we use as a definition of democracy the old phrase used by the American president Abraham Lincoln to refer to it, then we have no choice but to agree that what is obviously true for a monarchy and for many other forms of government must be completely false for a democracy:

"Democracy is government of the people, by the people and for the people."

We will agree that, according to this definition, in a democracy it makes no sense to consider the government as a distinct entity that is alien to the people who are governed. In fact, the definition forces us to consider the people and the government as the same thing if we want to be coherent.

However, when we look at the structure of government that Constitutional Democracy creates, we have no choice but to admit that the people do not make any political decisions for themselves, so Lincoln's phrase can hardly be referring to a Constitutional democracy:

Constitutionalism is originally conceived as a *political* system designed to govern the people without the people and, therefore, there is the government and there is the people as two distinct entities.

In Full Democracy, on the contrary, Political Power is exercised by the citizenry, making good Lincoln's definition that democracy is the government of the people, by the people and for the people, since the government and the citizenry being governed are the same thing. There is no difference between government and governed in Full Democracy:

1) Political power is exercised by the citizens and not by the Constitutional Court.
2) Representative institutions and representatives are delegated to make public decisions and create laws, but they do not have real power since any act they carry out can be delegitimized by the citizens.
3) The Constitutional Text can only be modified by the citizenry itself or with the permission of the citizenry, making the citizenry the protector and guardian of the Constitution.

Political stability in a Full Democracy is guaranteed because Political Power has an owner, the citizenship, and is not within reach of any oligarchy. Political Power is owned and exercised by the citizens as a whole, and winning an election does not allow representatives to take power, since neither the change of the Constitutional Text nor any other executive or legislative act can be done without the implicit or explicit consent of the citizens.

In a Full Democracy the government and the citizenry are the same entity and are not two different entities.

The Full Democracy with which the Swiss people are governed has enjoyed enviable political stability over the last 150 years for this reason and for no other. The current economic wealth of the Swiss makes them extremely conservative and liberal, but Switzerland has not always been rich.

The economic elites must understand that the present economic system from which they obtain their economic privileges will be consented by citizens in a Full Democracy as long as a minimum of equity and a minimum of economic wealth for the most disadvantaged people is guaranteed. Otherwise, the present economic system will not be consented and will inevitably disappear.

Full Democracy is not a threat for economically benefited minorities, but it is a threat, and a very real one, against an economic system that allows and consents misery and despair of a growing part of society. The social majority will never allow this to continue.

The Constitutional Democracy that currently governs us is allowing an economic system that does not guarantee that minimum of equity and wealth for the less favoured people and that is why democracy, thus understood, is showing all over the world the unstable nature that characterizes it. In a Full Democracy a part of the population would never be left in the lurch when an economic crisis comes, and better or worse, the whole society would weather the storm without leaving the most disadvantaged minority in poverty.

Albert Einstein once said that human stupidity consists in repeating over and over again the same experiment thinking that now it will give a different result. We have been repeating an experiment that always gives the same result for two centuries and we would be stupid to think that this time it will give a different result.

Chapter II: THE RIGHT TO DECIDE

2.1. The origin of Human Rights

To understand how democracy has become the natural ally of the minorities benefited by the economic system, when it should represent a clear threat to them, it is necessary to understand the essential role that "*The Universal Declaration of Human Rights*" has had in the final result of the slow and unstable process of implementation of the democratic system. But, where do the Human Rights that are recognized to all people and that all governments are obliged to protect come from?

From governments themselves, certainly not. If it were so, governments would not violate them as systematically as they do whenever they have the opportunity. It is necessary to know where they come from, but sociology, philosophy and even ethics have lost themselves in vague dissertations and do not give us a clear answer. The answer that is usually accepted as the most popular, and defended by almost all humanists, explains that the source of Human Rights is human dignity. But no one seems to be clear enough about what human dignity is to define it.

One of the basic unresolved problems of ethics and law refers to the origin and foundation of human rights. Although Law as a discipline does not concern itself much with the origin and legitimacy of laws, but rather with their application, the same does not happen with Human Rights. These never appear as laws, they appear as imperative mandates in the Constitutions and their legal development is a great problem for legislators because they tend to create areas of application that contradict each other.

Let us think, for example, of the right to private property and the right to housing. Should the empty and unused house of a private individual be expropriated... thus violating the right to private property... in order to give it to another private individual without a house so that he may have housing... thus recognizing his right to housing? We know that both are a human right that the Constitution protects in its articles, but the Constitution says nothing about which of the two must be respected when both come into collision.

The absence of a foundation on the origin of human rights does not only create a theoretical problem. This lacuna also creates a social problem that is very cleverly used by some currents of thought, such as liberalism, to propagate ideas that are degrading for human beings. Liberalism claims that the right to liberty and the right to private property are the only human rights that should be declared fundamental and therefore protected in the Constitution. According to their way of seeing things, the other rights should not be included and protected in the Constitution because they are not fundamental rights.

If we want to avoid these perverse conceptions that threaten human dignity and that some ideologues defend, we must ethically and ontologically found the formulation of Human Rights, that is to say, we must determine their origin.

This is why, when we argue that education is a human right, liberals demand that we argue why we consider it a fundamental right... *"take money from those who have the most to give education to those who have the least"*. Leaving aside that the use of the word "take away" does not do justice to what is only every citizen's contribution to what we consider common expenses, the truth is that the liberal complaint has merit. The fact that liberalism cannot justify why we should consider liberty and private property as the only Human Rights, does not relieve us of our obligation to justify that the right to education, and many other rights, should be considered Human Rights.

If we cannot justify that a specific Human Right exists, how can we demand that it be respected?

To prove that a human right exists and must be respected is an obligation that cannot be avoided within a Constitutional Democracy, since it not only boasts of formulating them in its articles, but also creates a Constitutional Court with the only function of protecting them from the arbitrariness of the citizens. It may be thought that the task we entrust to ourselves is complicated, difficult to define and completely out of our competences, but a relaxed and unprejudiced vision of the task disabuses us immediately and shows us that it is very easy to demonstrate which Human Rights exist and must be respected and which are not.

It is easy to understand that for a right to exist it must first be granted, and a right cannot be granted if it cannot be protected. Only when a right can be protected as a Human Right can it then exist as a Human Right. This is very interesting, because it states that for any right to be a Human Right, it must be protected as a Human Right. That which is protecting a right is that which is also granting it and, therefore, who is defining it as a Human Right. To know if a right is a Human Right, we only have to ask ourselves if who is protecting it as a Human Right can or cannot protect it as a Human Right.

We cannot give what is not ours, and it is not ours if we cannot protect it. A Human Right exists if the one who grants it is able and willing to protect it. If this condition is not met, a

right cannot exist as a Human Right. At best it would only be a declaration of good intentions.

> *What we must ask ourselves then is about "that" which is protecting Human Rights, because it will be "that" which is protecting them that is granting them and, therefore, who is giving them existence and forcing them to be recognised.*

If it is nature that is protecting Human Rights, and is able to protect them, then it is nature that grants Human Rights. If it is God who is protecting your rights, and God is able to protect them, then it is God who grants you your rights. If it is the Constitution that is protecting your rights, and is able to protect them, then it is the Constitution that is granting you your rights.

Whoever is protecting your freedom is granting you the right to your freedom and making it a Human Right.

Who is protecting your right to freedom?

We are not born free and we know it. Although we may fool ourselves into thinking that we are, it is not a natural or divine right to be born free. We can verify this by taking a look at history and seeing that there has been no human culture that has not had slavery as something desirable and natural. The Greeks, those that we know as the paradigm of culture and ethics, saw slavery with total naturalness and used it to have the necessary free time to bequeath us their philosophy. If we are not born free, then who is protecting the individual freedom we enjoy? Because whoever is protecting our individual freedom is the one who is granting it to us and, therefore, is the one who is turning it into a Human Right.

Who is granting you the right to individual freedom is the rest of the human beings that make up society. They can grant it to you because they are able and willing to protect it. Without a mutual commitment to protect your freedom, they could not grant it to you because they could not protect it. If we think about it a little bit, we will realize that precisely, the cause and the reason why we are constituted as a society is to protect the rights that we grant all human beings to ourselves.

When we understand this then we also understand that in order to declare which rights we elevate to the category of "human" and, therefore, to announce our will to protect them, it is necessary that the prior right to declare them exists. That is to say, there must exist a primordial right with which we endow ourselves, with which we legitimize ourselves to be able to decide which rights are protected and which are not:

> ***The Right to Decide:*** *"Every human being has the right to decide, together with other human beings, in which world he/she wants to live and in which world he/she wants to educate his/her children".*

To understand that it is by making use of our Right to Decide in community that we grant all Human Rights to ourselves is now very evident. And to understand that the Right to Decide is the most fundamental of Human Rights, also, since we could not grant ourselves Human Rights if we could not decide which rights we protect and which rights we do not protect.

2.2. The Right to Decide in Community

The human community is totally different from any other community that the animal world has ever created. Human beings have acquired consciousness by evolving within a social structure prior to the acquisition of consciousness. What characterizes human consciousness is that the human community where it is formed is prior to the formation of consciousness. Therefore, we are not beings with an individual consciousness that have come together to create society, as liberals seem to believe, we are beings that have acquired consciousness within a community.

We have first been social beings who have then evolved into conscious beings. The human community cannot be called a society until each of the human beings that form it are conscious of their own individuality within it. That is why society becomes a conscious structure formed by many human beings aware of their own individuality, and that makes the difference with any other non-human community. While the rest of the communities are only the aggregation of the individuals that compose it, in the case of the human community, consciousness makes the community itself conscious.

And this is what makes human beings unique.

People, by becoming aware of their own individuality after forming the community, create, modify and transform society so that it is society that protects its individuality by

committing each and every person to protect each and every individuality that forms it, with their lives if necessary and in a conscious manner.

The origin of all human rights stems from the awareness that each human being has of his or her own fragile individuality and the need for the society in which they live to protect it. Society then evolves to become the protector of the individuality of the people who form it, and not a threat to their individuality. This is the great difference between human society and other non-human societies.

> *The Right to Decide appears then as the most fundamental of all human rights, because it is by exercising this right that society is constituted as an entity that protects individuality by allowing the people that form it to decide what rights are protected and, therefore, what rights are granted to each of the human beings that make up society.*

We don't realise it because we haven't thought about it, but our conscience is a social conscience and it's not an individual conscience. When we affirm, for example, that there is an almost universal consensus in considering private property as a Human Right we are admitting the implicit existence of a referendum within society that is won by a majority in favour of considering the right to private property as a Human Right. Of course, this referendum has never taken place, but we will all agree that, since the dawn of time, long before we became aware of our individuality, this implicit consensus already existed within the human community. So much so that the Theory of Law calls "natural rights" those rights whose social consensus no one has ever doubted.

It is the same with freedom. You can exercise and demand your right to freedom because the other citizens have granted it to you and by doing so, we have also granted it to ourselves. The concession is implicit in the exercise of the right, although no referendum has ever been held to grant it to us, but we understand that there is an implicit consensus and that is why we say that it is a Natural Human Right. Slavery has been consented to and socially accepted because we stripped the slaves of their humanity, before enslaving them. It can be well understood that social consensus only protects people who belong to society, but it does not protect those people we exclude from it.

Although we citizens have not needed to make any referendum to grant us the right to freedom and the many other rights that appear in the Universal Declaration of Human Rights, it is easy to understand that there is an implicit consensus in declaring them as Human Rights and granting them to ourselves. If we follow the reasoning, we will realise that, without being aware of it, we are recognising the Right to Decide with the source from which all Human Rights come from and, therefore, also by consensus declaring it a Human Right and granting it to ourselves. That is to say, we are implicitly accepting democracy as the primordial form of government, even prior to the acquisition of our individual conscience.

We come to the same conclusion when we realize that when we approve the Constitutional Text by referendum, we are granting ourselves most of the rights that appear in the Universal Declaration of Human Rights, being now impossible not to recognize that we are ourselves who are granting ourselves the Human Rights that appear there recognized.

All rights, all rights, are born out of the conscious recognition of every human being to protect them. You can exercise your freedom because you have made a commitment to protect the freedom of every other human being. This individual commitment makes the whole society recognize it as a right, is willing to protect it and therefore it is granted.

The Human Rights we have are not granted to us by the UN, nor by our government, nor by the Constitution, nor by nature, nor by God, they are granted to you by other human beings because we are all willing to protect them. And for this it is necessary that the Right to Decide exists and is recognized as the only means to be able to recognize them, that is to say, to be able to grant them to us.

2.3. The Right to Decide... what is it?

We have to go back in time some 300,000 years, when according to anthropologists the first Homo Sapiens appeared, to imagine a group of hominids walking through the savannah in one of the permanent displacements they made in search of game to feed themselves. In the middle of the group are the young, together with the women with their young and the adults surrounding them. There are no more than a hundred members and we can imagine how the passage of the millennia is making them a little taller. After a while, and if we have enough imagination, we can see them become a group of hominids very similar in appearance to the one we have now: dangerous human beings carrying spears and arrows in a circle of defense, with the center occupied between laughter and gestures by the mothers with their children and the young, dragging gear. Many millennia ago they knew how to speak and became conscious beings.

A community is always created to protect each of the individuals who form it. This is not only true for human communities, but also for any other community. We call them groups when they are small societies made up of a small number of people, but today we are part of a society made up of more than 8 billion individuals. Speech, language, makes it possible to coordinate very effectively any strategy among those who form the group by allowing them to dialogue and exchange views before undertaking any action. Decisions are made by everyone because that is what language has been developed for, so that they can discuss and agree. The fruits of social behaviour are then shared among all, and that is also the purpose of spoken language, so that things are spoken, things are clear and there are no misunderstandings that could threaten the integrity of the group. But the important thing is that the individual conscience is acquired by already belonging to a society.

If we ask ourselves now what is the Right to Decide within human society, the answer is obvious.

> *The Right to Decide is the right that each member of the group has to decide, together with the other members of the group, what is done and what is not done within the group. It is this right that creates the individual being as a social being, and society as a whole that protects each of the individual beings that form it. There is no mystery in this, the Right to Decide is what builds and creates society, since it is the means that the individual uses to force society to protect him or her. Without the Right to Decide of each and every one of the members that form part of society there can be no society.*

The latter is well understood because, on the one hand, the Right to Decide is an individual right that each member of the group has but that can only be exercised together with the other members of the group, so it is its exercise that is creating society, that is turning the sum of individualities into a society. Without the exercise of the right to decide there can be no society.

Democracy is born from the existence of the Right to Decide and it is only the name we have given to the political system where the Right to Decide is exercised, and without which there would be no society, as we have already mentioned. Democracy can only be direct democracy, that is, there can only be democracy when decisions are made by all the members of society. There can be no other type of democracy than direct democracy, or we will be deceiving each other.

As direct democracy is not practical in large and complex societies, we have created a political system with which we elect, not our representatives, but a group of people from the group to whom we delegate the making of decisions that we think it is not necessary for all of us to make directly. Not because we do not have the right to do so and not because we cannot make them, but because there are many of us and specialisation in the work advises us not to do so.

But Representative Democracy, which is the name given to the political system in which the people who make political decisions are elected periodically, cannot imply a renunciation of the exercise of the Right to Decide or of Full Democracy where it manifests itself. If the people who are part of society cannot exercise their Right to Decide, how and when they want, and on the issues they want, there will be no democracy whatever you call it, nor will there be society.

2.4. The Practice of the Right to Decide

We have presented and defended in this work the Right to Decide as the universal, individual and inalienable right of any human being to exercise the "Political Power" by means of calling a referendum in a Full Democracy. But our work would be incomplete if we did not also show the image of the world which would be reached if it were put into practice, even if only as a sketch.

The 15M movement, and in particular the City Councils for Change, have always been very clear that things have to be built from the ground up. If the foundations are solid, the construction that supports them will also be solid and will be able to grow over time. The logic behind this strategy is easy to understand: To *give back to the citizens the sovereignty that Full Democracy offers them, starting from the bottom and working upwards*. Starting from what is closer to their direct experience and covering little by little what is more distant and what they also have to take responsibility for because it affects them.

An ordinary citizen is concerned about the political situation in this order: his family, his work, his home, his neighborhood, his town or city, his province, his region, his country, his continent and his planet. Giving back to the citizen his Right to Decide, together with the other citizens, in each and every level of political organization must begin by giving him back the sovereignty over his most immediate environment, while at the same time devolving, without pause, the responsibility he has to assume at the highest levels of political organization.

The final idea is logical and ambitious but not utopian at all: *"the whole of all human beings should be able to call referendums to make decisions on global issues that affect us all and that cannot wait". "*

There must be global referendums in which we all participate and in which it is confirmed which Human Rights must be protected worldwide and the means must be put in place to ensure that they are fulfilled. There must be referendums on what must be done to prevent or reverse climate change, if that is still possible, or to mitigate it if it is already inevitable. Referendums must be held on what specific laws must be passed to protect the biosphere, animal species, threatened forests on many continents, etc. Referendums should be held on what measures should be taken to promote clean energy production or even go as far as banning the use of fossil fuels if this is deemed necessary. Referendums should be held on what trade laws should be passed to reduce the degrading inequalities between countries. Etc.

All these decisions and many others are decisions that we must take together because they affect each and every one of the people who inhabit the planet. We cannot avoid our responsibility and continue to delegate them to our governments. None of them would have any value or meaning if they were not approved by the entire population through binding referendums.

Utopian?

No. It is our planet that is at stake and with it, our future as a species. A future that affects us all and not just the current ruling caste, so these are decisions that we must take together. We have to become aware that everything that happens to the planet and its biosphere is the responsibility of each and every one of us who inhabit this planet.

This requires the implementation of the mechanism of calling binding referendums from the citizens themselves at all levels, global, continental, national, regional and local. It also includes deciding by referendum on which decisions are left to the discretion of the different levels. All this implies moving towards a government based on a World Federal Democracy, in which all the inhabitants of the world form part of a single political community.

It is an ambitious project, but not utopian. In which the practical implementation must be done from the bottom up, from near to far, but without unnecessary delays in decision-making at national or supra-national level.

As it has already been said, the main function of calling binding referendum by citizens is to legitimize decisions taken by elected representatives by absence, that is, when no referendum is called against them. So it is tried to make them easy to call them, but it is also tried that there are no reasons to call them. This does not imply limiting, annulling or

hindering decisions taken in Representative Institutions, but on the contrary, it is about forcing representatives to take decisions in a transparent way. The ordinary citizen is not only protecting them, but also giving them the Democratic Legitimacy that they do not have now.

It is well understood, therefore, that the particular representative system that each country or nation has should not have to be modified, except in those aspects that increase or guarantee the transparency of the exercise of the public function.

We believe that the right thing to do is to give society and citizens time to get used to political participation, to accept it as a matter of course and to take responsibility for the public decisions taken at all levels. Nothing better to do this than to start in the immediate surroundings of neighbourhoods, cities and provinces, all of which are particularly close and in great need of citizen protection from the threat posed by money, investment funds in their different forms and private ambitions.

Simultaneously, or sequentially, but without unjustified delays, the citizen can take over decisions of higher level by means of implementation of the call for binding referendum in all levels of public decision.

We do not believe that the inhabitants of any region of this planet are incapacitated for cultural, religious or ideological reasons to make the public decisions that they believe are convenient to realize themselves as human beings. Each culture will try to preserve its closest environment so we think that Full Democracy will help to maintain human cultural diversity or even to increase it, without turning this diversity into a threat for the others since the right to be different implies also the commitment to the protection of the other's difference.

Conflicts like that of Chiapas in Mexico, or that of the Mapuche in Chile or Argentina, would not have made sense in societies structured on the Right to Decide instead of in the current Constitutional Democracies implanted on the idea of nation. This is another reason to recognize as soon as possible the Right to Decide as universal, individual and inalienable right.

Its recognition and implementation does not have to be a traumatic or revolutionary process. If we go slowly because we want to go far, we can turn the change from Constitutional Democracy to Full Democracy into a learning process in which all human beings unite to turn the society and the planet we live in into the society and the planet we all desire to fulfil ourselves as the individual and social beings we are.

2.5. Independence and the Right to Decide

A very frequent political situation, in which the meaning of the Right to Decide is mixed in a very contradictory way with the meaning of the Universal Right to Self-Determination of the Peoples, can be found in the majority of the independence movements that exist scattered without discontinuity all over the world when they claim the right to constitute independent nations.

All the ethnic conflicts that exist in the world are originated as a reaction to the excluding reality that the concept of nation, inherited from the 19th century, imposes on the possession of territory as the very end of the national fact. We see it here in Spain when we hear someone from Cádiz say that Catalonia, which is more than 1,000 kilometres away from where he lives, is Spanish in a sense of possession. This person, who lives in Cadiz, seems to care very little if he himself is unemployed, or if many of his basic rights, such as education or healthcare, are being met by his government, but he does seem to care, and very much so, to feel that Catalonia belongs to him because he was born a Spaniard.

Nationalism is a very difficult sentiment to justify rationally and we can only speculate that for some strange evolutionary reason it is firmly rooted in our need to belong to a group. It could be said, but with the caveat that we have no evidence to justify it, that our collective subconscious or social instinct needs shared material possession. We reject in a very visceral and violent way that someone wants to dispossess us of what we consider to be ours in the collective sense. It's strange, but we have already mentioned that we have acquired our individual consciousness being previously within a previous social structure, so it's not strange that the feeling of possession is, before being an individual possession, a collective possession.

This primitive feeling of collective possession is what the economically favoured social minorities exploit with great skill to encourage their citizens to impose, from a central government, laws and decisions on the management of natural resources in regions with their own cultural identity, which gives rise to the logical rejection of the local inhabitants who wish to preserve their own sense of possession, and which is so badly understood by the absurd nationalismthat feeds the concept of nation.

> *We think that the Right to Decide comes to overcome the feeling of nation as possession and imposition on a territory from a central "Political Power", which persists today and which has been so disastrous for human coexistence during the last centuries. The federal structure which naturally induces the exercise of the Right to Decide, and the Full Democracy it demands as a political system to implement it, will allow as far as possible the balance between the national independence to which many regions of the world aspire and the existence of a*

central government which nationalisms do not want to renounce, and whose existence is necessary to structure decision making.

However, what we are interested in highlighting now is that any historical or cultural territory that claims the right to national independence cannot claim it by appealing to the Right to Decide, which as we know is an individual right, although it can make use of it to claim full autonomy within a federal structure.

This is the great implicit contradiction when one tries to use an individual right to obtain rights associated with a collectivity. It is not possible. The Right to Decide breaks with the idea of historical nation and dilutes it within a non-exclusive and interdependent federal framework. The Right to Decide does not allow the existence of the concept of independent nation, since it transcends it by making the human being belong to a single political unit on a planetary scale.

But it is possible, within the logic of the Right to Decide, to ask by means of referendum if it is desired, or not, to create a political unit or nationality within a historical or cultural territory which has expressed its will of being it, independently of historical rights or not. The question asked in the referendum can never imply the renunciation of the Right to Decide to which one appeals to build the nationality or political unit, because such an attitude would be a tremendous contradiction. The question, therefore, cannot be a YES or NO to the territorial independence of a community, which is what is usually done in these cases in which it is intended to build a sovereign nation.

To proceed in this way would be to enter into the logic of nationalism that has caused so much damage to humanity and that the Right to Decide comes to overcome.

The question cannot be reduced to a "YES" or "NO" to the independence as a nation of people who settle in a territory and feel in possession of a cultural legacy that they want and must protect. The question to be asked must be this one, or a similar one:

"Do you want to create a political unit or nationality in the historical or cultural territory in which you reside based on the recognition of the individual right of any human being to decide, together with other human beings, in which world you want to live and in which world you want to educate your children?"

YES/NO

With this question, the society that resides in a territory legitimizes itself to constitute itself as a political unit or nationality by recognizing and using the Right to Decide as an individual right possessed by any person and, therefore, also by the people who inhabit the territory where the question is asked. But, in addition, it commits itself to protect the decisions

made through the exercise of the Right to Decide in broader social groups to which it also belongs, since the Right to Decide is recognized as a universal, individual and inalienable Human Right.

For this reason, the previous question to be endorsed in any territory which has expressed its firm will to become a political unit or nationality differentiated from the nation or territory on which it depends at present must be accompanied by another question raised in the same referendum, but separated from the previous one, which reads:

> *"Do you want the historical or cultural territory in which you reside to be part of the Federal State in which the nation to which you now belong is henceforth constituted, recognizing the legitimate Right to Decide of each and every person?"*
>
> *YES/NO*

With the first question, in the case of an affirmative answer, the territory legitimises itself as an independent nation by recognising and using the Right to Decide as a source of legitimacy to constitute itself as an independent political unit or nationality. With the second question, it chooses the next organizational level to which it belongs and, in the case of an affirmative answer, it declares its will as a sovereign nation to be part of the Federal State in which it is constituted from now on the one it belongs to.

They are two questions which change the idea of nation with which the world has been built up to now, and which must be carried out simultaneously in a single referendum and in all the regions which are part of a nation in which citizens show their will to share the same political future. The Right to Decide is much more than a forgotten Human Right:

> *The Right to Decide is not a collective right, it is an individual right that can only be exercised in community and that all human beings have, from birth to death, and not only people born in a specific territory. It is with the collective exercise of the Right to Decide that society is built, Full Democracy is established and all other Human Rights are recognized and declared.*

2.6. The Constitution and the Right to Decide

We have explained and shown, beyond any reasonable doubt, that it was a pact between the existing monarchic aristocracy and the rising wealthy bourgeoisie which gradually implanted Constitutional Democracy as the form of government to prevent the access to political power of the ordinary citizen brought by Full Democracy. There is no doubt about this, and historical evidence is very evident, but this historical evidence is far from explaining the reason why Constitutional Democracy has been ruling nations for two centuries without any serious opposition, beyond attempts to implant a communist society, with or without private property, and under political conceptions very far from and antagonistic to democratic systems.

It is necessary to go deeper and explain what is due to its gradual stability and unquestionable prevalence in time, and even more when we know that a society is not stable unless ordinary citizens believe legitimate bases of the government they live in. Constitutional Democracy, and Constitution on which it is based, must feel legitimate by citizens who abide by it or it would not have lasted so long.

It is not difficult to understand that, indeed, the political stability and popular acceptance enjoyed by Constitutionalism is based on the existence of a substitute Principle of Constitutional Legitimacy in which all citizens as a whole believe and which replaces the absent Principle of Democratic Legitimacy.

The first thing that any Constitution does, when it sets itself up as the Legal Normal on which the Rule of Law is going to be based, apart from the obligatory and protocol statements about the sovereignty of the people, is to declare the Human Rights that must be respected by all citizens, including the representatives. We know that this is completed with the creation of the Constitutional Court in charge of overseeing that the elected rulers, and the institutions in which they exercise their functions, do not overstep in the exercise of Political Power and in their broad constitutional attributions. Everything seems perfect and without blemish, transmitting the reassuring message to the ordinary citizen:

> *"The function and raison d'être of The Constitution and the Constitutional Court is to protect the Fundamental Human Rights of every citizen from the possible arbitrariness of those who exercise "Political Power" within society."*

Then the mass media, by dint of repeating it over and over again, turn the statement into an indisputable "truth", beyond any doubt and self-evident. This can be seen very well in the Declaration of Independence of the USA, in what was the moral justification that would give way to the first Democratic Constitution of the world and which is still in force today, where it reads:

"We hold these truths to be self-evident: That all men are created equal; that they are endowed by their Creator with certain unalienable rights; that among these are life, liberty, and the pursuit of happiness; that to secure these rights governments are instituted among men, which derive their legitimate powers from the consent of the governed; That whenever any form of government becomes destructive of these principles, it is the right of the people to reform or abolish it, and to institute a new government founded on these principles, and to organize their powers in such form as they shall think most likely to secure their safety and happiness. Prudence, of course, will advise against changing for slight and transitory reasons anciently established governments; and, indeed, all experience has shown that mankind are more willing to suffer, so long as evils are tolerable, than to do themselves justice by abolishing the forms to which they are accustomed. But when a long series of abuses and usurpations, invariably directed to the same object, evinces the design of subjecting the people to an absolute despotism, it is their right, it is their duty, to overthrow that government, and to provide new safeguards for their future safety and happiness."

Declaration of Independence, 1776

It is incredible the moral height reached by the Founding Fathers of the USA in those distant years of 1776, which is very well reflected in the paragraph where the "duty" of the people to overthrow their rulers is justified. The Constitution would come later, giving way to Constitutionalism as a form of government, an idea that is far removed from the principles appealed to in the Declaration of Independence.

What the Declaration of Independence expresses is "so self-evident" that it has become part of people's collective subconscious over time. This is where the idea that we all have, and which we tend to believe in wholeheartedly, that the Constitution is made with the purpose of protecting the Human Rights of the citizens, is born. But this belief falls apart when we ask ourselves from whom or whose Human Rights are being protected.

The answer to this question becomes disturbing when we observe that the only people who are prevented from changing the Constitution, and thus becoming a threat to the Human Rights protected therein, are the citizens themselves. Political representatives can change the Constitution, but citizens cannot change it, so it is inevitable to conclude that the Constitution is protecting the Fundamental Human Rights of the citizens themselves:

"The Constitution finds its raison d'être in the protection it affords to human rights from the threat to them posed by the citizens themselves."

Shocking. Citizens are the implicit threat from which the Constitution is protecting itself, but... is it true or false that the ordinary citizen is a threat to himself and to his fundamental

rights... because it is this belief that the ordinary citizen accepts the loss of his most precious Human Right, the *Right to Decide together with other human beings in which world he wants to live and in which world he wants to educate his children*, and which the above mentioned Declaration of Independence of 1776 includes and recognizes with accurate words:

> *"...that to secure these rights, governments are instituted among men, which derive their legitimate powers from the consent of the governed; that whenever any form of government becomes destructive of these principles, the people have a right to reform or abolish it, and to institute a new government founded on those principles, and to organize their powers in such form as in their judgment will offer the greatest probability of attaining their safety and happiness..."*

At what point, when the American Constitution was finally written, did the Founding Fathers forget that...*the people have the right to amend or abolish it...*and not just to elect their representatives?

No. The belief that we renounce the most fundamental right we have, to decide what our Constitution says or does not say, when we also appreciate that Human Rights are too often relativized in the liberal economy that all the Constitutions of the world so zealously protect, is not at all vacuous.

We have seen throughout this document that the price we paid for approving the Constitution in the Constituent Act, with which we renounced our legitimate right to exercise political power, is very high:

1) We abdicate our legitimate sovereignty to the people who make up the Constitutional Court. A group of women and men without mercy, who we do not know very well neither what ideology they have, nor what interests they defend, nor who appoints them, nor with what criteria they are appointed.
2) We created the political caste, generally made up of people who are very well off economically, whose interests are more in line with economic liberalism than with the protection of the human rights of citizens.
3) We reduce democracy to the periodic ritual of selecting at the ballot box among those who aspire to govern us, those who, shamelessly mocking us, shout at us from the top of a rostrum:

   "Vote for me. I promise to do what I won't let you do."
4) We leave it to the political parties to select the candidates to represent us, without us being at all clear about who finances them and who controls them.

We pay a high price for a belief and we must make sure that this belief has some basis.

We remember with horror the death camps where more than six million Jews were murdered. We remember with horror the mass murder of Muslims in Bosnia. We remember with horror the more than 300,000 people murdered in Syria. We remember with horror the half a million murdered Tutsis in Rwanda.

We remember with horror so many infamous events of recent history, and not so recent, that it is very sensible to ask ourselves if all of them are the eloquent and unequivocal proof of our violent social nature and of our incapacity to take together and collectively decisions that affect us all. Because if this were so, we would have no choice but to agree that the belief that is legitimizing the Constitutions of the whole world is very well founded, when they remove the citizens from the exercise of any political power with their articles. In such a case, it would be very sensible to continue to protect the citizens and prevent them from taking any decision for themselves except, of course, the election of the people who are going to govern us.

Those of us who have written this document have the deep conviction that these horrible facts that History reminds us of, would never have happened in countries with a Full Democracy as a political system to govern themselves. We are convinced that even at the height of Nazism, in 1939, the Germans would have said "NO" to the invasion of Poland in a binding referendum. We are also absolutely convinced that German citizens would never have approved the creation of extermination camps in a referendum.

All the crimes that we as a society have committed, and that History narrates and reminds us of, always have the same and unique pattern. The pattern of a "Serial Killer Beast", immortal in time, that seems to be waiting for the right moment to act:

> *"First, a centralized government run by a small group of people; second, a media totally controlled by the government; third, the figurative creation of an internal or external enemy who is blamed for all ills from the government media."*

We are convinced that this pattern cannot be reproduced in a society that is structured and governed with the exercise of the Right to Decide as the basis of coexistence. For this reason we think, and we are completely convinced of it, that the belief that the human being is a threat to the human being is totally unjustified and unfounded. This converts the supposed protection of Human Rights offered by the Constitution from the threat we suppose ourselves, only a hoax and an excuse to hide the real reason for their existence, which is none other than to remove the ordinary citizen from the exercise of Political Power within a Full Democracy.

> *We denounce that the raison d'être of the Constitution and of constitutionalism is to prevent the citizen and the use of his Legitimate Right to Decide together with the other citizens in which world he wants to live and*

in which world he wants to educate his children. That is to say, to prevent him from exercising the Political Power that the Full Democracy grants him.

We understand that it is the fear of the decisions that citizens can take to limit the excesses of the privileged elites or to protect the natural resources from the depredation of the economic system, so democracy has evolved everywhere towards a Constitutional Democracy, which prevents the legitimate right of citizens to exercise the Political Power with the excuse of the danger that this exercise supposes for their Fundamental Rights.

2.7. Marxism and the Right to Decide

Karl Marx has undoubtedly been the most influential person in human thought in the last two centuries. To deny this is to deny the historical evidence and we do not believe that anyone would dare to go that far. We have then the obligation to analyze Marx's ideas in relation to the existence of the Right to Decide that in these pages we are declaring as a universal, individual and inalienable Human Right.

Marx's social thought, and therefore Marxism as a social project, is presented as a declaration of principles when he published The Communist Manifesto, where he clearly sets out the line of argument that justifies and guides the practical application of Marxism or communism. But it is in his later writings where we can better appreciate "the materialist interpretation of history" and the dichotomy between social infrastructure and superstructure that forms the basis of his philosophy:

...in the social production of their lives men establish certain necessary relations independent of their will, relations of production which correspond to a given stage in the development of their material productive forces. The totality of these relations of production forms the economic structure of society, the real basis on which the juridical and political superstructure is built and to which correspond certain forms of social consciousness. The mode of production of material life conditions the process of political and spiritual

social life in general. It is not man's consciousness that determines his being but, on the contrary, it is his social being that determines his consciousness.

Karl Marx, 1859
Prologue to the "Contribution to the Critique of Political Economy".

Karl Marx's essential belief in "the productive structure" as the basis on which "the socio-political structure" is created and sustained within a community, and which conditions any practical realization of Marxism, is not correct, and the historical evolution of human communities shows just the opposite. It is the socio-political structure, previous to the productive structure and which we have called throughout this work the Political Power, which creates the productive structure used by those who govern to obtain their economic privileges.

The conception we have defended throughout this treatise, completely opposed to Marx's conception, can be summarized very well with the following Social Law:

"Who has the political power is who has the economic power".

And in the corollary, the logical consequence of the statement, which affirms:

"Any economic power, however powerful it may be, cannot long be maintained unless it also possesses, exercises or controls Political Power."

This is logical and should come as no surprise to anyone, no matter how little they think about it. In fact, Marxists must realise that they are entering into the logic of this statement when they need to make themselves stage a coup d'état and seize political power, as a preliminary step to the emancipation of the working class. Marxists recognize, and it is clear to no one that they are contradicting themselves by thinking one way and behaving in a very different way, that they must first seize political power and establish the dictatorship of the proletariat in order to abolish private property and eliminate the "relations of production" from which the capitalist class derives its economic privileges. Karl Marx says this explicitly in The Communist Manifesto:

… … …

"We have already said that the first step of the workers' revolution will be the exaltation of the proletariat to power, the conquest of democracy.

… … …

The proletariat will make use of power to gradually strip the bourgeoisie of all capital, of all the instruments of production, by centralizing them in the

hands of the State, that is, of the proletariat organized as the ruling class, and by endeavoring to foster productive energies by all means and as rapidly as possible."

… … …

Karl Marx and Friedrich Engels
The Communist Manifesto (1848)

The whole History of Humanity is supporting as Social Law the statement we have made about the nature of Political Power and the need to possess it. All of History can be interpreted without difficulty as a permanent struggle to exercise and control the Political Power that allows you to decide the structures of production from which your economic benefits as a privileged social minority come out.

Let us show with some very simple examples this Universal Law.

When the old feudalism, based on the brute force of arms, evolved towards the nascent aristocracy, it needed some legitimizing principle that would allow the feudal lord to exercise political power without having to be permanently defending it with the use of force. It finds it in the religion that grants the monarch, by "divine right" and by blood inheritance, the exercise of political power. Organizational principles that are extended to the whole social minority that constitutes the aristocracy. It is on Divine Right and Blood Inheritance that the ancient feudal lord becomes the aristocratic class and manages to legitimize the exercise of Political Power which allows him to build, on the possession of agricultural land, the economic structure from which he obtains the privileges and which make him the dominant economic class. From then on, the feudal lord I will not have to use force to claim his legitimate right to exercise political power. It will be enough for him to prove he is *"son of..."* to claim it.

When, from the 15th century onwards, the bourgeoisie began to have growing economic power, thanks to the globalization of trade and the technological development associated with science, the imperious need to exercise political power to be able to maintain and increase the new productive structures on which its growing wealth was based began to grow. The aristocracy is an impediment and a permanent threat to the bourgeoisie, since it possesses and exercises the Political Power with which it can deprive it of its growing wealth at any moment. We see how History shows us the appearance of new ideas that are going to delegitimize the basis on which Monarchical Legitimacy is based, and it does it, precisely, with ideas and people belonging to the rising bourgeoisie. Thinkers like Voltaire, Rousseau, Locke, the Fathers of the US Constitution and others, raise their voices and create the new legitimacy that will allow the emerging bourgeoisie to seize political power to maintain and increase the productive structures on which it bases, and from which it obtains, its emerging economic power.

The independence of the English colonies of North America from the Kingdom of Great Britain falls within this logic and can hardly be interpreted in any other way. We have already explained that the Three-Phase Theory seems to have been made specifically to explain the American Revolution.

We think Karl Max was completely wrong when he pointed to economic structures as the basis on which political structures are based. Nothing could be further from reality than to point to economic power as the source of Political Power and not the other way around. The causal line that implies, *"he who has the Political Power is he who has the economic power"*, can be seen with clear clarity in the *Constitutional* Democracy with which we are governed today.

Democracy, as a system of government, was born everywhere associated with the protection of two basic human rights, individual freedom and private property, placing these two rights in the Constitutions of the time, even above the right to life or any other human right. It is what is known in history as "liberalism" and its basic objective was to put in check all monarchical legitimacy and raise to the top of the political power to the nascent economic bourgeoisie through the implementation of democracy as a political system.

The problem with the brilliant plan that was going to allow the bourgeoisie to attain political power was that democracy points to the ordinary citizen as the legitimate recipient of the exercise of political power, and not to the new economic bourgeoisie. That is why, even when the form it takes is that of a Constitutional Democracy, it threatens to deliver what it promises and allow the rule of the people. Any upstart with socialist ideas becomes a danger for the economically benefited people if he knows how to attract the votes of the people. The delay of the universal suffrage, the own conservative mentality of the people, the political parties, the mass media, and as a last resort the coups d'état, involutions and even the invention of fascism try to avoid the inevitable, but they only delay it.

What is inevitable is, of course, the seizure of political power by its legitimate recipient in a democracy: the ordinary citizen.

> *The whole second half of the 19th century in Europe and the whole second half of the 20th century in the rest of the world is the manifestation of a permanent struggle, not between the two social classes created by capitalism as Marxists think, but the struggle of the minority benefited by the economic system that tries to prevent by force the access to the exercise of Political Power granted by Democracy to the ordinary citizen.*

The problem of Democracy is that those benefited by liberal economy, those who possess the economic power, do not have and never can have the Political Power. They are not its recipients. They have it, to the extent that they are able to control and merge with the

political caste, but even so, the political class is forced to make concessions to the citizens because, after all, it is they who elect it and from whom it feeds.

The Constitution, as a manifestation of Human Rights, is the great invention used by the economically benefited minority to finally prevent the exercise of Political Power to the ordinary citizen. Then the Welfare State appears in its most evolved manifestation, which is where the political caste finds its raison d'être with its bipolarity "right" and "left" according to what they declare to defend the people favoured or disadvantaged by the liberal economic structures, and which manages, finally, that the citizenship forgets that it is them who have the legitimate right to exercise the Political Power in Democracy.

It is Human Rights, and their defense, that manages to avoid the inevitable.

Constitutional Democracy, the political caste it engenders and the Constitutional Court supporting it declare themselves defenders of Human Rights and Welfare State. Democracy is reduced, from then on, to a periodical ritual of electing representatives who, previously filtered by political parties and mass media, achieve the best balance between protection of Human Rights (Welfare State) and liberal economy. End of History:

1) *The people who benefit from the liberal economy possess economic power.*
2) *Citizens have been removed from the exercise of political power.*
3) *The Constitution, and the Constitutional Court, guarantee that there will be no serious threat to private property and freedom of enterprise, claiming as an excuse the protection and safeguarding of the Human Rights of citizens.*

Marx should have understood that Constitutional Democracy is only the last defensive bulwark which prevents the ordinary citizen, and therefore the working class, from having access to the exercise of Political Power. History shows, without any possible doubt, Constitutional Democracy as a gentlemen's agreement between the old aristocracy of the land and the new economic bourgeoisie to face together the real threat represented by Democracy:

"The citizen as sovereign in public decision-making".

"The worker as the legitimate owner of political power".

Karl Marx was wrong, and he was very wrong, unfortunately for all of us. The dictatorship of the proletariat that he touts as the inevitable course of history is only an excuse that, at best, barely conceals the exchange of one master for another master. Therefore:

It is with the exercise of the Political Power that Full Democracy grants to the ordinary citizen (the proletarian), that he will be able to create the productive

structures which will benefit him economically and which will allow him, at last, to be the one who possesses the economic power.

Ordinary citizen does not need to win elections to get Political Power in Full Democracy because he already has Political Power in Full Democracy.

In order to understand the problem created by the inevitable existence of political power in human societies, perhaps it is convenient to express explicitly what we have been defending throughout this document about the nature of the human being:

1) It is an individual and unique being, aware of its individuality and uniqueness.
2) He is a social being, who becomes conscious within society and who, therefore, needs society in order to realize himself as an individual human being.
3) He is a just being, aware of his need to justify his actions before others, to legitimize his actions before the rest of the members of society.

As a social being, the human being is born and grows up in a society together with the inevitable Political Power that accompanies it. As a conscious individual being, he seizes political power and uses it to create the economic structures that benefit him as an individual. As a just being, he needs to legitimize the economic exploitation to which he subjects his fellow human beings and which clearly proves the economic privileges he possesses.

The whole struggle of humanity has been and always will be the struggle to possess the political power that accompanies any society and the justification of the legitimacy of exercising it.

This third point is very important to understand well, because even the most atrocious regimes we can remember have needed to justify themselves. Hitler justified the genocide of more than six million Jews on the legitimate right of the non-existent superior races to exterminate the no less non-existent inferior races.

Marxist regimes have also needed to legitimize themselves by some kind of principle or justification. They have always found it in the economic equality that is achieved within communist society by dispossessing the citizen of any private possession of the means of production. Equality that also implies, as it could not be otherwise, the dispossession of the citizen from making any political decision for the benefit of a ruling elite that thinks and cares for everyone and about everyone. Marxists should be aware that this Principle of Equality lacks rationality and only barely hides the justification used by the ruling minority to legitimize the use of Political Power for their own benefit.

Because in any human society political decisions must be made and are always made by those who govern. Even in communist regimes.

For example, in the political regime of Cuba, comrade Fidel has governed for the last 40 years without any Marxist seeing it as a pure and simple dictatorship. At present, after his death, his political heirs have created a new Constitution that all Cubans have endorsed in the manner of the Western Constitutional Democracies and with which the citizens have renounced, just as the citizens of the Constitutional Democracies have done, the exercise of any Political Power in favor of the Cuban ruling caste. The approval of the Cuban Constitution is the justification needed by the Cuban ruling caste to perpetuate itself in power, just as it happens in Constitutional Democracy.

Liberalism, too, as an economic ideology beyond democracy, needs to justify the patent inequality that occurs within the liberal economy. It justifies itself in "meritocracy", with which it sums up the belief that the self-made person, with his talent, his effort and his personal work, is worthy of the wealth he holds. We are not going to discuss the veracity of this justification, we are only going to point out that it is part of the truth that the mass media relentlessly propagate.

Also constitutionalism, although democratic, needs to justify the Constitutional Legality that separates the ordinary citizen from the exercise of power, and we have already commented that it does so by naming the Constitutional Court as the defender of Human Rights against the threat that the ordinary citizen represents to them.

Therefore, to avoid the ruthless struggles for possessing the Political Power shown by History, it is necessary that every individual human being has and exercises the Political Power granted by Full Democracy, preventing any other human being or social group from taking possession of it and using it to subjugate others for his own benefit, whatever justification he may claim for it.

Allowing each person to exercise political power does not mean destroying political power or its necessary centrality. It is to atomize it in its exercise so that command structures cannot be created without explicit or implicit consent of all citizens. This is the meaning of the Right to Decide and the Full Democracy it needs to be exercised. Its legitimacy or justification rests on the will of each citizen to recognize, protect and grant it.

Chapter III: WHAT TO DO

3.1. Full Democracy and the environment

We think that in previous pages we have more than enough shown the contradiction in which Constitutional Democracy falls, when it separates ordinary citizens from legitimate exercise of Political Power granted by democracy with the excuse of protecting Human Rights from danger of citizens themselves. To think so is ridiculous, but that doesn't matter much when you have all the levers of power to scare citizens about their capacity and sanity to make political decisions. Forced tutelage with which citizens are subjected in Representative Democracy does not make any sense.

We have also shown the high price paid, in the form of political instability and authoritarian drift, when the Constitutional Court is used to replace the citizen as the ultimate and unappealable judge in the process of legitimizing the laws and executive acts carried out by our representatives. But we understand that we would not be fulfilling our duty if we do not explain briefly, with equal or more clarity, what citizens must do to achieve, in the shortest possible time and with the least possible social trauma, that Full Democracy replaces Representative Democracy with which we are governed now.

First of all, we must remember and keep in mind what the objective is when we demand that the Right to Decide be recognized as an individual and inalienable Human Right within the Constitution:

> *"The person, in his or her individuality and uniqueness, is the only important thing, and the society in which he or she is fulfilled as a human being has the obligation to protect him or her. This can only be guaranteed when it is the individual person himself who, together with other people, takes it upon himself to protect himself by making use of his right to decide".*

When we stated that the nearly 8 billion people who populate the planet are the ones who have to assume the responsibility to protect the Human Rights of each and every one of

us, we were not joking. We were stating the willingness of the ordinary citizen to recognize and assume the responsibility to protect himself by making decisions that affect the community, and the human community is now almost 8 billion people and spread all over the planet.

Not only that. We are also declaring the will of the citizen to assume the responsibility of making the public decisions that will define the relationship of our species with the rest of the species with which we share our planet.

We observe with astonishment and disbelief how the representatives we elect to govern are incapable of taking any decision that goes against the interests of companies or puts a stop to the systematic destruction of the environment from which companies make their profits. We are very clear that it is not only the defence of Human Rights that is at stake when we demand Full Democracy. We know and we are very clear that Human Rights are intimately linked to the protection of the environment that we need to live and to develop as social beings. We know that human beings cannot be respected and protected if we do not demand equal respect and protection for the environment in which we develop as people. It is just as important to prevent climate change, to conserve species and their biodiversity or to prevent the systematic pollution of the environment as it is to protect human rights. Human Rights cannot exist without the environment in which they are articulated. We are not beings that live in a test tube, and we cannot leave these important issues in the hands of people who benefit economically, who prioritize their private interests over the general interest, just as we cannot leave them in the hands of those who lead political parties.

Neither the people who benefit economically nor the political parties are going to do anything to prevent the systematic destruction of the planet's capacity to support life. The former because they are too afraid of losing the wealth they have if the way we relate to the environment is changed, and the latter because they are too dependent on the favor of big business to be re-elected periodically. Only ordinary people will be willing to change things and do something to protect the environment, because they are the only ones who understand that our future and that of our children depends on it. It is the poorest and most disadvantaged by the economic system who have the most to lose from climate change, because it is they who will pay the price in human lives that will undoubtedly lead to the destruction of the environment and the mass extinction of animal and plant species, which is already catastrophic.

It is the ordinary people who have to exercise political power, and be responsible for protecting the planet from the plundering and systematic destruction to which it is being subjected by big business and big interest groups. But for this, it is necessary to be able to call referendums at the request of the citizens and on any issue they deem appropriate.

3.2. What to do?

How to achieve to allow the call of referendums by means of collection of signatures in all different levels of organization? Formally, it is enough to include in the Constitution of every democratic country of the world the same articles with which its exercise is developed in the Swiss Constitution. In this sense, the process to follow to reach the Full Democracy is very simple, because it is only necessary to change the text of the constitution.

Variants adapted to the circumstances of each country can be tried, but before proposing changes, the best is to take advantage of the long experience of more than 150 years the Swiss have on this subject and copy the articles as they are in their Constitution, and only later, when possible improvements appear, to make changes in the Constitution to adapt the right to call referendums to the culture of each country, without altering the essence of the Full Democracy based on the exercise of the Right to Decide.

Specifically, the articles of the Swiss Constitution to which we refer are 138, 139, 140, 141, 142 and 143, all belonging to Title 4, Chapter 2 of the aforementioned Swiss Constitution.

However, to affirm that converting our present democracies into a Full Democracy is as easy as changing some simple lines of text in the Constitution, is as true as childish in the real world we live in. It is very naive to think, to give an example, that economically benefited minorities in the USA are going to allow ordinary citizens to change the Constitution when they gather enough signatures to call a referendum. Even if any American understands very well what is stated in the Declaration of Independence that led to the founding of their country:

> *...that to secure these rights, governments are instituted among men, deriving their legitimate powers from the consent of the governed; that whenever any form of government becomes destructive of these principles, it is the right of the people to reform or abolish it, and to institute a new government founded on these principles, and to organize their powers in such form as they shall think most likely to secure their safety and happiness.....*
>
> *(emphasis added)*

We would be deceiving the people if we told them that the citizens are going to change a political system that is more than 200 years old without encountering fierce resistance. Those who lead and prosper within the political parties belong to the minority that benefits from the economic system and will not allow the Constitution to be changed in Germany, in France, in Italy or in the United States, to recognize the right of the citizens to decide what they want or do not want to do by calling a referendum. We would be very naive and

negligent if we thought that those who currently govern are going to allow the change to a Full Democracy without a fight:

> *"No social minority has ever renounced the exercise of political power without first putting up fierce and violent resistance".*

The above statement is only the statement of an unwritten Social Law, which is always fulfilled, and its validity can be easily verified. We only have to remember what has happened in Syria, when citizens have tried to overthrow the dictatorship of Bashar al-Assad. Or what has happened in Egypt, Algeria and across North Africa when people have tried to remove the ruling military from power. What is happening in Venezuela, Brazil and Mexico. Or what is happening in Spain with the imprisonment of politicians in Catalonia without Brussels saying anything about it.

We have to be very conscious that we are social beings who have become aware of our individuality within a society, so there is a collective thinking above individual thinking that will interpret any social change as a threat to its integrity as a society. No matter how reasonable we think our demands are or how much idealism and good intentions we defend, what we have in front of us is a blind collective conscience that will see the call for a referendum as a threat to representative democracy, whatever we do, and that will try to use all the means at its disposal to prevent it.

What we have to do, therefore, to change the idea of the Constitution to allow calling binding referendums, as Full Democracy demands, is not to try a direct attack against the system, which would only provoke a direct defence of the system. It does not make any sense to try to change the Constitution, because the Constitution puts many difficulties to any change, and it does not make sense to impose the right to call referendum by force, but we can behave as if we already had this right. In this sense, what we are proposing is the same thing that Rosa Parks did, and many others before her, like Gandi.

> *On December 1, 1955, Rosa Parks refused to give up her seat to a white man and moved to the back of the bus in Montgomery, Alabama (United States). For such an action she ended up in jail, which sparked the spark that made visible and united the whole society in the pursuit of a common goal, the Civil Rights Movement in the United States.*

What we have to do is what Rosa Parks did. We have to exercise our right to decide by calling a referendum, even when the right is not recognized or there are laws against exercising it. We must do what Rosa Parks did in 1955:

SAY NO!... and call the referendums by collecting signatures

What we have to do is refuse to be prevented from calling a referendum. The difference, and the similarity, with what Rosa Parks did is that the right we are demanding is not a right that we can exercise individually. She sat on the bus exercising the right to do so. But to call and hold a referendum, it is not something that can be exercised individually, we must exercise it all together and we must be all together those who say "NO" and those who call a referendum.

No human right has ever been achieved without a fight, none, and this time will be no different. We would be remiss, and we would be misleading people, if we said that this struggle is going to be easy and short.

Of course, we do not ignore that in the Europe of the Peoples that is being built, it will be much easier to change the Constitution and implement a Full Democracy than in the United States of America, in the United Kingdom or in Spain. But we would be lying if we said that this struggle, as many other social struggles before this one, will not cost any effort.

Here we do not intend to deceive anyone as to the difficulty of the undertaking and the time it will take to carry it out. Although it should be clear, from now on, that the struggle we propose will always be "non-violent" in all senses and meanings of the phrase. But this does not mean that the resistance and opposition we encounter will be non-violent; on the contrary, it is very likely that the phrase "*blood, sweat and tears*", uttered in another context, will be more than a hollow and meaningless statement.

3.3. The Popular Legislative Initiative

When we study the Spanish Constitution, the European Constitution, and many other Constitutions in the world, we discover, not without certain bewilderment, that those who designed it already knew that the change from a Representative Democracy to a Full Democracy based on the Right to Decide was going to happen in the near future. That is why they left almost all changes needed for the transition to be carried out naturally, without unnecessary traumas and as soon as the citizenship asked for such transformation to be carried out.

In almost all the Constitutions of the world there is a figure of political participation called "Citizens' Legislative Initiative", which in the case of Spain is developed at least up to the autonomous level and which allows the citizens as a whole, by collecting signatures, to propose to the chamber of representatives a proposal or bill to be discussed by the representatives in that chamber.

The reason for the existence of this form of political participation is far from clear.

In the Spanish case, it can be stated, without the slightest doubt about it, that the Popular Legislative Initiative was the substitute of the article allowing the call of referendum by means of collection of signatures in the draft of the Constitution of 1978. The then candidate to the presidency by the Spanish Socialist Workers Party, Felipe Gonzales, agreed with the king Juan Carlos I to change the draft of the Constitutional Text to remove from it, two basic aspects of the figure of the referendum. The first one, that citizens could call them. And the second one, that in case of calling a referendum from the government, it would not be even binding. On the other hand, the Constitutional Text included the figure of the Popular Legislative Initiative by means of which the citizenship, by means of collecting signatures and after a considerable effort, could propose laws for their possible study and approval by the representatives.

We see, that the reason why the Popular Legislative Initiative is included in the Spanish Constitution is to keep appearances within a political system conceived originally as a monarchy in which the Head of State is a king, but to which it is wanted to give appearance of representative democracy. For this purpose, *the government of the people, by the people and for the people* is allowed to propose a Popular Legislative Initiative, but they are denied to make any political decision, except to elect the people who will govern them, that is, their representatives. That is why, the only thing we can expect from political parties, whatever their ideology is, will be a fierce resistance to any kind of call for referendum by citizens, and an unreserved defence in favour of Representative Democracy and against Full Democracy, since political parties are the ones who have the privilege of governing.

Appearances matter, and hiding as much as possible that the Constitution conceives of government as something alien to the citizenry created for the sole purpose of governing them, is very important. Appearing that you can force your representatives to take decisions in a matter of special sensibility and relevance for small group or for all citizens, is not a trivial matter when the Constitution with which you are governed boasts of respecting, above all, Human Rights of citizens. For that there is the figure of the Binding Popular Initiative.

In Spain, and also in other countries where the figure exists, some Popular Legislative Initiatives have been carried out that have had different fates. In general, it can be said that very few of them have managed to gather the necessary signatures and, when they

have managed to do so, they have been largely rejected in the House of Representatives. It should come as no surprise, then, that it has had little success as a means of political participation:

1) An immense effort in the collection of signatures so that, in the end, the same people who rejected the bill, or who did not even want to discuss it, are the ones who will reconsider whether or not to reject it again or to approve it. It does not make much sense.
2) The proposals to be put to the chamber can only be made on very limited subjects, which is not easy to understand, since it will be the representatives themselves who must finally approve or reject it. Why can the representatives discuss and approve a law that has been proposed by other representatives, but they cannot approve a law when it has been proposed with a previous Popular Initiative? It is completely ridiculous.

The Congressmen can propose and approve or reject a Legislative Initiative that comes from a parliamentary group of the House, no matter what the topic is, but they cannot approve or reject the same Legislative Initiative when it is the citizens, through the collection of signatures, who present it? Why?

It is not understood because it cannot be understood.

The Popular Legislative Initiative is a figure of political participation that shows the malice and mockery that the Representative Democracy makes to the citizen, who is the one from whom, according to the Constitutional Text, "emanate" the powers of the State.

If **Aristotle** explained "emptiness" by the horror, or rejection, nature feels towards nothingness, what the ancients called "***horror vacui***", the non-existence of referendums of any kind is the irrefutable proof of the "**horror populo**" the Constitutional Democracy has to any form of political participation of citizenship, and in the Spanish case it joins with the **"horror populo" the** king has to his subjects. Without fear of exaggeration, it can be stated that Spanish Constitution oozes in every paragraph of its text rejection to Full Democracy. It is the palpable manifestation of fear of democracy left by last two centuries of struggle in subconscious of people favoured by economic system.

Although the figure of the Popular Legislative Initiative has contributed very little to increase political participation, the importance for us lies in the fact that it can be used as a bridge to facilitate the necessary Constitutional change that implies the establishment of Full Democracy.

3.4. The collection of signatures to call for a referendum

The realization of a referendum in any of the levels of the political organization, consists almost always of three phases:

1) State the proposal (or mandate) to be endorsed in the form of a YES/No question, clearly, unambiguously and in relation to a single issue.
2) Collect the required number of signatures in support of the proposal within the given time frame.
3) Convene the referendum sufficiently in advance to ensure discussion of the consequences of the response to the proposal.

The plan to follow, which we have already exposed, consists in behaving as if the Constitutional Text really allowed the calling of referendums by means of collecting signatures, and we lived in a country where citizens are recognized their legitimate right to call a referendum. That is to say, what we propose is to behave as if in our country existed a Full Democracy.

Therefore, when the country in which we live allows the realization of Popular Legislative Initiatives, the situation is much more favourable to achieve the proposed goals. This is the case in Spain, but it is also the case in many other countries:

> *When in a country the Popular Legislative Initiatives are allowed, part of the process can be used to call a referendum. The idea is to start collecting signatures proposing the question to endorse as if it were a Binding Popular Initiative, presenting it to process in the chamber of representatives once the number required by law for it has been gathered. Then, regardless of what the representatives decide, the binding referendum is called and held, although it is clear it may be illegal to do it.*

In case of living in a country which does not contemplate the possibility of proposing the realization of Legislative Initiatives or some equivalent figure, there will be no other choice than to carry out all phases of calling and realization of a referendum without the legal protection provided by the existence of the Popular Legislative Initiative in the first phases of the process. But when the country contemplates the possibility of calling a Binding Popular Initiative, only the last stage, the calling and physical holding of the referendum, could be illegal and, therefore, could be repressed by means of institutional violence. The procedure to follow in such a case is to call a Popular Legislative Initiative, to which is added the holding of a referendum:

1) The choice of the Legislative Initiative that you wish to put to the citizens to endorse, in the form of a YES/NO question.

2) The presentation of a Popular Legislative Initiative with the question to be endorsed in the corresponding institution, when the legislation of the country contemplates it, or the opening of a notarial act otherwise. This officially opens the term for the collection of the necessary signatures, a process that is extinguished when the required number of signatures is reached or when the time limit for collecting them is exceeded.
3) Once the signatures were obtained within the term and once approved the presentation of the Popular Legislative Initiative in the chamber of representatives, it is declared the Call of a Binding Referendum so that the citizenship, and not our representatives, could decide by means of their vote if the legislative proposal presented is approved or not.

It is very clear, and no one is unaware of it, that both the first and the second phase are completely legal and are included in the legislation when in the country it is legal to present a Legislative Initiative, so the Constitutional Court will hardly be able to intervene to declare the illegality of the process of collecting signatures, at least in Spain.

However, it is also very clear that the third phase can be declared illegal by the members of the Constitutional Court, even though there is no law that explicitly prevents it. Specifically, in Spain, the holding of a referendum is not prohibited by law anywhere, but that has not prevented a referendum called to decide the independence of Catalonia from being declared illegal.

Anyway, as soon as the necessary number of signatures has been collected within the established time limit, and it has been recorded before a competent authority by means of a notarial act, for instance, it is possible to call and must be called the referendum.

3.5. The calling of a binding referendum

Once the necessary signatures have been collected and it has been recorded, the referendum must be called, with a specific question, on a specific date, and with the firm

will of carrying it out in time and form. In such case, two situations may arise from that moment:

a) That the physical realization of the referendum be prevented by resorting to the senseless use of institutional violence. More specifically, that the riot police and the forces of law and order intervene, as happened in Catalonia in the referendum of October 1, 2017.

b) That the physical holding of the referendum is not prevented, but that, once it is carried out, the result is not recognized as binding, alleging some vague reason. Something that should not be ruled out because it is very likely to happen.

In any of the two cases, to the citizens who think that the Right to Decide is a universal, individual and inalienable human right and who fight for the recognition and protection of this right, *we can only resort to the use of "non-violence" and "passive protest" until the Full Democracy and the call for binding referendums with which it is exercised, are recognized by our representatives in the Constitution and its exercise is protected*.

There is no other way out.

As in many other social struggles, before this one, for the recognition of a fundamental human right, and before the foreseeable belligerent attitude of the government, protected by its interpretation of the Constitutional Legality, we have no choice but to resort to civil disobedience based on the old principle that reads:

> *"Laws that violate human rights, or that violate the dignity of persons, or that violate our conscience, must never be obeyed".*

If we think about the deep meaning of the Right to Decide, and we think that what we are demanding is the recognition and protection of the most fundamental of Human Rights, because it is the right with which Full Democracy is exercised**:**

> *"Every human being has the right to decide, together with other human beings, in which world he wants to live and in which world he wants to educate his children."*

Then, there is no other way but to disobey the laws that we consider unjust, degrading to the dignity of people, that violate Human Rights and that are used to subjugate us. Perhaps, having reached this point, it is worth remembering, once again, the preamble of the Declaration of Independence that led to the creation of the USA, where the reason for citizens to rise up against oppressors, in this case peacefully, is expressed very well:

> *"We hold these truths to be self-evident: That all men are created equal; that they are endowed by their Creator with certain unalienable rights; that*

among these are life, liberty, and the pursuit of happiness; that to secure these rights governments are instituted among men, which derive their legitimate powers from the consent of the governed; That whenever any form of government becomes destructive of these principles, it is the right of the people to reform or abolish it, and to institute a new government founded on these principles, and to organize their powers in such form as they shall think most likely to secure their safety and happiness. Prudence, of course, will advise against changing for slight and transitory reasons anciently established governments; and, indeed, all experience has shown that mankind are more willing to suffer, so long as evils are tolerable, than to do themselves justice by abolishing the forms to which they are accustomed. But when a long series of abuses and usurpations, invariably directed to the same object, evinces the design of subjecting the people to absolute despotism, it is their right, it is their duty, to overthrow that government, and provide new safeguards for their future safety and happiness."

Declaration of Independence, 1776

The underlining is ours, but we do it to point out the long and inevitable process of struggle that will take place to achieve the recognition and implementation of Full Democracy, and in which we must always respect all people who do not understand what we claim and the reason for which we fight. We must always keep in mind that we are not and do not belong to any sect and therefore we are not trying to convert anyone to any creed or religion. We must remember that our intention is simply the recognition of a Human Right, which we think we should all have and that, as such, we want it to be included and protected in the Spanish Constitution and in all the Constitutions of the world.

The paragraph is also very important to understand that this struggle for the recognition of the Right to Decide is in no way different from many other previous social struggles. The acceptance of universal suffrage, the right of women to vote, the right of black people to vote, the right to independence for India, the right of indigenous populations to self-manage the territory where their ancestors were born, etc., are struggles that at the time met with strong social resistance despite the obvious legitimacy of the changes they demanded.

It is equally important to be very clear that we must not accept discounts that limit the exercise of the Right to Decide:

1st It should not be accepted that issues to be endorsed are limited. Anything that can be decided by a Government or a House of Representatives can also be proposed to a binding referendum by the citizens and be approved or rejected by them. Representatives are not better, nor do they make better decisions than the citizenry. THE CITIZENRY DOES NOT NEED TUTORS TO BOSS THEM

AROUND. ON THE CONTRARY, IT IS THE REPRESENTATIVES WHO NEED TO BE TUTORED BY THE CITIZENRY.

2nd No Constitutional Court can limit the Right to Decide of all citizens. Only provisionally, and as long as there are no worldwide referendums in which all the people living in the world participate, the Constitutional Court of any country should stop a referendum that affects the current consensus on the protection of recognized Human Rights.

3rd The Right to Decide cannot be limited to local matters, exclusively. There is a temptation to recognize the right to call a referendum on local issues, excluding decision making at the national or international level, alleging the lack of capacity of citizens to make decisions at this level, which has no logic whatsoever.

4th To think that the decisions taken by the citizens in a referendum cannot be wrong is stupid. Just as our representatives can be wrong when they make decisions that affect us all, the citizens can also be wrong. When this happens, nothing happens. When they become aware of the mistake, they rectify it and that's it. It is the same thing that happens when representatives screw up and make a wrong decision, which is rectified and that's it (with the big difference that when they are the ones who are wrong, who pay the consequences is the most disadvantaged people in society, ie, us).

In proposing this concrete line of action, we note that we are only expressing a general and consensual feeling held by the people who have contributed to writing this document, and no one should feel obliged or constrained by an opinion, no matter how general or consensual it may be. An opinion is only an opinion.

The motivation guiding us to write this treatise is no other than to express aloud the reasons which push us to suggest that this, and not other, is the line of action to be followed in order to implement the Full Democracy with the least possible damage and social suffering for citizenship. But we are very conscious that it is not up to us to take the final decision of what should or should not be done. There is written a short booklet entitled "Manual of Referendum", where recommendations to achieve Full Democracy as a form of government are extended.

3.6. The Right to Self-Determination.

The existence of the Right to Decide comes to break with the idea of nation understood as the group of people who, sharing language, race and customs, justify in the name of an ethnic or cultural majority the imposition of their will on a territory. Understanding why the outdated concept of "nation", which has already provoked two world wars and countless colonial wars, must give way to a broader concept of nation derived from the Right to Decide is what we are going to explain now.

We have already explained the general lines to be followed to achieve the recognition of the right of any ordinary citizen to call a referendum to take political decisions that affect him, but we must be aware that every nation has its own history and its own peculiarities that wrap it in an artificial reality that makes its rulers believe that their nation is different. One of these peculiarities in which all nations agree in seeing their "problem" very different from the "problem" that other countries have, is the issue that concerns the independence of any part of the national territory. In this matter, each nation declares itself to be different from the others, and if independence movements in foreign countries can be viewed with sympathy, independence movements in their own countries are not usually viewed with such generosity. Perhaps because of this, the passage of time has led all nations to reach the unwritten consensus of looking the other way when any nation oversteps its bounds and violates human rights by repressing separatist movements. It is not difficult to understand why: "You have to look hard to find a nation that does not have a territory whose population wishes, with more or less intensity, to become independent".

Understanding, however, that the Right to Decide comes to overcome the problem that creates the desires for territorial independence and not to aggravate it, is very important.

Let us remember that Full Democracy implies recognizing the right of all citizens to exercise the Political Power in all levels of territorial organization by means of calling referendums. From local level to national or supranational level. In this sense, Full Democracy implicitly recognizes the right of a population to make political decisions within its territory, even more so when there is also a common ethnic or cultural past which is to be preserved as part of human cultural diversity. But being Full Democracy, and the Right to Decide with which it is exercised, a universal, individual and inalienable right, also its exercise is recognizing the belonging of the territory to a supranational structure on which it depends.

The Right to Decide not only recognizes the right to make autonomous decisions to the group of people who decide to exercise political power within a territory, but it also recognizes the obligation of the residents of the territory to submit to and abide by the decisions made in broader organizational structures. Therefore, the Right to Decide, instead of confronting two social structures, complements them by allowing both to

coexist on two different levels, without it being necessary to impose the concept of nation over the concept of region.

By recognizing that the origin of the legitimacy of the exercise of the Right to Decide, in the self-recognition of belonging of all human beings to a single supranational entity where decisions that affect us all as a community are made, the concept of nation becomes one more level of organization within the structure of nested levels ranging from regional autonomy to decision-making at the planetary level. The right to "territorial independence" is being granted by a supranational entity to which one belongs and whose decisions one is obliged to abide by.

The only controversy arises when one tries to determine which is the supranational entity to which any territory belongs and whose decisions the residents of the different territories are obliged to obey. Because it is that supranational entity that is granting to any territory the right to be an independent nation. For example, in the case of Spain, who does Catalonia depend on, Spain or Europe? Which is the next level in the territorial hierarchy to which Catalonia belongs: Spain or Europe? In reality, there is no answer to this question, nor can there be.

We think that it is the citizens who live in the territory who must decide which is the next hierarchical level to which they belong. It cannot be otherwise. In the case of Catalonia, it is the people who live in Catalonia who must make this decision, and it would be very stupid, and therefore unthinkable, if the people who live in Catalonia decided to dispense with belonging to Spain and declare that they wish to belong directly to Europe.

It would be stupid because at present half of the population residing in Catalonia has declared its desire to remain part of Spain, and it would make no sense to have half of your citizens dissatisfied simply because 51%, 60% or even 80% of the residents wish to have no relationship of dependence with Spain. Ignoring over 500 years of common history is stupid. To renounce a cultural heritage more than 2,000 years old is stupid. To frustrate the aspirations of half of your citizens is stupid. Seeking Catalonia's independence from the Parliamentary Monarchy that currently governs the Spanish people could be rationalised and defended, but the independence of Spain is indefensible within the Full Democracy that legitimises the exercise of Political Power of all human beings that inhabit this planet, and to which we all aspire.

But whether or not it is stupid for Catalonia to decide to separate from Spain, it is a decision that only the people who live in Catalonia can and should make.

3.7. Catalonia is not the problem, but the solution

We have to understand that the Right to Decide comes to change the relations of domination imposed on the rest of the population by a group of people, more or less majority, who share language, race and customs. In this sense, Full Democracy comes to overcome the concept inherited from the last 500 years of History which bases the existence of the nation on the imposition by force from a central government on a territory of which sovereignty is claimed appealing to the concept of nation.

By declaring that the Right to Decide is a "universal" right, we are declaring a Human Right that affects all human beings because it obliges all human beings equally to make the decisions that affect us all jointly. The Right to Decide implies accepting that the nation is born from the will of the population to assume jointly the making of public decisions that affect the territory, and not from its past history, so it is enough with the declaration of the population of a territory of the desire to be independent to have the right to independence. But the Right to Decide also points out that citizens also belong to each of the different organisational levels into which public decision-making is divided, from top to bottom. From the region to the continent or the planet. The legitimacy to recognize the national fact is not now created from below but from above, so that the supranational structures are prior to the nation and are the ones that guarantee the right to exist of these.

The nation is now being built because the supranational right to make decisions in common is implicitly recognised and accepted, and is born of recognising the right to be independent within a specific territory when its population so manifests, and without the need to demonstrate any "historical right" beyond the simple manifestation of its will to be so. Therefore, the referendum we propose to call in Catalonia contains two different questions that must be answered independently, not only in Catalonia but also in the rest of the communities of Spain, they are:

> *"Do you want that each and every citizen living in your region is recognized as Human Right the right of the population to make public decisions by calling binding referendums through the collection of signatures, on any subject and at all levels of political decision?*
>
> *YES/NO*
>
> *"Do you want your region to be part of Spain as a Federal State, or Federation of nationalities, to decide together our common political future within Europe?*
>
> *YES/NO*

Evidently, the questions are only a guide that can be greatly improved in their wording but that show without misunderstanding the new concept of nation with which it is intended to give continuity to Spain as a historical nation.

The affirmative answer to the first question expresses the will of the citizen to recognize and grant himself as Human Right, the right to call referendum for taking public decisions in any organizational level. But it leaves the doubt about the will of the residents of the territory to continue belonging to Spain, as a historical nation. The second question clarifies the ambiguity to declare, in the case of an affirmative answer, the will of exercising the Right to Decide within Spain as a historical nation with federal structure.

As an example, and so that nobody is misled, the Spanish Federal State that would result in a double majority "YES" to the two questions is identical to the federal structure with which Spain is already organized today, and the only thing that changes is the recognition of the right of citizens to call a referendum. Spain would be recognized as a Federal State within the federal structure with which Europe is being built.

The inevitable creation of a globalized government structured in the form of a World Federal Framework for the taking of political decisions at multiple levels of organization, from the local, regional, national, continental and world levels, requires expressing the will of each of the nationalities, including Spain, to constitute itself as part of the Spanish Federal State within the structure. For this it is necessary to have not only the express will of all Catalans but also of all citizens of the rest of Spain.

The affirmative answer to the two questions raised in the referendum, in each and every one of the regions forming Spain, declares the will of all Spanish citizens to recognize Spain as a historical national community within the Federal Structure with which the world will be governed in the near future, and recognizes the Right to Decide its future to each one of the regions forming Spain, and by extension, to the rest of the regions existing in the world.

The justification for Catalonia's belonging to Spain can only be based on the recognition by the people who live in Catalonia of the common and shared history of the last five centuries, in addition to the obvious existence in Catalonia of some two million people who wish to continue to share the political future with the rest of the Spanish people.

There is no other reason why Catalonia cannot become a direct part of Europe as an independent state than the majority "*YES*" answer to the second question in the referendum, as the people of Catalonia recognise a common past and the desire for a shared future with the rest of the Spanish people.

We have already explained the general lines to achieve the recognition of the right of any ordinary citizen to call a referendum to be able to take political decisions affecting him, but

we must be aware that each country has its own history and its own peculiarities which invite us to approach the fight for the recognition of the Right to Decide by alternative ways, but not excluding, which can offer more chances of success than the direct call of a referendum.

We cannot speak about France, Germany, Brazil, Russia, India and many other countries because we do not know them well enough to dare to give advices about which is the most effective way to get Full Democracy as a form of government, but we know very well Spain and the sad monarchic peculiarity that has it still anchored in the past. If we want to succeed in the enterprise we have proposed, we must bear in mind that the greatest resistance will come from the monarchical institution and its fear of calling a referendum on the monarchical institution, but we hope that this fear will be mitigated and the monarchy will end up accepting the reality of globalization.

EPILOGUE

We were asked to write this document and we have done so. The vision set out here is our opinion, so no one should feel bound or compromised by it.

We think that we are living in a unique moment, in which two conceptions of the human being are facing each other and fighting in a battle whose uncertain outcome will condition the further development of Human History.

The first conception of the human being is the one defended by liberalism, which considers human society a place of Darwinian struggle where each individual person competes and confronts his fellows to get, thanks to the personal effort of each one, to his dedication and his personal work, the biggest possible piece of cake that allows him to fulfil himself as a human being, even if it is at the expense of the piece of cake of other people with less luck or more clumsy.

The second conception of the human being is the one represented by the Right to Decide, which considers human society as the means by which each person, unique and individual, develops and expands his or her social conscience. In this conception, society is constructed as a place where the individuality of each person is protected by allowing them to create, together with other people, the world in which they want to live and the world in which they want to educate their children.

These two excluding and incompatible conceptions one from the other, confront each other, not in the economic aspect as it could seem at first sight, but they confront each other in the political aspect when they substitute Full Democracy by Representative Democracy, by imposing the deep meaning of what is understood by Democracy, by recognizing as basic principle of any social organization the affirmation:

"He who has the political power has the economic power."

Both political conceptions choose a different active subject for the exercise of political power within human society. To the political caste and the minority benefited by the economic system, liberalism. To the ordinary people, the Right to Decide.

Liberalism is going by leaps and bounds towards a centralized global government, shamelessly exercised by the political caste created by Representative Democracy. A political caste which, as it could not be otherwise, allies and merges as a whole with the economically favoured social minority to sustain together the liberal productive structure from which both get their economic privileges. A tandeen and a union that needs, in order to achieve its aims, to keep away the ordinary citizen from any exercise of Political Power

to prevent the defence of his interests as an economically disadvantaged social group. Representative Democracy and the defence of Human Rights is the political system used to achieve this.

If the political caste, which thrives and feeds on Representative Democracy in democratic countries, becomes globalized in the form of a centralized world government, it will be almost impossible to escape from the fusion between the political caste and the minority favoured by liberal economic structures, as it has already happened in each and every democratic country of the world, and as it is happening in the european construction.

That is why we think that this moment in the History of Humanity is unique.

We believe that we contemplate before us a vast battlefield in which the two conceptions of the profound meaning of what it is to be human have been fighting for decades. The outcome of the battle, whatever the winner, will be irreversible, and we must all, without exception, become aware that in this struggle we are risking our future as a species.

Although history never likes to repeat itself, it always warns us similarly. And, at least in Spain, it will be in the referendum for independence in Catalonia that it will be decided which of the two competing conceptions will be the dominant one and which will finally be imposed as the form of government, not only in Spain, but also in the rest of the world. It already happened in 1936, when the Spanish Civil War was the Cassandra that warned the world of the disaster that would unleash the Second World War, and it will happen now in 2017, when Catalonia will be the one to warn the world of the future facing all humanity.

We believe that everyone should be aware that the threat is real. That in Catalonia, Full Democracy and the Right to Decide must win. All the people of all the democratic countries of the world must unite and fight together so that Full Democracy and the Right to Decide win this final battle for the survival, dignity and future of all.

We are grateful to the Manhattan Circle of Malaga, in special thanks to Manuel for the help he gave in the elaboration of this document.

THE LAWS OF PHYSICS
DE
THE ECONOMY

(THE MADRID THEORY)

PART 0
THE CORRUPT ECONOMY

PART I
THE BASIC EQUATIONS

PART II
THE CONSUMER MARKET

PART III
THE CAPITAL MARKET

PART IV
FINANCIAL THEORY OF GROWTH

PART V
MONETARY THEORY OF THE CREDIT CRISIS

PART VI
FISCAL POLICY

PREFACE
(First Edition)

It is curious, but the most quoted economics book of all times begins its preface with the same words that we would have chosen to explain the reasons that lead us to the publication of this work:

> *"I address this book especially to my fellow economists, though I hope it will be comprehensible to those who are not. Its primary object is to deal with the difficult questions of theory, and only secondarily with its practical applications; for if orthodox economics is in disgrace, the reason is to be sought not in the superstructure, which has been worked out with great care as regards its logical consistency, but in the lack of clarity and generally of its premises."*
>
> *JOHN MAYNARD KEYNES, 1935*

If we had proceeded in this way (and removing the reference to "my fellow economists", which in our case would have been clearly pretentious because only one of the authors has studied economics), we would have been very justly accused of plagiarism; and that is why we have not done so.

We say it is curious, because the quote is almost a century old and nothing seems to have changed in the economy in such a long period of time, in which the advances in other scientific disciplines would leave the most daring visionaries of those times with their mouths open. We have been to the Moon and back, and in a few years we will do the same with Mars. Genetics has advanced so much that the problems we face are more ethical than scientific: cloning, buying and selling organs, immortality just around the corner and at exorbitant prices. We know what happened to the universe 15 billion years ago and also what killed, in more recent times, our distant relatives the dinosaurs. Getting machines to think is a goal that many visionaries already see as a very feasible one to try to tackle. The new materials that chemists and physicists put within our reach allow us to dream of towers as tall as Babel, and in which we can touch the sky with the tips of our fingers. We live in a world that is so extraordinarily generous and promising to human beings that we are astonished that only 10 years ago, in 2008, everything was about to go down the drain because of an economic crisis that very few economists were able to predict and that nobody seems to know even today, 10 years later, why it happened.

It amazes us that, being immersed in such an abundance of scientific knowledge, nobody knows how to tell us what it is that pushes us so blindly to destroy the world in which we live and that with so much generosity has been giving us sustenance for more than 1 million years.

There are a few economists, "colleagues" of other economists, who have denounced without rest and without achieving absolutely nothing, the degraded situation in which economics finds itself from the scientific point of view, and which Keynes also denounced in the prologue of "The General Theory". To name now the small number of these people does not make any sense here, and we are not going to do it, but we will point out that there have always been within the universities of the world "a handful of irreducible Gauls" (like Asterix), who have tirelessly denounced the repression of economic thought that the Empire of Liberal Theory has imposed by force in all the universities of the world and, most importantly, who have been able to keep alive the flame of science that illuminates economics.

In this prologue we denounce Liberal Theory as responsible for the great scientific deficiencies that economics has suffered for hundreds of years.

We denounce in this prologue, the large amounts of money with which Multinational Companies and Investment Funds flood our Public Universities around the world, to buy wills, to remove and put chairs, to decide what is researched or not researched, to propagate as science what is only ideology with the sole purpose of maintaining an economic system that favors a few, while pushing the rest of us to deplete the planet's resources.

We denounce in this prologue, the Private Universities. Like Princeton University, which uses its immense annual income of more than 25 billion dollars to propagate Liberal Theory.

We denounce in this prologue, the Swedish bank that awards the Nobel Prizes without anyone knowing who are the people in charge of the election, nor is it at all clear what dark and unspeakable ideological reasons they are serving when they grant the coveted award.

We denounce in this prologue, the media that propagate and give interested coverage to opinions lacking any scientific support from liberal economists.

Clara Rojas Garcia
Julia Rojas Garcia
Pedro Rojas Sola

October 05 of the year 2019

PREFACE
(Second Edition)

Beginnings are always difficult, or so they say, but the reception of the first edition of the Madrid Theory has been really disastrous. The authors selected more than 100 economists, almost all of them Spanish and university professors, and we sent them the first pdf edition of the theory asking for an evaluation of its content, but no one responded to our request. In the message they were told that the work deduced the basic equations of a monetary economy and analyzed the most direct and evident consequences they have for the real economy, but, for some reason unknown to us, the mention of the basic equations not only did not arouse any curiosity on the part of economists, but rather produced a strong rejection and incomprehension towards the work.

We still don't really know what happened exactly. Perhaps the problem lies in the mathematical language we use, very far from the one economists are used to, even though the level of mathematics used in the theory is really simple and within the reach of any pre-university student.

Perhaps the problem lies elsewhere, and is more psychological than anything else. It seems that economists are brought up to believe that economics is not an experimental science like medicine, chemistry or physics. Economists are usually very wary of any such claims about the discipline. Even more so when you assert, as is done in theory, that the use of money imposes very demanding constraints and limitations on what can and cannot be done in economics. Although it is not hidden from anyone, and not even from economists, that economic crises exist and therefore not everything is possible within a monetary economy, it seems that to openly expose a mathematical expression to explain them, raises an enormous suspicion among economists, without the authors being able to understand why. Let us look at the following formula:

$$\frac{1}{k_F}\frac{d}{dt}PIA = [Ah^C - Ah^S] \qquad \textit{Growth Equation}$$

The expression, that we call in theory the Growth Equation, indicates that it is the amount of bank money injected in the economy through credit, that guides nominal production within the currency economy. From the expression, whose veracity is very easy to verify empirically, we deduce the condition for a credit crisis to appear, which apparently is impossible to believe for an economist educated in the Theory of Utility, accustomed to reasoning with undefined variables or dealing with equations lacking any empirical support.

One of the most prestigious economists to whom we sent the first edition of the Madrid Theory in October 2019, was an English Marxist economist, whose name we will not mention, and who offered to give an assessment of the theory before getting to know it, despite the fact that we warned him that it had not been translated into English. Thinking of reducing the work, we sent him the document already translated with Google into English with the idea of avoiding the translation, and it was quite frustrating to see that like the rest of the economists to whom the work was sent, he would not respond, much less send any evaluation of the work. He did not even respond to our requests as to whether the paper had reached him, despite the fact that he continues to write economics articles with the same intensity as ever.

The sadness that seized us was very great. We were unable to understand anything that was going on around us, and we could not understand why no one responded, if only to tell us that our work seemed meaningless to them.

So disappointed were we that we went to visit in person one of the more than 100 economists to whom we had sent the paper and asked for an assessment. Specifically, we went to visit a prestigious professor of economics at the University of Seville in search of answers about the theory, and we had no qualms about approaching him in his office in the hope that, at last, we were going to know why the Madrid Theory was so silent. He attended us very politely and listened to us very patiently, but we did not get anything clear from the talk because, as was logical, he told us that he had only had time to look at the work.

Silence became more silence, and the only thing we got out of our visit to Seville was that even with a personal conversation we were not going to find out why nobody seemed to have any interest in expressing an opinion on what was said in theory. Of course, our professor was very sceptical about everything we told him about the existence of only two markets, consumer and capital, and the immense predictive power they have when you study the economy from this point of view, but apart from that, we could not get anything out of the talk.

Our search ended there, in that office, and we gave up trying to find an economist who wanted to give us an answer. From then on, we focused on expanding the theory in the hope that, by rewriting the Madrid Theory and explaining its consequences more directly and in more depth, it would be better received by the scientific community.

The second edition of the Madrid Theory began to be rewritten at the beginning of the pandemic, already in 2020. Between confinement and confinement, the extension of the theory was ready for Christmas of that year, coinciding with the arrival of the expected vaccine that was going to leave behind the hundreds of people killed every day by the terrible pandemic, only in Spain. It was a great effort for us, but we thought it was very important to finish it. The virus had put the entire world economy in check and all the

nations of the world were using the Central Bank's ability to create money to rescue the real economy, without having any idea of the consequences or the limitations of such a course of action, and without having any idea of the existence of other alternatives.

It is in this pandemic situation, when the economy collapses, that we clearly see the need for good economic theory to guide us in raising real production and alleviating the economic effects of confinement. Let us note that, in less than a year, scientists working in the field of infectious diseases have prepared more than half a dozen vaccines to stop the virus and make it a bad memory. Yet the economists working for us in our public universities or in public institutions have been unable to come up with a coordinated and coherent response to the economic problem that every country in the world is facing.

Let us observe that, while the rest of the scientific disciplines advance and find solutions to the problems they face, economics and economists seem bent on leading humanity to disaster. The problem with economists is not only that they do not find solutions to the problems, but that they intervene and behave as if they were not responsible for the economic disasters caused by their economic theories. In this sense they are like the dog in the manger, that neither eats nor lets eat, because they recommend not to do anything, but they are not responsible for that recommendation. They are, but they are not.

It's funny, but if you ask an economist about what happened in 2008, they will answer that it was a natural disaster, a black swan, or that it was the consequence of the lack of regulation of the financial sector, but despite their terse response and the lack of content of the answer, they will give you to understand that they do not feel responsible for anything and will not show the slightest modesty or the slightest shame for what is happening in the world. It is as if the economy has nothing to do with them, and they are incapable of understanding that they alone are responsible for bringing the economy to the edge of the precipice, and letting it fall over there. For an economist, the 2008 crisis was something alien to economics and to his area of work, and, so to speak, something unforeseeable about which there is no answer from science.

In this sense, having the Madrid Theory is very important from a social point of view, because it allows us to understand the origin of the economic crises and what causes them, and allows governments to face the economic effects of the pandemic in the best possible way. We hope that the scientific knowledge provided by the Madrid Theory will contribute a lot to avoid economic crises and to prevent them. Madrid Theory will contribute a lot to avoid economic crises and their most painful consequences.

But we must also insistently warn that the problem the study of economics suffers is due to the lack of any scientific methodology within the discipline. It is much more important for economics to reinstate scientific methodology within the discipline than to have a scientific economic theory, in spite of the important scientific contribution of the theory we present here. If economics wants to leave behind the control imposed on it by private

universities in the USA, it is necessary first of all to reinstate peer review within the discipline and to create a set of public economics journals where the selection of articles to be published is carried out in a clear and transparent manner.

But to achieve that, several things must be done first.

It is also necessary to make the selection process by which the Nobel Prize in Economics is awarded transparent, because the prize is currently being used for ideological and propagandistic purposes. To explain this and other measures that must be taken to return economics to its status as a scientific discipline, we have added a brief chapter zero in this second edition of the book, in which we talk about science and the scientific method, and in which we denounce the degraded situation into which economics has fallen and how to remedy it.

There are many economists, more and more of them, who are aware of the degrading situation in which the economic discipline finds itself, but the lack of a reasonable explanation of what is happening and the root causes of the discipline's failure prevent them from taking concrete actions to remedy it. Also, the lack of an alternative theory with which to confront the liberal doctrine that is taught in public universities around the world, prevents them from organizing themselves successfully and stopping the process of degradation that has been going on for many decades, since they are aware of who the real enemy is and to confront him: the private institutions of the USA, including in them the private universities of the USA and their ability to put the teachers who direct the public universities around the world.

We hope this treatise will open the eyes of all these economists and allow them to understand where the problem has always been and how to remedy it, because only by restoring the scientific methodology within the discipline, can the economy have any future, and with it the society in which we live. We have the absurd idea that "Science" is, by itself, invincible and very capable of defending itself from any violence that is exercised on it, but nothing is further from reality than this idyllic idea that we usually have about the incorruptibility of the scientific method. Science", like almost anything else that is valuable, is fragile and must be protected against those who want to manipulate it, break it and turn it into an instrument of oppression and death, precisely because it is so valuable.

We address this treatise to all students studying economics in the many public universities around the world, but not only to them. Although it is undoubtedly true that, after reading it, students will have a totally different view of economics from the one their professors try to instill in them during their university career, we would be very insincere and somewhat untruthful if we said that this is the only motivation that guides us to write it and to publish it. This treatise is addressed to the rest of the scientific community to remind them that science, like democracy, needs our protection, much more than we think it does.

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March 04 of the year 2021

PART 0

THE ECONOMY

CHAPTER 0

THE SCIENCE OF ECONOMICS

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March 04 of the year 2021

1. WHAT IS SCIENCE?

What is science? When is something considered scientific? How do we know if any statement is being backed up by science?

Answering these questions in a categorical way is always very difficult, and it is certainly an impossible enterprise. Philosophy, which is the discipline that studies these and other similar problems about the perception we have of reality, tells us that what we call "science" is only the more or less majority consensus that the scientific community has about those statements that are considered scientific, that is, about those statements that are the object of scientific study. We see then that it is science itself that tells us what is scientific and, therefore, that scientific knowledge is not, nor can it be, alien to the scientific community where it is created and where it exists. Therefore, when studying the foundations on which scientific knowledge is based, philosophy uses the word "paradigm" to refer to the set of statements that are considered "true" by the scientific community at a given moment in the historical evolution of a discipline.

Of course, we are not claiming that the paradigm created by scientific consensus is subjective, but we are claiming that the set of basic assertions on which any non-trivial scientific theory of some aspect of the reality around us is based always contains a subset of assertions that are subjective and unprovable. There is, therefore, no "truth" that can be stated as objective within a scientific discipline, but there is, however, a methodological consensus on how to arrive at the set of basic propositions or assertions on which any scientific theory is based. Scientific knowledge is, therefore, the set of statements that are considered true by the scientific community at a given moment, but what we consider science, or specifically, what we consider the Scientific Method, is the procedure that allows us to reach the consensus with which we arrive at them. Science is then the method

used to reach scientific certainty, but science is not certainty itself, which is always basically undemonstrable.

When we understand that there is no such thing as truth within science, but rather the scientific consensus that attempts to arrive at it, then we understand that science, and the strength of the Scientific Method that creates it, rests on the prescription, or compliance, of the set of unwritten rules that must be followed to create consensus on the scientific certainty of a statement. The set of rules that must be followed to reach scientific consensus is known as "peer review", and there can be no scientific certainty if this methodological prescription is not followed. Understanding this is very important, because a scientist is not a priest who is in contact with the goddess of truth, but a person who is part of a community that follows a specific methodology before affirming that a theory is a scientific theory.

Summarizing in a few words what the Scientific Method consists of and what is the set of rules that must be followed to reach scientific certainty is not very difficult, since it basically requires that any statement or statement that is made within a scientific discipline be exposed to permanent criticism from the moment it is proclaimed, because it is the permanent criticism on the veracity or non-veracity of any statement, and in which the entire scientific community participates, which creates the consensus on the dominant paradigm within a discipline and what makes a theory to be considered scientific.

Now, once we understand what scientific truth is, and once we understand that permanent criticism is needed to arrive at it (peer review), it is possible to understand why economics is currently so far from being a scientific discipline. It is very important to understand, and we will show it now, that economics fails so miserably in the scientific aspect because no statement that is shown to be scientific within economics is being subjected to any criticism whatsoever. Or to put it another way, the current economic paradigm that is presented to the scientific community as the result of scientific methodology has not been created by that scientific methodology, but has been deliberately created behind its back by a small group of people with enough political power to do so.

Let us take an example within economics to clarify what we are saying about the methodological consensus and why the set of rules that allow us to reach it are not being complied with.

One of these unwritten rules required by Scientific Methodology refers to the variables (or parameters) that appear in a scientific statement, and prescribes that these variables must always be well defined, or at least that they refer to something that can be measured or isolated in the context in which they are defined. This is logical. If the elements with which a statement is constructed are not well defined or cannot be isolated within the context where they are created, it will be difficult for another person to verify or refute a statement where these elements appear, and it will be difficult to reach any consensus on whether

the statement is true or not, since it will not even be possible to agree on what is being talked about.

However, it is easy to see that most of the variables used in economics are not only undefined, but cannot even be measured or isolated, and therefore it is impossible to debate a statement made with them.

It is incredible, but almost all the basic variables with which the current economic paradigm is constructed are either impossible to calculate or it is impossible to affirm something concrete about them because they are not defined. Supply", "demand", "utility", "efficiency" are the most basic variables of economics and, nevertheless, nobody can calculate them because they are ambivalently defined according to the context in which they are used and depend on it. Not even money is defined in a clear way within the economic paradigm, even though any non-economist is able to identify it without any possible confusion in the real world.

But it does not only happen with the basic variables, as we have pointed out, it also happens with other variables that are not so basic and that are used to explain more complex phenomena.

An example of the latter variable is the "*non-accelerating inflation rate of unemployment*", also known as NAIRU (*non-accelerating inflation rate of unemployment*). While, of course, the inflation rate and the unemployment rate are variables that are well defined and measurable, the NAIRU is a term that is not well defined. Not only because the supposed variable implies in its definition that there is a causal relationship between unemployment and inflation that is never formulated, in the sense that the decrease in unemployment is the cause of the increase in inflation, but also because it is impossible to calculate the NAIRU without first creating a theoretical context in which the NAIRU exists and can be isolated from the rest of the variables.

The existence of concepts such as NAIRU demonstrates very clearly that economics does not follow scientific methodology, nor does peer review exist. If peer review existed in the discipline of economics, an article on NAIRU would never have been published in an economics journal because the reviewers of the journal would have considered the term as a non-scientific term. At most, some article would have been published showing the shortcomings of the NAIRU definition and asking for help from the scientific community to create the theoretical context in which to redefine it, but it is certain that it would never have become the focus of economists' attention for decades, as it has in fact been.

For decades, thousands of articles on NAIRU have been published in the most prestigious economic journals in the world without any of their editors raising any objection. How could this have happened? Well, because economics journals are private companies in which their owners publish the articles they consider convenient to publish on the topics

they consider convenient, following ideological criteria that have nothing to do with any scientific criteria. Not only that, but they also prevent the publication in the journals of any criticism against variables such as NAIRU, turning the economic journals into mere instruments of ideological propagation, far removed from the function of permanent criticism of the ideas that they should have within the scientific methodology.

The science of economics is not in such an advanced state of degradation by chance. Journals have a relevant role in scientific methodology that cannot be altered without also altering the progress of science. Evidently, in an environment where what is published in economic journals is manipulated, science can hardly prosper and the result of the control that the owners of the journals have, can only be the creation of a religious doctrine with fundamentalist dyes, as in fact is the Liberal Theory. But, how has it come to this?

2. SCIENTIFIC JOURNALS

Science differs from any of the many other systems that have been used to accumulate and make knowledge accessible in that any statement made within it is always subject to criticism and revision, whether or not the statement is considered true. It is on this particular point that the difficulty of a discipline being able to call itself scientific lies, because it is not at all easy to create the necessary environment for the permanent critique of any idea or statement to take place.

Let's think of any religion, for example, Catholicism. The structure that the Catholic Church has created to spread Catholicism is a pyramidal structure at the top of which is the pope, and under him is a priestly oligarchy that has nothing to add to what the pope affirms, to whom divine infallibility is attributed when he gives his opinion on Catholic dogma. We see clearly that Catholicism is not a scientific discipline, nor can it ever become one, because it does not accept any criticism of what the pope affirms about Catholic dogma. There is no criticism allowed within Catholicism, nor within any other religion. That is what characterizes the religious phenomenon and that is what differentiates scientific methodology from other forms of knowledge, which is based on creating a social procedure with which to permanently question what we consider to be true.

We can justify the doctrinal behavior of the Catholic Church over the last 2,000 years by appealing to the need to protect Catholic dogma from dissidents, but it is not possible to use the same thesis to justify why the discipline of economics works the same way as the Catholic Church and why it has recreated the same pyramidal structure. Economics is not a religion and the study within the discipline should not be subject to a pyramidal regime

similar to that of the Catholic Church, so it is necessary to analyze the way in which peer review is carried out in order to understand how it has arrived at this deplorable situation.

In science, "peer review" is the term used to refer to the procedure that ensures that the dominant scientific paradigm is always subject to criticism and open to any new data that may force the scientific community to revise it, which is achieved through the publication of articles in scientific journals. In this sense, the function of scientific journals is to make public, not only new discoveries, but also any criticism or any new data contrary to the ideas that are considered true to be discussed by the scientific community. The problem arises when journals are used to do the opposite, and prevent the publication of criticisms or new data that question the validity of the set of statements presented to the community of economists as the "scientific truth". In fact, this is what has happened in the discipline of economics, where the necessary selection process to which any article is subjected before publication in a journal is used to censor articles based on ideological criteria that have nothing to do with science or the scientific method.

The perversion of the change in the role of economics journals is so incredible, so inconceivable, that no economist seems to be aware that this is what has been happening for more than fifty years with the articles published in economics journals around the world. To understand how this deplorable situation has come about, it is only necessary to analyze the process that an article follows to be published in an economics journal and see how easily it can be manipulated:

1) The article is evaluated, in a quick reading, by the editor of the journal or by the person that the management of each journal has designated to do so, with the intention of determining whether or not it is suitable for publication in the journal. When the article is rejected in this first evaluation, it is usually returned to the author accompanied by a laconic comment in which it is said that either the subject matter does not fit in with the journal, or that articles very similar to this one have already been published, or that the article does not have sufficient relevance, or it is rejected without any explanation.
2) When the editor finds the article interesting then it is sent to a group of 2 to 5 reviewers, whose names usually remain anonymous and who are supposed to be independent and knowledgeable about the particular subject of the article. They are the ones who, after 15 days to 3 months, give a verdict on the article and decide whether or not it will be published in the journal.
3) From this point on, what happens with the article review process becomes confusing at best. When the article is accepted, it is usually returned to the author to be modified in some specific aspects, and when it is definitively rejected, it is returned to the author without ever telling him who were the people who evaluated his work or why it was rejected. In other words, the scientific community does not even know that the article has been submitted for

> publication in the journal and has been rejected, let alone why it was rejected or who rejected it. Something odious and senseless, because it is the same procedure used by a censorship court in a country where there is no freedom of the press.

The obscure evaluation process to which an article is subjected before being published in a journal has its origins in the recent past, when the scientific community was very small and all scientists knew each other. At that time, it was considered a good idea that the name of the article's reviewer should remain anonymous to avoid suspicions among colleagues who knew each other. But it is no secret to anyone that the secret evaluation process we have just described makes the hair on the back of the neck stand on end for anyone who knows a little history, because it is the same procedure followed by any Court of Censorship to prevent the publication of ideas that are considered dangerous to those who govern. For example, it is the same process used by the Tribunal of the Holy Inquisition to try the accused and which usually ended with the condemnation of the accused to burn at the stake.

In fact, at the dawn of the scientific method, scientific journals were not used to communicate discoveries, as they are today. At that time, peer review (and the permanent criticism that it implies) was carried out directly with the exchange of letters between specialists in which ideas were communicated and completed with the publication of books aimed at the entire scientific community, while scientific journals remained in the background and were used only to communicate new discoveries to the rest of the less specialized scientific community. Journals were newsletters for the popularization of science among non-specialists. It is therefore easy to understand why, in that distant era, the process of article selection did not pose any danger to the scientific method or to science, since peer review was not taking place with the publication of articles in journals.

However, the situation is completely different nowadays, when scientists hardly know each other and the prestige that a researcher enjoys comes exclusively from whether or not he or she publishes in the most prestigious scientific journals in his or her field. In this context, the obscure selection process to which articles are subjected before publication is absurd and dangerous, since it is the owners of the journals who arrogate to themselves the privilege of assessing the scientific importance of an article before its publication, thus preventing the entire scientific community from assessing it, and even preventing them from learning of its existence. This is absurd and contrary to what is required by scientific methodology.

Let us note that when the editor of a journal, or the group of reviewers who assist him, consider that an article is not important enough, the article is not published and the scientific community does not even know that the article exists and has been rejected by the journal. This makes those who run the journals the people who decide which articles or which discoveries are scientifically relevant in economics, which is completely absurd,

since that is the role of the entire community of economists, not just the privileged few who run a journal. Not only that, but the rest of the scientific community assumes that the journal endorses and guarantees the scientific quality of the articles it publishes, which puts in the hands of a handful of people (the editor and reviewers) the selection of the set of statements that will form the scientific paradigm of the discipline, which is completely absurd.

It is quite possible that a physicist, a chemist or a doctor does not show any fear for the distortion of the scientific method implicit in the prior censorship process to which articles are subjected before publication. Probably because he thinks that any important discovery, sooner or later, will make its way into his discipline, even though it may be rejected for publication at first. He will think something like: *science, like life, will eventually break through*. But that opinion is pathetically naïve, even in deeply scientific disciplines that are not very prone to manipulation, such as physics, chemistry or medicine, and all scientists know that. Funding for research and academic progress in any discipline depends to a large extent on whether or not you get a paper published in a journal, and everyone knows that. It is absurd and dangerous, in fields as neutral as physics or medicine, to give that power to anonymous people whose ideological motivations are unknown, but it is collective suicide to allow the same in a field like economics, where the fruit of research can and does change the social structure in which we live.

If the reader has any doubt about the danger of leaving the selection of the statements by which the scientific paradigm is to be created in the hands of private institutions, compare this situation with the situation created in any age by a Court of Censorship, and he will agree that there is no appreciable difference in the way the two perform. The implicit idealism among scientists, who have always seen themselves as incorruptible benefactors of humanity, does little to help them see the potential danger of the nauseating system of article selection imposed on researchers by the editors of scientific journals, and time has passed without anyone ever questioning the process or denouncing the danger it entails.

But time never passes in vain.

Scientists don't seem to realize it, but in less than 200 years science has gone from the "god is machine" that opened the industrial revolution to the "every man for himself" that brings with it the most atrocious economic liberalism. Scientific knowledge, at first shared collective knowledge, has given way to an unbridled race to obtain patents, which turns science and the scientific method into the greatest source of inequality between the different countries of the world. Immense universities and research centres have sprung up all over the world, in the same way that only a few centuries earlier the immense cathedrals, synagogues, madrassas or Buddhist temples that look down from the heights on the rest of the world's constructions had been erected. Governments devote a substantial part of their GDP to what they call R&D in the hope of not being left behind in

the race for discoveries. The new god of science claims his tribute, and the power and riches he pours down on his believers, thanks to scientific discoveries, are immense. It is very difficult to escape his spell and not end up worshipping him just as we did with the old gods.

It is inevitable not to shudder at the panorama that is drawn before our eyes when we recreate the birth of science and the industrial revolution it brought with it. It is impossible not to shiver, because of the aura of unreality that science and the "scientific" had taken on at the end of the 19th century. To be "a scientist" was already tantamount to being a priest who was in touch with wisdom and knowledge, and was considered little short of infallible in his claims when he spoke in the name of science. It was in this climate of unreality between the divine and the human, between sleep and wakefulness, between wisdom and ideology, that science was used to sustain the racist theories that justified the most atrocious colonialism of the time and eventually led to the genocide of the Jews. Science had become too powerful not to be used for purposes that have nothing to do with shared knowledge. To present a claim as being supported by the scientific method and by science was to present the claim as absolute truth, and that was something that could be used for purposes very different from obtaining pure and simple shared knowledge.

It was inevitable that those who decided what was published in economics journals would end up using that power to establish a censorship court to prevent the propagation of ideas that they considered contrary to their interests. In disciplines such as medicine or physics it might not make any sense to distort scientific discoveries, which is not true either, but in a discipline as special as economics, that power of censorship would allow a small minority of people to present the foundations on which the Liberal Theory is based as the greatest scientific discovery of all times. The free market, and its supposed productive efficiency, was going to be presented to the community as a scientific truth just by being published as such in a scientific journal of economics.

We can understand that there are left-wing and right-wing newspapers, and we can understand that journalists are required to profess the ideology of the editorial line of the newspaper they work for. However, we would find it hard to understand if this were to happen in scientific journals. Scientists like to think that articles are published according to the scientific importance of their work and not because of the ideology professed by the writer, completely forgetting that "scientific truth" is only the consensus reached by the community using scientific methodology. Scientists behave like children when they prefer to ignore what this means: *that it is very easy to pass off as science what is only ideology, just by controlling the selection process to which they submit the articles published in scientific journals*.

How it has come to this and why such a thing has been allowed to happen is beyond anyone's comprehension.

3. PRIVATE UNIVERSITIES IN THE UNITED STATES

Everything started to go wrong in the world after the end of the Second World War. At that time it became very clear that there were two superpowers, the USA and the USSR, engaged in an all-out ideological struggle over which was the best political and economic system to organise the world: communism or liberalism. Of course, it escaped no one's notice that the ideological struggle between the two hegemonic blocs barely concealed the struggle for world hegemony of the USSR and the USA, which used the class struggle as an excuse to intervene in all the countries of the world.

In the midst of such a violent situation, where two opposing conceptions of society struggle to maintain military and economic hegemony, it is inevitable that the temptation arises to bribe science to make it support the ideas defended by one of the two sides. Economic theories became then, unwittingly, a battlefield where scientific knowledge matters very little and where any consideration is subordinated to the achievement of ideological victory over the opponent. However, while in the USSR it was not necessary to bribe scientists because any statement was subject to prior censorship, the same did not happen in the USA and in the so-called "free world", where economists propagated Marxist ideas without any restraint, driven by an environment of poverty, misery and inequality that acted as a breeding ground and a sounding board all over the world.

In the "free world", unlike in the USSR, there was a very strong incentive to control the ideas and theories that were propagated as scientific within the discipline of economics. It was necessary to present the Liberal Doctrine, and the supposed productive efficiency of the free market, as a scientific theory in the face of socialism, and to this end, the science of economics had to be forced to take the side of the liberal cause.

What was done to achieve this, as it could not be otherwise, was to use the process of selection of articles published in economic journals as a censorship court. In full view of the world, but without anyone being aware of what was going on, everything that was published in economics journals and textbooks was subjected to strict censorship by those who ran the private universities in the US. Any article contrary to liberal ideology was prevented from being published in economics journals, and economists who did not defend liberal doctrine with sufficient zeal were no longer hired as professors. Scientists from other disciplines, too idealistic to think that such a thing was possible, never came to understand that the greatest attack ever perpetrated against science was not only being carried out under their noses, but was being consummated with their collaboration and ideological consent.

The witch hunt that the Mecca of cinema, Hollywood, suffered during the decade of the 50s of the 20th century is known to all, but not so well known is the silent expulsion of teachers with leftist ideas that, at that time, began in all private universities in the United States. The period of persecutions that began then, and that Hollywood was able to visualize with all the

pomp that any media lynching always deserves, also occurred in other activities within the United States, but in a much more silent and forceful way among university professors who taught economics, where it was natural that there were economists who defended alternative approaches to the teaching of economics, such as, for example, Marxist approaches. A rapid process of selection of university professors teaching economics began, based on their political beliefs, their race, their nationalism and, above all, their faith in liberalism.

The ideological cleansing was greatly aided by the fact that most US universities are private universities, whose owners are under no obligation to justify why some faculty were hired and not others. Gradually, and after the passage of only a decade, all faculty working in private universities in the US professed unreservedly liberal ideology.

From then on, they began to censor everything that was published in economic journals which, at that time, just after the end of the war, were private institutions that depended on private universities in the United States. The most important economics journals in the world all belonged, almost without exception, to the teaching staff of the private universities of the United States, the only country that had ended the war unscathed. The obscurantist process used for the selection of the articles before their publication was perfect for that purpose, and in the seventies it allowed the economists who directed the private universities of the USA to present to the world the Liberal Theory as a scientific theory, the result of the Scientific Methodology and of the scientific consensus among economists, nothing could be further from reality.

The power that the cloisters of the private universities in the USA acquired from that moment on was immense, and the small minority of people who formed them were able to pass off as brilliant ideas what were only ideological hogwash aimed at justifying the application of liberal policies throughout the world.

Theories were constructed to justify the free circulation of capital, forcing local currencies to a constant process of devaluation in relation to the dollar. Theories were constructed to justify the elimination of tariffs, unprotecting the nascent local industry of all the countries of the world. Theories were constructed to justify the dismantling of trade union organizations, destroying the social consensus that had been achieved after the post-war period. Theories were constructed to justify the inefficiency of public enterprises, forcing governments to privatize public services for the sake of greater efficiency. Theories were created to justify auctioning monopolies to the highest bidder. And finally, perhaps by far the most negligent and damaging thing ever done for ideological reasons, the theory of externalities was constructed to prevent local governments from protecting the environment, both in the US and around the world, making a mockery of democracy and the people's right to decide. From then on, it mattered very little which party won an election, because in practice, no government could make any decision against the free

movement of money, the free movement of goods and the free destruction of the environment upon payment of the appropriate negative externality.

All the theories that appear in university economics textbooks, and that are taught to students as scientific theories, have been created by economists working for private US universities, and are aimed at protecting US economic interests for reasons of "social utility" and "economic efficiency". Only collaterally, these theories seem to defend and protect local economic oligarchies as well, although a closer analysis of the consequences of liberalism and free markets shows beyond doubt that local interests take a back seat to the interests of the richest people on the planet, who are invariably mostly US citizens.

Economists working for private universities in the US have a very bad memory and now, after the 2008 crisis, they are denying some of the recommendations that they have been making for the last 50 years, and that the International Monetary Fund forced developing countries to follow when they fell into a crisis of change. It is quite understandable that today they want to forget the role played by the economic theories that they developed, since it is those theories that are responsible for the poverty in which half of the human population lives, for the deterioration of the environment and for the threat that climate change poses to life on the planet.

What is science for? Science serves to protect human beings against the ideological fundamentalism with which human beings degrade each other, but what happens when a minority uses science to scientifically justify the degradation to which they subject other human beings?

That is what Nazism did with the supposed scientific support that Darwin's theory of evolution gave to the existence of a superior race, and that is also what liberals have been doing for the last 50 years with the economic theory created exprofeso by economists working for private universities in the United States. These economic theories are taught in public universities around the world, are supported by articles that are published in the most prestigious economic journals in the world, and the economists who created them are awarded the Nobel Prize in economics. However, these theories have no scientific basis and have been created to give scientific support to the degrading liberal idea that some human beings are more productive and more efficient than others and that, therefore, the former are deserving of their wealth and the latter are deserving of their poverty.

If racism used physiological differences to justify that some human beings are better than others, now, the Liberal Theory justifies with the difference in income, the productive and moral superiority of some people over others and, therefore, justifies as self-deserved the misery and poverty suffered by a good part of the human beings that inhabit the planet.

4. PUBLIC UNIVERSITIES

To talk about the science of economics is to talk about economists, since they are the ones who create economic theories and disseminate them. To talk about economists is to talk about corrupt economists, regardless of whether it may seem unfair, or even insulting, to many of the people who work as economists in public universities around the world. We are sorry if they are upset.

We have already denounced the conscientious selection work that private universities do to hire teachers and researchers who teach economics in their classrooms, but it has not been at all clear why we have to put in the same bag economists working in public universities around the world.

Let us note that those who run a private university cannot be reproached for hiring as teachers the economists they deem appropriate. Although we may call degrading the exhaustive ideological examination to which teachers are subjected before being hired, private universities are private institutions that have the right to do so. For this reason, we can hardly call these teachers corrupt, since they are only doing the job for which they have been hired. For example, Paul Samuelson or Gregory Mankiw, are economists who have worked, or are working, for a private university in the USA and we cannot reproach them for deceiving, lying, misrepresenting and spreading false ideas about the laws and principles on which the economy is based in the respective teaching books they have written, because that is what they have been hired to do.

However, it is very clear and diaphanous for all those who want to see it, that next to these economists whose main work is deception and who are usually awarded the Nobel Prize, there are other economists much greyer and much less visible, without whose complicity, silence and work, the deception of the others would not be possible and could not be carried out. We are referring to the economists who work in public universities around the world. They are, in our opinion, the real corrupt economists of the discipline, because their job and the reason why they are hired, is to prevent economists like Paul Samuelson or Gregory Mankiw to achieve their purpose and pass off as scientific theories what is only ideological. These economists are hired by the citizens and their salaries are paid by the citizens, yet they follow the deceit, lies and guidelines of economists working for private universities in the USA, leaving the economy of their countries defenceless against the excesses of liberalism.

To understand how the economists working in public universities around the world have become so corrupt, and why, instead of denouncing the falsehood of liberal doctrine from their professorships, they endorse and spread it, we must remember the procedure used to hire them.

Unlike what happens in a private university, where no one doubts the right of the owners to hire the research and teaching staff that they see fit, in a public university the opposite is true. As a consequence of the transparency demanded by the administration of public goods, in a public university there is a complex selection process that seeks to be impartial when determining the suitability of the teaching and research staff it hires. First, it tries to guarantee that all people can access a job within the public administration under equal conditions, without anyone being selected on the basis of their race, sex, ideology, beliefs, etc., something that, as we know, is a requirement that there is no obligation to guarantee when hiring personnel in private companies. And, secondly, the aim is to ensure that the person hired is the one who has the best training and is best qualified to carry out the job on offer.

People do not usually understand that when a merit-based competition is held to select some people and not others, some people are necessarily being discriminated against others, which leaves the door open to manipulation of the selection process, since the result of the competition will depend on the criteria used to determine the merits. At present, the set of merits used to assess the suitability of a candidate who applies for a post in a public university includes two very specific aspects of his or her work that are easily manipulated, as they come from an external assessment of the candidate. The first aspect that is valued in a candidate focuses on the quantity and scientific quality of the articles, books and other publications that he/she has published throughout his/her professional life, and the second aspect that is valued focuses on the quantity and quality of the years of teaching that he/she has worked in.

No one is unaware, and we have already analysed this point, that publishing an article in an economics journal does not depend on the scientific quality of the article, but on the assessment made by those who run the journal, which is almost always a private institution that is under no obligation to explain the criteria it uses to select the articles. It is very clear, in such a case, that it is the people who run the economics journals who are allowing the candidate to acquire the necessary curriculum to access the position within a public university, when they decide whether or not to publish their work in the journal. It is very clear that the candidate will have many incentives to mold his articles to the ideological line of those who direct the journals of economics, with the idea of acquiring the necessary curriculum to surpass the other candidates in a merit-based competition.

The same is true of the time worked as a teacher. An economist who opts for a position at a public university can present as part of his or her curriculum vitae the time spent teaching at a private university in the United States. It is clear, for anyone who wants to see it, that here too it is the people who run the private university that allow the candidate to acquire the necessary curriculum to compete with an advantage for the positions offered by public universities. It is very clear that, in such a case, any economist who wants to work in a

public university will have a strong incentive to adopt and follow the ideology of those who run private universities in the US.

In both cases, it is a private university in the USA that is allowing the candidate to acquire the curriculum with which to successfully opt for the place offered by a public university in any country in the world. It is understood then very well, that the people who direct the cloisters of the private universities of the USA use this unacceptable privilege to weave an extensive mafia network, with the only intention of obtaining to the economists of liberal ideology the necessary merits to successfully copulate the places that are offered inside the public universities of the whole world. We see that what seemed like a good idea, to force transparency and neutrality in the processes of hiring staff within a public university, becomes its Achilles heel when the number of articles published in a private journal of economics or the time spent teaching in a private university in the U.S. is used as a merit for hiring. Seeing is believing.

This silent and corrupt process of curricular selection has been going on in the field of economics for more than 50 years and nowadays it is easy to verify that more than 90% of the teaching and research staff of any public university of economics in the world professes liberal ideology. It is very easy to see that most of the economists working in a public university in Spain have the same curricular profile. First, almost all of them have a PhD financed by a private entity, or a postdoc financed by a private university in the USA. Second, almost all of them have been hired between 6 months and 2 years as an assistant at a private university in the US. Third, all of them have published regularly in the private economics journals considered the most prestigious, and which usually depend on a private university in the US (generally in the journal published by the private university where they did their postdoctoral studies or where they worked as assistant professors).

All this is no coincidence. We are in the presence of an international organization, directed from a foreign country, whose ultimate purpose is to interfere in the advancement of a discipline as fundamental and vital for the human development of a country as economics. We almost always forget the obvious, but it is the economists working in public universities who have to advise governments when they are faced with the problems posed by the complex modern organization. When these economists are selected for their liberal view of the economy, then they will hardly be able to defend the interests of those to whom they advise, and, on the contrary, with their recommendations and advice they will be serving the economic interests of the foreign country to which they owe their jobs.

We forget the obvious, because we want to forget the obvious, but who has to determine the scientific "quality" of a scientific article is the whole scientific community and not those who run economic journals. That is the basis of Scientific Methodology. We have left it to a network of private institutions, directed by private criteria, and belonging to a foreign country, to evaluate the scientific quality of our economists and the scientific quality of the

articles they write. We should not be surprised then that economists are selected on the basis of their docility to accept the scientific validity of the economic theories they create exprofeso for our government to follow, with disastrous results.

Why does the number of articles that a researcher has published in a private journal in which the articles are selected by unknown people and following unknown criteria enter into the curriculum vitae of a researcher? Why does the time spent teaching in a private university that hires teachers by hand and without holding a merit-based competition enter into the curriculum vitae of a researcher? It is absurd that in a merit-based competition, merits that are obtained without going through a merit-based competition are accepted. It is a completely absurd contradiction. It is obvious that an article published in a private journal or time spent teaching in a private institution cannot be accepted as a merit to discriminate between candidates in a public competition. However, this is what has been done for 50 years in Spain and in the rest of the world to hire staff working in public universities of economics.

We forget the obvious, and it comes at a high price: not having a scientific economic theory that you can rely on to make the important economic decisions facing your country, nor having a pool of trained economists.

5. THE NOBEL PRIZE IN ECONOMICS

But neither all the manipulation that exists in the merit competitions to work in public universities, nor all the censorship imposed by those who run economics journals on the articles they publish, would be enough to prevent, on its own, the scientific truth from breaking through. Even in a discipline as degraded as economics, something more is needed to close the circle and stifle any hint of critical thinking within the discipline. That "something more" was only achieved by using the awarding of the Nobel Prize in Economics to give a scientific appearance to the economic theories that were being created exprofeso in the private universities of the USA.

Like scientific journals, the Nobel Prize is relatively modern and the Nobel Foundation began awarding it in 1901. Also, as with the selection process that an article has to undergo to be published in a journal, the process carried out by the Nobel Foundation to determine the laureates is very little transparent and neither what it consists of nor who are the people who award it is not known. The reason for such obscurantism is to be found, once again, in the suspicions that could be aroused within the small scientific community of the late nineteenth century, knowing the nationality and ideology of the people in charge of awarding the prize. It is therefore understandable that from the very beginning of the

institution, the people in charge of awarding the prize were knowingly concealed and the criteria used to choose the candidates were kept secret.

Seeing is believing. Once again, the naivety and blind faith in ethics that scientists attribute to themselves, allows for the establishment of a process of choosing the winners that is very easily manipulated by a small minority of people, whose identity, moreover, remains The process of choosing the laureates is very easily manipulated by a small minority of people, whose identity, moreover, remains hidden because the selection process itself guarantees their anonymity.

In the specific case of the Nobel Prize in Economics, the situation is even worse than what we have described for the other sciences, since it was not until 1969, at the beginning of the liberal offensive, when the Swedish Central Bank established the prize, which was initially called the Bank of Sweden Prize in Economic Sciences in Memory of Alfred Nobel (in Swedish, *Sveriges riksbanks pris i ekonomisk vetenskap till Alfred Nobels minne*), and which later, subsequently, came to be managed by the Nobel Foundation. It was not by chance that only a year after its implementation, in 1970, the Swedish bank awarded the Nobel Prize in Economics to Paul Samuelson for his work on the Theory of the Production Function, marking what was to be the purpose for which the prize was awarded: to support the scientific character of the economic theories that would emerge from the private universities of the USA to propagate the liberal doctrine.

To think otherwise about the Nobel Prize in Economics would be stupid.

Long before Samuelson was awarded the Nobel Prize, economists had shown that one cannot consistently associate the real production of an economy with a Production Function, as conceived by Samuelson. It is not difficult to understand that it has been thanks to his being awarded the Nobel Prize in Economics that private universities in the USA have been able to present the Theory of Production Factors and the Production Function to the world as an unquestionable scientific fact, when the reality is that it can be easily demonstrated that they cannot exist.

It is also impossible to qualify, from a scientific point of view, the "Theory of Rational Expectations", but as soon as Roberts Lucas was awarded the Nobel Prize in Economics, any criticism of the obvious stupidity of the theory was no longer possible. When we analyze the winners of the Nobel Prize in Economics, we observe with astonishment that there is not a single economist who has been awarded the prize for having discovered some empirically verifiable fact. There is no such economist, nor is there such an empirical fact. Always, the reason why the Nobel Prize has been awarded has been to be able to present the theories created by private universities in the USA as scientific theories, and the recommendations derived from them, as scientific recommendations.

We only have to take a look at the supposed scientific findings that have motivated the awarding of the prize to realize that they justify, in one way or another, the recommendations made by the Liberal Theory: the elimination of tariff barriers, the elimination of capital controls, the convenience of auctioning public companies, the theory of externalities that allows the destruction of the environment, etc. All of these recommendations, endorsed by Nobel Prize-winning economists, leave the civilian population defenceless against the predation of big business and the environment defenceless against the predation of investors.

Isn't it surprising that around 70% of the Nobel Prize winners in Economics belong to the faculty of a private university in the USA? Isn't it strange that seven out of ten people who receive the Nobel Prize in Economics are US citizens and have an important position in the organization of a private university in the USA?

This alone tells us all we need to know about who is behind the choice of awardees and what kind of criteria may be used to award them. For example, William Nordhaus is an economist who was a close collaborator of Paul Samuelson and who has been involved for many years in the management of the private Yale University in New Haven, Connecticut (USA). In 2018 he was awarded the Nobel Prize in Economics for his research and findings on climate change published in the 1990s. What do these findings on climate change consist of? Certainly nothing, but the people who run the cloisters of private universities in the US wanted to award a final tribute to the only economist still alive from Samuelson's generation, that generation that made the liberal revolution. Moreover, by awarding him the Nobel Prize, Nordhaus's assertion that the economic losses caused by global warming would be in the order of 3% of world GDP, a ridiculous amount to worry about, was being passed off as a scientific discovery. Once again, the Nobel Prize in Economics was awarded because they could simply award it. There is no other reason, nor can there be any other reason for it:

"I can because I can"

The situation that the science of economics has reached is grotesque, but people are not aware of the extent to which grotesqueness can easily turn into horror. into horror.

6. OPERATION KNIGHT

The obvious question that you may have asked yourself after reading all that we have stated is, what is the point of all this, and what is the benefit for the senates of the private

universities in the USA, when they finally manage to have at their service all the research staff working in public universities all over the world? We are of the opinion that, if you have come this far, and you still do not know the answer to this question, it is because, surely, you are one of the many naive people who believe that liberalism has come to liberate citizens from an oppressive government that only seeks to subjugate them, extort them and deprive them of their individual freedom. We are sorry to have to disabuse you.

In 1947, just after the end of the Second World War, a group of 36 intellectuals, most of them economists, met in the small Swiss village of Mont Pelerin to discuss how to deal with the threat posed by socialist ideas to the world that emerged after the Allied victory in the Second World War. Among them was the Austrian economist Frederic Hayek, to whom the intellectual authorship of liberalism would later be attributed, even though it was not he, but the American economist Frank Knight, who promoted the meeting and who later orchestrated the operation that would lead liberalism, and the liberal ideology on which it is based, to become a doctrine backed by science and the scientific method.

We have to understand that for the conservative mentality of the people gathered at Mont Pelerin, the whole world had succumbed to socialist ideas, which was a completely absurd idea, even though it was true that the Soviet dictatorship was threatening to establish itself in every corner of the planet. Be that as it may, the post-war economic reality was quite different from this crude staging of two antagonistic blocs in permanent struggle that those gathered at Mont Pelerin had in mind.

The reality was more complex. As a consequence of the world economic crisis that began in 1929, both the United States and the rest of the democratic governments had tied up the industrial and financial system of their respective countries and had passed a good number of laws aimed at restricting their capacity to manipulate the economy for their own benefit. Therefore, it was very true that the governments of the time acted quite forcefully in restricting the freedom of movement of money before the war, and it was also very true that taxes were very progressive and loaded public spending on the incomes of those who earned the most. Moreover, when they became independent after the war, the former colonies had almost all adopted the form of a Republic, and most of the governments that came out of the ballot box were quite nationalistic. It is not surprising then, that the first thing these governments did on achieving independence, was to nationalize the production of raw materials and use the profits to finance the welfare state and build up a local economy based on the protection of home-grown technology.

It was very clear then, for the big international companies of that time, almost all of them from the USA, that neither the policies of the industrialised countries to which they belonged, nor the policies of the newly independent countries, were about to return to the "laissez faire" of the 1920s. In particular, it was no longer possible to continue to live as before the war, at the expense of the marketing of local raw materials for which no

money was paid, nor at the expense of the marketing of local agricultural production cultivated at very low wages. For all these reasons, the new political situation that arose after the war was interpreted in a self-interested way by the economic elites settled in the USA and in Europe: as an intolerable interference in private economic activity to which it was necessary to give a response. These elites, and in particular the people gathered at Mont Pelerin, interpreted the defence of the economic interests of the majority of citizens, which was the basic idea guiding the democratic governments of the post-war period, as an unjustified interference in the freedom of enterprise that had to be remedied.

If we look at the historical events of the post-war period, we should not be too surprised to see how many countries embraced democracy at that time, and to see that the list is almost as long as the list of countries that would end the democratic experiment with a violent coup d'état backed by the CIA. But understanding everything that happened in the world between 1945, the year the war ended, and 1980, the year the liberal revolution officially began, is only possible if you understand what happened that spring of 1947, in the Swiss canton of Vaud, at the foot of Mont Pelerin.

Let's start by understanding that the reason, quite prosaic, why such a homogeneous group of people of such a conservative ideology got together, is basically stated, in very understandable language, in the book written by Hayek just a couple of years before the meeting: "Road to Serfdom". The central idea of the book is to point out the threat that socialism, and its alluring promise of a just society, posed to people's individual freedom. In Hayek's view, since the mid-19th century, socialist ideology had been behind all revolutionary attempts to bring the working class to power. It was also responsible for establishing a communist dictatorship in Russia and for pushing European society in the early 20th century into two world wars, so it was necessary to convince people of the real threat that socialism, and its establishment, posed to individual freedom in democratic societies.

According to Hayek, in order to defeat socialism and the socialist utopia, it was necessary to use the search for individual freedom as a utopian goal to be pursued by society as a whole, as opposed to the egalitarian and fair paradise promised by the socialists, with the understanding that the idea of individual freedom would be very well received by citizens when confronted with the idea of submitting to the will of the leaders of the group, which was what the socialist dictatorship and the imposition by force of an egalitarian and fair society would be identified with. That was the idea, to resurrect the liberal idea of fighting against the arbitrariness of the established power, even when the government is democratically elected and claims to seek the welfare of the citizens.

The idea of reviving liberalism and confronting it, not with the arbitrariness of a monarchy, but with the arbitrariness of any government, whatever the legitimacy on which it is based, was not a bad idea, but none of the people gathered at Mont Pelerin were fools and,

Hayek, although not a brilliant economist, was not either. He, and everyone else, was well aware of the role that intellectuals play in propagating more or less utopian and unattainable ideas that sweep people along in the hope of a better life. In fact, Hayek attributed much of the success of socialism to the fact that the belief in an egalitarian paradise was shared by the intellectual elite of the time, and it was clear to them that without the intellectual elite and the influence it exerted on the rest of the population, the liberal revolution would not be possible and it would not be possible to defeat the socialist threat.

Luckily for the group, at that Mont Pelerin meeting was Karl Popper, an Austrian philosopher with a deep understanding of the scientific method, science and its weaknesses. It was Popper who made the group understand the immense manipulative power of the common belief that science and the scientific method are infallible. In fact, as Popper made them see, a large part of Karl Marx's success was to present Capital as a scientific treatise on economics, in which he scientifically demonstrates the mechanism that capital uses to exploit the worker: surplus value. Karl Popper convinced everyone that liberalism, if it was to succeed among the intellectual elite, needed to be presented to the world as an economic theory backed by science and the Scientific Method. In Popper's view, only after science endorsed the goodness of the free market and laissez faire would it be possible to convince the intellectual elite to embrace liberal doctrine and pursue the pursuit of individual freedom, not just as a desirable utopia in its own right, but as necessary to achieve maximum social welfare.

After a few days of meetings, the Mont Pelerin Society was finally founded with the aim of carrying out a set of actions, known as "Operation Knight" after the name of the economist who finalized it, which can be summarized in the following three points:

1) To occupy with economists akin to the liberal ideology, the teaching positions within the universities of economics of the free world. First in the private universities of the USA and then in the public universities of the whole world. The private character of most US universities would facilitate the operation within the US, but to do the same in public universities around the world would require a little more fine-tuning.
2) Using economic journals to propagate and support the Liberal Theory. First, by publishing in the journals only articles supporting the desirability of letting the market act freely, while preventing the publication of articles disseminating any alternative economic theory. Second, and no less important, to prevent the publication in the journals of articles that questioned the validity of the Liberal Theory. The fact that economics journals are all private institutions that depend on private universities in the US, and the fact that any article has to undergo an obscure screening process before publication, was going to make the job of censoring anything published in economics journals much easier.

3) To establish the Nobel Prize in Economics (which did not exist at that time) and to control the process of choosing the winners, so that the prize would only be awarded to economists who defend the Liberal Theory. The purpose that was to be pursued from then on was none other than to give the Liberal Theory an apparent scientific character, since everyone knows that the Nobel Prize is only awarded to people, such as Albert Einstein, who have made great scientific discoveries. The fact that the Nobel Prize in Economics was initially awarded by a Swedish central bank, originally a private institution, and the fact that the Nobel Foundation is a private foundation (as are all private foundations in the US) would make it much easier to create a completely opaque election process that would guarantee the Mont Pelerin Society the behind-the-scenes choice of the laureates.

Operation Knight" began in the early 1950s as part of a much larger and more ambitious operation known as the "Witch Hunt", which was intended to expel anyone suspected of having socialist ideas from relevant positions in the US administration. Although the witch-hunt apparently ceased in 1955 with the removal of Senator McCarthy from the chairmanship of the Un-American Activities Committee, the truth is that the ideological cleansing did not stop then and continued well into the 1960s.

In a few years, less than a decade, anyone considered to have a socialist mentality had been expelled from positions of responsibility in American society, but especially from teaching positions in private universities of economics, where they were replaced by people with solid beliefs in liberal ideology. People chosen by the Mont Pelerin Association became the directors of the private economics journals and the ideas that were to be published in them from then on were subjected to strict censorship. The books that were used to teach economics in private universities were rewritten to extol the free market and Liberal Theory (for example, the book written by Samuelson became the bible of liberalism, since he received the Nobel Prize). The Nobel Prize in Economics was established in 1968, without anyone objecting to it and without anyone asking about the process of choosing the winners, nor did anyone ask who were the people in charge of choosing the winners. A complete success, impossible to believe, only a decade earlier, by the majority of those gathered at Mont Pelerin.

Operation Knight" culminated well into the 1970s, when Friedrich Hayek was awarded the Nobel Prize in Economics, proving to all the members of the Monte Pelerin Association that the three phases of "Operation Knight" had been completed successfully and without any opposition from economists of socialist ideology:

- The ideology of professors working in private universities in the United States was controlled and the ideology of professors working in public universities in the rest of the world began to be controlled as well.

- Everything that was published in the most prestigious economic journals in the world, all of them private and dependent on private universities in the USA, was controlled.
- The awarding of the Nobel Prize in Economics was controlled, which was only received by economists of liberal ideology, almost all of them professors who worked for one of the many private universities in the USA and, only marginally, the odd European economist, also of liberal ideology.

By the mid-1970s, everything was ready to embark on the real conquest of the free world. Thanks to the network of liberal economists that "Operation Knight" was infiltrating in public universities around the world, the science of economics was already in an advanced state of decomposition, being unable to give a coherent response to the economic crisis that had caused the rise in the price of oil in 1973. The confusion created in public universities by liberal economists, with their constant and unjustified criticism of any policy that limited the "laissez-faire" of business, made governments appear to be to blame for the excesses and arbitrariness of the financial and business sectors.

The few remaining economists of socialist ideology had no joint answer to offer their governments to explain the origin of the exchange rate crises that were ravaging economies around the world, and even if they had had one, it would not have been of much use because only the explanations offered by economists working for private universities in the United States were published in the economics journals. Economists had become isolated from each other, with no real possibility of communicating and no possibility of creating any consensus through the economics journals, which were now run by people belonging to the faculties of private US universities. There was no longer any scientific methodology, no scientific consensus was possible, and the science of economics was dying for all to see. What was beginning to be taught in public universities around the world were theories that had been fabricated specifically to dismantle any organized defense by local governments against the free flow of money or against any attempt to protect themselves from foreign products with tariffs. There were no longer any answers based on scientific knowledge.

The world's Governments had become defenceless in the face of the challenges that technological developments and the growing economic power of the financial sector posed to citizens.

(Compare the state of economic theory in the 1970s with the situation after 2008, when even economists have not been able to give any coherent answer to the origin of the crisis that hit the world in 2008. Only the Federal Reserve seemed to know what it was doing when it prevented Capital Market prices from collapsing and dragging down the real US economy. But except for them, no one in the world of economics was able to string together two sentences in a row that meant anything. Despite this, economists continue to teach the same nonsense in public universities around the world that they taught before the crisis, just as the Nobel Prize continues to be awarded to the same economists who

claimed and continue to claim that the 2008 crisis could not happen. Nothing seems to have changed within economics).

7. THE DOLLAR INTEREST RATE

It is very interesting to analyse what happened from the 1970s onwards, once all the objectives that had been proposed with Operation Knight by those gathered at Mont Pelerin had been achieved, because it coincidentally coincided with the abandonment of the Bretton Woods agreements and the return to the economic scene of the central banks, if they had ever left it.

From those years on, the Mont Pelerin Association became radicalized, unashamedly turning into a fascist organization that supported all the military dictatorships that had been imposed on legitimate democratic governments, and that defended the reduction of public spending to levels that endangered the very existence of nations. Moreover, perhaps most absurd of all, they insisted that the US return to the gold standard, when it was obvious to everyone that this was completely impossible. After more than two decades of sponsoring, in the name of freedom, military coups in every corner of the world, the Mont Pelerin Association was marginalized from the leadership of the liberal cause, which passed into the hands of the people who ran the faculties of the private universities of the United States, with ideas much less fascist in appearance, and capable of giving continuity to the liberal project, attracting to their cause intellectuals of the time, who only a few years before had called themselves socialists.

During the following two decades, the 1970s and 1980s, private universities in the United States were responsible for spreading throughout the world a huge self-sustaining clientelistic network of economists loyal to the Liberal Theory. Thanks, above all, to the curriculum that they obtained with the publication of articles in the private magazines of economy, their hiring as teachers was assured, and at the end of the decade of the 80s, most of the teachers and researchers who gave classes in any public university of economy of the world, or were liberals or were Keynesians of liberal cut, who had obtained their curriculum thanks to the backing received by the private universities of the USA (Both types of economists think the same, speak the same and have the same liberal vision of the economy. The only difference between them is that the former blame the government for meddling too much in the economy and spending too much, while the latter blame the government for meddling too little in the economy and not spending enough. For both, the government is always to blame for everything that goes wrong in the economy.)

It was then that the golden age of liberalism began. In the early 1980s, Ronald Reagan and Margaret Thatcher were elected presidents in a climate of exalted liberalism amplified by the media, and supported both by economics professorships around the world and by the ideas of economists who had received the Nobel Prize. In that decade, the occupation of teaching posts within public universities by economists loyal to the liberal cause was completed. Economics had ceased to exist as a scientific discipline and what was being taught to students in any public university in the world were the economic theories manufactured exprofeso by private universities in the USA.

Why do we need an economic theory? We all know that economists who occupy positions of responsibility within public institutions are in charge of advising governments and warning them of the consequences of the decisions they take, but for that they need to have an economic theory they can trust. However, when the people who occupy these positions of responsibility within the public administration are promoted solely on the basis of the ideology they profess and their notorious lack of criticism of any stupid idea published in a prestigious economic journal, then they will be unable to advise anyone and the governments they serve will walk blindly in a world in which an economic crisis, however small it may be, will condemn millions of people to misery.

This is what happened after 1971, when the Bretton Woods agreements that had allowed the longest period of world growth in modern history, the so-called "thirty glorious years", were broken. At that time, just when their governments needed them most, economists had no idea what to do to cope with a world where a local currency, the dollar, was the reserve currency, while each country operated with its own currency. The only existing theory on the subject had been constructed by the Canadian economist Robert Alexander Mundell, and it implied that it was possible to keep the exchange rate fixed against the reserve currency, as long as the country renounced its own fiscal and monetary policy. With such a theory, for which Mundell was awarded the Nobel Prize in 1999 and which was called the Optimal Currency Area Theory, the succession of exchange rate crises in which the world would be plunged was inevitable, because it was self-inflicted.

At the beginning of the 1980s the first exchange rate crisis appeared, devastating almost all the economies of Latin America, something that had never happened before, and leaving the rest of the world economy, including the USA, badly affected. While Bretton Woods was in force, the control of monetary flows had allowed the exchange rate between currencies to remain fixed, but after the breakdown of the agreements, monetary flows began to be liberalised and the exchange rate with the dollar was allowed to fluctuate without governments being able to do anything to prevent it. The problem worsened when, in order to avoid devaluation of the local currency, persistent imbalances in the balance of payments began to be settled by borrowing from private investors rather than from central banks, as had been the case under the Bretton Woods agreements. Now, governments could not count on the collaboration of the US government to lend them the

necessary dollars at almost no interest. The new and harsh exchange rate reality took care of responding by itself to the new situation posed by the dollar and the liberalization of monetary flows and already, at the beginning of the 1980s, almost all governments were forced to devaluate and let the currency float, with many countries entering into an exchange rate crisis due to debts contracted with investors, almost all of them during the harsh rise in the price of oil in the 1970s.

Specifically, the first countries to fall into an exchange rate crisis were the Latin American dictatorships and the immediate consequences of the devaluation, the so-called Latin American "lost decade", was to definitively destroy the incipient local industry that had been protecting the substitution policy of the Bretton Woods era. After that crisis, the entire Latin American continent specialized in the production of raw materials that were exported to the industrialized countries, entering into a spiral of unequal exchange from which even today, forty years later, they have not been able to escape. That was not a lost decade, but a lost half-century from which Latin America has still not recovered.

That was only the beginning, and in 1989, Norway and Sweden also entered into a crisis of change when the real estate bubble that had developed in their respective countries burst. It was the year in which the "Iron Curtain" fell and with it, the USSR, the great reference used by Western economic elites to justify coups d'état in Latin America and the rest of the world.

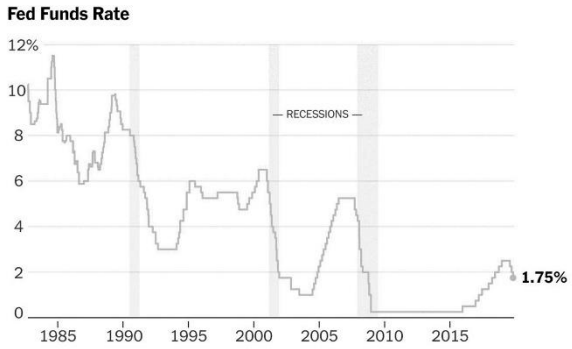
At the beginning of the 1990s, in 1993 to be precise, the whole of Southeast Asia entered a crisis of change. The economies of Indonesia, South Korea and Thailand collapsed without remedy, and the economies of the rest of Asia and Oceania were seriously affected. Although we have hinted at it, but we have not said it explicitly, the result of an exchange rate crisis is always the specialization of the economy in the production of raw materials or in the production of goods with low added value. In the case of the Asian crisis, this specialisation is also observed, even though South Korea, being a highly industrialised country, does not show the process in such an obvious way. This is also the case in Sweden and Norway, even though in these countries it is much more difficult to see the process of specialisation in lower value-added products.

In 1998, at the end of the 20th century, Russia also entered an exchange rate crisis that completely destroyed its economy. Russia was, at that time, a rapidly re-industrialising country that was trying to avoid specialising in the production of raw materials, but was brought to its knees by the exchange rate crisis. The Russian crisis shows much more clearly the specialisation in low value-added products that a country suffers when it finally manages to recover. If even before the exchange rate crisis Russia was highly dependent on trade in raw materials, after the exchange rate crisis this dependence has become chronic. The Vodka crisis, as it was jokingly called in the books used to teach economics in

private universities in the US, was particularly cruel to the civilian population and ended up bringing Vladimir Putin to power.

When the new century finally arrives, almost no economy in the world has been spared the devastation of an exchange rate crisis. Except for China, Germany and the USA, the world was in a state of total desolation. Misery was everywhere, and it was only thanks to the economic success of the Chinese that the UN figures on the increase in poverty and inequality in the world could be disguised. However, the network of liberal economists working for private universities in the US, in their books, call the period of time between the crisis of change in Latin American countries and the crisis of change in 2008, with the name of "the great moderation", surely because the US was not using nuclear bombs to conquer the world.

Let's try to understand what has happened in the world during these last 50 years of great moderation by the Federal Reserve. Let's look at the attached graph, which shows the evolution of the dollar interest rate. Although the data is only shown from 1990 onwards, the three big increases in the dollar interest rate made by the Federal Reserve during the period can be seen very well. The first big increase starts in 1993 and is the one that causes the Asian crisis. You can also see very well in the graph the interest rate spike in 1998, which is the one that caused the Russian exchange rate crisis. The second big interest rate hike started in 2004 and was stopped by the Federal Reserve in 2008 because of the recession it created in the US. The third major rate hike starts in 2015 and, again, is stopped by the Fed at the end of 2018, before the US economy goes into recession (the arrival of the pandemic hides this fact).



If we had started the graph a decade earlier, in 1980, we would also have seen the big rise in the dollar interest rate that the Federal Reserve initiated that year of 1980, which was the one that provoked the exchange rate crisis that devastated the entire Latin American continent (on this occasion, the interest rate rose to 22%, about 7 points above peak

inflation). We would also have been able to see the spike in the interest rate of the dollar in 1987, which coincided with the crisis that destroyed the economy of the Nordic countries.

Why has the evolution of the dollar's interest rate never been associated with the exchange rate crises that have plagued the world for the last 50 years? Are there not enough economists in the world for one of them to see the graph and establish, not only a possible correlation between the two phenomena, but a clear and authentic cause-effect? Of course there are such economists, but their works do not transcend because they are not published in the prestigious economics journals that depend on private universities in the U.S., and they are forgotten without anyone getting to know them. We must understand that any economist who wants to prosper in any public university has to look the other way and be interested in other topics, just those other topics that are rewarded with their publication in those prestigious journals that then count for the curriculum.

But let's note that the graph showing the interest rate at which the Federal Reserve lends money says something else.

Specifically, the chart tells us two more things. First, that the interest rate hike that began in late 2003 affects the US economy the most, something the Fed did not expect to happen. It was only because the Federal Reserve was forced to quickly lower the interest rate and orchestrate a bailout of the economy, unprecedented in the history of the Fed, that the European economy was saved from the devastating consequences of the persistent rise in the interest rate of the dollar. Secondly, the dollar interest rate hike initiated in 2015 was once again thwarted because the Federal Reserve had to backtrack at the end of 2019, before the US economy slipped back into recession, a fact that the Fed did not expect to happen either, but a fact that, for the second time, saved the world from an exchange rate crisis of unpredictable consequences.

Let's note that the Federal Reserve keeps raising the dollar interest rate until the US economy shows signs of going into recession. As long as that does not happen, the Fed maintains the level reached by the dollar interest rate, regardless of what may be happening in the rest of the world. Apparently, a Russian life is not worth as much to the Fed as an American life, and the devastation wreaked on the population by an exchange rate crisis in any one country matters little to the Fed as long as that country is not the US. Let us note that economists working for private universities have no explanation for what is happening, because officially nothing is happening. In the economics textbooks, the devastating crises of change do not appear, and the only thing that is told in them is the wonderful "great moderation" into which the US economy has entered since the 1980s. What happens to the rest of the world does not seem to be the object of study of economics.

However, if we look at the destruction that an exchange rate crisis is capable of leaving behind, we will all agree that the persistent rise in the dollar interest rate has more destructive power than any nuclear bomb, and if we look at the deaths they cause in the civilian population, we would all agree that those who run the Federal Reserve should be considered war criminals. An economic theory is a weapon of mass destruction when the country that has it uses it to destroy the economy of another country which, moreover, is incapable of defending itself because the economists who occupy the positions of responsibility, and who have to advise the government, work for the foreign country that is destroying them.

Let's look at the graph once again.

In the graph, it is very clear that the value of the interest rate, every time the Federal Reserve starts to raise it, is lower and lower. Specifically, the value is 3% in 1993, close to 1% in 2003, and has a value of almost zero in 2015.

Why, now, does the US economy threaten to go into recession every time the interest rate is raised and before it did not? Evidently, because the Federal Reserve does not know that the consequences of raising the interest rate are not the same when the interest rate is close to zero as when the interest rate is close to 3%. But why does the starting level of the interest rate matter? The reason is in this equation:

$$K = \frac{\langle \alpha \rangle \cdot k_F}{i} M$$

This is the most important equation in macroeconomics, but to understand what it says, it is necessary to first read the Madrid Theory which we will explain below. Our intention is not to tell it now, but to show that the US has used the network of economists it has been infiltrating in the positions of responsibility of countries around the world to blind and leave governments defenseless against the consequences of the use of the dollar as a reserve currency. All governments have accepted as good, the idea of allowing the free circulation of money and free trade, in the belief that it is only necessary to let the exchange rate float to avoid exchange rate crises, precisely because that is what economists working for private universities in the US propagate as true. However, the reality is the opposite, and no sensible country can let money circulate freely, nor can it let the exchange rate with the dollar be fixed by the market, because, in that case, it is exposed to an exchange crisis when the markets decide.

The world has already been saved twice from the destruction caused by an exchange rate crisis because the Federal Reserve has not been able to raise the dollar interest rate, but soon inflation will make its presence felt in the world's major economies, including the US. Then, it will be like going back to 1979, when Paul Volker started the monetarist experiment and raised the dollar interest rate up to 7% above inflation, which caused a

short recession in the US, but mercilessly sank the Latin American economies, the most vulnerable at that time, and seriously affected the rest of the world's economies. Perhaps it is time to remember that the postman always rings twice, but never rings a third time.

THE RESERVE CURRENCY. We will not go into the details of why this happens, but the direct consequence of raising the interest rate of money is to decrease the amount of money created by bank credit, since it becomes more expensive to maintain. As bank credits become more expensive to maintain, they, in aggregate terms, decrease, but in doing so, the bank money that is sustaining the exchanges also decreases.

Specifically, when the Federal Reserve persistently raises the dollar interest rate, not only is the US economy being pushed into a recession, but international trade is also being pushed into a recession because of the decrease in the amount of dollars. The decrease in the amount of dollars forces a reduction in international trade between countries, even though they wish to continue to trade. A macabre game begins, very similar to the game of chairs, in which investors try to find out which country will be the first to be unable to pay the interest on its debts in dollars, which they know will happen sooner or later because, in the face of a possible default, they themselves raise the risk premium they charge for their loans.

We say it is a macabre game because it is inevitable that the scarcity of dollars will end up preventing a country from meeting its debt commitments, since the high interest rate of the dollar feeds back into the high risk premium demanded by investors for lending the reserve currency. At some point in the not too distant future, investors will stop lending dollars to a country and the country will then be forced to devalue its currency and enter a spiral of default that only ends when the country's capital market collapses.

It is necessary to understand that any country maintains a delicate balance between the dollars it spends on the purchase of products abroad and the dollars it earns from the sale of products abroad. The absence of dollars in the international market changes this balance and forces many countries to borrow the dollars that have stopped coming in because of the contraction of international trade, as happened to Russia in 1998, since it is the dollars it obtains from foreign sales that are allowing it to pay the interest on the debt contracted in dollars. Or in other words, when the interest rate of the dollar rises, not only is international trade being impeded, but also the payment of the debt commitments in dollars that countries have contracted is being impeded. It is in this situation, when the country does not really have any serious economic problems, but the income in dollars has been reduced, when investors (investment banks) raise the risk premium they charge for their loans, turning the credit default into a self-fulfilling prophecy and provoking an exchange rate crisis if the situation of lack of dollars persists long enough.

It is in a situation of lack of dollars that the difference between a US company and a company from any other country in the world is best appreciated. When the former asks for a bank loan, it receives dollars, while the latter does not. To acquire dollars, a company from any country in the world must exchange local money for dollars, which it can only do if its government borrows in dollars from a US Investment Bank at a totally arbitrary risk premium set by the Investment Bank itself. This is not what happened when Bretton Woods was in force, since then it was the Federal Reserve who facilitated bank credit at a low interest rate and without conditions. The privilege that the Investment Banks have to create money is absurd, especially those in the US, since they are the ones that allow international trade, since they are the ones in charge of providing the necessary liquidity in dollars. A privilege, by all accounts, absurd.

When the Bretton Woods agreements were signed at the end of World War II, the rest of the countries of the world were not able to understand the great generosity of the United States that the agreement implied. The sad thing is that after almost a century, economists still do not understand that it is a real stupidity to use the currency of a particular country, the dollar, to carry out international trade between countries, and that it is a crime against humanity to raise or lower the interest rate of the dollar without taking into account the consequences for the rest of the countries of the world. We fear that economists will long continue to miss the point, and that we will never see any chairman of the Federal Reserve on trial for crimes against humanity, even though his decisions have caused far more deaths than any more conventional war criminal.

8. THE THIRD WORLD WAR

Albert Einstein was asked one day what kind of weapons would be used in World War III, and he replied that he did not know, but he was sure that World War IV would be fought with stones. To understand Einstein's answer, you have to understand who Einstein was and the context in which he was being asked the question.

Albert Einstein was the most prestigious theoretical physicist of the 20th century and a convinced pacifist, in spite of having signed a joint letter addressed to President Franklin Roosevelt for the USA to build the atomic bomb. The context in which he was asked the question was the nuclear race that the USA and the USSR had started a few years before. What Albert Einstein was saying, with his keen sense of humor, was that the weapons had reached such a level of destruction that the whole of human civilization would be destroyed in the event of a Third World War.

But Albert Einstein was wrong.

Only a few years after Einstein's death in 1955, the Third World War was going to start without anyone noticing it. A war in which all the economies of the free world were going to be annihilated, and whose direct consequences were going to be the condemnation to a life of misery and hunger for more than half of the world's population. All this, without dropping a single bomb and without anyone being able to do anything to prevent it. And no, the Fourth World War was not going to be fought with stones, as Einstein thought.

What is a war for?

A war has always been fought for the same reason, to seize the enemy's natural resources and, if possible, to put them to work for the victor. This is not debatable. This has always been so, and always will be so. There has never been any other reason for waging war except to achieve the economic benefits one hopes to gain from it. That is why Einstein was wrong, because no one is ever going to wage a war from which he will not derive any economic benefit and in which he runs the risk of being annihilated, as would happen in the case of using nuclear weapons. A nuclear war is not a good business for anyone.

But are nuclear weapons the only weapons that exist and the only weapons with which World War III can be waged? No. There are other weapons that are far more destructive than nuclear weapons, that allow you to take your enemy's natural resources and put them to work for you, and all without any risk to those who use those weapons. I am referring to science, the most powerful weapon that has ever existed and far more destructive than any other weapon. Specifically, I am referring to the science of economics, a discipline that can easily be used as a weapon of mass destruction because it has more capacity for annihilation than any nuclear weapon and yet possesses none of its drawbacks.

Let us give an example so that we can understand what we are saying.

Let's imagine a country, for example, Spain. Let's look at the low price farmers get from selling olive oil. What should the government do to solve the problem facing olive production, or at least alleviate it? Put tariffs? Subsidize the crops to keep the jobs? Eliminate the crops and find alternative work for the farmers? The government has many options and choosing among them is not necessarily an easy task, but anyone understands that making a good decision will make Spain and Spaniards progress, while making a bad decision will make Spain and Spaniards poorer.

Thanks to this example, we understand very well how important it is for any country to have an economic theory that it can trust and on which the government can rely to make the decisions it faces with guarantees of not making mistakes. Now it is well understood that the progress of the billions of people who live on the planet and indirectly, of the ecosystems in which they live and of life on the planet itself, will depend on having or not having an economic theory that is scientific and that you can trust.

If we are able to understand the importance of having an economic theory, then we are also able to understand the importance of our enemies not having one. In such a situation, we will make progress based on economic theory, while our enemies will make the wrong choices that will lead them to impoverishment and eventually to economic dependence on us.

In this context, for example, it is possible to understand why the US Federal Reserve reacted so quickly in 2008, when it created more than 4 trillion dollars to buy assets of all classes, and yet the European Central Bank delayed the same decision for about 5 years, with very damaging consequences for the European economy. Why did the US government make the right decision quickly and why did the European government delay the same decision for 5 years? Well, because the US government has a reliable economic theory to go by, while the government of Europe only has the nonsense you read in university textbooks written by economists working for private universities in the US.

Why did the Bank of Japan raise the yen interest rate from 2.5% to 6% when the stock market had long since collapsed and it was clear that the economy was heading for a severe recession? The Bank of Japan did not lower the yen interest rate until 1995 when the economy had been flat on its back for at least a couple of years.

While in the USA, the responsible positions in the administration are occupied by economists who know economics, in Europe and in the rest of the world, the responsible positions in the public administration are occupied by the dense network of liberal economists who have been infiltrating the private universities of the USA for years. These infiltrated economists have no capacity for criticism and do not know the most elementary things about a monetary economy, among other things, because they have been selected exprofeso for their ignorance of everything related to bank money. What would have happened in Europe in 2013 if we did not have the example followed by the Federal Reserve in 2008? Well, the European Central Bank would never have created more than 3 trillion Euros to buy financial assets of all kinds to prevent the European Capital Market from collapsing in 2013. The ECB did this because it saw the Fed do it first. Without the Fed's guidance, Europe's entire economy would have collapsed without remedy in 2013.

An Economic Theory is a weapon of mass destruction when your country has a theory to rely on and the rest of the countries in the world do not have it, and it is the same as with the nuclear bomb, when a country has the weapon and the rest of the countries do not have it, it is very likely that it will end up using it.

<u>THE FEDERAL RESERVE</u>. Perhaps economists reading this believe that what students are taught in economics textbooks has something to do with reality, but they are wrong. Specifically, those books claim that the Federal Reserve raises and lowers the dollar interest rate to keep inflation in check, even though it is very easy to check whether that is true.

The attached graph shows the evolution of the interbank interest rate and the inflation rate in the US. It is very clear that the Federal Reserve is not raising or lowering the interest rate to control inflation in the US, since it has remained below 5% per annum since 1990. In fact, since 1995 the inflation rate has never exceeded 3% per annum and it cannot be justified in any way, on the basis of the data, that the Federal Reserve would raise the interbank interest rate above 6% per annum to protect the US from the threat of inflation when the main consequence of doing so was to sink the economy of South East Asia in 1997. Much less is it possible to justify the Federal Reserve's interest rate hike in 1999 that ended up sinking the Russian economy as well. In both cases, inflation in the US was fully under control.

We see that the attitude of the Federal Reserve from 1995 onwards cannot be justified in any way.

However, it is easy to see that the end result of the persistent, and unjustified, interest rate hike from 1995 onwards can be explained very well by the Federal Reserve's desire to sink the euro before it was even created. In that case, the collapse of the South East Asian economy and the subsequent fall of Russia, was the collateral victim of a war between two great currency areas, the US and Europe, waged not with nuclear bombs, as Einstein thought, but with the immense destructive power of an economic theory.

The most powerful weapon that exists has always been knowledge, and it is very important that any knowledge be shared by all and remain outside the struggles between countries, and much more, economic knowledge.

9. WHAT TO DO?

Where does the power that private universities in the US have over everything related to economics come from? It comes from the merit-based competition that an economist who wants to work for a public university anywhere in the world has to take part in.

It is very evident that when, in a merit-based competition to access a position in a public university, the amount of articles that the candidate has published in a private economics journal in the USA is valued above all, then it is the people who run these private journals who hand out the "tickets" for access to the job that is put up for competition. This is also what happens when in the merit-based competition, the time that the candidate has worked in a private university in the USA, or in any other private institution in the USA, is valued. In such a case, it is also a private institution, and belonging to a foreign country, which is handing out the "tickets" to access the teaching positions offered by public universities, something, by all means, insane.

The problem becomes a chronic disease when, after 50 years, public universities of economics all over the world have been completely infiltrated by economists who have obtained their positions thanks to publishing in private US journals or thanks to working for some private US institution. This is what is happening nowadays, when more than 90% of the professors have obtained their jobs in public universities in this way. It is easy to see that there is already a client mafia of economists that reproduces itself over time, thanks to the fact that they are the ones who determine what specific merits will be taken into account to select new candidates. These clientelist mafias are the ones who decide which specific economics journals will be taken into account to assess the suitability of the applicant, and which specific private universities will be taken into account to assess the teaching time, so that the merit-based competition becomes a handpicked election, since publishing in those journals or working in those private universities does not depend on any merit-based competition, but on being recommended by someone who belongs to the clientelist network.

It is the same procedure that the Catholic Church used for many centuries to maintain earthly power in Europe over the power of governments: choosing the priests who gave mass in the small local parishes. Today, private universities in the United States are the ones that impose the economic theory that will guide the governments of all the countries of the world, and they achieve this thanks to the support given to the theory by the extensive network of economists who work for them in public universities around the world. Just as the Catholic Church threatened kings who dared to oppose the dictates of the clergy of Rome with excommunication, so the private universities of the United States threaten governments that dare to raise tariffs or that dare to limit the movement of money with economic sanctions and the flight of investors' money, a threat far more real and destructive than any excommunication by the Catholic Church.

Evidently, the first thing to be done to eliminate the power of decision that private universities in the US have over economic affairs is to expel all the economists that have infiltrated public universities around the world, and to destroy the clientelist network with which they renew themselves. The situation would be similar, saving the distances, to the expulsion of the Jesuits that took place in many countries of the world, in view of their constant interference in earthly affairs. For this, we only need to change the merit-based competition for access to teaching posts in public universities, not only for new candidates, but also for established teachers and professors who owe their jobs to merits obtained in private institutions in a foreign country.

Specifically, the changes that need to be made are:

1) A public network of economics journals has to be built that perform their function under strict transparency and strict control by the whole community of economists. This will eliminate the main source of power that private universities in the US have, since they would no longer decide who publishes and what is published in economics.
   Of course, in order to guarantee the transparency of the process of admission of articles for publication, it is necessary to make public, together with the evaluation of the article, the name of the person who evaluates it, so that both are known to the entire community of economists. Science is the result of a methodological consensus based on the permanent criticism of ideas, and any criticism, before anything else, has to be public.
2) No article published in a private economics journal should be considered an academic merit to access a position within the public administration and, much less, serve to apply for a job in a public university. Neither should the time spent teaching in a private university, or the time spent working in a private institution, ever count as a merit to apply for a position in a public university of economics, quite the opposite. It is barbaric to let foreign people who run private institutions in foreign countries decide which people will occupy positions of responsibility in the public institutions of a sovereign country.
3) The Nobel Prize must be awarded by the scientific community as a whole. It cannot be left to a group of people, who nobody knows who they are and nobody knows what interests they protect, to award the Nobel Prize in Economics. This is truly barbaric. The method used to award the Nobel Prize must be transparent and similar to that used in the cinema to award the Oscars or the Goya Awards. It must be economists from all over the world who select the person deserving of the Nobel Prize by an open two-round ballot. In economics, as in film and song, each economist has to count one vote.

(It is often thought that an article is scientific because it is published in a scientific journal, thus indicating that it is the scientific quality of the journal that endorses the scientific

quality of the article, when the reality is the opposite, a journal is scientific because scientific articles are published in it. The function of a scientific journal is not, nor can it ever be, to endorse the scientific quality of the articles published in it, this is absurd. If that were the reason why journals exist, then a handful of people, the editors who run the journals, would be the ones who decide what is and what is not scientific by allowing or not, the publication of the article in the journal. This is what happens today, and it is the reason why economics journals are no different from the publications run by any religious sect. It is also the reason why economics is no different from a religious doctrine).

ECONOMICS IS DIFFERENT. The prestige of an economist cannot depend on whether or not a private journal publishes his or her work, or whether or not he or she is cited more or less frequently in other articles by other economists. This is tantamount to giving the editors of these journals the privilege of selecting the teachers and researchers who will work in public universities around the world, which is absurd and should never be allowed. Nor can it ever be allowed that the curriculum vitae used to assess the suitability of a teacher or researcher applying for a public post should include the time he or she has worked for a private institution that is governed by private criteria and that has hired him or her according to private criteria.

We fully understand that to arbitrate a procedure of self-assessment, so that the scientific community of economists themselves assess themselves, is a very delicate aspect that must be studied carefully, but the alternative to not doing so is odious. In 2020 the Nobel Prize in Economics was awarded to the Americans Paul R. Milgrom and Robert B. Wilson for their research in auction theory, according to the award proclamation. However, when we look at the extensive academic record of both economists, we note with horror that no merit, award, or work contract, was ever obtained by facing other economists in an open merit competition. All the curriculum that either of the two economists has been acquiring during more than 50 years of profession, has always been obtained "by hand" and without ever competing with other candidates in an open and transparent way. Even the Nobel Prize in Economics has been obtained in this way, by hand, and we will never know who has awarded it to them, nor what criteria have been used to choose them and not other economists.

The discipline of economics is different and there is a very high incentive to misrepresent it.

It is very important to understand that the science of economics cannot thrive subject to the dictates of a Court of Censorship that selects in the shadows the papers that are or are not published in the most prestigious journals of economics. It is very important to remember that 7 out of 10 economists who have received the Nobel Prize in Economics are of American nationality. If we count the number of economists who have received the prize and who are not of US, European or Russian nationality, then we do not find only the

Indian economist Amartya Kumar Sen, which shows that our colonialist prejudices of the end of the 19th century remain unchanged. It is a real shame.

It is very important not to continue to allow economists working in public universities and public institutions in all countries of the world to owe their jobs to private universities in the USA, because it is those economists who should be advising their governments when they have to make difficult economic decisions.

10. THE MADRID THEORY

The Madrid Theory is a Keynesian theory that follows in Keynes' footsteps and justifies the whole theoretical environment he created when he wrote the "General Theory of Employment, Interest and Money".

In the Madrid Theory, the notion of aggregate demand, so important in Keynes' work, is replaced by disposable income, a concept analogous to it, but well defined from the scientific point of view, which, moreover, has a solid mathematical basis. To this end, the Madrid Theory corrects Keynes' definition of saving, which he introduces using the erroneous classical definition, and deduces the most important consequences of the new definition in the form of a pair of equations of great importance that any monetary economy has to fulfil.

The Madrid Theory touches almost all aspects of economics and is too extensive to summarize here in a few words. Following the ideas of the Italian economist Piero Sraffa, it develops a theory of price determination in the consumer market, which is completed in later chapters with a theory of price determination in the capital market. The theory correctly defines what capital is and associates it with goods that produce rents, which are named capital goods. This distinction between consumer goods and capital goods is, perhaps, the most important observation made in the Madrid Theory, because, although it may seem unimportant, it is what ends up giving a totally different character to a monetary economy from any other system used to organize the production and distribution of goods.

It is not our intention now to summarize the Madrid Theory, but to point out that it is a theory that confirms all the ideas that Keynes poured out in his 1936 book, and develops them to the point of overcoming them and leaving them behind. For example, it defines in a very rigorous way the idea of uncertainty that Keynes introduces in a very vague way to explain the fluctuations of investment and the origin of recessions. In the Madrid Theory, uncertainty is introduced as a postulate when stating the First Law of Capital, which gives

it a mathematical support that allows both its precise calculation and the experimental verification of its value. In the Madrid Theory, Keynes' idea of uncertainty is carried to the end and is used to enunciate a second and a third law with which the Three Laws of Capital are completed, which will serve to characterize the Capital Market and with it, capitalism.

However, in spite of all that has been said, in the exposition of the Madrid Theory very few references are made to Keynes. That is because we think his work has been totally distorted by economists working for private universities in the US and we do not wish to deal with the preconceived ideas economists have in their minds about what Keynes did or did not say. We have decided that, by exposing the ideas without commenting that they are ideas taken from the "General theory of employment, interest and money", we would not conflict with the opinion each one has on Keynes' thought.

To conclude, just to say that the Madrid Theory has been constructed with the intention of bringing economists out of their lethargy and reminding them that their job is to advise and protect the citizens of the country in which they live. It is to them that they owe their salaries and it is to them that they should serve. If we were to say anything to these sleepy economists it would be, in a nutshell: "Try to understand what this equation says".

$$K = \frac{\langle \alpha \rangle \cdot k_F}{\overline{\aleph} \cdot i} M$$

It hides the best kept secret in the world. On the other hand, to the economists who work in public universities and who owe their jobs to the private universities in the USA and to the rigging of merit competitions, tell them to get a job in one of those private universities in the USA, because we are going to throw them out of our public universities without any consideration and without a care in the world.

11. THE FIRST THEOREM OF DISCOMFORT

A company is an organization of economic and human means constituted with the purpose of obtaining economic benefits, therefore, the term "economic benefit" is an essential part of the definition of company and it is necessary to define it if we want to know what we want to name with the word company. For one thing, an organization that does not fundamentally seek this economic benefit can be many things, but it is not a company. Moreover, the essential characteristic of a company is that it always seeks the maximum economic benefit, and we will hardly be able to know what is the maximum benefit that each of the companies competing in a market can obtain, as long as we do not define it.

The Dictionary of the RAE defines profit as "economic gain obtained from a business, investment or other commercial activity", so stating that the company seeks the maximum economic benefit is the same as stating that the company seeks to achieve the maximum economic gain, which is not a tautology since the economic gain is a term that is very well defined since ancient times, and refers to the money obtained from a business.

Our insistence on this point is not idle, because now that we know what the profit of companies is, we can check whether the statement made by the Scottish Adams Smith in a book written in 1776, "The Wealth of Nations", is true or not, although we still do not know what is the maximum profit that a society can obtain:

> *"The natural effort of every individual to improve his own condition, when freely and securely exercised, is so powerful a principle that, alone and unaided, it is not only capable of leading society to wealth and prosperity, but of overcoming the hundred impertinent obstructions with which the folly of human laws too often hinders its operation."*
>
> *Adams Smith, (The Wealth of Nations)*

This statement is the essence of liberal economic doctrine and is the basis for the idea that general political considerations must be subordinated to private economic considerations, since it affirms that by letting everyone pursue his own maximum personal interest, society will also achieve the maximum general benefit, which is not clearly true. Let us observe that we can associate the maximum benefit pursued by companies with the improvement of our own condition Smith speaks of in the paragraph, but it is not at all clear to what we can associate the wealth and prosperity of society, to be able to prove that both ends can be achieved at the same time, as Smith affirms.

We can agree, and this is of course a convention, that, since the company obtains its profit from selling the goods and services it produces, we can identify the wealth and prosperity of society with the production of the different goods at the least possible cost, understanding that when some companies produce a good at a cost higher than the minimum cost at which it is possible to produce it, then we can agree that society has not reached the maximum wealth and the maximum prosperity it is possible to reach. In fact, when we think about it a little, it is logical to conclude that an economy in which goods or services are produced at the lowest possible cost, is a society that produces with the minimum possible social effort, so our convention is a very acceptable criterion to determine when a society produces with the maximum possible profit, always understanding that there is no undesired unemployment and that there is no undesired under-use of available resources.

Therefore, to demonstrate that Smith's statement or conjecture is true, it will be necessary to show that when companies obtain the maximum possible economic benefit, they also

manage to produce goods at the lowest possible cost, because only in this way will it be possible to demonstrate that the search for the maximum particular interest also finds the maximum general interest.

Ever since Adams Smith wrote that, more than 250 years ago, all the economists in the pay of the richest social class have been desperately seeking to prove that, indeed, in a free market economy, the obtaining of the maximum possible economic profit by each of the companies engaged in production also leads to the obtaining of the maximum possible social profit. Such a demonstration is the "Holy Grail" of liberal economics and the richest social class has made tremendous efforts and devoted immense amounts of money to find the demonstration. In fact, the first thing they teach a university student of economics is that, in a market of perfect competition, the obtaining of the maximum profit by the companies leads to the obtaining of the maximum social profit, which is manifestly false, as we are going to demonstrate below.

Let's start by clarifying what is the criterion used to know when a company obtains the maximum possible profit. We know that any company has to comply with an accounting equation that equals the economic profit to the difference between the income from sales and the expenses originated by production, and that depends on the price and the quantity of goods produced:

Profit= Revenues - Costs

$$B(p,q) = I(p,q) - C(p,q)$$

In general, to obtain the maximum possible economic profit, the entrepreneur has to maximize the difference between the income and expenses of the company, subject to the condition that the price at which the production is sold is given by the demand function, $D(q)$. That is, we must solve the problem of maximizing a function of two variables, the profits, linked to the condition that the price is given by the demand function:

$$B(p,q) = I(p,q) - C(p,q) \qquad \text{maximize}$$

$$p - D(q) = 0 \qquad \text{restriction}$$

It is generally accepted that the cost of production does not depend on the price at which the output is sold, and it is also generally accepted that the firm's revenue is equal to the product of the quantity produced times the price at which the output is sold, when the firm produces a single commodity. Both assumptions lead to greatly simplify the problem of finding a price and a quantity of production for which the profit is maximum. Specifically, when we express the accounting equation in terms of the unitary variables, that is, when we express the profit, the revenue and the cost of the company, with the unitary profit, the unitary revenue and the unitary cost of each good, we have:

$$B(p.q) = q \cdot \bar{B}(p,q) \quad ,, \quad I(p,q) = q \cdot \bar{I}(q) = q \cdot p(q) \quad ,, \quad C(p,q) = q \cdot \bar{C}(q)$$

Where the variables with bar are profit, revenue, and cost per unit of output. Now the problem of maximizing profit, subject to the price following the demand curve, is greatly simplified:

$$B(p,q) = q \cdot \bar{B}(p,q) = q \cdot p(q) - q \cdot \bar{C}(q) \qquad \text{maximize}$$

$$p - D(q) = 0 \qquad \text{restriction}$$

After a few operations we obtain the condition that appears in all the economics books of the world:

$$\frac{\partial}{\partial q}[q \cdot p(q)] = \frac{\partial}{\partial q}[q \cdot \bar{C}(q)]$$

$$siendo \begin{cases} \frac{\partial}{\partial q}[q \cdot p(q)] \equiv marginal\ revenue \\ \frac{\partial}{\partial q}[q \cdot \bar{C}(q)] \equiv marginal\ cost \end{cases}$$

We see that the condition for the firm to produce with the maximum possible profit is reached when the marginal cost is equal to the marginal revenue, which is what we wanted to demonstrate:

Marginal revenue = marginal cost

However, the condition for the economy to produce with the maximum possible social benefit, which we have identified with getting each product to be produced at the lowest possible cost, is different from the previous condition and is calculated by deriving the unit cost and equating the result to zero:

$$\frac{\partial}{\partial q}\bar{C}(q) = 0$$

This condition is different from the first condition, so it can be stated that the search for individual profit does not coincide in general with the search for social profit. This result on the impossibility for a company to produce with the maximum possible social benefit, is general, and is valid regardless of whether or not there is perfect competition, which allows us to formulate the First Theorem of Discomfort.

FIRST THEOREM OF UNEASINESS. In a monetary economy in which many companies produce the same product independently, obtaining the maximum business profit never coincides with obtaining the maximum social profit.

Demonstration. The demonstration is simple, since the condition for a company to produce with the maximum possible economic benefit, is:

marginal revenue = marginal cost

Whereas the condition for the economy to produce with the maximum possible social benefit is that the variation of the unit cost of producing the goods is zero. $\bar{C}\,(q)$ *is zero, that is to say:*

$$\frac{\partial}{\partial q}\bar{C}(q) = 0$$

Conditions that are different and cannot be matched, in general.

This result destroys Adam Smith's utopian dream, and tells us that it is not possible to obtain the general interest by pursuing only personal interest, but it does not tell us how far the economy moves away from the situation of maximum social benefit when companies produce with the maximum possible profit.

1984. It is curious, but in the novel "1984", its author, George Orwell, predicts for that year, a society incapable of perceiving the dystopia of the reality that surrounds it. Written in 1949, the novel narrates the change in the behavior of a citizen who works in the Ministry of Truth, when he begins to discover that the purpose of his work is to completely alter the perception that citizens have of reality. Orwell tells us, for the year 1984, of a society enveloped in a dystopian reality that has been created exprofeso by the Ministry of Truth with the intention of making citizens believe that the party does everything it does to protect them from internal and external threats.

We say it is curious, because it was just at that time, at the beginning of the 80s, when Ronald Reagan and Margaret Thatcher were elected presidents of their respective countries by citizens eager to eliminate any government interference in the economy, completely forgetting that the government they prevented from intervening is the government they themselves elect with their vote and, therefore, is the government they would like to see intervene in the country's economy.

It is curious, because the absurd belief of the citizens, that the government they themselves elect at the ballot box "robs" them with taxes, can only have been acquired after an intense indoctrination directed from a Ministry of Truth similar to the one that appears in Orwell's novel. A Ministry of Truth to which economists who teach in public universities all over the world belong, both those who have liberal ideology and those who claim to have Keynesian

ideology, despite the fact that both propagate the very liberal idea that all the ills of the economy are caused by the government, the former because it does too much and the latter because it does not do enough.

Let's think of the economist Paul Krugman, who we understand to be a Keynesian economist who blames the government for not having a sufficiently high public deficit. Can someone who has been awarded the Nobel Prize in Economics and who has been teaching macroeconomics at university for more than forty years ignore that business profit is something very different from business expenditure? Does Krugman ignore the fact that profit and expenditure are variables that can never be identified? However, in the university book that Krugman has been writing for many years, and with which millions of university students around the world learn economics, the "normal" profit of a company is identified with the "opportunity" cost of that same company, so that, depending on which page of the book you are on, the profit is considered a "benefit" or it is considered a "cost" (specifically, the so-called opportunity cost).

For example, the reasoning we have done to prove the First Discomfort Theorem can be redone by including the "normal" profit of the firm in the production costs of the firm, and, in this way, to achieve that the firm obtains profits, the so-called "opportunity" cost, and at the same time produces without obtaining any profit, being this last condition the one that allows Krugman to affirm that in perfect competition the firm is producing with the maximum possible social benefit.

Seeing is believing.

That is to say, to demonstrate that in a market of perfect competition it is produced with the maximum possible social benefit, Krugman accepts that the companies produce maximizing the company profit, but when at the end of the demonstration, Krugman finds that, in such a case, the company does not obtain any benefit, then he affirms that a part of the cost is the "opportunity" cost that in reality is a benefit of the company and not a cost, so the company does obtain benefits although he has just demonstrated that in perfect competition the company does not obtain benefits.

Surely, you have not read the novel "1984", and you do not know that the narration ends with the mathematical expression, "two plus two equals question mark":

$$2 + 2 = ?$$

What George Orwell wanted to express with the equation was not that "2+2" can be 5, sometimes, and can be 3, sometimes, depending on what the Ministry of Truth decides at any given moment. No. Orwell's idea goes much further, and is related to what he calls "doublethink". What Winston Smith is telling us when he writes on a table the question mark on the other side of the equal symbol, is not that the result of the sum is a specific

number that can change according to what the Ministry of Truth affirms, but that the question mark is all the numbers at the same time: doublethink.

Compare Winston Smith's doublethink with Paul Krugman's doublethink when he identifies the "normal" profit of a company with a profit and a cost at the same time. For Krugman, economic reality is dual and it is not defined either, because "profit" and "cost" have the same nature and have a different nature, depending on which page of his book we are reading. With his economics book, Krugman exercises students in doublethink, when he shows that in perfect competition the company does not obtain profits while at the same time he affirms it does obtain profits, expressing the same thing Winston Smith expresses at the end of the book:

$$benefits = revenue - costs = ?$$

Evidently, the identification of "normal" profit with a cost, the "opportunity cost", can only have been decided by a powerful Ministry of Truth, which is currently run by the extensive network of private non-profit universities in the US, and for which economists who teach economics in public universities all over the world work. It is those who run this immense network of private universities in the USA who decide what is true and what is not true in the discipline of economics, since they are the ones who decide what is published in private economics journals and which ideas will be awarded the Nobel Prize in Economics.

The only thing that Orwell seems to have got wrong was to think that it would be a dictatorial government that would set up the Ministry of Truth after coming to power, and not, as has actually happened, that it would be private initiative, always so ingenious and always so well financed, that would do it.

PART I

THE BASIC EQUATIONS

CHAPTER 1

DEDUCTION OF THE BASIC EQUATIONS

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1. INTRODUCTION

If we do not want a discipline to advance from the scientific point of view, so that it becomes completely stuck in barbarism and ideological fundamentalism, the first thing we have to do is to define the variables on which the discipline is based as imprecisely as possible. When a magnitude or variable is poorly defined, nothing can be affirmed or denied about it and any discussion about its evolution will be impossible; nobody will know what we are talking about. Thus, we will be able to prevent any discussion of the statements made within the discipline, no matter how absurd they may be, and any nonsense we come up with can be passed off as a stroke of genius. Therefore, we are not very surprised to find that the variables used in textbooks to describe economic reality are all so poorly defined that nothing can be affirmed or denied about them and, much less, they can be measured in practice and predictions can be made with them.

On the contrary, for a theory to be "scientific" it must have at least one essential characteristic: *"that the variables that the theory uses to describe reality must be well defined, so that any statement or prediction that is made in the theory about those variables can be discussed by the community"*. When a theory has at least this characteristic, and the variables the theory uses are well defined, any predictions or claims made about them can be discussed and tested. In such a case, the theory is said to be "falsifiable," that is, it is possible to test whether any prediction or claim made by the theory is false or not false.

In this sense, the economic theory currently taught by economists working for private universities in the USA is not a scientific theory, and most of the variables used to explain social organization from an economic point of view are not well defined, are imprecise and, in practice, impossible to measure. Although we understand that the criterion of

"falsifiability" is only one of many criteria that can be used to define science, the intention of using it now is to denounce the lack of any scientific methodology within economics. For example, and they are by no means the only meaningless variables, "utility" or "opportunity cost" are variables that appear very frequently mentioned in the works published in the most prestigious economics journals in the world, despite the fact that nobody knows how to define them and, therefore, nobody can ever measure them.

Another example, but much more serious, is the definition of "supply" and "demand". Both are by far the two most important basic variables in economics, yet their definition is so imprecise that it is impossible to measure them. Economists call the quantity of goods produced by entrepreneurs "supply", but it is never clear whether they are referring to the goods that are sold, the goods that are produced, or even the quantity of goods that can be produced but for some reason are not produced. But the most serious thing about the idea of "supply" is that it is a heterogeneous aggregate of goods and it will be difficult to compare different aggregates of goods. Which supply is greater or smaller, a supply of two cars and a tractor or of two tractors and a car?

The same happens with "demand" that, depending on the case, can be referring to the quantity of goods that are consumed, to the quantity of goods that are desired to be consumed or even to the quantity of goods that can be consumed, without ever being clear to which of the three situations we are referring to. Moreover, the different demands cannot be compared among themselves, since they are heterogeneous aggregates of goods.

So why do private universities in the US base the economic theories they have fabricated on two variables that cannot be used for measurement or comparison because they are ill-defined? Evidently, because the job of private universities in the US is to prevent economics from becoming a scientific discipline.

Here, to develop the Madrid Economic Theory, we will begin by doing what the science of economics should have done more than a century ago, which is to define in a univocal and coherent way the basic variables on which any economic theory must be based to be considered a scientific theory, so that any statement made about them can always, at least, be discussed. Only then will we be able to speak of peer review and scientific method. We will begin by defining the variables "income" and "expenditure", with the same meaning it has for a person who is not an economist, and which, curiously, can be measured without any problem using money.

It is easy to see that the quantity of goods or services that are sold, as well as the quantity of goods or services that are bought, are variables that can be measured very easily. However, both are magnitudes that cannot be compared with each other, because they are a heterogeneous grouping of different goods, and therefore, although they are

considered as basic variables of economics, they cannot be used directly within an economic theory.

Instead of the quantity of goods bought and sold, we will use the monetary flow of buying and selling, i.e., expenditure and income, as the constructive variables of the economic theory we are going to develop. The monetary flows created by the purchase and sale of goods, which are calculated multiplying the price of each good by the quantity of it bought or sold in a period of time, are variables that can be measured and compared without any difficulty, since their value is given in current money.

Here we are going to use "income flow" and "expenditure flow" as the basic variables of the economy in the Madrid Theory, although later we will introduce more variables to complete the theory. Of course, we will not mention the word "supply" or the word "demand" again in the rest of the paper, because in the Madrid Theory we will not need to define them.

2. THE *G-EXPENDITURE* MATRIX AND THE *PIA*

Let us imagine that some extraterrestrials visit an island inhabited by three people, Juan, Celia and Lucia, where there is a monetary economy. The extraterrestrials do not find it strange to see that the three inhabitants of the island cooperate in the production of consumer goods, and they do not find it strange either to see that they share among themselves what they produce. But they are struck by the "money" that seems to guide the relations of production and distribution within the island. So much so, that they decide to investigate the function that the mysterious "money" that the inhabitants always use as "currency" when they give each other goods, may have within the society.

To do this, during a specific period of time, they record the amount of "money" that the inhabitants of the island exchange among themselves, with the idea of verifying the suspicion that "money" is always the same and is conserved when exchanged for the goods produced on the island. With the data they collect, they construct a square matrix where they record the flow of money given (and received) by each of the inhabitants of the island during a given period of time (a month, for example):

	John	Celia	Lucia
John	0	400	600
Celia	600	0	200
Lucia	300	500	0

Expenditure (Euros/Month)

What appears in each row of the square matrix, which we will call Expenditure Matrix ***G*,** is what each inhabitant of the island spends, during a month, in buying goods from the other inhabitants of the island. For example, Juan has spent during the month 400 euros in purchases from Celia and 600 euros in purchases from Lucia. The same can be said of Celia and Lucia, who spend 600E and 300E respectively on purchases from Juan. Of course, in the matrix does not appear specified the type of goods that have been given in exchange for the money because the aliens are only interested in keeping track of the money to show that the money is preserved during the purchases, and in the table appear all of them.

<u>THE SPENDING MATRIX</u>: The "Spending Matrix" shows the money that each participant in a monetary economy spends on the purchase of services from any other participant, over a period of time, usually a year:

$$\textit{Spending Matrix} \rightarrow \quad \boldsymbol{G} = \begin{pmatrix} c_{11} & \cdots & c_{1n} \\ \vdots & \ddots & \vdots \\ c_{n1} & \cdots & c_{nn} \end{pmatrix}$$

The coefficients of the expenditure matrix c_{ij} are the basic variables of the theory we are going to develop, and their dimensions are money/time, that is, they are a monetary flow. We can verify that when we take any row and add all the values that appear in it, we obtain the total flow of spending x_i of each of the participants, that is, the total money spent on purchases by a participant "i" of the island during the period of time considered:

$$(Flow\ of\ speding)_i \rightarrow \quad x_i \stackrel{\text{def}}{=} \sum_j c_{ij}$$

$$(Flow\ of\ income)_i \rightarrow \quad y_i \stackrel{\text{def}}{=} \sum_j c_{ji}$$

But we can also see that when we add up the values that appear in any of the columns, what we get is the total flow of income of each of the inhabitants of the island, that is, the total money that each inhabitant earns from sales in a month. y_i of each of the inhabitants of the island, that is, the total money that each of the inhabitants earns from sales in a month:

$$\rightarrow \begin{cases} \boldsymbol{X} \overset{\text{def}}{=} \boldsymbol{G} \times \boldsymbol{I} \leftrightarrow \begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix} \overset{\text{def}}{=} \begin{pmatrix} c_{11} & \cdots & c_{1n} \\ \vdots & \ddots & \vdots \\ c_{n1} & \cdots & c_{nn} \end{pmatrix} \times \begin{bmatrix} 1 \\ \vdots \\ 1 \end{bmatrix} \leftrightarrow x_i \overset{\text{def}}{=} \sum_j c_{ij} \\ \boldsymbol{Y} \overset{\text{def}}{=} \boldsymbol{G^t} \times \boldsymbol{I} \leftrightarrow \begin{bmatrix} y_1 \\ \vdots \\ y_n \end{bmatrix} \overset{\text{def}}{=} \begin{pmatrix} c_{11} & \cdots & c_{1n} \\ \vdots & \ddots & \vdots \\ c_{n1} & \cdots & c_{nn} \end{pmatrix} \times \begin{bmatrix} 1 \\ \vdots \\ 1 \end{bmatrix} \leftrightarrow y_i \overset{\text{def}}{=} \sum_j c_{ji} \end{cases}$$

The "expenditure matrix" is all we need to know for now to describe the economic activity of the island. It is thanks to it, that we define the expenditure vector x_i and the income vector y_i as the sum of the rows and columns, respectively.

The expenditure matrix was first introduced by the French economist François Quesnay in 1758, and although it differs in no way from the one we have introduced here, it is not the same as the one we have just described.

The definition of the income vector y_i and the expenditure vector x_i by means of the coefficients of the expenditure matrix $\boldsymbol{G}$ are two of the basic equations of the theory, and with the matrix we introduce two of the basic economic variables with which we are going to describe the monetary economy.

Now it is very easy to prove the suspicion of aliens, and to prove that money is conserved in the purchase and sale. For this we only have to prove that the sum of all expenditures is equal to the sum of all incomes, which is always the case. Equality between aggregate expenditures and aggregate income of the economy, is a property that will always be fulfilled in any economy and we will call it Say's Law, because it was the economist Say who first formulated it in 1870, although in an ambiguous context where it is not clear that it has the same meaning we are giving it here:

SALLY'S LAW: "The sum or aggregation of all expenditures made within a monetary economy is equal to the sum or aggregation of all income.

$$\sum_j x_j = \sum_j y_j \qquad (Say's\ Law)$$

Say's law is a macroeconomic property and its validity, as it is formulated here, is beyond doubt since it is a consequence of the fact that the expenditure matrix $\boldsymbol{G}$ and its transpose $\boldsymbol{G^t}$ contain the same coefficients. Say's law is another of the equations that appears in the set of basic equations of monetary economics and tells us that in a closed monetary economy aggregate income is always equal to aggregate expenditure.

Ample Indoor product. $\boldsymbol{PIA}$. Another variable of interest that is going to be used frequently is the *PIA* or Broad Domestic Product. It is defined as the nominal value of the

sum or aggregation of all monetary flows of exchange carried out within the economy, during the period considered:

$$PIA \stackrel{\text{def}}{=} \sum_i x_i = \sum_{ij} c_{ij} = I \times G \times I \ = X$$
$$PIA \stackrel{\text{def}}{=} \sum_i y_i = \sum_{ij} c_{ji} = I \times G^t \times I \ = Y$$

The *PIA* is, therefore, a monetary flow and its nominal value can be obtained by two different ways, one by means of the sum of the agents' sales income, and the other by means of the sum of all their expenses for purchases. Both sums give identical results because they contain the same terms, the coefficients of the expenditure matrix. c_{ji} of the expenditure matrix. It is this equality what we have called Say's Law.

3. THE MATHEMATICS OF ECONOMICS

The previous section suggests very clearly that vectors, matrices and scalars seem to be the natural language to describe monetary phenomena because they are very well adapted to the description of an economy divided into different sectors, what is usually called microeconomics. For this reason, in the Madrid theory we will use the matrix language as the basic mathematical language in which to express any relation within the monetary economy.

Specifically, any microeconomic relation or linkage that a generic sector "i" fulfills, we will represent it using a vector relation, indicating in this way that it is a linkage that each sector of the economy has to fulfill independently. For example, the definition of the flow of income y_i or expenditure flow x_i is a vector expression and the generic subscript "i" refers to the fact that it is the flow of income or expenditure of each of the sectors into which the economy has been divided:

$$\begin{cases} x_i \stackrel{\text{def}}{=} \sum_j c_{ij} \\ y_i \stackrel{\text{def}}{=} \sum_j c_{ji} \end{cases}$$

Another vectorial expression with which perhaps the idea is clearer, is the expression that is usually used to define the saving and that will be studied later:

$$y_i = x_i + ah_i \qquad \begin{cases} si \;\; ah_i > 0 \;\; \rightarrow \;\; saving \\ si \;\; ah_i < 0 \;\; \rightarrow dissaving \end{cases}$$

The expression tells us that each participant in the economy divides its income between spending and saving. It is an equation that must be fulfilled by each and every one of the sectors and the index goes through all of them. That is why we say the expression is a microeconomic linkage, because it describes a property or linkage that each participant of the economy must fulfill independently.

The interesting thing about the vector formulation is that we can define an operation, "the vector aggregation", that adds all the components of the vectors that appear in the expression, so that if the microeconomic expression is satisfied, the aggregate expression will also be satisfied. For example, when we add up all the components x_i of the expenditure vector, we obtain a number, the aggregate flow of expenditure of the whole economy Xwhich is no longer a vector, but a scalar to which we have given the name of the *PIA, or Producto Interior Amplio for* its acronym in Spanish:

$$X = \begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix} \equiv x_i \qquad \xrightarrow{agregacion} \qquad X = x_1 + x_2 + \cdots + x_n = \sum_i x_i = PIA$$

When instead of referring to a single vector as in the previous case, reference is made to a vector equality, the aggregation process is carried out by adding the components of each of the vectors that appear in the expression, and will result in a scalar identity that will be valid as long as we assume that the vector identity from which it comes is valid. For example, the usual expression used to define savings has an associated aggregate equation, which will be valid to the extent that the savings equation from which it comes by aggregation is valid:

$$y_i = x_i + ah_i \qquad \xrightarrow{\boldsymbol{aggregation}} \qquad Y = X + Ah \qquad \begin{cases} Y = \sum y_i \\ X = \sum x_i \\ Ah = \sum ah_i \end{cases}$$

<u>AGGREGATION</u>: Given a microeconomic property expressed by means of a vector identity, when we add each of the components of each of the vectors that appear in the expression we obtain a scalar identity that, in the particular case of the economy, is always associated with the idea of aggregation as the sum of the parts of a whole.

We define the aggregate equation of a vector expression (or scalar equation), to be the equation obtained when we add up all the components of the vector expression:

$$a_i = b_i + c_i \xrightarrow{equation\ agregada} \sum_j a_j = \sum_j b_j + \sum_j c_j \leftrightarrow A = B + C$$

In general, we will use capital letters to refer to a macroeconomic variable and lowercase letters with subscript to refer to a microeconomic variable.

The importance of the aggregation process comes from the different economic meaning of the aggregate equation. A vector equality is fulfilled component by component and refers to a microeconomic property that must be fulfilled by each of the agents or sectors into which the economy has been divided. On the contrary, scalar equality is fulfilled by the aggregate sum of all the components, so a scalar equality refers to a property that is fulfilled by the whole economy as a whole.

MICROECONOMIC EQUATION. A vector expression is a microeconomic restriction that has to be fulfilled component by component, that is, it has to be fulfilled by each of the agents used to describe the economy, since each component of a vector is associated with the behaviour of each of the agents:

$$a_i = b_i + c_i$$

MACROECONOMIC EQUATION. On the contrary, when we take a vector expression and add or aggregate all the components we obtain a scalar expression that refers to a macroeconomic restriction that the whole economy as a whole fulfils:

$$a_i = b_i + c_i \xrightarrow{aggregate\ equation} \sum_j a_j = \sum_j b_j + \sum_j c_j \leftrightarrow A = B + C$$

Some aggregate expressions will be very important in the theory we are developing because they are macroeconomic laws that must be complied with by the whole economy.

4. THE MONETARY EQUATION

That money exists and is real has been known for a long time. That there is a fixed amount of money M circulating in the economy, which is linked to total production, is also a very old and well-established idea in economic science. But to show what is the relation between the quantity of money, what we will call "mass", and the quantity of money circulating in the economy. M, what we will call "money supply", and the other variables of the economy, such

as income and expenditure flows, is not so simple or so evident, and this is the reason why we will introduce the relation here in the form of a postulate.

The type of completely real variable, such as the quantity of money, that is used in economics, but that is at the same time a phantom variable M that is used in economics, but that is at the same time a phantom variable because it has no clear link that relates it to the other variables of economics, appears a lot in the natural sciences and its practical importance in the discipline depends on whether we can find an equation that links it to the rest of the variables used in the theory.

In a theory, the equations of experimental origin that serve as a link between variables that do not necessarily have to be related are called **Constituent Equations of the Theory** and, although the subsequent development of the theory can deduce them from deeper principles without the need to impose them from outside as empirical laws, they are equations of tremendous importance because their experimental origin allows the expressions in which they appear to be validated empirically. That is, they are the expressions or relations that turn a simple theory into a scientific theory, because they allow the formulation of laws that can be experimentally verified and, therefore, allow the theory to be validated.

In short, a theory becomes science when this type of relationship appears, which allows the expressions that are deduced from them, and in which the variables on which the theory is based appear, to be contrasted by experiments and empirical data. Without these equations there is no experience, nor is there science.

In the science of economics there is one of these equations, the so-called "**constitutive**" ones, which has been going around for a few centuries now and has been the subject of heated discussion within the discipline. If we want to do justice to history, we have to affirm that the expression periodically reappears from its ashes like a phoenix to become the fashionable expression of the moment, only to fall into oblivion and disappear shortly afterwards. We are referring to the equation they call **The Currency Equation** and that is expressed in the matrix language we are using, as:

$$k_F \cdot M = \sum_j p_j \cdot q_j = PIA \qquad (Monetary\ Eq.)$$

Where k_F is Fisher's constant, and the summation is made over all the monetary flows of exchange carried out during a period of time. I.e., the expression relates what we have called the *PIA* with the quantity of money present in the economy through a constant, Fisher's constant. Although there are several interpretations of the expression, each one subject to the different conception each school of thought has of money, here we will consider valid the interpretation made of the expression at the beginning of the twentieth

century by the American economist Irving Fisher, and that is the reason why the constant bears his name: "*Fisher's constant*".

The monetary equation is an equation with a long history in economic science and, undoubtedly, it is by far the most famous equation in the discipline. One of the first times it appears is by David Hume, although he was by no means the first to refer to it. Hume used it successfully in the mid-19th century to attack the protectionism of his time, stating that any monetary surplus of a country as a result of increased exports would eventually raise prices and limit exports. The dubious conclusions reached by Hume brought the equation into disgrace and it disappeared from economics shortly afterwards. More than a century later, it was revived by Irving Fischer, who in the 1910s used it in a very similar way to Hume, before falling into oblivion again as a result of the Great Depression and Keynes's fierce criticism of it.

The last time it became fashionable was in the 1970s after the rise of "monetarism" sponsored by economists working for private universities in the U.S., in particular, the University of Chicago. It was an economist from this university, Milton Friedman, the father of liberalism, who with the publication in 1957 of a famous short article, once again brought the equation into fashion. In the article he demonstrated, with empirical data taken from historical series, that the "velocity of money" (the k_F of the expression) was in practice a constant, which does not depend on any other variable and which changes little over time, i.e. the same idea defended by both Hume and Fisher. The problem with Friedman's interpretation of the equation is that he completely forgets what the monetary equation really says and uses it to justify the liberal doctrine, propagating the idea that inflation is a consequence of the creation of money by the government, without it being at all clear how the statement should be interpreted because he does not develop a theory of monetary creation. His is the famous phrase: "*inflation is always and everywhere a monetary phenomenon"*, which is little or nothing different from that other famous phrase which says: *"rain is always and everywhere a meteorological phenomenon",* except that neither of the two statements tells us anything we do not know. It seems a bit excessive to give someone the Nobel Prize for such a trivial statement.

THE MONETARY EQUATION: The monetary equation is what in the natural sciences is known as the constitutive equation. An equation whose origin is almost always empirical and whose relevance lies in the fact that it links variables which apparently have no relation, in this case, the quantity of money and the flow of exchanges.

Clearly it is not an accounting equation, nor can it be easily deduced from first principles, but it is an expression that links variables that have a very clear statistical meaning, such as the quantity of money, or the sum of the economy's purchase flows, or PIA, so its ultimate theoretical justification will have to be sought in statistics, and its validity will be proved by empirical data. Mor as is the sum of the economy's purchase flows, or PIA, so its

ultimate theoretical justification will have to be sought in statistics, and the proof of its validity will be the empirical data taken from reality that show it:

$$k_F \cdot M = PIA \qquad \textit{Monetary Eq.}$$

The expression links a monetary stock $M$the quantity of money in the whole economy, with the aggregate flow of the economy, the PIA, through the Fischer constant, although there is no economic reason why the two variables should be related. k_F or Fischer constant, although there is no economic reason why the two variables should be related. This was the meaning Fischer gave to the constant at the beginning of the 20th century and the reason why we think the constant should bear his name. The dimensions of the constant k_F is that of $(time)^{-1}$.

Although its importance for the theory we are developing is that it will allow us to relate the creation of money with the growth of the economy, the monetary equation is, above all, the expression that gives value to money. It is not an expression used to fix the specific price of goods, but it is an expression which tells us the purchasing power of money, since it establishes a biunivocal relation between the quantity of money and the quantity of goods which can be bought:

Amount of money ↔ Amount of goods
M ↔ PIA- year

The monetary equation is one of the basic equations of monetary economics. It refers to a macroeconomic property and is the only one of them that has an experimental or empirical origin. It introduces into economics the important concept of the money mass M associated with the PIA, the aggregate flow of exchanges, in Fisher's original interpretation. The monetary equation is the pillar on which all monetary economics rests. If it falls, the whole theory we are going to develop here falls.

<u>THE FISCHER CONSTANT</u>. Although the monetary mass M is unique and in the monetary equation it appears related to the PIA, we can expect, although it is not entirely correct, that if there is a constant relation between the monetary mass M and the PIA, then there must also be a constant relation between the monetary mass M and the GDP. This forces us to define two monetary equations with two different Fischer constants, depending on the flow we relate to the money mass:

$$\begin{cases} k_F^* \cdot M = PIB \\ k_F \cdot M = PIA \end{cases}$$

In order not to overload the notation with two different Fisher constants, we will name both constants with the same name, the Fisher constant k_FThe Fisher's constant is the Fisher

constant, understanding from the context to which of the two flows we are referring to in each moment, if it is with the PIA, as is usual in economics, if it is with the GDP.

5. THE FISHER EQUATION: THE MONEY SUPPLY

The monetary equation introduces in the economy the quantity of money as a new variable, different from the flows of expenditure and income, which must be precisely defined before it can be used in the description of the economy. In a monetary economy which we suppose to be stationary, without growth or decrease of economic activity, we can intuit that there will be a certain quantity of money M associated to this stationary situation, in such a way that an increase or decrease of M will take the economy out of the stationary state in which it is, increasing or decreasing the nominal flow of exchanges. The importance of this fixed amount of money, associated with the aggregate flow of exchanges, is that it allows us to characterize the currency economy, according to whether or not the currency equation is fulfilled.

MONETARY ECONOMY: It is said that an economy is a monetary economy when there is a good called money with which any other good, service or merchandise put on sale can be bought and whose quantity M fulfills the monetary equation:

$$k_F \cdot M = PIA \qquad Ec.\ Monetary\ Eq.$$

Where M is the money supply.

The money supply is measured as a nominal amount or stock in current currency, being perhaps the most important concept in macroeconomics because it allows us to "touch" money, which up to now we have only seen it passing from one side to the other as a monetary flow of income or expenditure. For now, it will be enough to understand that a monetary mass is necessary for an economic system based on the exchange of goods and services for money to work.

Let us imagine that the shops are full of products but no one has enough money to buy anything. Nothing can then be bought and nothing can then be sold, buying and selling will be impossible. If the baker needs to buy flour and has no money he will have to wait to sell the loaves he has in order to get the money to buy the flour to continue producing loaves. It can be intuited that when the amount of money in the economy is scarce, the purchase and sale will be scarce and will be conditioned to the previous purchase and sale, which will lead to a slowdown in the flow of exchanges and a decrease in the *PIA*. The opposite will happen if the amount of money used by economic agents is very large. Exchanges will increase and

will be very fluid, perhaps in excess, in such a way that the shops may empty of products and the suppliers of services may not be able to satisfy the high demand for goods due to the increase in the quantity of money. In such a situation, intuition leads us to suspect that there may be a generalized rise in prices, perhaps together with an increase in production.

It might be thought, from what we have said up to now, that the money supply is a macroeconomic concept related to the money flows of the whole economy, which can hardly be generalized defining a microeconomic money supply for any sector or agent in which the economy is divided, which is only half true. Besides, it is thought that its origin will have to be based on statistics and big numbers, so we might get the wrong idea that it is a concept which can only be associated to the economy as a whole.

On the contrary, from now on, we will consider that any economic agent, or sector in which we divide the economy, is made up by the grouping of a sufficient number of single agents which behave in the same way, so that we can use statistics and associate to all of them, as a whole, a micro-economic monetary mass with which they carry out the economic activity.

MICROECONOMIC MONEY SUPPLY. The micro-economic money supply is defined as a vector whose components represent the nominal stock used by each of the agents into which the economy has been divided to carry out exchanges. m_i *represent the nominal stock used by each of the agents into which the economy has been divided to carry out exchanges, understood as a group of a great number of persons or companies of the same type:*

$$\boldsymbol{M} = \begin{bmatrix} m_1 \\ \vdots \\ m_n \end{bmatrix} \xrightarrow{agregation} M = \sum_i m_i \qquad M \rightarrow \left| \begin{array}{c} monetary\ mass \\ of\ the\ entire\ economy \end{array} \right.$$

It is not difficult to understand that the aggregate sum of the vector m_i *is the aggregate money supply* M *of the economy which appears in the monetary equation.*

Our purpose in introducing now the vector $\boldsymbol{M}$ is to find the microeconomic expression from which the currency equation derives and which we will call the Fisher Equation. We know the currency equation is a scalar expression and describes a macroeconomic link that must be fulfilled by the economy as a whole, so there must be a microeconomic property, described by a vector equation, from the aggregation of which the currency equation derives.

We also know that the monetary equation establishes a relation between a stock, the aggregate monetary mass $M$and the aggregate flow of expenditure or income of the economy, the *PIA*, so the vectorial expression we are looking for must relate microeconomically the same magnitudes, that is, it must relate the vector monetary mass m_i of each agent with the monetary flow created by each agent in his economic activity.

The only doubt will be to know with which of the two possible flows, the flow of expenditure x_i or the income flow $y_i$we will have to relate the money mass:

$$¿?\ \rightarrow\ k_F\begin{bmatrix} m_1 \\ \vdots \\ m_n \end{bmatrix} = \begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix} \equiv\ k_F \cdot m_i = x_i \xrightarrow{aggregatión}\ k_F \cdot M = PIA$$

$$¿?\ \rightarrow\ k_F\begin{bmatrix} m_1 \\ \vdots \\ m_n \end{bmatrix} = \begin{bmatrix} y_1 \\ \vdots \\ y_n \end{bmatrix} \equiv\ k_F \cdot m_i = y_i \xrightarrow{aggregatión}\ k_F \cdot M = PIA$$

Both flows, expenditure and income, have the same aggregate value, the *PIA,* so both flows will reproduce by aggregation the monetary equation. But both vectors have different components, so choosing one or the other will give rise to two completely different theories. That is, only one of the two possible expressions is correct and only one of the two possible flows is the one which generates the monetary equation by aggregation.

A priori, we have no reason to choose the expenditure flow and discard the income flow, and vice versa, but of course only one of them can be valid. Which of them is the correct flow? Which of the two vectors, the expenditure flow or the income flow, is the one that must appear in the microeconomic monetary equation, or Fischer Equation?

The doubt of which of the two vectors, expenditure or income, is the one appearing in Fisher's expression is solved when we understand that the income flow is the money received in exchange for the sale of a good, so it represents the agent that does not need to have money to carry out the exchange: "the income flow represents the seller". y_i is the money received in exchange for the sale of a good, so it represents the agent who does not need to have money to carry out the exchange: *"the income flow represents the seller"*. On the contrary, the expenditure flow x_i represents the expenditure made by the buyer and requires the previous possession of money so that the exchange of purchase and sale can take place: "*the expenditure flow represents the buyer*". Therefore, it is very clear that it must be the expenditure flow which is backed by the money supply, since the money supply represents the money it is necessary to have previously in order to carry out the buying and selling exchanges.

When we exchange a good for money there is an agent, the seller, who does not need to have money to carry out the exchange, and there is another agent, the buyer, who needs to have the money to carry out the exchange. It is therefore to the purchase flow, to the buyer, that we must associate the money supply, because it is he who is using the stock of money to carry out the purchase:

$$k_F \cdot m_i = x_i \qquad (Fischer\ Eq.)$$

We call the microeconomic equation that relates the monetary mass with the flow of expenditure, the Fisher Equation and it is another of the basic equations of a monetary economy. From it we obtain the monetary equation by aggregation:

$$k_F \cdot m_i = x_i \quad \xrightarrow{aggregatión} \quad k_F \cdot M = PIA$$

With this last expression we put together a set of three basic microeconomic equations and their corresponding aggregate equations.

6. BASIC EQUATIONS OF MONETARY ECONOMICS

We have already said we were going to use "income" and "expenditure" as the basic variables to describe the monetary economy. We have called **income vector** the annual amount of money received by any agent for the sale of goods and services, and we have called **expenditure vector the** annual amount of money spent by any agent in the purchase of goods or services, and we have used the expenditure matrix to define both vectors. But, apart from these two definitions, we have introduced the rest of the equations implicitly using two postulates in our reasoning.

Specifically, it is well understood that to define income and expenditure we have implicitly assumed that in an exchange or buying and selling, the amount of money the seller earns is always equal to the amount of money the buyer spends. The validity of the previous statement may seem very obvious, but it is important to understand that it has been necessary to use it to obtain Say's Law.

CONSERVATION POSTULATE: The quantity of money used by each agent in a monetary economy is a magnitude m_i used by each agent of a monetary economy is a magnitude that is conserved in the buying and selling exchanges.

Or in other words, the activity of buying or spending does not change the quantity of money in the economy, i.e., the aggregate sum of all the money used in the economy is constant and conserved during exchanges. The postulate of conservation of the quantity of money is an evident postulate in itself and all economists agree with it, even though it has never been formulated explicitly. We have used it implicitly when constructing the expenditure matrix **G** and using it to obtain the vectors of income and expenditure, but we cannot forget that it is its existence that will allow us to state that when money in the economy grows or decreases it is because someone is making money out of nothing or destroying it.

The other postulate we are using, this time explicitly stated as a basic equation, is the monetarist postulate we have used to define the money supply of an economy.

MONETARIST POSTULATE: In a monetary economy there is a constant relation between the quantity of money and the quantity of money. k_F between the quantity of money M which is used in exchanges and the flow of exchanges, or PIAthat take place within the economy:

$$k_F \cdot M = PIA$$

Or in other words, we have characterized the monetary economy as that economy in which the monetary equation is fulfilled with the interpretation made by the American economist Irving Fischer, at the beginning of the twentieth century. It is also this postulate which has allowed us to deduce that Fischer's micro-economic equation must also be fulfilled, from which it proceeds by aggregation.

The two postulates, conservation and monetarist, are very simple, very easy to understand and even easier to interpret. The variables that appear in them are measured in money and, therefore, the conclusions reached with them are empirically verifiable. Based on these two postulates, we have already found six of the eight basic equations which a monetary economy based on the free exchange of goods for money fulfils:

Basic Equations of Monetary Economics

$$Microeconomic\ Equ.\begin{cases} y_i = x_i + ah_i + \dfrac{1}{k_F}\dfrac{dx_i}{dt} & (Conservaction\ Equ.) \\ \begin{cases} y_i = \displaystyle\sum_j c_{ji} & (definition\ of\ income) \\ x_i = \displaystyle\sum_j c_{ij} & (definition\ of\ expense) \end{cases} & \\ k_F \cdot m_i = x_i & (Fisher´s\ \ Equ.) \end{cases}$$

$$Macroeconomic\ Equ.\begin{cases} k_F \cdot M = PIA & (Monetary\ Equ.) \\ \left.\begin{matrix} Y = \displaystyle\sum_i y_i \\ X = \displaystyle\sum_j x_i \end{matrix}\right\} \rightarrow PIA = \displaystyle\sum_i x_i = \sum_i y_i & (Say´s\ Law) \\ Ah + \dfrac{1}{k_F}\dfrac{dPIA}{dt} = 0 & \begin{pmatrix} conservation \\ aggregate\ equ. \end{pmatrix} \end{cases}$$

The set of basic equations is divided into two subgroups, the equations that describe the economy from the microeconomic point of view and the equations that describe the economy from the macroeconomic point of view.

Microeconomic equations express the links that each of the sectors into which the economy has been divided for its study must comply with. Vectors are used as a means of representation because they allow each component "i" of the vector to refer to each of the "N" sectors or economic agents into which the economy has been divided.

On the contrary, macroeconomic equations are scalar relations obtained by the sum or aggregation of the components of each one of the vector equations, so they are not independent equations of the vector equations they come from. Macroeconomic equations do not add new links to the existing ones, but they refer to a link that must be fulfilled by the whole economy as a whole, so each one of them has a macroeconomic meaning very different from the microeconomic meaning of the vectorial expression they come from.

It remains, therefore, to deduce the other two equations that appear in the set, the first equation and the last one:

THE CONSERVATION EQUATION. In a monetary economy the following relationship between the flows of expenditure, income and savings is fulfilled:

$$y_i = x_i + ah_i + \frac{1}{k_F}\frac{dx_i}{dt} \qquad \textit{Conservation Eq.}$$

THE GROWTH EQUATION. In a monetary economy, the nominal decrease in the IPA is proportional to the net flow of savings (the flow of money destruction), the constant of proportionality being the Fischer constant. Ah (the flow of money destruction), the constant of proportionality being Fischer's constant k_F:

$$\frac{dPIA}{dt} = -k_F \cdot Ah$$

Although we have not yet defined the savings vector ah_iit can be easily checked that the Growth Equation formally comes from the aggregation of the Vector Conservation Equation, just defining Ah as the aggregate flow of the savings vector.

CHAPTER 2

THE CONSERVATION EQUATION

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1. CONSERVATION EQUATION OF MONEY FLOW

What characterizes a monetary economy, and what differentiates it from any other type of organization which can be used to jointly produce and distribute the goods needed to live, is that each of the generic agents which participate in the economy must fulfil an accounting equation, the Conservation Equation, which forces money to be conserved.

Let us remember that in the first chapter we have used only two postulates to derive the set of basic equations that a currency economy satisfies. In fact, we have used the monetarist postulate to derive two of them, while the other three equations are a consequence of the conservation postulate and the definition of the flow of expenditure and income through the expenditure matrix:

$$\begin{cases} y_i = \sum_j c_{ji} & (Def.\ of\ income) \\ x_i = \sum_j c_{ij} & (Def.\ of\ expense \end{cases}$$

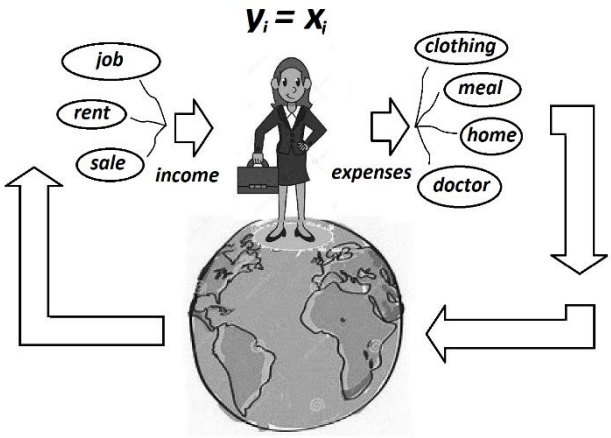
$$k_F \cdot m_i = x_i \qquad (Fischer, s\ Eq.)$$

$$k_F \cdot M = PIA \qquad (Monetaria\ Eq.)$$

$$\left.\begin{array}{l} Y = \sum_i y_i \\ X = \sum_j x_i \end{array}\right\} \rightarrow PIA = \sum_i x_i = \sum_i y_i \qquad (Say´s\ Law)$$

But none of these equations refers to the accounting equation that must be fulfilled by each of the persons, companies or institutions that participate in a currency economy. The equation we are missing is a vector equation, since it must be fulfilled by each of the agents independently of the rest of the agents, but it must also be a conservation equation that forces money to be conserved, since this is the essential characteristic of a currency economy.

Let us begin by explaining why the missing equation must be an equation that conserves the monetary flow, which we will call the **Conservation Equation.** In the attached figure, we show the relation that any generic agent has with the rest of the economy, which we have represented symbolically by a globe. We can see that the generic agent only has two ways of connection with the rest of the economy, one is the money he earns from his sales and the other is the money he spends on his purchases.



Let us observe, that when we demand from each of the agents that participate in the economy that the nominal flow of their expenses is equal to the nominal flow of their income, we will be forcing money to be conserved in the economy, since the rest of the world is formed by many other agents to whom we are also imposing the same condition:

LAW OF CONSERVATION OF THE MONETARY FLOW (economy without savings or monetary creation): *The Flow of Expense for purchases of each one of the agents that participate in the economy is equal to their Flow of Income for sales:*

$$x_i = y_i \qquad \Big| \begin{matrix} Conservation\ Eq. \\ of\ the\ Monetary\ Flow \end{matrix}$$

To impose on each agent to equal his income with his expenditure, is one of the many possible statements we can make of the Conservation Equation to force money to be conserved in the economy, but it is not the only one. In fact, the statement thus formulated is very restrictive and we will see it describes a very particular case of monetary economy in which neither monetary transfers between different agents, nor the creation or destruction of money are allowed, but it serves as an example to show the meaning of the conservation equation and the reason why its formulation is so important in the economy, since its function is none other than to force the activity of each agent to conserve the quantity of money in the economy.

The Conservation Equation of the Monetary Flow expresses the bond that each agent must fulfill within the economy to guarantee that the monetary flow is conserved, that is, the conservation equation will serve to describe the destiny or origin of the money being created or destroyed within the economy.

In the particular example above, the equality in the flow of expenditure and the flow of income we impose on each agent implies that no agent saves and, therefore, in the economy there is no saving. It also implies that there is neither creation nor destruction of money, so in the general case, the conservation equation will have to be very different from the previous equation, since in the real economy there is saving and there is also creation and destruction of money, and the previous expression does not consider it.

Another observation on the conservation equation that is important to make now is that, since it is a vector expression, we can obtain from it by aggregation a scalar identity that reflects the macroeconomic conservation condition of the economy as a whole. With the particular formulation we have given to the conservation equation, the aggregate equation coincides with Say's Law:

$$x_i = y_i \xrightarrow{aggregation\ eq.} PIA = \sum_i x_i = \sum_i y_i$$

The appearance of Say's Law does not occur by chance, and is the reason why we have named the equality between the aggregate flow of expenditure and income, as Say's Law, since this was the original meaning given to it by Say:

> *"Every producer asks for money in exchange for his products, only for the purpose of employing that money again immediately to purchase another product, for we do not consume the money, and money is not usually sought to hide it; therefore, when a producer wishes to exchange his product for money he may be considered as already asking for the commodity which he proposes to purchase with that money."*
>
> *Say*

We can clearly see in the paragraph that Say is saying that in an economy the microeconomic conservation equation we have just formulated is "normally" present, which obliges any seller to spend in purchases all he earns in sales. Assuming this condition is met, Say succeeds in showing that in a monetary economy there cannot be overproduction at the aggregate level, since aggregate income must be equal to aggregate expenditure, which is what Say really wanted to show.

Say's intention was to refute the argument that most economists of his time used to explain the economic crisis: *"an economy in which more is produced than is desired or can be consumed"*. It is exactly the same argument that Keynes used 100 years later to explain the economic crisis, and that is still used now, 200 years later, to explain recessions: "under-consumption".
Therefore, Keynes mentions Say's Law and affirms that in an economy it does not have to be fulfilled. We see that the idea of what causes economic crises has changed very little in the last two hundred years.

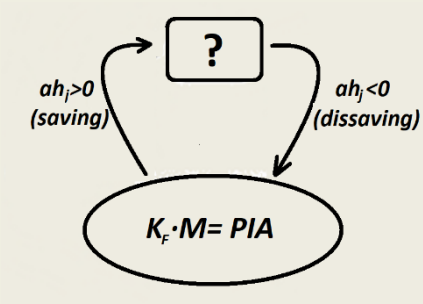
We have called "Say's Law", not the microeconomic conservation equation that forces each agent to spend what he earns, which would have been more correct, but the conclusion that is reached when this obligation is imposed, which is what Say wanted to prove to refute the argument of over production, or under consumption, as the origin of the economic crisis (it is necessary to remember that what we have called "Say's Law" is always true, whatever the particular statement of the conservation equation).

The rest of the chapter will be devoted to find the most general possible conservation equation which satisfies any generic agent in a monetary economy.

2. SAVINGS IN THE MONETARY ECONOMY

In a real economy economic agents do not spend all their sales income and usually save part of their income. Not only that, agents can also borrow money, which allows them to maintain a spending flow higher than the value of their income flow. To construct a realistic economic theory we must bear in mind that both possibilities, saving and borrowing, can be assumed by agents when they carry out economic activity and must be reflected in the specific formulation of the Conservation Equation. It is evident that the equality between expenditure and income, as we have formulated it in the previous section in the Conservation Equation, does not allow saving and will have to be changed to reflect the possibility of saving and spending on credit.

<u>SAVING</u>. A very important aspect to bear in mind when saving or spending on credit is that we are not going to consider it as an exchange of buying and selling. The reason to proceed in this way is that when you save or spend on credit we understand that you are not acquiring any service in exchange for money, which is what is understood by a purchase-sale, so it should not appear in the expense matrix. ***G****.*



The attached figure shows what we mean by savings. The act of saving or spending borrowed money is a monetary transfer between economic agents without compensation in the present, based on a promise of future return of the borrowed money backed by a legal system. There is, therefore, no buying and selling or exchange, nor is there any reason why it has to appear in the expenditure matrix, which is what we use to describe currency exchanges.

The figure shows that savings money is taken out of the real economy and ends up outside the economy. The opposite happens with the money that is dissaved, which in the figure comes from outside and ends up being spent within the real economy.

This makes it necessary to separate the monetary flows generated by savings and credit from the flows generated by buying and selling exchanges in the real economy, so a specific vector will be defined to represent savings and credit, the savings vector ***Ah.***

The traditional definition of savings and credit, as the two inseparable sides of a single coin, can be found without difficulty in the statements made by economists, and not precisely in the less famous ones. John Keynes' definition, which appears in the General Theory, is more than 80 years old and is still considered valid today. It is the standard definition used in economics:

> *"As far as I know, everyone agrees that savings is the excess of income over consumption expenditures."*
>
> *John Keynes, 1936*

However, when we look at the statement with which Keynes defines saving from the perspective of the theory we are developing, we see that the expression is, at the same time as the definition of the saving vector ah_i of the economy, a possible formulation of the **Conservation of Money Flow Equation** for an economy in which savings and credit are allowed. Therefore, we define savings:

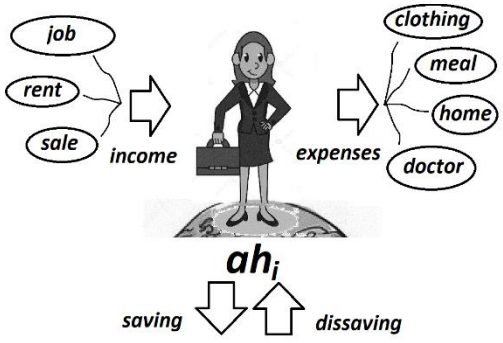
SAVINGS: The Flow of Savings is defined as ah_i is defined as the surplus of the flow of income over the flow of expenditure of each of the agents that develop the economic activity:

$$y_i = x_i + ah_i \qquad \begin{cases} si \;\; ah_i > 0 \;\; \rightarrow \;\; saving \\ si \;\; ah_i < 0 \;\; \rightarrow \;\; dissaving \end{cases}$$

$$\boldsymbol{Ah} = \begin{bmatrix} ah_1 \\ \vdots \\ ah_n \end{bmatrix} \xrightarrow{\;aggregation\;} Ah = \sum_j ah_j$$

From this point of view, saving is a monetary extraction and lending is a monetary injection.

The reason for the positive sign in the expression is so that its coefficients are positive when they represent money that leaves the economic system and is not spent (what is understood by savings), and negative when it represents money entering the economic system (what is understood by a loan). The definition of savings, understood as the statement of the conservation equation, contains and generalizes the expression given in the previous section, as a particular case where the savings vector is identically null. The attached figure shows this idea.



Savings Equation

$$y_i = x_i + ah_i$$

Now, the definition allows us to understand savings and credit within the economy as a monetary flow outside real productive activity that allows us to violate, and not fulfill, the microeconomic conservation equation we imposed on the agents in an economy without savings:

$$ah_j \neq 0 \xrightarrow{y_i=x_i+ah_i} y_i \neq x_i$$

Thanks to saving, agents do not have to spend everything they earn, and thanks to borrowing they can spend more than they earn, invalidating the previous formulation of the Law of Conservation which stated that each agent's income flow had to be equal to his expenditure flow.

The Conservation Equation. To prove that, in fact, the expression with which the saving vector is defined ah_i is the **Conservation Equation of the Monetary Flow of** an economy in which saving and lending are allowed, we only have to prove that when the expression is fulfilled money is really conserved. To prove it, let us obtain the aggregate equation of the new conservation equation:

$$y_i = x_i + ah_i \xrightarrow{aggregatión} \sum_j y_j = \sum_j x_j + \sum_j ah_j \xrightarrow{Say.s\ Law}$$

$$\rightarrow \quad Ah = \sum_j ah_j = 0 \qquad (Aggregate\ Conservation\ Equation\ )$$

The expression tells us that in an economy in which the equation with which we have defined saving is fulfilled, aggregate saving is always zero. Perhaps we can see more clearly what it means for aggregate saving to be zero if we separate the agents who are spending on credit from those agents who are saving:

$$\sum_j ah_j = 0 \rightarrow \left\{ \begin{array}{l} ah_i > 0 \leftrightarrow saving = \sum_{ah_i>0} ah_i \\ ah_i < 0 \leftrightarrow dissaving = \sum_{ah_i<0} ah_i \end{array} \right\} \rightarrow Ah = saving + dissaving = 0$$

That aggregate saving is zero necessarily implies equality between the aggregate flow of saving and the aggregate flow of lending, i.e., it necessarily implies that all the money saved is spent as a loan and, therefore, that in the economy there is no creation or destruction of money. I.e., the expression with which savings is defined in monetary economies is, in effect, the statement of a Law of Conservation of Money Flow that does not allow the creation or destruction of money.

This can also be seen when the positive components of the savings vector are identified with "savings", and the negative components with "investment", which is what loans are usually identified with in the economy:

$$\sum_i ah_i = 0 \quad \rightarrow \quad \left\{ \begin{array}{l} ah_i > 0 \ \rightarrow \ saving \ \rightarrow \ A = \sum_{ah_i>0} ah_i \\ ah_i < 0 \ \rightarrow \ inversion \rightarrow \ I = \sum_{ah_i<0} ah_i \end{array} \right\} \rightarrow \quad A + I = 0$$

Using the same words that John Keynes used in the General Theory, almost 100 years ago:

> *"To my way of thinking, the prevalence of the idea that savings and investment, considered in their strict sense, may differ from each other, can only be explained by the optical illusion due to the fact that the relation between an individual depositor and his bank is regarded as a unilateral operation, instead of bilateral, as it is in reality. It is assumed that a depositor and his bank have a way of contriving to effect an operation by which savings may disappear from the banking system in such a way that they are lost to investment; or conversely that the banking system may contrive to bring about an investment to which no savings correspond."*
>
> *John Keynes, 1936*

Although it is a very strange quote coming from Keynes, knowing what he thought about Say's law, the obligation that every euro saved must be lent and spent, or vice versa, the obligation that any amount of money lent must be previously saved, is a consequence of how saving has been defined, but it is very difficult to understand why it has to be necessarily fulfilled. It is not easy to justify why any money that is saved has to be lent and spent, or vice versa, it is very difficult to understand why all the money given in loan obliges someone to simultaneously make the corresponding saving.

The problem is not only to find the mysterious mechanism by which the two flows, the flow of savings and the flow of loans, are connected. It is also the problem of determining which is the causal line that creates equality between saving and borrowing: *Who saves forces someone to spend on credit or is it who spends on credit that forces someone to save?*

All economists of all times have tiptoed silently past the problem, and have postulated equality between saving and credit appealing to the equilibrium achieved by manipulating the interest rate of money, without even understanding where the problem lay, except Keynes. Only Keynes seems to have understood very clearly that the usual definition of saving obliges equality between saving and investment, although this does not seem to make him

doubt the definition of saving. However, we have just shown that whenever the equation defining saving is fulfilled, both flows must always be equal:

$$\sum_j ah_j = 0$$

The ultra grave obligation that links saving and investment, is a problem that has always been latent in economics and turns out to be a direct consequence of the equation used to define saving, so it is easy to conclude that the definition cannot be, far from it, the general conservation equation we are looking for, because, as we have shown, it describes an economy in which money is neither created nor destroyed, which does not correspond to a real economy in which money can be created and destroyed.

Adding the definition of saving to the set of equations we already have allows us to describe a monetary economy with saving and credit, but without money creation:

monetary economy without money creation

$$Microeconomic\ Eq. \begin{cases} y_i = x_i + ah_i & (Conservaction\ Eq.) \\ \begin{cases} y_i = \sum_j c_{ji} & (def.\ of\ income\ vector) \\ x_i = \sum_j c_{ij} & (def.\ of\ expense\ vector) \end{cases} & \\ k_F \cdot m_i = x_i & (Fisher´s\ Eq.) \end{cases}$$

$$Macroeconomic\ Eq. \begin{cases} k_F \cdot M = PIA & (Monetary\ Eq.) \\ PIA = \sum_i x_i = \sum_i y_i & (Say´s\ Law) \\ Ah = 0 & \begin{pmatrix} aggregate \\ conservation\ eq. \end{pmatrix} \end{cases}$$

These equations are the first representation we make of a monetary economy. The second and third expressions are used to define expenditure and income, so they always hold. The fourth expression is the vector version of the currency equation and has an experimental origin. The first expression is the only expression that implies an economic hypothesis or postulate, the Conservation Postulate, and therefore it is not necessarily true, even though y is the expression used to define savings and has been considered true since the dawn of time.

The problem of saving. We can say we have reached the limits of knowledge. The above set of expressions are those used at present to describe a monetary economy, in spite of the fact that we know that in the real economy it is possible to create and destroy money, and therefore we also know that the equation with which saving is defined must necessarily be false.

THE PROBLEM WITH SAVING: Let's look at the following two statements:

If the millions of euros carried by an armored car are burned in a traffic accident, according to the equations proposed, the rest of the agents are forced to take out from somewhere the same amount of money that has been burned in the accident to lend it and spend it.

When a counterfeiter succeeds in spending his counterfeit bills, according to the equations we have set out, the rest of the economic agents are obliged to save in the same amount in which the counterfeiter spends the counterfeit money.

It is very evident that the two previous statements must be false in general, and yet the Conservation Equation with which we have defined saving forces both statements to be true because it does not allow money to be created and destroyed.

Therefore, saving cannot be "the surplus of income over consumption expenditure"*, as Keynes thought, but then, what is the expression of saving that allows the creation and destruction of money within an economy?*

The problem is obvious. The link we have imposed on the economy with the equation defining savings is unrealistic:

$$y_i = x_i + ah_i \qquad (Conservation\ Eq.)$$

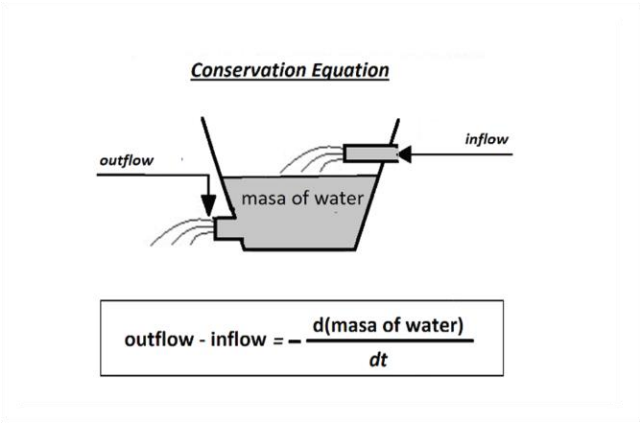
The equation cannot reflect what happens when a counterfeiter (or any bank) creates money out of thin air and spends it in the economy. Nor can it reflect what happens when a saver buries money in his backyard. Both possibilities can occur in a real economy and the conservation equation, as we have defined it, does not allow it.

To solve the problem and understand what is the ***Conservation Equation*** that allows there to be net saving or net credit spending, that is, that there can be both the creation and destruction of money, we must ask ourselves the right questions. Where does the money that someone extracts from the economy when he saves come from? Where does the money that the counterfeiter manages to sneak into the market go?

3. THE MICROECONOMIC CONSERVATION EQUATION

To understand why the micro-economic money mass is so important m_i which we introduced when we formulated the Fisher Equation, is so important, let us make a simile between the money flowing through the economy, which we represent with the monetary mass, and the mass of liquid flowing through a pipe system.

Let us think concretely of a container in which water accumulates, with a pipe through which it is filled and with a pipe or drain through which it is emptied. The attached diagram describes the physical situation, together with the conservation equation that the quantity of water contained in the container fulfills:



$$\frac{d(outgoing\ mass)}{dt} - \frac{d(incoming\ mass)}{dt} = -\frac{d(container\ mass)}{dt}$$

The equation, which only expresses the conservation of the mass of the water in the container, says textually that, "*the difference between the outflow of water and the inflow of water can only come from a change in the mass of water contained in the container, increasing or decreasing depending on the difference of flows, positive or negative*". Therefore, we can express the amount of water in our container as:

$$outgoing\ flow - incoming\ flow = -\frac{d(container\ mass)}{dt}$$

Knowing the value of the inflow and outflow we can know without any difficulty how the amount of water in the container changes.

Now, let us make a conceptual leap and accept that the quantity of money in the economy is conserved in the same way the quantity of water in a container is conserved. I.e., we will consider the economic system as a whole as a system formed by many pipes through which

money circulates and many recipients where it accumulates, and we will identify any generic agent as one of those recipients that contain money inside. Then it will also be possible to identify the conservation equation of the mass of water in a recipient with the conservation equation of the mass of money used by any agent for his activity in the economy.

With this identification, the monetary mass m_i which each agent uses to maintain and carry out the economic activity is equivalent to the water contained in each recipient. Therefore, when the amount of money a generic agent has changes, either because he spends more money than he earns, or because he earns more money than he spends, there will be an outgoing flow of money or an incoming flow of money linked to the changes in the money supply, which is no different from the rest of the money being used in the economy.

The changes in the value of the quantity of money m_i of each of the agents, will create a flow, either incoming (creation of money) or outgoing (destruction of money), which are completely real and can be used to buy, when spending increases with respect to income, or to save, when spending decreases with respect to income:

$$\frac{dm_i}{dt} = (incoming\ flow\ of\ money - outgoing\ monetary\ flow)_i$$

The monetary inflow, or outflow, as a consequence of the changes in the monetary mass used by each agent is real and must be added to the conservation equation of the monetary flow we already have to complete it, but the variation of the monetary mass must never be confused with saving or credit, which continue to be described by the saving vector ah_i because it has nothing to do with it. Therefore, to obtain the equation which will allow us to describe the evolution of a monetary economy in which money can be created and destroyed, we must add to the conservation equation which we used to define saving, a new term which takes into account the contribution in the money flow caused by the changes in the money mass of each agent:

MONETARY FLOW CONSERVATION LAW: In a monetary economy, the flow of income from sales of any economic agent must be equal to the sum of the flow of expenditure of any economic agent. y_i of any economic agent must be equal to the sum of the flow of expenditure for purchases, plus the flow of savings x_i for purchases, plus the flow of savings Ahplus the variation of its monetary mass:

$$y_i = x_i + ah_i + \frac{dm_i}{dt} \qquad (Conservation\ Eq.)$$

The expression is the Conservation Equation of a currency economy in which money can be destroyed or created.

This is the general conservation expression we are looking for. The positive sign in the expression indicates that an increase in the money supply can only be the consequence of a positive difference between the flows of income, expenditure and savings:

$$\frac{dm_i}{dt} = (incoming\ flow\ of\ money)_i = y_i - x_i - ah_i$$

The expression is clearly the **Currency Flow Conservation Equation** (or **Accounting Equation)** that any agent or sector within a generic currency economy must necessarily comply with, considering the possibility of changes in the quantity of money it handles, and is, as we know, a microeconomic link.

TEMPORAL DEPENDENCE. The notable novelty of the "Conservation Equation" we have just presented is that it introduces time as an economic variable into the economy in a natural and unforced manner.

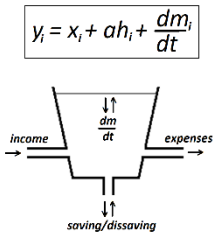
Besides, it is the variation of the quantity of money in time that appears in the Conservation Equation, so the quantity of money becomes an independent variable as are the flow of expenditure and income necessary to carry out the exchanges:

$$y_i = x_i + ah_i + \frac{dm_i}{dt} \qquad (Conservation\ Eq.)$$

The expression is a dynamic equation that turns economics into a predictive science, since it describes the evolution of economic variables over time.

Perhaps the simplest way to visualize what the equation states is to reuse the simile of water flowing in and out of a container.

In the attached figure an agent is again represented as if it were a recipient in which a flow of water enters and leaves. The quantity of water in the recipient is the economic agent's monetary mass, and the water flowing in and out to another recipient is identified with his expenditure and income. The flow of savings and loans we identify with the extraction or injection of water to or from nowhere, implying it is an exchange of money in which there is no purchase or sale. In other words, saving or credit allows changing the amount of money used by an agent in the economy without being limited to his income or expenditure.



While spending and income flows come and go from one recipient to another without changing the quantity of money in the economy, savings and credit flows have a known destination and origin within the economy, and are external to it.

The latter, the extraction and injection of money within the economy is very well seen when we calculate the aggregate equation associated to the new conservation equation, since it is this that will allow us to show without difficulty that the new term will allow money, although it is conserved, to be created and destroyed without any problem. I.e., the vector equation that includes the term of variation of the monetary mass is really the conservation equation of money we are looking for.

We know that to obtain its aggregate equation we only have to add each of the components of the conservation equation, and since Say's Law is always obtained, we have that:

$$0 = Ah + \frac{dM}{dt} \qquad (Conservación\ Aggregate\ Eq.)$$

The aggregate expression links the nominal value of the money flow that saving or lending is taking out or entering from the money supply, $Ah$with the changes in the money supply *M*, as is quite logical. In addition, we can see that when aggregate savings is null $Ah = 0$the equation tells us that the monetary mass *M* remains unchanged, that is, when aggregate saving is zero there is no creation or destruction of money and all the money saved by an agent has to be spent by some other agent as credit, or vice versa. On the contrary, when aggregate saving is not zero, the expression tells us that money is being created or destroyed and the money mass M changes. The importance of the equation, apart from the value it has by itself, is that it points to the necessary monetary mass to carry out economic activity as the destination or origin of the money created or destroyed from outside the economy:

CREATION AND DESTRUCTION OF MONEY. The monetary mass M necessary for the functioning of the economic system is the origin of the money that leaves the economic system (destruction), and is the destination of the money that enters the economic system (creation), through the flow of savings Ah:

$$0 = Ah + \frac{dM}{dt}$$

The equation can be compared with the equation of conservation of energy in physics, since it speaks of the conservation of the monetary mass in the economy:

> *"When the economy is isolated, i.e. no money is flowing in or out, the money supply remains unchanged".*

The conservation equation, together with its aggregate equation, turns economics into a predictive science that in no way differs from the other natural sciences, since it expresses

the time dependence of the basic variables with which economics is described. Moreover, it allows us to solve most of the problems that have hindered the scientific progress of the discipline in the last two centuries, among them, those related to the creation and destruction of money.

With the new conservation expression, the set of equations describing any generic monetary economy remains:

Basic Eq. of Monetary Economics

$$Microeconomic\ Equ.\begin{cases} y_i = x_i + ah_i + \dfrac{1}{k_F}\dfrac{dx_i}{dt} & (Conservaction\ Equ.) \\ \begin{cases} y_i = \displaystyle\sum_j c_{ji} & (definition\ of\ income) \\ x_i = \displaystyle\sum_j c_{ij} & (definition\ of\ expense) \end{cases} & \\ k_F \cdot m_i = x_i & (Fisher´s\ \ Equ.) \end{cases}$$

$$Macroeconomic\ Equ.\begin{cases} k_F \cdot M = PIA & (Monetary\ Equ.) \\ PIA = \displaystyle\sum_i x_i = \sum_i y_i & (Say´s\ Law) \\ Ah + \dfrac{dM}{dt} = 0 & \begin{pmatrix} conservation \\ aggregate\ equ. \end{pmatrix} \end{cases}$$

Now it would seem we have reached the goal of finding the set of basic equations describing any generic monetary economy. This is true, but it would be a pity to end our search here and not finish it with a beautiful finale.

If we derive the Fischer equation with respect to time and use the expression to replace the vector m_i for the expenditure vector x_i in the microeconomic conservation equation, we obtain:

$$y_i = x_i + ah_i + \frac{dm_i}{dt} \quad \xrightarrow{k_F\frac{dm_i}{dt} = \frac{dx_i}{dt}} \quad y_i = x_i + ah_i + \frac{1}{k_F}\frac{dx_i}{dt}$$

The new equation is not different from the old one, although the monetary mass has been eliminated from it and now only the income vector, the expenditure vector and the saving vector appear in the expression. The aggregate equation will not have a different meaning from the one it already had, even if now in the new formulation the monetary mass does not appear as an explicit variable, but the aggregate expenditure, or PIA:

$$y_i = x_i + ah_i + \frac{1}{k_F}\frac{dx_i}{dt} \xrightarrow{agregacion} Ah + \frac{1}{k_F}\frac{dPIA}{dt} = 0$$

Now the aggregate expression relates the flow of money creation to changes in aggregate economy-wide expenditure, or Ah to the changes in aggregate expenditure of the whole economy or PIA. Therefore, the definitive set of basic equations that any economic system based on the free exchange of goods for money must fulfill is:

basic equations of monetary economics

$$Microeconomic\ Eq. \begin{cases} y_i = x_i + ah_i + \dfrac{1}{k_F}\dfrac{dx_i}{dt} & (Conservaction\ Eq.) \\ \begin{cases} y_i = \displaystyle\sum_j c_{ji} & (definition\ of\ income) \\ x_i = \displaystyle\sum_j c_{ij} & (definition\ of\ expense) \end{cases} & \\ k_F \cdot m_i = x_i & (Fisher´s\ Eq.) \end{cases}$$

$$Macroeconomic\ Eq. \begin{cases} k_F \cdot M = PIA & (Monetary\ Eq.) \\ PIA = \displaystyle\sum_i x_i = \sum_i y_i & (Say´s\ Law) \\ Ah + \dfrac{1}{k_F}\dfrac{dPIA}{dt} = 0 & \begin{pmatrix} conservation \\ aggregate\ eq. \end{pmatrix} \end{cases}$$

Of all the set of equations that describe the currency economy, only the microeconomic equations form an independent set. The scalar equations are obtained by aggregating the vector equations, so they are redundant equations. The reason why we state them explicitly is because each one of them has a macroeconomic meaning very different from

the microeconomic meaning of the vectorial expressions they come from. In fact, we can say that the set of vector equations describes the economy from the microeconomic point of view, while the set of aggregate equations describes the economy from the macroeconomic point of view.

The last expression, which we have called the scalar conservation equation, has as we shall see an enormous importance in economics, so much so, that we have given it a specific name:

THE GROWTH EQUATION. In a monetary economy, the nominal growth of the IPA is proportional to the flow of money creation $Ah$the constant of proportionality being Fischer's constant k_F:

$$\frac{dPIA}{dt} = -k_F \cdot Ah$$

The equation tells us that the growth of the IPA has nothing to do with the amount of money saved for investment, since it is only the spending of new money that is created out of nothing that allows for growth, whether or not it is spent on investment.

$$\sum_i ah_i = Ah \neq 0 \rightarrow \left\{ \begin{array}{l} ah_i > 0 \rightarrow saving \rightarrow \quad A = \sum_{ah_i > 0} ah_i \\ ah_i < 0 \rightarrow inversion \rightarrow I = \sum_{ah_i < 0} ah_i \end{array} \right\} \rightarrow A + I \neq 0 \rightarrow \frac{dPIA}{dt} \neq 0$$

This is perhaps the most important macroeconomic law of economics and is equivalent to the conservation of energy equation in the physical sciences.

CHAPTER 3

THE MEANING OF THE BASIC EQUATIONS

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1. THE MONETARY EQUATION

We do not want to be tiresome repeating once again the same thing, but the importance of the monetarist postulate demands it, since it is this postulate, together with the conservation postulate, which allows us to obtain the set of basic equations that a monetary economy fulfills.

Although it is not easy to agree on what science is, we can affirm that we all agree more or less that it is based on the belief that there is a set of laws or relations which link and make dependent on each other the immense quantity of phenomena we observe around us. Bearing this in mind, and supposing this vague way of defining science as the search for the laws that order reality is true, we have no other choice but to state that the monetary equation is a physical law that relates or links economic phenomena that appear to us as independent when they are not.

What reason can there be for needing a specific amount of money to maintain a specific flow of monetary exchanges? In principle, none, but it is the fact that there is such a relation between two variables which appear to us as independent, which allows us to investigate and relate other economic phenomena which also appear to us as independent, but to which the monetary relation links without remedy once we consider it to be true. Specifically:

$$k_F \cdot M = \sum p_i \cdot q_i \quad \rightarrow \quad \frac{dPIA}{dt} = -k_F \cdot Ah$$

The growth of expenditure, what we have called the PIA of the economy, does not have to be related to the flow of savings, understood as monetary injection coming from the creation of money from nothing. However, it is this interdependence between apparently unrelated variables, which the mathematical structure of a theory forces us to formulate a posteriori, which constitutes the magic that surrounds science and the reason why we believe that there really exist in nature a reduced set of mathematical relations with which we can explain what happens around us. In this sense, the scientist is a believer who in no way differs from other believers, and like them, he bases his faith on the mute dialogue he establishes with nature.

At no point in this long treatise are we going to try to justify, by resorting to first principles, that the monetary equation is true. Not because we do not have a deeper theory from which the relation can be derived, but because it is enough to introduce it as a postulate and let the conclusions it leads us to show us its validity.

To understand that it is the monetary equation which characterizes a monetary economy, is then evident. To understand that the monetary equation is the ultimate binding cause of credit crises is also very evident. But to understand that it will be finally the monetary equation to which we will have to resort to find a cure, is the magic which drives science and which forces us to believe in it.

2. THE CONSERVATION EQUATION OF MONEY FLOW

Let us analyze the three formulations of the Conservation Equation, which have appeared until we find the most general equation which allows us to describe a monetary economy in which money is created and destroyed:

$$y_i = x_i + ah_i \qquad (1)$$

$$y_i = x_i + ah_i + \frac{dm_i}{dt} \qquad (2)$$

$$y_i = x_i + ah_i + \frac{1}{k_F}\frac{dx_i}{dt} \qquad (3)$$

The first equation is nothing more than the accounting equation we have taken for granted all our lives. It is the expression used in economics to define savings as an external and external activity of the production and distribution process. To use Keynes' words:

"As far as I know, everyone agrees that savings is the excess of income over consumption expenditures."

It is a static equation in the sense that no time derivative of the variables appears, although there is nothing in the expression that prevents the vector of income, expenditure and savings from changing over time. However, we know that the expression cannot be valid in a generic way for any economy because its aggregate equation, the one obtained by adding all its components, tells us that the aggregate saving of the whole economy is zero:

$$\sum_i y_i = \sum_i x_i + \sum_i ah_i \xrightarrow{PIA=\sum_i y_i=\sum_i x_i} \sum_i ah_i = 0 \;\rightarrow\; Ah = 0$$

In an economy where the usual expression used to define saving is fulfilled there can be neither creation nor destruction of money, and it cannot be used to create a real model of the economy because the expression cannot be valid in a real monetary economy.

The second equation is telling us exactly the same as the first one and is, is therefore also an accounting equation:

$$y_i = x_i + ah_i + \frac{dm_i}{dt} \qquad (2)$$

The difference between one and the other lies in the appearance of a new term, the term of variation of the money supply, which converts the expression into a dynamic equation in which the quantity of money in the economy does not have to remain unchanged. Now the aggregate saving Ah of the whole economy need not be zero and money can be created and destroyed in the economy:

$$\sum_i y_i = \sum_i x_i + \sum_i ah_i + \frac{dm_i}{dt} \xrightarrow{PIA=\sum_i y_i=\sum_i x_i}$$

$$\rightarrow \sum_i ah_i + \sum_i \frac{dm_i}{dt} = 0 \;\rightarrow\; Ah + \frac{dM}{dt} = 0$$

We see that the quantity of money present in the economy depends on the aggregate flow of savings M depends on the flow of aggregate savings, and when this is not zero, the variation of the quantity of money will not be zero either. The really surprising thing about the expression is that it indicates the origin and destination of the money that is created or destroyed in the economy:

"It is from the monetary mass m_i which each agent uses to carry out the buying and selling exchanges, where the money which is destroyed and created in the economy comes from and where it ends up":

$$y_i - x_i - ah_i = \frac{dm_i}{dt} \rightarrow \begin{cases} y_i - x_i - ah_i > 0 & \rightarrow \frac{dm_i}{dt} > 0 \\ y_i - x_i - ah_i < 0 & \rightarrow \frac{dm_i}{dt} < 0 \end{cases}$$

The problem with the equation is that it does not tell us how to calculate the money supply, nor what relation it has with the other variables of the economy. Specifically, it does not tell us what relation each agent's money supply has with his income, his expenditure or his savings.

The third expression is another story:

$$y_i = x_i + ah_i + \frac{1}{k_F}\frac{dx_i}{dt} \qquad (3)$$

It is not only that it is a dynamic equation in which the time derivative of expenditure appears as a variable, it is also the fact that now, since money supply does not appear as an explicit variable x_i as a variable, it is also the fact that now, since money supply does not appear as an explicit variable, the expression recovers its original status as an accounting equation with which savings are defined ah_i and expresses again the microeconomic linkage existing between the three basic variables of the economy: income, expenditure and saving. Let us also observe that, when the economy does not change in time, the expression becomes the one used by Keynes to define saving, in the first equation. Therefore, the third expression is a more general equation than the one traditionally used in economics to define saving, and contains it as a particular case.

The expression also tells us of the deep asymmetry that exists between the role of the buyer and the role of seller in monetary economies, since the flow of expense x_i appears in the Conservation Equation together with its time derivative, something that does not occur with the flow of income. y_i. This asymmetry is not trivial and is of enormous importance, since it clearly indicates the causal line of economic growth:

$$\frac{1}{k_F}\frac{dx_i}{dt} + x_i = (y_i - ah_i) \quad \rightarrow \quad x_i \xrightarrow{\frac{dx_i}{dt} \rightarrow 0} (y_i - ah_i)$$

The Conservation Equation is a differential expression with respect to expenditure, where the difference between income and savings is what is acting as an independent term and,

therefore, is the term to which expenditure tends: *"expenditure follows the difference between income and savings"*. If we forget the ambiguous term coined by Keynes in the General Theory to name the engine of growth: "Effective Demand", and we replace it with the much more precise: "Disposable Income", as the difference between income and savings:

$$(disposable\ income)_i = y_i - ah_i$$

So, what the Conservation of Money Flow Equation tells us is that the expenditure of any sector of the economy will grow or decrease according to whether disposable income is greater or less than the expenditure of the sector. In other words, the nominal consumption of any sector follows disposable income and "will grow when disposable income grows and will decrease when disposable income decreases". Or in other words, any sector of the economy will go into recession when the sector's disposable income decreases.

Last but not least, the expression tells us that the creation of money is the only cause of the growth of the economy:

THE PRINCIPLE OF GROWTH. In a monetary economy, the nominal growth of any sector is proportional to the difference between disposable income and expenditure of the sector, the constant of proportionality being equal to Fisher's constant:

$$(disposable\ income)_i = y_i - ah_i$$

$$k_F \cdot (y_i - x_i - ah_i) = \frac{dx_i}{dt} \rightarrow \begin{cases} \xrightarrow{y_i - x_i - ah_i > 0} & dx_i \uparrow \quad (\boldsymbol{in}crease) \\ \xrightarrow{y_i - x_i - ah_i < 0} & dx_i \downarrow \quad (decrease) \end{cases}$$

This is why the Conservation Equation should be called "Keynes' Equation" because the equation expresses what he wanted to communicate when he wrote the General Theory:

$$y_i = x_i + ah_i + \frac{1}{k_F}\frac{dx_i}{dt} \qquad ¿\,Keynes´s\ Equatión?$$

We leave it to the scientific community to decide that, because Keynes is not exactly an economist who needs to be rescued from oblivion.

3. ANALYSIS OF AN ECONOMY DIVIDED INTO *N* SECTORS

Let us begin by studying the conservation equation of a monetary economy divided into N sectors in the general case in which money can be created or destroyed:

$$y_i = x_i + ah_i + \frac{1}{k_F}\frac{dx_i}{dt}$$

We will assume at all times that income, expenditure and saving are functions independent of each other, and that they are only linked by the conservation equation. This working hypothesis is very debatable, especially as far as saving is concerned, but we have no choice but to assume it to be true if we want to reach very general conclusions without first having to consider any concrete example of economics.

The conservation equation shows, with the above assumption, a system of first order differential equations for the expense vector **X** which has, an associated homogeneous equation, a characteristic equation, and a non-homogeneous functional term:

$$\boldsymbol{Y} = \boldsymbol{X} + \boldsymbol{Ah} + \frac{1}{\mathrm{k_F}}\frac{d\boldsymbol{X}}{dt} \;\rightarrow\; \begin{cases} \dfrac{d\boldsymbol{X}}{dt} + \mathrm{k_F}\,\boldsymbol{X} = 0 & (homegoneal\ equation) \\ k_F(\boldsymbol{Y} - \boldsymbol{Ah}) & (non-homogeneous\ term) \\ (k_F + \lambda)^n = 0 & (characteristic\ equation) \end{cases}$$

The general solution of the system of differential equations is, for each component:

$$x_i(t) = C_i e^{-k_F t} + k_F e^{-k_F t}\int [y_i(t) - ah_i(t)]\, e^{k_F t} dt \qquad (solution\ sector\ "i")$$

The following observations can be made about this equation:

1) The general solution has a transient functional term $C_i e^{-k_F t}$ which for large times cancels out, since k_F is positive by definition:

$$C_i e^{-k_F t} \xrightarrow{t\to\infty} 0$$

This shows that the events that occurred in "the past" do not influence the present beyond a characteristic time that is of the order of the "Fischer constant" k_F.

The economic significance of the "Fischer constant" k_F is thus the average time it takes for the flow of expenditure to respond to sudden changes in disposable income (the equivalent of the sector's money creation), which can be used to calculate experimentally the value of the Fischer constant.

2) From the previous statement it is deduced that, for very long times the transient can be neglected and the general solution remains:

$$x_i(t)_{t\to\infty} = k_F e^{-k_F t} \int [y_i(t) - ah_i(t)]\, e^{k_F t} dt$$

Let us note that the term $[y_i(t) - ah_i(t)]$ is precisely the value of $x_i(t)$ when there is no change in expenditure, what we have called the disposable income of the sector, so the expression shows the causal line of monetary economies:

"spending depends on and follows the sector's disposable income".

In other words, it is necessary to increase disposable income above spending in order to achieve spending growth in the sector:

$$y_i - x_i - ah_i > 0 \quad \leftrightarrow \quad \frac{dx_i}{dt} > 0$$

Money that can come from a transfer from another sector via the credit flow.

3) The conservation equation of the monetary flow can be expressed for each of the sectors as follows:

$$(y_i - ah_i - x_i) = \frac{1}{k_F}\frac{dx_i}{dt}$$

The term $(y_i - ah_i - x_i)$ represents the net money flow out of or into the sector, and when referring to a country's economy it is referred to as the external balance of payments. In the conservation equation, this term acts as the flow of money creation within the sector, so, as we already know, the economy of the sector can only grow when the term is positive. Although, later we will explain the theory of economic growth, it is observed that the origin of the nominal increase of expenditure (consumption) within any sector (or within a country), can only grow when the term is positive. $\frac{dx_i}{dt}$ (or within a country), has two possible origins:

$$(y_i - ah_i - x_i) > 0 \;\rightarrow \begin{cases} \xrightarrow{ah_i=0} \; y_i - x_i > 0 & \rightarrow income\ increase \\ \xrightarrow{y_i - x_i = 0} \; ah_i < 0 & \rightarrow \begin{cases} external\ credit \\ + \\ money\ crease \end{cases} \end{cases}$$

The first term indicates the amount of money that enters the sector due to the difference between sales revenue and purchases expenditure. The second term is saving, i.e. income due to internal money creation in the sector plus monetary transfers in the form of credit from other sectors (which acts as money creation).

When the sum of both terms is positive it contributes to the nominal growth of the economy.

4) DEFINITION. *We say that an economy is Say when the expenses for purchases of any sector are equal to its income from sales:*

$$y_i(t) = x_i(t) \qquad (Say\ Economy)$$

In a Say economy, each sector fulfills the same expression that aggregate saving fulfills in a closed economy:

$$y_i(t) = x_i(t) \iff^{\textbf{Say Economy}} \frac{1}{k_F}\frac{dx_i(t)}{dt} = -ah_i(t)$$

To put it another way, in a Say economy each sector behaves as an isolated economy (but to which money can come from other sectors).

With this small introduction to the underlying mathematical structure of the Conservation Equation we end this third chapter, but not before making a brief incursion in the terrible consequences that "Disposable Income" has in the real economy we live in.

4. EMPTY SPAIN

Although it will be later, when we will develop in more depth a theory of trade, we want to show now how the Conservation Equation of Currency Flow allows us to explain very easily one of the most evident and less pointed phenomena of the globalization of trade:

> *"The massive migration from the countryside to the city shown by all societies based on a monetary economy, in every age and in every place."*

All countries, whether rich or poor, tend to concentrate a large part of their population in large urban centres. Moreover, it can be empirically proven that the less economically developed a country is, the higher the percentage of the population concentrated in large cities tends to be. We are not going to give specific names of countries that follow this dynamic of human concentration in large cities, but it can be easily verified that it is not uncommon to find urban centers where a third or more of the country's entire population is concentrated.

Paris is a huge city with about 12 million inhabitants in a country with a population of about 70 million people. Tokyo is the most populous city in the world, sitting on an island, Japan,

which contains some 120 million inhabitants. However, it is not uncommon to find many capitals, in countries with less than half the per capita income of France or Japan, with a population that reaches and exceeds 18 or 20 million people in countries with no more than 60 million inhabitants. For example, the city of Buenos Aires has around 16 million people in a country 4 times the size of France and with a population of about 45 million inhabitants.

Why does this phenomenon occur?

Although it is, of course, a phenomenon that has always occurred, it is not difficult to demonstrate that it has become much worse during the last 50 years of globalization of trade and free movement of capital, without it being at all clear whether the two phenomena are, or are not, connected.

"Empty Spain" is the term used in Spain to refer to this phenomenon that is happening everywhere, that seems unstoppable and for which there is no convincing explanation from economists working for private universities in the USA, because they simply prefer to ignore it. Everything that does not appear in the prestigious economics journals published by the prestigious private universities in the USA does not exist, even if it is a phenomenon that is very easy to explain from a monetary point of view.

Let us observe what the conservation equation says when we divide the economy in two unique sectors, which in our case we can identify with an urban nucleus against the periphery. When we suppose there is no creation or destruction of money, we have:

$$\left.\begin{aligned} y_1 &= x_1 + ah_1 + \frac{1}{k_F}\frac{dx_1}{dt} \\ y_2 &= x_2 + ah_2 + \frac{1}{k_F}\frac{dx_2}{dt} \end{aligned}\right\} \xrightarrow{ah_1+ah_2=0} \frac{dx_1}{dt} + \frac{dx_2}{dt} = 0 \rightarrow$$

$$\rightarrow \begin{cases} (x_1 \uparrow) & \leftrightarrow \quad (x_2 \downarrow) \\ (x_1 \downarrow) & \leftrightarrow \quad (x_2 \uparrow) \end{cases}$$

The equations tell us that, when there is no monetary creation, the nominal growth of one sector is at the expense of the nominal growth of the other sector, which is a very remarkable result. Especially when it is understood that it is the disposable income of each sector that is guiding the process of growth or decline of the sector. That was the conclusion we reached when we analysed the conservation equation and showed that the causal line linking expenditure to income confirms that the decrease in disposable income below expenditure leads to a decrease in expenditure, which has dire consequences for the sector that suffers from it, since, as we will see later, the decrease in consumption expenditure will reduce its productive fabric in favour of the growth of the productive fabric of the other sector. Concretely, for any sector this is true:

$$(y_i - x_i - ah_i) = \frac{1}{k_F}\frac{dx_i}{dt} \xrightarrow{(y_i - ah_i) < x_i} \frac{1}{k_F}\frac{dx_i}{dt} < 0 \rightarrow x_i \downarrow$$

Where $(y_i - ah_i)$ is the sector's disposable income and x_i its expenditure.

The conclusion of the expression is valid for any generic sector and shows that, within the same country, the regions that "export" more than they "import" will see their productive fabric increase, while the regions that "import" more than they import will see their productive fabric decrease (as long as we identify the increase in expenditure with the increase in production, as is correct). It is the same thing that happens between exporting countries and importing countries, the former will see their production increase at the expense of the production of the latter, which export less than they import.

Let us observe that it is possible to maintain stationary expenditure in each sector, in spite of the fact that income is greater or less than it. To see this, perhaps it is better to compare the monetary flows coming from buying and selling with those coming from the transfer through the savings vector, so that both are balanced:

$$(y_i - x_i - ah_i) = \frac{1}{k_F}\frac{dx_i}{dt} = 0 \rightarrow \begin{cases} (y_1 - x_1) > 0 \leftrightarrow ah_1 > 0 \\ (y_2 - x_2) < 0 \leftrightarrow ah_2 < 0 \end{cases} \xrightarrow{\frac{dx_i}{dt}=0} ah_1 + ah_2 = 0$$

A sector that sells more than it buys must save and lend the monetary surplus to the sector that buys more than it sells, to keep the economy balanced, while the sector that buys more than it sells must spend by borrowing (negative saving) to be able to keep its economy balanced. Evidently, what one saves must be what the other spends on credit, so the economy that buys more than it sells can maintain the balance as long as it "has credit", otherwise, it will have to decrease spending and thus production (its *PIA*) will decrease until it manages to balance spending with income. That is, economies, or sectors, that import more than they export sooner or later will see their production decrease and will become poorer and unproductive when money stops coming in through loans.

The great migratory flows from the periphery to the big urban centers, which have always occurred, but which are getting worse since the liberalization of trade and the free circulation of capital, are a direct consequence of the Currency Flow Conservation Equation, and have little or nothing to do with how much or how little people work. Regions become poorer to the extent that they need to buy more than they sell, which is quite logical. Empty Spain, the enormous capitals that are being created all over the world at the expense of the population of the periphery are part of the same process that we are witnessing impassively without doing anything to remedy it.

How can you fight an equation? You can't fight an equation. When we fight against mathematics we must be like the reed that bends with the wind, but without ever breaking. Let us try to understand the mechanism we are fighting against:

1) A core with a larger population produces more variety of goods and more efficiently than those produced in the periphery, which tends to have a widely dispersed population.

2) The vast majority of the time, goods manufactured in the urban core have a higher added value than those produced in the periphery, for many and varied reasons.

3) A greater variety of goods implies that, under normal conditions, people living in the periphery buy more goods from the core than goods bought by those from the core in the periphery. This unequal flow of goods unbalances the flow of monetary exchange between the two regions, which causes the disposable income of the region that buys more in the other, to decrease below the expenditure. That is to say, the income in the periphery is lower than the expenditure it makes, and vice versa, the nucleus has income higher than its expenditure.

There is nothing strange or mysterious in the analysis, what we have is a periphery that empties of money:

$$(y_i - x_i - ah_i) = \frac{1}{k_F}\frac{dx_i}{dt} \quad \xrightarrow{(y_i - ah_i) < x_i} \quad \frac{1}{k_F}\frac{dx_i}{dt} < 0 \quad \rightarrow \quad x_i \downarrow$$

The people of the periphery depend on many products that they are not manufacturing and that they need to buy from the urban core, causing an imbalance in the monetary flow between the periphery and the center. The periphery literally empties of money and with it, empties of companies and people. If we want to say the same thing, but in a more technical way, we would say that the disposable income of the periphery decreases and with it, the whole productive fabric of the periphery.

Taxation, understood as a flow of transfers, can slow down the process and even stop it, but any attempt to stop the process with fiscal transfers from the centre to the periphery will always have to be maintained because it does not attack the source of the problem. The solution lies elsewhere and we will show it when we study international trade.

The consequences of the use of money in people's lives, which we have shown in the brief analysis of "Empty Spain", are very general and can be applied to any other coherent division of a monetary economy into two sectors. Of course, for the analysis to be valid it is necessary that the agents which form each of the sectors into which the economy has been divided are sufficiently homogeneous so that their behaviour can be assimilated to

that of a single agent, but beyond this statistical restriction, which is not at all difficult to fulfil, there is no other limitation which prevents us from generalizing the result.

The preceding analysis of the causes of Empty Spain is also valid to predict what is going to happen in a country as big as the European Economic Community made up of some 500 million people, or what is happening to a country as big as the USA, regardless of the fact that it uses the same currency.

When we divide Europe into two sectors, the industrialised countries of the centre and north, and the agricultural and tourist countries of the south, we have a situation with two very heterogeneous sectors that reflect very well the imbalances of buying and selling that we have talked about. It is foreseeable that the "disposable income" of the countries of the North will remain above their expenses thanks to their greater specialisation in products with a high added value that the countries of the South do not produce, but which they consume avidly. The opposite happens with the income of the countries of the periphery, which are highly specialized in tourism and products derived from agriculture and fishing, and which tend to pay lower salaries compared to the salaries paid in the industrialized North.

In this economic context, and taking into account that the difference in language will prevent massive displacements of the population in search of work, it will be inevitable that the imbalance in the flow of income from one sector to the other will lead to a net extraction of money that will force production in the countries of the South to fall. The decrease in production will be seen in an increase in unemployment, which will remain at very high levels and which economists working for private universities in the US invariably associate with structural unemployment for which they recommend lower wages.

Despite the fact that what is happening is that there is an imbalance in the balance of trade that feeds back, and whose origin is to be found in the lower income obtained by producing goods of lower added value, that is to say, in low wages.

To see that these imbalances are not easy to solve, let's take the East and West German economies as an example. Both areas still have a significant inequality in wages even after almost 30 years since the fall of the wall, and this, despite the numerous aids and investments that the industrialized West Germany has made in East Germany. If the Germans themselves have not been able to balance the production of the two Germanys after 30 years of uninterrupted efforts, even less can the Greeks, Spaniards or Portuguese be expected to do so. It is enough for them to follow the wheel and not fall even further behind.

ECONOMY OF TWO COUNTRIES. The set of independent variables that describe a monetary economy is formed by the coefficients of the expenditure matrix, the savings flows, the savings flows of the economy of the two countries. c_{ij} *the savings flows* ah_i *and time. The*

flow of expenditure x_i and the flow of income y_i are obtained from the sum of the coefficients of the expenditure matrix by aggregation and are therefore redundant variables.

Specifically, an economy divided into N sectors has N ^{2}+N independent flows linked by N equations: the N^2 flows that form the expenditure matrix and the N flows that form the savings vector. Therefore, if we want to go a little deeper into the consequences of the conservation equation, we must express the conservation equation in terms of these general flows of the expenditure matrix.

For example, let's do it for the particular case of an economy divided in two sectors, or in two countries, the conservation equation expressed in terms of the coefficients of the expenditure matrix remains:

$$\begin{matrix} y_1 = x_1 + ah_1 + \frac{1}{k_F}\frac{dx_1}{dt} \\ y_2 = x_2 + ah_2 + \frac{1}{k_F}\frac{dx_2}{dt} \end{matrix} \rightarrow \begin{matrix} c_{11} + c_{21} = c_{11} + c_{12} + ah_1 + \frac{1}{k_F}\frac{d(c_{11} + c_{12})}{dt} \\ c_{12} + c_{22} = c_{21} + c_{22} + ah_2 + \frac{1}{k_F}\frac{d(c_{21} + c_{22})}{dt} \end{matrix}$$

*Where the income and expenditure vector are obtained by aggregation of the rows and columns of the expenditure matrix **G**:*

$$\begin{cases} x_1 = c_{11} + c_{12} \\ x_2 = c_{21} + c_{22} \end{cases} \qquad \begin{cases} y_1 = c_{11} + c_{21} \\ y_2 = c_{12} + c_{22} \end{cases}$$

When each sector represents the economy of a country, the coefficients of the expenditure matrix have a very concrete and simple meaning:

$$\begin{matrix} c_{11} \rightarrow gasto\ del\ país\ 1\ en\ el\ propio\ país \\ c_{12} \rightarrow gasto\ del\ país\ 1\ en\ el\ país\ 2 \\ c_{21} \rightarrow gasto\ del\ pais\ 2\ en\ el\ país\ 1 \\ c_{11} \rightarrow gasto\ del\ país\ 2\ en\ el\ propio\ país \end{matrix}$$

The two differential equations dependent on the coefficients of the expenditure matrix c_{ij} are very complicated to solve in the general case, but it is possible to simplify them a lot by making a fairly simple assumption which is likely to be true in most cases:

"the expenditure that a country makes within another country is proportional to the total expenditure of the country".

With this simple assumption, the four coefficients of the matrix become dependent on only two parameters. Calling "a" and "b" the percentage of own spending that one country spends in the other country, we have:

$$c_{11} = (1 - a) \cdot x_1 \quad \rightarrow \quad \textit{expenditure of country 1 in own country}$$

$c_{12} = a \cdot x_1$ → *expenditure of country 1 in country 2*
$c_{21} = b \cdot x_2$ → *expenditure of country 2 in country 1*
$c_{22} = (1-b) \cdot x_2$ → *expenditure of country 2 in own country*

With a little algebraic manipulation, the two differential equations become the following system of coupled differential equations, now dependent on the coefficients "a" and "b" and saving:

$$\left.\begin{array}{l} \frac{1}{k_F}\frac{dx_1}{dt} = -a\cdot x_1 + b\cdot x_2 - ah_1 \\ \frac{1}{k_F}\frac{dx_2}{dt} = a\cdot x_1 - b\cdot x_2 - ah_2 \end{array}\right\}$$ *Economy of two countries*

Again, a set of general conclusions can be drawn as long as we accept that both expenditure and expenditure flows are x_1 y x_2 are independent of each other:

a) Let's suppose, for simplicity, that the respective saving flows are zero, that is, we will suppose that there are no monetary transfers between the Capital Market of both countries (we will see a little later what the capital market is). With this assumption, the system of equations reads:

- Each of the expenditure flows has two contributions. A first transient contribution that tends to zero for very large times, and a second stationary contribution, to which each of the expenditure flows tends to zero for large times.

- For large times, when the transient decays, the two expenditure flows tend to a constant relationship, dependent only on the expenditure coefficients "a" and "b". In particular, it can be shown that the relationship is:

$$a \cdot x_1 = b \cdot x_2 \quad \leftrightarrow \quad \frac{x_1}{x_2} = \frac{b}{a}$$

Therefore, for very large times, the trade balance has to balance and the expenditure between both countries is equalized, being the quotient between the total expenditure of both countries (the GDP), inversely proportional to the quotient between their respective expenditure coefficients.

This result is quite remarkable, and may seem shocking until we describe it in balance of payments terms. When we identify the flow of expenditure x_1 y x_2 with the GDP of each of the countries, what the expression states is that the more unbalanced the balance of payments of one country is with respect to the other country, and the more one country spends in the other, the lower its GDP (production) will end up being with respect to the GDP (production) of the other country. That is, the relationship between the GDP of both countries will end up being inversely proportional to the quotient between the respective expenditure coefficients.

b) When we suppose the saving flows are not null (but we suppose there is no creation of money), or what is equivalent, when we suppose both saving flows are equal and of opposite sign, the result is slightly altered, but they do not change the essence of the matter. For very large times, the ratio to which the expenditure of each of the countries tends, is altered:

$$ah_1 = -ah_2 \rightarrow \qquad a \cdot x_1 = b \cdot x_2 - ah_1$$

Now, thanks to a flow of negative savings (coming from and equal to the positive savings of the other country) it is possible to maintain an expenditure (which we identify here as the country's GDP, which is not entirely correct) above that which corresponds to its income from trade, i.e. the country can maintain a deficit expenditure thanks to the loan from the other country:

$$a < b \xrightarrow{a \cdot x_1 = b \cdot x_2} x_1 > x_2 \qquad \text{(trade balance=0)}$$

$$a < b \xrightarrow{a \cdot x_1 = b \cdot x_2 - ah_1} x_1 \overset{?}{\leftrightarrow} x_2 \qquad \text{(balance of trade≠0)}$$

Now, the trade balance is not cancelled out for very long periods because the trade deficit is maintained by the loan from the surplus country, and the country's GDP can be maintained above the level of its trade. We see that, thanks to the flow of loans, it is possible to maintain an external deficit without having to reduce domestic spending (GDP), but, logically, it will be necessary to ensure that the flow of external credit that compensates the trade deficit is maintained indefinitely over time.

c) The situation changes again when we take into account the possibility of creating money and the flows of savings are decoupled and can both be negative. In such a case, the system of equations becomes difficult to solve in a generic manner, so we will have to wait a little, until we define the Capital Market and have a theory of economic growth, to try to approach the concrete solution in some specific situations, but we cannot expect the result obtained in the previous sections to change significantly.

Since we still have no theory of growth or of monetary creation, it is impossible to interpret in more depth the consequences of saving on the final GDP of countries, but it does not seem an exaggeration to state that money flows will not be able to change the economic reality underlying the exchange of goods, so probably the conclusion we reached when we assumed there was no saving will be universally valid:

"The more one country's trade balance is out of balance with the other country, and the more one country spends in the other country, the lower its GDP (production) will end up being relative to the other country's GDP (production)"

It is the same conclusion we reach when we try to explain the economic growth that benefits the big cities at the expense of the periphery.

5. THE KEYNESIAN EXPENDITURE MULTIPLIER

One of the strangest concepts that exist in economics is the "spending multiplier", specifically, the "public spending multiplier" or "Keynesian multiplier". As is the case with most of the variables used in economics, the "multiplier" is something very vague that is never defined, but any economist will tell you that he knows exactly what it is, even though it is impossible to measure in practice, precisely because it is not defined.

For example, "Samuelson" defines it as the ratio of the increase in GDP to the increase in government spending that causes it (a definition that, of course, can be generalized to any increase in spending by any agent within the economy, e.g. "the investment multiplier"). The problem with the definition is that it is not clear what is meant by an increase in public spending; whether it is an increase in taxes to increase public services evenly, or whether it refers to a one-off, deficit spending by the government to activate the economy. A similar definition can also be found in another textbook published by a private university, in this case written by Mankiw, where the concept is not explicitly defined, but where it is also associated with the increase in *GDP in* the face of an increase in public spending, without specifying what is meant by an increase in public spending. Be that as it may, the indefinition that characterizes any variable used to describe the economy, seems to be motivated in this particular case to the fact that the expenditure multiplier is associated more with an evolutionary process of the economy than with a simple quotient of two variables, so the concept needs some implicit model to support it.

If we stick strictly to the definition of the multiplier as the relationship between GDP growth and growth in public spending, we must first of all think about two basic aspects that surround the ratio. The first is that public spending is a flow and, therefore, changes in the flow of public spending are the variation of a flow, and cannot be described as a flow. Second, for public spending to increase, there must be either an increase in revenue or deficit spending, so the best way to analyse the spending multiplier from the point of view of the basic equations we have developed is to divide the economy into two sectors, the private sector and the public sector:

$$\left.\begin{array}{l}\frac{1}{k_F}\frac{dx_1}{dt}=-a\cdot x_1+b\cdot x_2-ah_1\\ \frac{1}{k_F}\frac{dx_2}{dt}=a\cdot x_1-b\cdot x_2-ah_2\end{array}\right\}$$

Economy divided into two sectors

Where now the meaning of the parameters is:

$$a \cdot x_1 \quad \rightarrow \quad \textit{what is collected in the private sector}$$
$$b \cdot x_2 \quad \rightarrow \quad \textit{public spending that ends up in the private sector}$$
$$ah_1 = 0 \quad \rightarrow \quad \textit{private sector net saving}$$
$$ah_2 \quad \rightarrow \quad \textit{the flow of public sector credit}$$

For simplicity we have assumed that the net saving of the private sector is zero and that the constant public deficit comes, in aggregate terms, from monetary creation. Although it is possible to solve the system of equations without difficulty, to find the expression of the expenditure multiplier we are looking for, we only need to divide the change in the economy's GDP by the change in government expenditure due to credit spending:

$$\frac{dPIB}{dx_2} = \frac{d(x_1+x_2)}{dx_2} = \frac{-ah_2}{(a \cdot x_1 - b \cdot x_2 - ah_2)} = \textit{expenditure multiplier}$$

The result is very curious and somewhat different from what you might expect. Given that ah_2 is always negative because it is a loan, and given that the term $(a \cdot x_1 - b \cdot x_2)$the difference between what taxes are collected and what the public sector spends within the private sector, can be negative or positive depending on whether the public sector is in surplus with the private sector or not (almost always the term is negative), we have that the multiplier will be greater than "1" or less than "1" depending on whether the public sector surplus is positive or negative:

$$(a \cdot x_1 - b \cdot x_2) > 0 \quad \rightarrow \quad \frac{dPIB}{dx_2} < 1$$
$$(a \cdot x_1 - b \cdot x_2) < 0 \quad \rightarrow \quad \frac{dPIB}{dx_2} > 1$$

The expression is of a very general nature, and it tells us something we already know, that the concept of multiplier does not make much sense when it is associated to the public deficit in this way, because it is very dependent on the specific public deficit at the moment of the monetary injection and not only on the monetary injection, which is what would give sense to the relationship.

A much more coherent way of defining Keynes' multiplier, in the context created by the Madrid Theory, is expressed in the aggregate conservation equation, that is, in the Growth Equation:

$$\frac{dPIA}{dt} = -k_F \cdot Ah$$

When we refer Fisher's constant to the *GDP,* we have:

$$\frac{dPIB}{dt} = -k_F \cdot Ah \quad \rightarrow \quad \frac{1}{Ah}\frac{dPIB}{dt} = -k_F$$

The expression tells us that, whatever the origin of the monetary injection is $AhGDP$ will grow proportionally to the monetary injection, being the Fisher constant of proportionality, this being the main conclusion derived from the basic equations deduced in the first chapter. Here, we will consider all the time that the value of Fisher's constant is "2", but there are many reasons to think that its value is closer to "1.5", although this is indifferent for what concerns us here.

PART II

THE CONSUMER MARKET

CHAPTER 4

SIMPLE PRODUCTION ECONOMY AT CONSTANT YIELDS

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1. INTRODUCTION

In the first topic we find the equations that describe a currency economy based on only two assumptions. The first, that in the monetary equation Fisher's constant is effectively a constant and, second, that the quantity of money used to carry out exchanges is conserved. In spite of all this, and although the basic equations are very powerful and allow us to reach very general, deep and surprising conclusions on the monetary economy, the truth is that, as they stand, the equations only talk about monetary flows and tell us nothing about the productive reality which creates them.

The purpose of this second topic will be to present a Basic Economic Model, in which the monetary flows appearing in the set of basic equations are connected with the two variables with which we usually describe the economic reality around us, the price variable and the quantity of goods variable.

Evidently, the difficulty of creating a "model" of economy in which money flows depend on prices and the quantity of goods will be closely related to the possibility of finding a balance between the realism of the model and the predictive capacity of the model. A model so excessively simple that it only allows us to make trivial predictions will be of no use, just as a model of economy so realistic, but so complex, that we cannot obtain any prediction with it, is of no use either. The model has to be realistic, but above all it has to be approachable from a mathematical point of view, so that it shows us predictions that we can check, only then will the model make sense.

Here we are going to be inspired by the self-sustaining mechanism that life uses to reproduce itself and we are going to build a model of the economy that is complex enough

to contain all the variables that appear and are used in the description of the economy, and simple enough to draw realistic conclusions without excessive mathematical difficulty. Let's start by understanding what life does to reproduce itself and why it is so efficient at keeping itself alive.

Let us think for a moment of a herd of gazelles. We will observe that all the individuals that form the herd are very similar to each other, so much so that it is difficult to distinguish them from each other, especially when we pay attention only to the adult members, which are the majority. All adult gazelles appear to be the same; they are the same size, feed on the same food and behave in the same way, so they are virtually indistinguishable from one another. But the most important thing of all, and what interests us most, is to note that when the food available to the herd increases or decreases, the gazelles do not increase or decrease in size, becoming larger or smaller, but the herd becomes more or less numerous, increasing or decreasing the number of gazelles.

Now let's look at what happens in a fishing port. We see in it many boats, almost all of them of the same size and almost all of them engaged in the same kind of fishing. In that sense it is very similar to what we see in a herd of gazelles; they are all very similar and they are all used to catch the same kind of fish. But, the curious thing is to note that also, as with the gazelles, when the fishing becomes more abundant we will see the number of boats in port increase, but we will not see the boats get bigger. It's the opposite that will happen when the fish become scarce. Then the boats will not get smaller, they will simply reduce in number to match the amount of catch they have access to. Fishing boats, as with most businesses we see around us, seem to behave like a herd of gazelles, increasing or decreasing in number as business opportunities increase or decrease, but maintaining the right number of businesses to match the size of the market.

We can go further and ask ourselves why this is so, why our companies seem to behave so much like life has been behaving for billions of years and why they show around us, like life, a plethora of diversity that is very reminiscent of the diversity displayed by animal species. The answer is very obvious:

> *"Because companies, like life, find it more efficient to reproduce themselves at constant yields.*

To see this, let's think for a moment about gazelles. If gazelles were to increase in size every time the amount of food available increased, they would face tremendous biological challenges that are difficult to solve. The heart, lungs, bones, and the rest of the body would have to increase in size, but not in a proportional way, but depending on their functionality. If the organism is already very efficient at a specific size, finding a way for all these organs to remain equally efficient when they change size does not seem easy to achieve. This is exactly what happens with a fishing boat. Having to change the size of a

fishing boat every time the amount of available fish changes seems like a very inefficient process.

It can be well understood that when there is more food the gazelle does not try to get bigger, but the herd takes advantage of it to feed a greater number of young and become more numerous, which is a more efficient way of growing than increasing the size of the individuals. The same thing will happen when for some reason the food decreases. If the gazelle had to decrease in size every time food became scarce, the biological challenge it would have to face to change its metabolism and adapt to the changing environment would be a very inefficient process in biological terms.

This can be seen much better if we think of two species competing for food in the same ecosystem, one of them changing the size of each individual in response to changes in food, and the other changing the number of individuals, but without changing size. It is easy to conclude that the most efficient strategy would undoubtedly be the second option, and not because we say so, but because it is the option that life has chosen and has used on Earth for the last 2,000 million years, without changing strategy in all that time.

So when we hear economists working for private universities in the US argue against the possibility of the economy operating at constant returns, we can only laugh. When they claim that *"it would be too much of a coincidence for any randomly chosen firm to operate at constant returns when it could operate in so many other possible ways"*, they are not only talking nonsense, they are deliberately misleading people, because the economy can operate at constant returns, even if individual firms do not (although they do too). We have seen that an economy produces at constant returns when, faced with an increase in output, the economy responds by increasing the number of firms, not by increasing the size of each individual firm. In such a case, it matters very little whether or not the firm operates at constant returns, because it is the specific set of firms, and not the individual firm, that produces at constant returns.

When we look around us we see without difficulty that, in order to increase production, the economy increases the number of companies engaged in production, but does not increase its size, so the assumption that it is possible to represent the economy with a model of simple production at constant yields, is not only a completely valid hypothesis within the reality that surrounds us, but above all it is a very sensible hypothesis given the mathematical simplicity of the model.

Of course, an individual company does not necessarily operate at constant returns, and in fact it almost never does. It is the same as with an individual gazelle, which it is absurd to claim that it operates at constant returns, just as a herd of gazelles does. In the same way, it would also be utterly absurd to think that a fishing boat runs at constant yields and will increase the size of its engine every time an extra sailor is hired. That is the absurd logic that the textbooks written by economists working for private universities in the United States

would have us believe that, for the economy to function at constant returns, it is necessary for individual companies to also function at increasing returns. We will not fall into this trap.

The reason why economists working for private universities in the USA despise the model of simple production at constant yields was already given by Piero Sraffa 50 years ago, when he comments in the preface of *"Production of Goods by means of other Goods":*

> *This view, which is that of the old classical economists from Adam Smith to Ricardo, has been submerged and forgotten since the advent of the "marginalist" method. The reason is obvious. The marginalist approach demands that attention be focused on variation, because without variation, either in the scale of industry or in "the proportions of the factors of production," there can be no marginal product and no marginal cost. In a system where production continued without variation in these respects, day after day, the marginal product of a factor (or, alternatively, the marginal cost of a product) would not only be **hard** to find, there would be nowhere to find it.*
>
> *Piero Sraffa*
> *(Production of Goods by means of Goods)*

In the model of production at constant returns there is no marginal return that can be associated with a set of factors of production. Labour appears in the model and is renumbered with wages, but, incredible as it may seem, there is nothing in the model that can be identified with physical capital that needs to be renumbered. In fact, capital cannot be coherently defined within the model. And therein lies the problem, because economists working for private universities in the US want the distribution of production to be made a function of the productivity of each of the factors involved in production, which is not possible in the model of simple production at constant returns.

When economics is driven by ideology, as has happened in the discipline since the 1970s, it is inevitable that science, and the peer review on which it is based, is pushed into the background and certain absurd ideas, such as Production Function Theory, are explained in textbooks as a scientific truth with empirical justification, when the truth is that it lacks any such support.

More than 1.5 billion years of multicellular life on the planet support that it is more efficient to produce at constant yields than in any other way. The logical thing then is to expect that the economy, like life, also tries to produce at constant yields, which is in fact what we observe around us:

"thousands of identical McDonald's locations, in identical cities, producing identical hamburgers accompanied by identically sliced pickles."

You have to be very blind not to see it and we are not going to insist any more on the obvious. We only wish to state that economists working for private universities in the US have more than earned their salaries.

2. SIMPLE PRODUCTION ECONOMY WITH CONSTANT YIELDS

Although in the first chapter we have found the basic equations describing a monetary economy and we have used them to draw a set of very general conclusions, the fact is that the monetary flows appearing in them have no reference to the productive reality which creates them. The purpose of this chapter will be to find the expenditure matrix associated to a simple production economy at constant yields as a function of the real variables, so that we can express the conservation equations as a function of price and quantity of companies engaged in production.

In order to associate the monetary exchange flows which appear in the matrix of Expenditure $\boldsymbol{G}$ with the physical variables which originate them, it is necessary, first of all, to make some constructive hypotheses on the production and distribution of goods and services within the economy. This is what is known in economics as a "model". Specifically, the model that we are going to use throughout this work is very simple, compact, and complete, and receives the name of **Model of Simple Production at Constant Yields**. It will be thanks to this model, with which we will obtain in the next topic the Buyer and Seller Asymmetry Principle that governs the production and distribution in the Consumer Market. But, we must make very clear from the beginning that, in spite of the apparent simplicity of the set of expressions we are going to arrive at, these will be valid with a very general character.

Simple Constant Yield Production Model

The model assumes that there are N+2 agents involved in the production process:

- The N basic enterprises that produce N differentiated goods or services.
- The workers as a whole.
- The business community as a whole.

Each of the N+2 agents will fulfil an accounting equation. The N firms will depend on two new real variables, "the number of basic firms" and "prices". λ and "the prices" $p$and it will be in terms of them that we will express the expenditure matrix and the conservation equations that describe the economy. The accounting equations of workers and businessmen will depend in turn on new variables, wages and profits.

a) The N basic companies.

The first and most important assumption we are going to make in order to realistically describe the economy is to define the "basic company". We will suppose that each of the sectors "i" into which the economy has been divided is made up by λ_i specific basic firms engaged in the manufacture of a single good.

THE BASIC COMPANY. The production of each generic good "i" is carried out within each sector of the economy by a number of identical and independent firms, called "basic firms" of the sector. λ_i of identical and independent companies, called "basic companies" of the sector.

We are said to be in a "simple production" economy when each basic firm produces only one good. The technical coefficient Q_{ii}^{o} describes the flow of goods of type "i" produced by each of the basic firms, while the set of technical coefficients Q_{ij} describes the flows of goods necessary for production, which each of them buys from the other basic firms. It is said that we are in a constant returns production model when the coefficients are all constant.

The accounting equation that each basic company fulfills is:

$$Q_{ii}^{o}p_i = \sum_{j=1}^{n} Q_{ij}p_j + B_i^{job} + B_i^{cap}$$

Where the coefficients B_i^{job} y B_i^{cap} are the expenditures made on salaries and rents.

The reason why the "basic firm" is introduced into the model is to attribute any increase or decrease in output to the increase or decrease in the number of firms that exist in the sector. In this way, the economy can produce at constant returns, even if the basic firms themselves do not produce at constant returns. In this sense, we will suppose that each basic company produces a constant flow of goods, consuming for it a constant quantity of

goods that are given by the technical coefficients, so the accounting equation that fulfils each of the basic companies is of the type:

$$(income)_i = (expenses)_i \rightarrow \begin{cases} (income)_i = Q_{ii}^o p_i \\ (expenses)_i = \sum_{j=1}^{n} Q_{ij} p_j + B_i^{job} + B_i^{cap} \end{cases}$$

Where, Q_{ii}^o is the quantity of goods produced by each of the basic firms, Q_{ij} is the quantity of products "j" that each basic company buys from each of the other basic companies, and B_i^{job} y B_i^{cap} are, respectively, the part of the profits that each firm devotes to pay the wages and rents received by the entrepreneurs. The p_i are the prices at which each of the goods is sold.

Evidently, in the Model of Simple Production at Constant Yields, each sector of the economy is formed by a concrete number of basic companies that is given by the variable $\lambda_i$and that we call, "number of basic companies of sector i". Therefore, the accounting equation that each of the sectors fulfils in function of the new variables is:

$$\lambda_i Q_{ii}^o p_i = \lambda_i \cdot (\sum_{j=1}^{n} Q_{ij} p_j + B_i^{job} + B_i^{cap})$$

We see in the equation that companies not only spend on buying goods from other companies, but they also spend on paying wages and paying corporate profits. This is the term $B_i^{trab} + B_i^{cap}$ at the end of the expression. That is to say, that a simple production economy with constant yields made up of N productive sectors, has at least two more sectors, the workers and the entrepreneurs, which must also be described independently by an accounting equation. This is logical. As we have said, the basic companies are not the only agents in a simple production economy.

b) The workers as a whole

In an economy there are not only companies, there are also workers who carry out the production in exchange for a part of the monetary surplus of the company. That is why their income appears in the accounting equation of each company as an expense, but we know nothing about what they do with it and what they spend it on, which is what we need to know in order to incorporate it into the expense matrix with its own accounting equation:

DEFINITION. The aggregate flow of expenditure made by the workers as a whole is equal to the sum of the quantity of each of the goods they buy, by their price q_i^{job} of each of the goods they buy, by their price p_i:

$$x^{job} = \sum_{i=1}^{n} q_i^{job} p_i$$

DEFINITION. The aggregate flow of income that the workers as a whole obtain for their work is equal to the sum of the profits that each basic company in the sector dedicates to paying workers for the number of basic companies in the sector per the number of basic companies in the sector. B_i^{job} that each basic company of the sector dedicates to pay workers for the number of basic companies of each sector λ_i in each sector:

$$y^{job} = \sum_{i=1}^{n} \lambda_i B_i^{job}$$

ACCOUNTING EQUATION OF THE WORKERS. The accounting equation that the set of workers fulfills is:

$$y^{job} = \sum_{i=1}^{n} q_i^{job} p_i$$

In the model of simple production at constant returns, workers are just another sector with its own accounting equation. The model tells us, not only where their income comes from, the term "income", but also what they spend it on, which is the row of the expenditure matrix. $\sum_{i=1}^{n} \lambda_i B_i^{job}$ but it also tells us what they spend it on, which is what the row of the expenditure matrix represents. $\boldsymbol{G}$ dedicated to them.

The group of entrepreneurs

Finally, it is not enough to include in the model the entrepreneurs, who, like the workers, are aggregated into a single independent agent who buys and sells in the same way as any other agent. The entrepreneur receives his income because he is the owner of the company and, like the workers, he will also be a buyer of the goods he needs to live, so he will also have to fulfil an accounting equation:

DEFINITION. The aggregate flow of expenditure made by entrepreneurs is equal to the sum of the quantity of each of the goods q_i^{cap} they buy of each of the goods for its price. p_i:

$$x^{cap} = \sum_{i=1}^{n} q_i^{cap} p_i$$

DEFINITION. The flow of income obtained by the set of entrepreneurs is equal to the sum of the number of basic companies in each sector by the part of the surplus λ_i *of each sector by the part of the surplus B_i^{trab} that each basic company* dedicates *to pay the entrepreneurs:*

$$y^{cap} = \sum_{i=1}^{n} \lambda_i B_i^{cap}$$

ACCOUNTING EQUATION OF THE ENTREPRENEURS. The accounting equation that meets the set of entrepreneurs is:

$$y^{cap} = \sum_{i=1}^{n} q_i^{cap} p_i$$

Now we also know where their income comes from and what specific goods the entrepreneurs buy with it. In other words, we know the accounting equation of the entrepreneurs and we can incorporate it as another row in the expenditure matrix. $\boldsymbol{G}$.

3. THE EXPENDITURE MATRIX

Knowing the accounting equations of each sector, and identifying each of the terms that appear in them with each of the coefficients of the expenditure matrix, we can finally describe a simple production economy with constant yields according to prices, the number of companies and the technical coefficients of each basic company. Specifically, the income matrix and the expenditure matrix take the following values:

$$\boldsymbol{G} = \begin{bmatrix} \lambda_1 Q_{11} p_1 & \cdots & \lambda_1 Q_{1n} p_n & \lambda_1 B_1^{job} & \lambda_1 B_1^{cap} \\ \vdots & \ddots & \vdots & \vdots & \vdots \\ \lambda_n Q_{n1} p_1 & \cdots & \lambda_n Q_{nn} p_n & \lambda_n B_n^{job} & \lambda_n B_n^{cap} \\ q_1^{job} p_1 & \cdots & q_n^{job} p_n & 0 & 0 \\ q_1^{cap} p_1 & \cdots & q_n^{cap} p_n & 0 & 0 \end{bmatrix}$$

It can be seen that the matrix is divided into four well-differentiated zones that have a specific economic significance:

$$\boldsymbol{G} = \begin{bmatrix} \begin{vmatrix} \lambda_1 Q_{11} p_1 & \cdots & \lambda_1 Q_{1n} p_n \\ \vdots & \cdots & \vdots \\ \lambda_n Q_{n1} p_1 & \cdots & \lambda_n Q_{nn} p_n \end{vmatrix} & \begin{vmatrix} \lambda_1 B_1^{job} & \lambda_1 B_1^{cap} \\ \vdots & \vdots \\ \lambda_n B_n^{job} & \lambda_n B_n^{cap} \end{vmatrix} \\ \begin{vmatrix} q_1^{job} p_1 & \cdots & q_n^{job} p_n \\ q_1^{cap} p_1 & \cdots & q_n^{cap} p_n \end{vmatrix} & \begin{vmatrix} 0 & 0 \\ 0 & 0 \end{vmatrix} \end{bmatrix}$$

The first quadrant of N rows and N columns, top left, contains all the expenditure flows generated by purchases among the basic firms present in the economy. The second two-column quadrant, top right, contains the expenditure flows that firms use to pay wages and rent (which are at the same time the income of workers and employers). Finally, the third two-row quadrant, below and to the left, contains the expenditures that workers and entrepreneurs make on the purchase of goods produced by the basic firms. Matrix $\boldsymbol{G}$ is general, and describes a Simple Monetary Economy with Constant Returns.

In addition, and independently of the expenditure matrix, the model also gives us the income vector of a simple production economy as a function of the technical coefficients of the basic firms, prices and the number of firms:

$$y_i = \lambda_i q_{ii}^o p_i$$

Note that the model does not say two different ways of obtaining the vector of income, one this last expression and the other by adding all the coefficients of each of the rows of the expenditure matrix $\boldsymbol{G}$, which is much more important than it seems, as we shall see.

It is interesting, for the purpose of simplifying the notation, to define the auxiliary matrices $\boldsymbol{Q}$ y $\boldsymbol{Q}^o$ called matrices of the technical coefficients of the basic companies. A little further on they will allow us to express certain results in a very compact and elegant way:

$$\boldsymbol{Q} = \begin{bmatrix} Q_{11} & \cdots & Q_{1n} \\ \vdots & \ddots & \vdots \\ Q_{n1} & \cdots & Q_{nn} \end{bmatrix} \qquad \boldsymbol{Q^o} = \begin{bmatrix} Q_{11}^o & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & Q_{nn}^o \end{bmatrix}$$

The rows of the matrix $\boldsymbol{Q}$ represent the quantity of products purchased by each of the basic enterprises. While the matrix $\boldsymbol{Q^o}$ represents the quantity produced by each of the basic companies, and therefore all the coefficients that are not in the main diagonal are null.

Finally, and thanks to the fact that the expenditure matrix $\boldsymbol{G}$we can express the basic equations of the economy in terms of the new real variables. Recall that the basic equations expressed in terms of the flow of income and expenditure are:

Basic Eq. of Monetary Economics

$$microeconic\ Eq.\begin{cases} y_i = x_i + ah_i + \dfrac{1}{k_F}\dfrac{dx_i}{dt} & (Conservation\ Eq.) \\ y_i = \sum_j c_{ji} & \\ x_i = \sum_j c_{ij} & \\ k_F \cdot m_i = x_i & (Fisher\ Eq.) \end{cases}$$

$$macroecomic\ eq.\begin{cases} k_F \cdot M = PIA & (Monetary\ Eq.) \\ PIA = \sum_i x_i = \sum_i y_i & (Law\ of\ Sally) \\ Ah + \dfrac{1}{k_F}\dfrac{dPIA}{dt} = 0 & \begin{pmatrix} Aggregate \\ conservation\ Eq. \end{pmatrix} \end{cases}$$

Specifically, the set of vector equations as a function of the new variables is:

Simple Production at Constant Yields

System of accounting equations

$$\overbrace{\lambda_i q_{ii}^{o} p_i = x_i + ah_i + \frac{1}{k_F}\frac{dx_i}{dt}}^{conservation\ equation}$$

$$y^{job} = x^{job} + ah^{job} + \frac{1}{k_F}\frac{dx^{job}}{dt}$$

$$y^{cap} = x^{cap} + ah^{cap} + \frac{1}{k_F}\frac{dx^{cap}}{dt}$$

$$\overbrace{\boldsymbol{X} = \begin{bmatrix} x_1 \\ \vdots \\ x_n \\ x^{job} \\ x^{cap} \end{bmatrix} = \boldsymbol{G} \times \boldsymbol{I} = \begin{cases} x_i = \sum_{j=1}^{n} \lambda_i Q_{ij} p_j + \lambda_i B_i^{job} + \lambda_i B_i^{cap} \\ x^{trab} = \sum_{i=1}^{n} q_i^{job} p_i \\ x^{cap} = \sum_{i=1}^{n} q_i^{cap} p_i \end{cases}}^{expense\ vector}$$

$$\overbrace{\boldsymbol{Y} = \begin{bmatrix} y_1 \\ \vdots \\ y_n \\ y^{job} \\ y^{cap} \end{bmatrix} = \boldsymbol{G^t} \times \boldsymbol{I} = \begin{cases} y_i = \sum_{j=1}^{n} \lambda_j Q_{ji} p_i + q_i^{job} p_i + q_i^{cap} p_i \\ y^{job} = \sum_{i=1}^{n} \lambda_i B_i^{job} \\ y^{cap} = \sum_{i=1}^{n} \lambda_i B_i^{cap} \end{cases}}^{businessmen\ spending}$$

$$\overbrace{y_i = \lambda_i q_{ii}^o p_i}^{businessmen\ spending}$$

$$\overbrace{x_i = k_F \cdot m_i}^{Fisher\ Equation}$$

Let us observe that we have given physical support to the set of monetary flows of indefinite origin appearing in the set of basic equations we obtained in the first chapter. Now, the expressions where it appears are expressed by means of the set of variables which are usually used to describe the real economy: the number of companies, the prices of goods and services, the number of firms, the prices of goods and services, and the prices of goods and services. $\lambda_i$prices p_i and the set of technical coefficients q_{ij} with which we describe the basic firms and which we assume to be constants of the economy. The novelty comes from the two different ways in which the income vector is expressed.

<u>The Principle of Conservation of Production</u>

There is a detail that needs to be mentioned because it almost always goes unnoticed. In all the analysis we have done it is implicitly assumed that all the goods produced by any basic company are bought and consumed. To see that this assumption is actually being used as true, it is only necessary to remember that the income of a basic company can also be expressed as a function of the quantity of goods it produces and sells:

$$y_i = \lambda_i q_{ii}^o p_i$$

Where q_{ii}^o is the quantity of merchandise "i" produced by each one of the basic companies. It is not difficult to see that when we accept as valid the previous expression, then we are also accepting that all the goods produced are consumed:

$$y_i = \sum_{j=1}^{n} \lambda_j Q_{ji} p_i + q_i^{job} p_i + q_i^{cap} p_i \quad \xrightarrow{y_i = \lambda_i q_{ii}^o p_i} \quad \lambda_i Q_{ii}^o = \sum_{j=1}^{n} \lambda_j Q_{ji} + q_i^{job} + q_i^{cap}$$

Any commodity that has been produced, the term $\lambda_i Q_{ii}^o$ of the left of the expression, is either consumed by enterprises, or consumed by workers, or consumed by entrepreneurs.

It is important to understand that this conservation law is not contained in the conservation equation of the monetary flow, so it must be imposed from outside when the production model is created and when the previous expression is assumed to be valid.

4. INVESTMENT IN THE CONSTANT YIELD PRODUCTION MODEL

Another interesting parameter whose value is not possible to know in the model of simple production at constant yields without making new assumptions, is the investment expenditure that is being carried out within the economy. The knowledge of the components of the expenditure matrix c_{ij} in function of the variables price, quantity of companies and technical coefficients allows to know in an explicit way the flow of exchanges inside the economy, the *PIA*, and also allows to know which is the flow of final goods *GDP* that is produced, which are the variables that usually interest in the economy, but in the model does not appear when investment is worth, that is, which is the nominal flow that is dedicated to create new capital.

Normally, it is said that the *GDP* of the economy is given by the consumption that entrepreneurs and workers make when they spend their income, without including the consumption that is made to replenish the existing capital, and without including the consumption in the creation of new capital. Normally the name investment is given to the money that is devoted to satisfying these last two concepts, the maintenance of existing capital and the expenditure on the creation of new capital. However, it is not at all simple to introduce these two expenses in the model at constant yields.

The usual thing is to accept that companies are dedicating a part of their income to replace the deterioration of the means of production, although we do not know how much explicitly. In this way, the profits that are distributed between workers and businessmen are the real surplus of the economy, and can be dedicated, indistinctly, to satisfy personal needs in consumption, or to new investment. For this reason, *GDP* is normally considered to contain personal consumption and investment, but it does not contain the cost of replacing existing means of production, which, logically, is not considered to be part of the surplus.

To see what we mean more clearly, let's look at the breakdown of the *IPA* according to what the different agents spend their money on:

$$PIA = \boldsymbol{I} \times \boldsymbol{G} \times \boldsymbol{I} = \sum_{i=1}^{n} x_i + x^{job} + x^{cap} \rightarrow \begin{cases} x_i & \rightarrow business\ spending \\ x^{job} & \rightarrow employee\ expense \\ x^{cap} & \rightarrow businessmen\ spending \end{cases}$$

Expressing each of the terms in terms of the coefficients of the Expenditure Matrix, we obtain without many problems:

$$PIA = \left[\sum_{j,i=1}^{n} \lambda_j Q_{ji} p_i\right] + \left[\sum_{i=1}^{n} \lambda_i B_i^{job} + \sum_{i=1}^{n} \lambda_i B_i^{cap}\right] + \left[\sum_{i=1}^{n} q_i^{job} p_i + \sum_{i=1}^{n} q_i^{cap} p_i\right]$$

Therefore, three monetary flows of differing economic significance contribute to the total value of the *IPA:*

$$PIA = \Phi^{business} + \Phi^{benefits} + \Phi^{consumption}$$

The first monetary flow is identified with the aggregate value of the expenses among the companies present in the economy. We call it business flow:

$$\Phi^{business} = \sum_{j,i=1}^{n} \lambda_j Q_{ji} p_i = \boldsymbol{\lambda} \times \boldsymbol{Q} \times \boldsymbol{P}$$

The second monetary flow is identified with the sum of the expenses that companies make when they pay workers and entrepreneurs. It is the income which the workers receive for their work and the businessmen for the possession of the firms, and its value does not necessarily coincide with the expenditure made by the workers and businessmen, since, in general, both can be saving or spending on credit. We call it profit flow because it is the monetary surplus that companies obtain from their activity, although it appears as an expense in their accounting equations:

$$\Phi^{benefits} = \sum_{i=1}^{n} \lambda_i B_i^{job} + \sum_{i=1}^{n} \lambda_i B_i^{cap} \equiv PIB$$

The third monetary flow is identified with what we normally call "consumption" expenditure, and which we identify here with *GDP* or with the aggregate expenditure flow of the whole economy, that is, monetary expenditure on final goods consumed by workers and businessmen:

$$\Phi^{consumption} = x^{job} + x^{cap} = \sum_{i=1}^{n} q_i^{job} p_i + \sum_{i=1}^{n} q_i^{cap} p_i$$

The difficulty of the simple constant output model is in clearly identifying real *GDP* and separating investment from consumption. Normally, investment is referred to as the part of consumption that entrepreneurs and workers devote to expanding firms:

$$PIB = \Phi^{investent} + \Phi^{consumption}$$

But this way of looking at things ignores the fact that it is not individuals but companies themselves that normally do the investment spending, using a part of the surplus that is not distributed as capital income. Although most of the time companies borrow the money they need to invest, the truth is that they almost always set aside a part of the surplus to spend on investment expenses. That is to say, a part of what the companies would have to

dedicate to pay salaries or rent, they dedicate, on the contrary, to investment expenses: the investment of a part of the surplus is insufficient to carry out the investment and

$$\Phi^{business} = \Phi^{production} + \Phi^{replacement} + \Phi^{investent}$$

From this point of view, all the replacement expenditure, but also part of the investment, is being made by companies and does not appear in *GDP as* we have defined it. However, when *GDP* is measured in practice, it usually includes both investment spending and replacement spending, in addition to all consumption spending, so it is not at all easy to differentiate between them all.

It is possible to carry out the "model" assuming that the companies distribute all the possible surplus in benefits and only carry out the expenses in replacement, which implies supposing that the investment is made by the workers and the businessmen by means of previous saving, which will be what we will do here.

CHAPTER 5

THE PRINCIPLE OF BUYER SELLER ASYMMETRY

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1. INTRODUCTION

In this section we will go into the thorny study of the formation of prices in the monetary economies, but we will limit our attention only to the reproducible goods which are bought and sold in what we will call the Consumer Market.

Any economist, or any self-respecting economic theory, is obliged to give a minimally convincing explanation of why things are worth what they are worth and are sold at the price at which they are sold, this being undoubtedly the subject that has aroused the greatest interest among economists since very early times and to which they have devoted the most time and discipline. If there is something that characterizes economists working for private universities in the United States, it is that they do not have a theory of price formation that can be called that. The reason is to be found in the Theory of the Production Function which forces to link prices with the marginal productivity of factors, but only for the price of labour and for the price of capital and leaves no explanation for the price of goods. For them, he resorts to the intersection of two curves, the supply curve and the demand curve, without anyone knowing for sure how each of them is determined, and without anyone ever having calculated them for a specific commodity.

The observation that is often used to start the discussion about the price at which things are sold is the great difference between the price at which water is sold and the price at which diamonds are sold. Water is considered very valuable, so much so that we cannot live without it, and yet its selling price is very low. Whereas diamonds, which are something that no one really needs for anything, have a very high selling price. Why is this so? Why is something with no real value priced so high and something so essential for life priced so low?

Let us observe, first, that the example is captious, very tricky and has been chosen with the intention of confusing, since neither water nor diamonds are reproducible goods of which any desired quantity can be manufactured. Both diamonds and water are non-reproducible goods, the quantity of which can be very scarce, as in the case of diamonds, or very abundant, as is usually the case with water. Therefore, we have no reason to think that their price is fixed in the same way as reproducible goods are fixed, which is the price we want to explain when constructing a theory of value.

We are very clear about what "price" is because we live in a monetary economy where most desirable things can be bought and have a price, which is the amount of money it costs us to buy them. However, we are not very clear about where the idea of "value" comes from, absolute, intrinsic and different from the price we attribute to a commodity.

Let's look a little more slowly at what history tells us about value and price.

Let us note that Aristotle, more than 2,000 years ago, made a distinction between the "value" and the "price" of things, pointing out that, all too often, prices do not correspond to the value things should have. We see that, since the most remote antiquity, any attempt to explain the price of reproducible goods starts from the point of view that there are two differentiated qualities within each thing, value and price, being the disparity between them what needs an explanatory theory. Although no one, not even the great Aristotle, ever clarifies to us what is the "value" we attribute to it value" that we attribute to things, and to which we suppose a quality differentiated from price.

There is written record of how in the time of Diocletian, 301, an imperial edict fixed the selling prices of more than 1500 products under penalty of death for those who did not obey it, and we know that at that time the application of the death penalty was taken very seriously. If prices are decided by healthy and free competition between buyers and sellers in the market, as economists working for the world's private universities tell us, it is very difficult to explain the complaints that consumers in all ages have expressed about the abusive selling prices of many commodities.

Nor is it easy to justify the fact that, in the face of people's discontent, the authorities of all ages have always ended up agreeing with the consumers and agreed to regulate prices. Today, for example, the price of rents in the centre of the most important cities of the world is regulated in a way that is in no way different from the edict issued by Diocletian. If there were not some truth in the popular idea that the "value" of goods is very different from the "price" they fetch in the markets, it is very difficult to understand the persistence of the idea over time.

Also throughout the Middle Ages there was a general consensus among scholastic thinkers regarding the issue of prices, reaching the conclusion that one thing was the price at which goods were bought and sold and quite another thing was the intrinsic value of goods. It

was they who introduced into the study of economics the idea of "fair price", which has endured to the present day and which is the basis of many social movements that do not believe in the goodness of the free market as proclaimed by economists working for private universities in the United States.

The attempts to explain the difference between the market "price" of a good and its "value", or inherent natural price, is what led the thinkers of the industrial revolution, such as Adams Smith or David Ricardo, to look for the origin of "value" in the human labour necessary for its production, justifying the punctual differences between the market price and the cost of its production (the intrinsic value of things), in the punctual scarcity of the quantity of goods. But this identification between work and value, although logical, does not correspond to what is observed in the markets, where the price at which things are sold does not seem to have a clear relation with the amount of social work needed to produce them.

The economist Karl Marx takes to the end this logic that implies the identification between the value of a commodity and the social labour contained in the commodity and turns Smith's and Ricardo's reasoning around like a sock is turned inside out. For Marx the selling price of a reproducible commodity always tends to its value, understood as "the social labour" contained in it, and he enunciates it as a law, the Law of Value:

"goods are exchanged according to the social labour contained in them".

For Karl Marx, "price" and "value" are the same in monetary economies (except for labor, because according to Karl Marx it is the only thing that is not being paid for its value).

Here, in the Madrid Theory, we will not go into this silly discussion between the value and the price of things. On the contrary, we will accept that there is only the "price" at which goods are bought and sold in a monetary economy, so our problem will be reduced to explaining clearly and unequivocally the mechanism by which the market price of things is determined.

THE THEORY OF PRICES. The only valuation of a merchandise that makes sense in a monetary economy is the price at which it is bought in the market, so the problem of creating a Theory of Prices is equivalent to creating a theory that determines how or who fixes the specific price of each merchandise.

In this sense, we will say we have a Theory of Price Formation when we find a set of variables on which prices depend and their specific functional dependence. I.e., if we are able to determine the functional dependence of the price of any good on a specific set of variables of the economy, then we can say we have a theory of prices that will be falsifiable insofar as these variables are well defined, can be measured and the dependence can be proved.

Recall that the set of variables on which the economics of the model depends is:

$p_i \rightarrow$ *prices*
$\lambda_i \rightarrow$ *the number of core businesses*
$q_i^{trab} \rightarrow$ *workers' consumption*
$q_i^{cap} \rightarrow$ *consumption of entrepreneurs*
$B_i^{trab} \rightarrow$ *benefits from work (wages)*
$B_i^{cap} \rightarrow$ *capital gains (income)*
$Q_{ii} \rightarrow$ *sales quantity*
$Q_{ii}^{o} \rightarrow$ *quantity produced*

What we are going to show now, and we will state as the Buyer-Seller Asymmetry Principle, is the concrete dependence of the price and the quantity of firms on the rest of the variables that appear in the model of simple production at constant yields we are using to describe the economy. With that we will have a Theory of Prices that we can call as such, since we will be able to predict the price of things knowing the rest of the variables on which it depends.

2. BUYER SELLER ASYMMETRY

In this work we will follow to the end the idea developed by Piero Sraffa in the work published in 1959, "Production of goods by means of other goods", but avoiding making many of the unnecessary hypotheses Sraffa makes to develop his theory. This will allow us to determine what prices and production depend on in a currency economy without making any additional hypothesis to the ones we have already made on the Simple Production at Constant Yields Model, with the only exception, and in a provisional manner, that any agent spends all his income. This will allow us to simplify the analysis without losing generality, since as we will see later, the conclusions we will reach remain unchanged in more general cases.

Let's start by remembering the functional form of the income and expenditure matrices. $\boldsymbol{Y}$ and expenditure $\boldsymbol{G}$ have for a simple production economy with constant yields as a function of the number of firms, prices and technical coefficients**:**

$$\boldsymbol{Y} = \begin{bmatrix} \lambda_1 Q_{11}^{o} p_1 \\ \vdots \\ y_i = \lambda_n Q_{nn}^{o} p_n \\ y^{job} \\ y^{cap} \end{bmatrix}$$

$$\boldsymbol{G} = \begin{bmatrix} \begin{vmatrix} \lambda_1 Q_{11} p_1 & \cdots & \lambda_1 Q_{1n} p_n \\ \vdots & \cdots & \vdots \\ \lambda_n Q_{n1} p_1 & \cdots & \lambda_n Q_{nn} p_n \end{vmatrix} & \begin{vmatrix} \lambda_1 B_1^{job} & \lambda_1 B_1^{cap} \\ \vdots & \vdots \\ \lambda_n B_n^{job} & \lambda_n B_n^{cap} \end{vmatrix} \\ \begin{vmatrix} q_1^{job} p_1 & \cdots & q_n^{job} p_n \\ q_1^{cap} p_1 & \cdots & q_n^{cap} p_n \end{vmatrix} & \begin{vmatrix} 0 & 0 \\ 0 & 0 \end{vmatrix} \end{bmatrix}$$

On the one hand, the income vector $\boldsymbol{Y}$ and the expenditure vector $\boldsymbol{X}$ can be expressed as a function of the variables price and number of firms using their dependence on the matrix $\boldsymbol{G}$:

$$\underbrace{\boldsymbol{X} = \boldsymbol{G} \times \boldsymbol{I} \quad \equiv \quad x_i = \sum_j c_{ij}}_{expenses} \qquad \underbrace{\boldsymbol{Y} = \boldsymbol{G^t} \times \boldsymbol{I} \quad \equiv \quad y_i = \sum_j c_{ji}}_{income}$$

$$\downarrow \qquad\qquad \downarrow$$

$$x_i = \sum_{j=1}^{n} \lambda_i Q_{ij} p_j + \lambda_i B_i^{job} + \lambda_i B_i^{cap} \qquad y_i = \sum_{j=1}^{n} \lambda_j Q_{ji} p_i + q_i^{job} p_i + q_i^{cap} p_i$$

$$x^{job} = \sum_{i=1}^{n} q_i^{job} p_i \qquad y^{job} = \sum_{i=1}^{n} \lambda_i B_i^{job}$$

$$x^{cap} = \sum_{i=1}^{n} q_i^{cap} p_i \qquad y^{cap} = \sum_{i=1}^{n} \lambda_i B_i^{cap}$$

But, on the other hand, the conservation equation gives us a second expression of income $\boldsymbol{Y}$, also as a function of the new variables:

$$\lambda_i Q_{ii}^{o} p_i = x_i + ah_i + \frac{1}{k_F}\frac{dx_i}{dt}$$

$$y^{job} = x^{job} + ah^{job} + \frac{1}{k_F}\frac{dx^{job}}{dt}$$

$$y^{cap} = x^{cap} + ah^{cap} + \frac{1}{k_F}\frac{dx^{cap}}{dt}$$

So we have two different functional expressions for the income vector as a function of the new variables: "*the definition of income as a function of the **G-matrix** and the conservation expression*".

STARTING HYPOTHESIS. In what follows, we will assume an economy in which it is true that any agent spends all the money he earns:

$$y_i = x_i$$

With this condition, we obtain two ways of expressing the income vector which, mathematically speaking, represent two different sets of equations that express the same thing:

$$y_i = x_i \rightarrow \ \lambda_i Q_{ii}^o p_i = \sum_{j=1}^{n} \lambda_i Q_{ij} p_j + \lambda_i B_i^{job} + \lambda_i B_i^{cap} \qquad (\ conservation\ eq.)$$

$$y_i = y_i \rightarrow \ \lambda_i Q_{ii}^o p_i = \sum_{j=1}^{n} \lambda_j Q_{ji} p_i + q_i^{job} p_i + q_i^{cap} p_i \qquad (definition\ of\ income)$$

The first one comes from the conservation equation when we impose that the income vector of each agent is equal to the expenditure it makes. The second comes from the very definition of income by means of the expenditure matrix ***G***. Both are two different systems of equations that link prices, the number of firms and the technical coefficients of the economy:

$$\overbrace{\lambda_i Q_{ii}^o p_i = \sum_{j=1}^{n} \lambda_i Q_{ij} p_j + \lambda_i B_i^{cap} + \lambda_i B_i^{job}}^{conservation\ equation \downarrow}$$
$$y^{cap} = \sum_{i=1}^{n} q_i^{cap} p_i$$
$$y^{trab} = \sum_{i=1}^{n} q_i^{job} p_i$$

$$\overbrace{\lambda_i Q_{ii}^o p_i = \sum_{j=1}^{n} \lambda_j Q_{ji} p_i + q_i^{cap} p_i + q_i^{job} p_i}^{definition\ of\ income \downarrow}$$
$$y^{cap} = \sum_{i=1}^{n} \lambda_i B_i^{cap}$$
$$y^{trab} = \sum_{i=1}^{n} \lambda_i B_i^{job}$$

The result is really quite remarkable, because each of the sets of N+2 equations is expressing two different things. If we now eliminate the variable λ_i from the first N equations that form the set of equations on the left, we are left with a set of N equations where only prices appear. If we do the same with the first N equations on the right and we eliminate the variable $p_i$variable is eliminated, we are left with a set of N equations dependent only on the number of companies. λ_i. More explicitly. What we obtain are

two systems of N equations dependent, each one of them, of only one of the two sets of variables:

$$\overbrace{Q_{ii}^{o}\, p_i = \sum_{j=1}^{n} Q_{ij} p_j + B_i^{cap} + B_i^{job}}^{system\ dependent\ on\ price} \qquad \overbrace{\lambda_i Q_{ii}^{o} = \sum_{j=1}^{n} \lambda_j Q_{ji} + q_i^{cap} + q_i^{job}}^{system\ dependent\ on\ quantities}$$

The first of them depends only on the set of prices, and we will call it the money circuit. p_i and we will call it the money circuit. The second of them depends only on the set of the number of enterprises λ_i and we will call it the circuit of commodities.

> *THE TWO CIRCUITS: "When in a generic economy of simple production at constant yields described in terms ofreal variables p_j y $\lambda_j$is satisfied that the income of each of the agents is equal to their expenditure, then the set of 2(N+2) accounting equations dependent on the 2N real variables p_j y λ_j with which the economy is described, unfold in two systems of N equations, each of them dependent, each one of them, either of the set of prices or of the set of the quantity of companies".*

That is, from the original set formed by $2(N+2)$ accounting equations dependent on the set of prices and on the set of the number of basic companies, two systems of N equations have been extracted, one dependent only on the set of prices "p_i"and the other dependent only on the set of number of companies "λ_i".

This result, which is not a mathematical mirage, shows that in a monetary economy there is a profound difference between the role played by sellers and the role played by buyers, since, even when the conservation equation is symmetric for income and expenditure, the role played by sellers and the role played by buyers within the economy are described by a different set of equations, independent of each other. $(y_i = x_i)$**the** role played by sellers and the role played by buyers within the economy are described by a different set of equations, independent of each other. By decoupling buying decisions and selling decisions into two independent systems of equations, the consequences of buying and selling are also decoupled:

"The consequences of buying and selling are different in monetary economies."

We call "Money Circuit" the system of equations dependent on prices, and we call "Commodity Circuit" the system of equations dependent on the variable quantity of firms.

3. THE MONEY CIRCUIT AND THE COMMODITY CIRCUIT

Let us analyze a little more in detail the two systems of uncoupled equations, each dependent on the variables price and number of companies when we impose on the economy that all income is spent, and try to understand what they mean in relation to the theory of price formation.

The Money Circuit

Let us study in detail the first set of N equations dependent on prices, which we have called the "Money Circuit". If, for more clarity, we group in a unique vector of profits, ***B***, the part of the income that firms dedicate to pay the wages of their workers and corporate income, i.e., we make in the expression:

$$\boldsymbol{B} = \boldsymbol{B}^{job} + \boldsymbol{B}^{cap}$$

Now, aided by the square matrices of the technical coefficients, the system of N equations can be cleared so that the vector of prices ***P*** is expressed as a function of the vector of profits **B** in a very simple and elegant matrix form:

$$Q_{ii}^{o} p_i - \sum_{j=1}^{n} Q_{ij} p_j = B_i^{cap} + B_i^{job} \xrightarrow{B_i = B_i^{cap} + B_i^{job}} \boxed{\boldsymbol{P} = (\boldsymbol{Q^o} - \boldsymbol{Q})^{-1} \cdot \boldsymbol{B}}$$

The result shows very clearly the biunivocal relation that exists between the profits obtained by basic companies and the prices at which goods are sold, so it is possible to affirm that there is a causal dependence between both: "*prices are fixed when companies fix their profits*". Which leads us to conclude:

1) It is the sellers (those who wish to sell goods or services in exchange for money), who determine the price at which they are to be sold when they decide the profits they make from the sale of goods.

> *Therefore, it is the owners of the companies, the businessmen, when they decide what profits the companies obtain, the vector **B, who** fix at what price the goods that are produced are sold, the vector **P.***

2) In the expression, prices depend on the sum of wages and rents, so the specific distribution of profits between workers and businessmen does not influence the prices at which goods are sold, as Piero Sraffa will show in 1959 in his work "Production of goods by other goods". $B_i$does not

influence the prices at which goods are sold, as Piero Sraffa will show in 1959 in his work *"Production of Goods by other Goods".*

There is, therefore, no macroeconomic or microeconomic reason that justifies a priori which specific part of the profits should go to pay wages and which part should go to pay employers' profits. Beyond affirming that it is usually businessmen who decide the distribution of profits, since they are the ones who usually fix the profits of companies, there is no justification to decide a priori for one distribution or the other, and if it exists it must be found somewhere else, perhaps in the Theory of Capital that we will study later, but it is not and cannot be in the Consumer Market.

3) The profits obtained by each company are decided in each company, but the selling prices of the products, which are the consequence of the decision, are determined globally in the whole economy. Any change in the profits of a particular company will affect not only the price of what the company itself produces, but also the prices of all goods produced in the economy.

   Although decisions about profits are made on an ad hoc basis and for specific sectoral reasons, the fact is that the consequence they have on prices is global. Society is producing and distributing the surplus jointly, and the struggle over who gets what is intersectoral.

4) The wages received by the workers can be considered one more expense of the companies or they can be considered the part that corresponds to the workers in the distribution of the profit of the companies between workers and employers. The mathematical structure does not change as a result, but the causal line of who sets the price of wages does change.
   In the first case, when wages are just another expense imposed on employers, then employers are price takers with respect to wages since it is the workers who decide the price at which they sell their labor (as we shall see, in such a situation employers have the privilege of saying how many people they hire).
   However, in the second case, when the distribution of profits between wages and rents is decided jointly, then we can say that the number of people hired is also a joint decision.

   It is difficult to decide which of the two situations is currently taking place in the economic reality around us, since the relationship between workers and employers is very different depending on which sector of the

economy and which country in particular. Depending on which country is studied, wages are considered in one way or another, and collective bargaining is carried out more intensively in some countries than in others. It is not difficult to confirm that workers' rights are very different in Germany or Denmark than in Spain or Portugal, even though both countries have the same monetary economy.

5) Prices are independent of the absolute or relative quantity produced of any service, since the system of equations that determines them does not depend on the number of firms λ in each sector. This is not a surprise, but the direct consequence of the hypothesis of production at constant yields that we have imposed on the accounting equations used to describe firms.

6) It is also shocking that companies do not seem to have any limitation when it comes to increasing profits, even if this increases the prices of the goods they sell, so according to the expressions we have just exposed, we would expect at least a tendency to inflation that is difficult to control. In other words, the Money Circuit seems to predict the uncontrolled inflation of all prices that clashes with the more than evident stability of prices in all current economies. It will be necessary to justify what other mechanism is stopping inflation, and we will explain the apparent paradox a little later.

THE LABOUR MARKET. As the theory is being exposed, the monetary surplus produced by each company is shared between workers and employers, reflecting the feeling of belonging of both in the same common social project. In this sense, we are going to consider that wages are fixed during collective bargaining between workers and employers and, therefore, that labour is not fixed in the consumer market as just another commodity, which is how it is considered by economists working for private universities in the USA.

But it is good not to forget that the mathematical structure on which the Madrid Theory is based does not prevent labour from being bought and sold as just another commodity and that workers, whose only possession is their labour, become mere sellers with "the freedom to choose" at what price they sell their labour.

Here, we will always consider that there is no "labour market" where workers are offered to the highest bidder, but we must not forget that the increase of "false self-employed" is moving us further and further away from a participatory economy and closer to a slave economy.

The Merchandise Circuit

Let us now analyze the second system of *N* equations dependent on the number of basic firms λ that exist in the economy. If, for the sake of clarity, we group the quantity of goods bought by both workers and entrepreneurs, $E_i = q_i^{cap} + q_i^{job}$ in a single vector ***E***, called the surplus vector, the system of N equations can be cleared for the number of firms $\boldsymbol{\lambda}$, remaining a function only of the surplus vector ***E*** in a very elegant matrix form:

$$\lambda_i Q_{ii}^{o} - \sum_{j=1}^{n} \lambda_j Q_{ji} = q_i^{cap} + q_i^{job} \xrightarrow{E_i = q_i^{cap} + q_i^{job}} \boxed{\boldsymbol{\lambda = (Q^o - Q^t)^{-1} \cdot E}}$$

The result shows, in a clear way, the correlation that exists between the spending preferences shown by consumers through the surplus vector and the number of companies that exist in the economy. So, it can be stated that there is a causal dependence between both variables: *"the number of firms that exist in the economy depends on the spending decisions made by consumers".* We can then conclude:

1) The amount of goods of a particular type bought by workers and employers, q_i^{cap} y q_i^{job}The number of basic enterprises, which represent their consumption preferences, determine the number of basic enterprises engaged in production. λ_i that are engaged in production.

> *Therefore, it is consumers, both workers and entrepreneurs, when they set their consumption preferences by spending their income, who decide what is produced and how much is produced of each of the goods or services, and, therefore, of the number of basic enterprises that exist in the economy.*

The statement may seem trivial, or even superficial, but it is the manifestation of a very deep and beautiful underlying principle, because the number of companies in any sector, and therefore in all sectors of the economy, does not depend on the willingness of entrepreneurs to invest, nor does it depend on the prices at which they sell the goods they produce, but depends only on the decision to consume made by workers and entrepreneurs.

The remarkable result is a consequence of the fact that service prices do not appear explicitly in the system of equations linking consumption decisions to the number of basic firms, so that prices cannot directly influence the number of basic firms engaged in the production of a good or service.

Of course, prices will indirectly influence the number of firms engaged in producing each good by causing consumers to change their consumption

preferences in response to a change in prices. But, and this is what the expression really tells us, it is the changes in consumption preferences, regardless of the motives or reasons why consumers decide to change them, that change the number of firms engaged in producing a given good.

2) Any change in the amount of consumption of a good not only changes the number of firms engaged in producing that good, but also changes the number of other firms in the economy. λ_i that are engaged in producing that good, but also changes the number of other firms present in the economy. That is, any change in the quantity of a good consumed is a sectoral decision that is taken individually, but affects globally the number of all the basic companies present in the economy.

3) Possible changes in consumer preferences for one product or another do not influence product prices, as is generally thought.

4) A change in the distribution of profits (the monetary surplus) between workers and entrepreneurs does not change the nominal value of expenditure, but it may change consumption preferences and, therefore, may change the amount of each service produced.

We tend to believe, to take an example from the world of cars, that advertising about the different vehicles being sold is the manifestation of the struggle between vehicle manufacturers to expand or maintain market share within the industry, which, while not necessarily untrue, is not entirely correct. As the Merchandise Circuit shows, the advertising that encourages us to buy cars, or any other product, can also be seen as the manifestation of a struggle between companies in different branches competing for a share of the disposable income that buyers devote to consumption.

For example, it is quite possible that a person who decides to go on holiday, is renouncing to renew his old vehicle by having to choose between spending the money he has on a holiday or on a vehicle. In this sense, it can be said that advertisements inviting us to buy a car are first and foremost aimed at convincing people to spend their money on renewing their old car and not on other alternatives such as travelling. Although no one doubts, and neither do we here, that when the advertiser achieves his purpose, it will most probably be his vehicle that the consumer will finally buy, and not another one.

If car manufacturers realised that they are competing with other sectors of the economy, and not so much with other car manufacturers, they would almost certainly make joint advertisements trying to convince people to spend their money on renewing their old car for a more modern one instead of spending it on something else.

THE COMMODITY CIRCUIT. Perhaps the most notable consequence of the existence of the "commodity circuit" is to show that the specific quantity of any given good produced is not decided independently of other consumption decisions.

In a monetary economy there are no markets independent of other markets because all sellers are competing for the disposable income of consumers. It is the struggle between sectors, and not the struggle within the sector itself, that ultimately decides how many firms there are in each sector.

Let's not forget that sectors do not have to be only companies. Sectors can also be entire countries that specialize in the production of a particular type of goods: agricultural, raw materials, manufactured goods, etc. Therefore, their final production or GDP will depend on the consumption decisions made in the other countries.

4. THE PRINCIPLE OF ASYMMETRY AND ITS CONSEQUENCES

The purpose of this chapter was to give a convincing explanation of how prices are formed in a monetary economy. The appearance of two systems of equations uncoupled with respect to the variables price and number of companies, shows us the different consequences of the decision of what to buy from the decision of what profit to obtain from what is sold. Now we are going to state in the form of "principles" what in reality are the conclusions derived from the appearance of the circuit of money and the circuit of goods, with the only intention of summarizing in a set of statements the consequences of the differentiated existence of buyers and sellers. This will help us understand many of the problems that seem insoluble in economics, and which, nevertheless, are trivial when seen from the point of view of the two uncoupled circuits:

The set of statements, we are going to enunciate them as principles, although all of them are a direct consequence of the use of money has in our way of organizing ourselves, and they will give us a general overview of the deep intricacies in which the Consumer Market moves:

1) The Principle of Asymmetry.
2) The Principle of Closure.
3) The Inflationary Principle.
4) The Principle of Apportionment.
5) The Principle of Unequal Exchange.

1) **The Principle of Asymmetry**

PRINCIPLE OF BUYER-SELLER ASYMMETRY. In a monetary economy, the quantity produced of each good or service is decided by the buyers when they distribute the available income according to their consumption preferences, while the price at which each of the goods or services produced is sold is decided by the sellers when they fix the profits they receive from the sale of what they produce.

Or, in other words, the decision of what to buy and the decision of what profits are obtained by selling, which is made by different people in each purchase-sale, has different or asymmetrical consequences in the monetary economies. The buyer decides what quantity of each good is produced in the economy when he decides what to buy, while the seller decides the price of each of the goods produced when he decides what profits he gets from selling them.

The possible doubt that arises, on whether it is prices that determine profits or profits that determine prices, is easily solved when we understand that the only thing that concerns the businessman is that the profits he obtains from the sale are "sufficient" to keep the business open, no matter what the price at which he sells his goods is. There is no "objective" price that any good has to have, but there is an "objective" profit that any business activity has to have in order to develop. In this sense, the "Principle of Asymmetry" is only formulating the obvious and what everybody knows since the dawn of time: the prices of goods or services have to give profits.

The same thing happens with the purchase of goods and services. It is very evident that the seller of a merchandise does not decide how much of it he is going to sell and, therefore, he does not decide how much of it he must produce. This is so obvious that no one with two fingers in front would dare to affirm the contrary: *It is the buyer, when he divides his income among the different goods he buys, who decides how much of each good is produced*.

THE MARKET OF PERFECT COMPETITION. Although the validity of the Principle of Asymmetry has always been evident to economists of all times, however, that has not prevented economists working for private universities in the USA from asserting just the opposite, propagating the idea that both sellers and buyers are price-accepting. To do so, they have created a whole theory based on a conceptual model, the Perfect Competition Market, which allows them to reach the final conclusion they wish to reach:

"both buyers and sellers are price acceptors".

That is, they have created a theory of price formation which states that nobody sets prices in a monetary economy, which is a very difficult conclusion to believe.

That such a theory is considered true and taught in the world's universities as such can only be explained by the absolute dominance of economists working for private universities in the US over what is or is not published in economics journals and textbooks.

It is very clear that economics is not a scientific discipline today because there is no "peer review".

Evidently, a theory that claims that nobody puts the price on goods and services is necessarily false, since not only does it not explain anything, but it is claiming that nothing explains everything.

The Principle of Asymmetry is the cornerstone on which the whole monetary economy is based.

The effects and its influence are felt in all areas, shaping and conditioning in such a deep and determining way the social structure in which we live, that it is, in fact, where we must look for the origin of capital and of the growing inequality which involves the whole capitalist system. It can be said that it is, by far, the most important statement which can be made in a monetary economy.

The Principle of Closure

THE PRINCIPLE OF CLOSURE. Although in a monetary economy the set of variables "price" and the variables "quantity of companies" are fixed independently one from the other, both sets of variables are linked to each other by the value of the PIA, which according to the Currency Equation is constant and independent of the specific value of each one of the variables:

$$PIA = k_F \cdot M \quad \leftrightarrow \quad PIA = \sum_i p_i \cdot q_i$$

What the Closure Principle says is that, in spite of what the Asymmetry Principle states, there is a link between the price of goods produced and the quantity of companies that produce them, so prices and the quantity of goods produced are not independent. The two statements, the Principle of Asymmetry and the Principle of Closure, are not contradictory and the two principles complement each other without excluding each other. While the origin of the Asymmetry Principle is in the conservation equation of the monetary flow, which is a microeconomic link, the origin of the Closure Principle is in the monetary equation, which is a macroeconomic link:

$$PIA = \sum_{j,i=1}^{n} \lambda_j (2Q_{ji}^o - Q_{ji}) p_i \; = k_F \cdot M \neq f(\lambda_i, p_i)$$

We have already commented that one of the apparent contradictions faced by the Principle of Asymmetry is to explain why businessmen do not raise their profits indefinitely. If it were true that price depends only on the profits sellers decide to obtain, it is not clear why they do not raise them indefinitely. Nor is it at all clear why consumers do not buy goods without limit. If it were true that the quantity of goods manufactured depends only on what buyers decide to buy, we do not see why they do not buy without limit. The reason why profits do not rise without limit, or the reason why consumers do not consume without limit, is not mysterious and is easily explained when we understand that the monetary flow of exchanges is limited by the monetary mass in the economy, as the monetary equation states.

The *PIA* has a specific value which does not depend neither on prices nor on the number of companies in the economy, since its value is exclusively linked to the amount of money in the money supply, and its growth or decrease depends only, according to the aggregate conservation equation, on the amount of money created or destroyed annually in the economy, that is, on the flow of saving Ah:

$$Ah + \frac{1}{k_F}\frac{dPIA}{dt} = 0$$

If there is neither creation nor destruction of money in the economy, the *PIA* will remain unchanged and prices cannot go up without the number of companies going down, or vice versa, the number of companies cannot go up without prices going down. We see that businessmen have a good reason not to raise their profits indefinitely, because in that case, they will have to reduce the number of companies in the economy and their own existence will be threatened:

$$PIA = \sum_{j,i=1}^{n} \lambda_j (2Q_{ji}^{o} - Q_{ji}) p_i \ = const.$$

The consequences of the Principle of Closure of the Economy are much deeper than this brief exposition appears. Its existence reminds us of the reason why prices do not end in a debocated inflationary spiral, in spite of what the Principle of Asymmetry states. The beauty of the appearance of the two circuits, and the different consequences of buying and selling, is an essential characteristic of monetary economies, which has no parallel with economies based on barter or any other organizing principle. Money conditions our lives in a way that would be unimaginable if we did not use mathematics to see and verify it, and the Principle of Asymmetry, together with the rest of the principles we are going to formulate, is only one of the many ways in which we can expose them.

2) **The Inflationary Principle**

THE INFLATIONARY PRINCIPLE. In a monetary economy it can be stated in a very general way that the price at which any good is bought and sold can only go up and can never go down.

DEMONSTRATION. Demonstrating the Inflationary Principle is not complicated, so it is very suspicious that no one has tried to formulate it before. For this, it is only necessary to resort to the Asymmetry Principle and use it to analyze the most immediate consequence it has in the accounting equation that must be fulfilled by any basic company in the economy:

$$q_{ii}^{o} p_i = \sum_{j=1}^{n} q_{ij} p_j + B_i^{cap} + B_i^{job}$$

We know, by the Principle of Asymmetry, that the entrepreneur is not the one who sets the price of what he buys, so he cannot reduce his production costs, the right-hand side of the equation. $\sum_{j=1}^{n} q_{ij} p_j$ the right-hand side of the equation. Nor can the entrepreneur lower the part of the monetary surplus with which wages are paid, the right-hand term of the equation. B_i^{trab}The employer also cannot lower the part of the monetary surplus with which wages are paid, the wage term, since he can at most negotiate them with the workers, but never fix them. All this leaves only one way for the businessman to lower prices, and that is to lower his own profits, which he can only do as long as he does not endanger the very survival of the company, since business profits must be positive most of the time, if he does not want to put money into it.

The reasoning leads to the same place to which the Principle of Asymmetry leads: *"to lower prices the businessman must lower the company's profits"*. Which, logically, can only be done as long as the accounting existence of the company is not endangered and it enters into losses that force it to close. This gives businessmen a very narrow margin of maneuver to try to lower prices in case they need to do so, which proves the statistical validity of the Inflationary Principle.

In short, entrepreneurs cannot, even if they wanted to, lower the prices of the goods they produce, so prices in general will tend to rise and never fall.

THE DEFLATIONARY CRISIS. The importance of the Inflationary Principle is not so much that it explains very well why in a monetary economy prices never fall, what in economics is known as the "rigidity" of prices, but in warning us what will happen in an economy that tries to lower prices.

No monetary economy can enter into a deflationary process because, in fact, the economy itself destroys the business fabric before it enters into a deflationary process which lowers

prices. This can be seen very well when we extract money from the money supply and force the economy to lower the aggregate flow of exchanges (the PIA). According to the monetary equation:

$$PIA = \sum_i p_i \cdot q_i$$

The PIA can go down either by lowering production or by lowering prices, but prices cannot go down according to the Inflationary Principle, so production will go down and the economy will enter a deflationary crisis. In fact, when we analyze the Financial Theory of Growth we will explain the deflationary crisis appealing to the Inflationary Principle and monetary extraction.

The apparent deflation of prices in the initial phases of any "deflationary crisis" is a consequence of the fact that the deflationary crisis is almost always preceded by a more or less obvious inflationary price bubble. Before the crisis, companies, in general, are buying and selling with slightly inflated prices, so that when the monetary extraction makes its appearance, companies still have a certain margin to decrease their profits and with it decrease the price of the goods they sell. But the price deflation that occurs in the initial phase of a deflationary crisis is only a desperate attempt to maintain production, which will soon cause losses that will force production to decrease and firms to close. The fall in prices will not prevent the decrease in disposable income that firms are fighting for (and, therefore, the decrease in the income of firms) and the deflationary process, far from stopping, is fed back:

$$\rightarrow (low\ disposable\ income)_i \rightarrow (lower\ spending)_i \rightarrow (lower\ production)_i \rightarrow$$
$$\leftarrow \leftarrow$$

Whatever the cause of the fall in disposable income, and once the initial price deflation has passed, the output of the whole economy falls rapidly, but now at constant prices.

The deflationary phase is deceptive because it hides the fact that companies, in their attempt to survive, are producing at a loss. But if during the short period of time that the deflationary process lasts, the fall in disposable income that is at the origin of the deflationary crisis is not remedied, nothing can prevent the destruction of the business fabric of the economy at a level of prices, this time inflexible to any attempt to lower them.

Price deflations are tremendously destructive for the economy precisely because they cannot happen. They must be avoided at all costs because they entail the physical destruction of the entire productive system of society.

THE THREE PRINCIPLES. What the Closure Principle tells us is that the buyer's spending is limited and is spread over all production, while the seller of one product fights with the other sellers of the other products to get a share of that spending. It is the struggle between entrepreneurs in different industries for the limited disposable income that keeps prices under control and prevents them from increasing their profits causing inflation to skyrocket, and it is the limited disposable income of buyers that prevents spending from skyrocketing.

The Asymmetry Principle is consistent with the Closure Principle, even though it states that decisions about what to produce and at what price to produce are made independently of each other by buyers and sellers.

The Inflationary Principle completes the picture by stating that prices can only go up and can never go down. It is a direct consequence of the Asymmetry Principle, since prices are set by setting profits and these, although they can be raised at will, cannot be lowered at will without endangering the viability of firms.

There really is something of divinity within mathematics when they are able to show us in such a clear way the immense beauty of natural phenomena when we express them with mathematics.

3) **The Principle of Distribution**

THE PRINCIPLE OF DISTRIBUTION: In a monetary economy, the nominal value of the monetary surplus produced by a company is independent of how it is distributed between workers' wages and employers' profits.

The distribution of the surplus among those who participate in the productive process is a decision of an exclusively social character that does not depend on the microeconomic variables with which the Consumption Market is described. If the distribution between wages and incomes has a certain proportion, the origin of such relation will have to be sought in the Capital Market, but certainly it is not found, nor can it be found, in the Consumption Market.

The Principle of Distribution was enunciated by Sraffa in "Production of Goods by Means of Other Goods" in 1959, where he showed that the distribution of the monetary surplus of firms between wages and profits of entrepreneurs does not affect prices or production.

The only doubt that can appear is related to the function that labour occupies within the mathematical structure of the theory, since the salary paid to a person can be considered as the expense that the company makes in the purchase of a merchandise called "labour" which is necessary to carry out production. When the worker is considered as an

entrepreneur who produces and sells his work, then, although in appearance there are only companies and there are only entrepreneurs, the truth is that there are two differentiated social classes, those who produce the merchandise called "work" and those who produce the rest of the merchandise or services, although from the point of view of the mathematical structure work is no different from any other merchandise that is produced.

In such an economy, in which work is a simple commodity, society ceases to exist as a group of people who organize themselves with the intention of producing and distributing among all what is produced. Companies cease to be the place where everyone, businessmen and workers, collaborate to obtain what is necessary to live and it becomes a slave society. In a situation like the one described, what we have are two different types of "companies" that the mathematical structure does not distinguish between them, but that we, from the outside, are able to differentiate: the producers of work and the producers of the rest of the products or services. This is the situation that Karl Marx describes so masterfully in "Capital" and that, sooner or later, will provoke a revolution as a consequence of the working class' struggle to take over the means of production.

However, if we distribute the monetary surplus produced by the companies following a social agreement between the owners of the companies and the workers, it is possible to overcome the separation of society into two social classes, in spite of the fact that this is the underlying mathematical structure which induces the use of money: a slave social structure in which work is paid as one more consumer good.

Fortunately, or unfortunately, the equations here are equally applicable to a society in which part of its members are slaves, such as the society that built the Roman Empire, or to a society in which all people share equally in the ownership of companies. This is the reason why we see coexisting under the same capitalist system, nations that seem to have overcome the social struggle between workers and employers, together with other nations that seem to be authentic slave regimes that differ very little from the ancient Republic of Rome.

The responsibility for what is done with a knife can never be attributed to the knife, because the one who wields it is the only one responsible for the benefits or the harm which its use may cause. Monetary economies have undoubted advantages over other ways of organizing production and the distribution of the social surplus, but money can hardly be responsible for the use society makes of money.

It is true that the use of money imposes some constraints and has some deep consequences on our way of organizing ourselves, for example, the Principle of Asymmetry or the Principle of Distribution are some of them, but the responsibility for turning the money economy into a slave society is only human.

We will call the last consequence of the presence of the two circuits the Principle of Unequal Exchange, and because of its importance we will analyze it separately from the rest of the principles.

5. THE PRINCIPLE OF UNEQUAL EXCHANGE

When we study the difference in wages at which different jobs are paid in today's economies, we can see two very clear facts:

a) The first one takes place within the same country and shows that the difference in salaries is always between different sectors, particularly between the primary sector and the rest of the sectors, with higher salaries in the latter.
b) The second curious fact occurs when wages in different countries are compared, and allows us to see the different wages paid for the same work in non-industrialized countries and in industrialized countries, with higher wages in the latter.

Both facts have been well known for a long time in economics and we will see below how the Principle of Asymmetry allows us to explain without difficulty the origin of the capacity of industrialized countries to impose the purchase price of what non-industrialized countries produce, which is the same capacity of the secondary sector to fix the prices at which it buys the production of the primary sector within the same country. Let us note that the Principle of Asymmetry seems to indicate the opposite, since it affirms that the seller is the one who sets the prices, which in this case is the primary producer. To do this, let's take a closer look at the example that is often used in this case: the production of cocoa and chocolate.

Cocoa is a primary product that is usually produced in less industrialized countries and chocolate is a secondary product that is usually produced in industrialized countries. It is not easy to understand why the wages of the people who work in the fields and produce cocoa are much lower than the wages of the people who work in the factories that make chocolate, but that is what happens. The example serves very well to illustrate the problem because it draws without any possibility of deception the real existence of "unequal exchange".

Cocoa is the raw material from which chocolate is made and for a long time its production has been concentrated in countries with a low level of industrialization, such as the Ivory Coast, the largest cocoa producer today. In contrast to the countries where cocoa is grown, the countries that produce and market chocolate happen to be highly industrialised

countries, such as Switzerland, the world's leading chocolate manufacturer and one of the countries with the highest per capita income in the world.

For this reason, it is striking that the wages paid to day labourers who grow and harvest cocoa and the wages paid to workers who process and package chocolate can be up to 10 times higher than each other. This difference is impossible to justify in a rational way by alleging the different productivity in the work performed by one and the other, since they are jobs with a similar level of specialization. Moreover, the greater or lesser use of machinery is a consequence of a greater or lesser industrialization of the activity and does not affect the work capacity of people. A chocolate factory can be much more industrialized than a cocoa plantation, but a person works the same in both activities and the final product, chocolate, needs both activities. We see that some other explanation is needed than simply stating that one job is more productive than another or denouncing the exploitation that the facts clearly show.

Let us now look, from the point of view of the Principle of Asymmetry, at the commercial relationship that exists between the chocolate manufacturers in Switzerland and the cocoa growers in Côte d'Ivoire. Let us note that the former, the Swiss, are the buyers of cocoa and it is they who decide the quantity of cocoa they buy, while the latter, the Costa Ricans, are the sellers of cocoa and it is they who decide the price of the cocoa they produce. It would seem, therefore, that it is the Swiss who have the most to lose in the exchange between the two because they are price takers and the Costa Ricans are not. Nothing could be further from the truth.

The Swiss only have to buy the right amount of cocoa to leave a surplus unsold on the chocolate market. In such a case, some cocoa producers will be left without selling what they have already produced, which necessarily drives prices down. The Swiss risk very little when they leave cocoa unbought because they are basically middlemen and, while no one denies that they have to bear fixed costs when they process cocoa into chocolate, the fact is that they lose little or nothing by not marketing as much chocolate as they could. Moreover, chocolate manufacturers can compensate for the decline in chocolate production by raising prices precisely because there is less chocolate for sale.

This is a completely different situation from that faced by cocoa producers, who have no choice but to sell what they have already produced, and which, thanks to the restricted purchase of cocoa from the Swiss, is almost always in surplus. The Swiss (the industrialised countries) can keep cocoa prices low by ensuring that cocoa production is always in surplus, because they decide, according to the Principle of Asymmetry, how much cocoa they buy and what will eventually be made into chocolate. Although the result is just the opposite of what the Principle of Asymmetry seems to lead to, it is the Swiss producers' use of their ability to decide how much cocoa they buy that allows them to force down the price of the cocoa they buy.

The result is applicable to the relationship that exists between the different links in any productive chain, so that it is the workers dedicated to producing the least processed goods who will have lower wages than the workers who produce the most processed goods. In economics, a very generic distinction is made between the primary sector and the secondary sector to distinguish unprocessed products from more processed products, and it is very eloquent to see that the difference in wages between these sectors is very real, although the difference is much better appreciated when comparing wages in different countries.

Let us note that they are not in contradiction with the Principle of Asymmetry because the Swiss are not deciding at any time what price cocoa is sold at. In fact, the price of cocoa is set downwards by the producers themselves: *the price of cocoa ends up being the minimum price that allows farmers to pay a survival wage, because it is from that moment on that cocoa production decreases without decreasing in price and the downward pressure mechanism stops working.* Clearly, the ultimate reason for the "unequal exchange" of labour between the Swiss and Costa Ricans is none other than the lack of control by Costa Ricans over the quantity of chocolate produced, which the Principle of Asymmetry states is set by the buyers, i.e. the Swiss chocolate manufacturers. This situation is aggravated by the absence of alternative work to cocoa cultivation. As a result of the lack of industrialization, cocoa-producing countries are unable to lower cocoa production and to shift cocoa workers to other (nominally) more productive sectors, thus preventing prices from falling.

This is what happens with lumber produced in Canada or the Norwegian countries. If the wages paid in the timber sector go down, workers will migrate to other sectors allowing the production of timber to go down, but not allowing the price of timber to go down. Production blackmail, which forces wages in commodity production to fall to just above survival wages, does not work in industrialized countries because workers migrate to sectors with minimum wages well above survival wages, capable of absorbing the occasional surplus of work. Canada may one day be forced to reduce lumber production to zero because of low prices from foreign competition, but it will not lower wages in the sector in the process.

However, this is not the case in developing countries, which are often characterised by high unemployment, and where there are no alternative jobs to the commodity sector. In these countries, the only defence against the threat of falling sales is a fall in wages, which only stops when it reaches survival level.

UNEQUAL EXCHANGE. One of the disastrous consequences of the absolute domination of economists working for private universities in the United States over economic thought was the lack of dissemination of many of the advances made by Latin American economists in economics from the 1950s onwards.

One of these advances, which was formalized in the so-called Latin American Structuralist Current, was the explanation given by the Argentine Raúl Prebisch and the German Hans Singer, to the growing deterioration of the terms of trade suffered by the third world countries with respect to the industrialized countries of the time. Singer first, and Prebisch later, had observed that the raw materials produced by the less developed countries were being exchanged for fewer and fewer processed products from the industrialized countries, attributing the process to the position of power that the developed countries enjoyed over the developing countries, which allowed them to reduce the relative prices of the raw materials they bought with respect to the processed products they sold, but without going so far as to formulate a theory that would explain the phenomenon.

Some time later, already in the sixties, the Greek economist Emmanuel Arghiri, used the term "unequal exchange" to refer to the unequal exchange between countries, but unlike Prebisch and Singer, now the exchange referred to trade between central and peripheral countries in a very similar way to the explanation we have given here to justify the origin of the "Empty Spain" in the second chapter. Nor did Arghiri go so far as to formulate a theory of the facts, beyond denouncing the obvious exploitation involved in the unequal exchange between the countries of the centre and the periphery, but he came very close.

Here we are going to keep the term "unequal exchange" but referring, not to the different exchange of production between countries and regions, as is usually the case, but to the different exchange of labor between countries, which is more accurate when we want to explain the causes of the phenomenon and formulate a theory about it. What interests us is not how many kilos of coffee a developing country exchanges for a car from an industrialized country, but how many hours of work are being exchanged between the two countries when they exchange coffee for cars (at equal monetary flow).

The problem of "unequal exchange" is a direct consequence of the existence of the division of the value chain which originates the division of labour in monetary economies, beyond the inequalities of political origin which may exist within society. It manifests itself within the same country, no matter if it is an industrialized country or not, affecting wages in the primary sectors, especially in agriculture, but it is in trade between countries where unequal exchange becomes pure and simple exploitation.

If within the same country it is already difficult to control the process, being the main cause of wage deflation that pushes the population of the periphery towards the centre, the problem between countries becomes chronic and impossible to solve because of the different legislation and different industrial development of each country. The trade specialization of a whole country in primary production condemns the country to a below average productivity, contrary to what happens with a country specialized in processed products, which usually have a high productivity or purchasing power.

It is possible to define the exchange between two trading countries as the quotient between the average time of work used by each country to produce the same monetary flow of exchange, and it is also possible to define the same parameter relating any two sectors of the economy of the same country, but we will not do it here.

The important thing to understand is that industrialized countries should force less industrialized countries to raise the wages paid for the goods they buy until they are equal to those of the buying country. This would have two advantages, the first is that they would not have to protect their own products by putting tariffs on products that are produced more cheaply because of low wages, and the second is that it will prevent production from being offshored in search of low wages.

6. THE DIFFERENT EVOLUTIONARY PROCESSES OF AN ECONOMY

The reason why we have called "principles", the direct consequences of the conservation equation of the monetary flow in the model of simple production at constant yields, is no other than to facilitate the analysis of the problems presented in the economy with the help of a set of very solid and easy to understand premises expressed in terms of the variables price and number of companies. It is the same thing that is usually done in the natural sciences when the Principle of Conservation of Matter, Conservation of Energy or other similar principles are formulated with the aim of analyzing very complex problems and arriving at accurate conclusions almost without a blink of an eye.

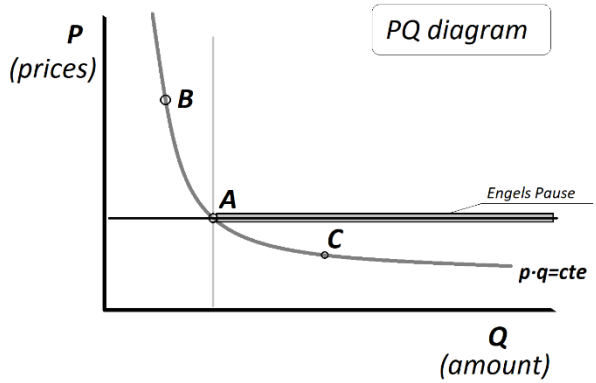
In this sense, it is possible to visualize graphically the different evolutionary processes that any economy can follow following as a guide the principles we have stated. To do so, let us express in a Cartesian diagram the nominal *GDP* of the economy, representing on the abscissa axis the average prices of the goods produced, and on the ordinate axis, the average quantity of goods produced. $\overline{p}$ of the goods that are produced, and on the ordinate axis, the average quantity of goods that are exchanged during a $\overline{q}$ that are exchanged during a period of time. The figure below shows the diagram explicitly.

When we point out in a "P-Q diagram" as described above, a generic point "A" as the initial state in which the economy is, from there, there are four evolutionary processes that are particularly well visualized thanks to the four quadrants into which the surface is divided when we draw the lines ($\overline{p} = const.$) y ($\overline{q} = const.$) that pass through this generic initial state:

1) Stagflation", which is the term used to describe an economy that suffers inflation at the same time that its output is falling. It occupies the upper left quadrant.

2) Growth", which is the name we give to the evolution of an economy when at the same time that prices increase, production also increases. It occupies the upper right quadrant.
3) Deflation", which is what an economy is called when production declines, accompanied by a more or less persistent decline in the average price of products $\bar{p}$ of products. It occupies the lower left quadrant.
4) Engels' pause, which is the name given to the evolution of an economy when real production grows, but accompanied by a very slight inflation of prices. It is the line that separates the two quadrants on the right into which the map has been divided, and which we have highlighted with a thick black line in the diagram. Its evolution is usually idealized with the line $\overline{p} = constante$although in practice there is always a slight inflation of prices.
5) The only region that remains unnamed is the lower right quadrant, and this is because according to the Asymmetry Principle, an evolution in which prices fall and output rises is a process that cannot occur in reality. In fact, while deflation has occurred on many occasions for short periods of time, there is no record that real growth in the economy, at the same time as falling prices, has ever occurred.

In the attached figure we have also drawn the iso-income curve ($\overline{p} \cdot \overline{q} = const$) which passes through point "A" and which represents the evolution of the economy when the nominal *AIP* does not change.



Let's explain in a little more detail what happens in the different evolutionary processes:

a) **<u>Stanflation</u>**

In an economy where the prices of goods are rising faster than the money supply is growing, it is inevitable that real output will fall because of rising prices and the economy will enter a process known as stagflation. Although the root cause that initiates the rise in

prices can be manifold, however, the cause that causes the fall in output is always the same: *the money supply does not grow as fast as prices do*. Stagflation is a direct consequence of the Closure Principle:

$$PIA = \bar{p} \cdot \bar{q} = k_F \cdot M \;\rightarrow\; \frac{dM}{M} = \frac{d\bar{q}}{\bar{q}} + \frac{d\bar{p}}{\bar{p}} \;\rightarrow\; \frac{d\bar{q}}{\bar{q}} = \frac{dM}{M} - \frac{d\bar{p}}{\bar{p}} \xrightarrow{\frac{dM}{M} < \frac{d\bar{p}}{\bar{p}}} \frac{d\bar{q}}{\bar{q}} < 0$$

We see that, if prices grow faster than the money supply, the economy enters stagflation, that is, the real output of the economy falls amidst an apparent monetary abundance that pushes up prices. We can express the relation in a more elegant way using the growth rates of the different variables:

$$\left.\begin{aligned} \tau_M &= \frac{1}{M}\frac{dM}{dt} \\ \tau_{\bar{p}} &= \frac{1}{\bar{p}}\frac{d\bar{p}}{dt} \\ \tau_{\bar{q}} &= \frac{1}{\bar{q}}\frac{d\bar{q}}{dt} \end{aligned}\right\} \rightarrow \quad \tau_{\bar{q}} = \tau_M - \tau_{\bar{p}} \xrightarrow{\tau_M < \tau_{\bar{p}}} \tau_{\bar{q}} < 0$$

The causes which can start a stagflation process are varied, but once it has started, it is the employers and the workers who maintain and increase it when they try to keep the purchasing power of their incomes by raising prices. If deflations are bad, stagflations are just as bad, because the monetary mechanism which produces them is the same: *"the existing money supply is not able to satisfy the monetary flow of exchanges demanded by the real production of the economy".*

<u>STAGFLATION</u>. Understanding the internal mechanisms that set in motion a generalized rise in prices without a sufficient increase in the money supply to support it, is not complicated if we start from the following two statements whose validity we will prove later on:

The increase in money supply depends on the increase in credit granted by banks.

When there is high inflation, banks are reluctant to grant credit because, even at a negative real interest rate, the nominal interest rate is very high and it becomes very difficult to repay any credit.

The above two statements indicate that, although economists often attribute inflation to an increase in the money supply, the fact is that the presence of high inflation severely limits banks' lending and therefore limits the increase in the money supply of the economy. In an environment of high inflation what usually happens is that, despite appearances, the necessary money is not being created for the nominal GDP of the economy to increase

which requires the rise in prices, which causes companies to begin to be destroyed (Principle of Closure):

$$credit\ little \rightarrow M\ grows\ little\ \rightarrow PIA\ grows\ little \rightarrow$$

$$\rightarrow PIA = \sum_{j,i=1}^{n} \lambda_j (2Q_{ji}^{o} - Q_{ji}) p_i\ \ grows\ little \rightarrow$$

$$\rightarrow \boxed{prices\ go\ up\ a\ lot\ \rightarrow\ number\ of\ companies\ low}$$

When prices go up a lot and the money supply increases little, production decreases. We must understand that the terms "little" and "much" are relative.

Let's note that what the Asymmetry Principle states is that entrepreneurs will raise prices as a rise in their costs threatens their profits and, therefore, their own survival. This is what happened when the price of oil rose in the 1970s and, in response, entrepreneurs raised the prices of their products as well. The increased spending on fuel prices had to be offset by lower profits in non-producing countries, as more of the surplus had to be transferred as spending to the oil-producing countries. But both employers and workers in the non-producing countries tried to maintain the purchasing power of their incomes, which was passed on to product prices and resulted in deep stagflation, especially in the developing countries which at that time were heavily indebted in dollars and could not resort to borrowing to alleviate the oil bill (which would have bought time to restructure the redistributive process).

The rise in oil prices was so rapid, and the induced inflation so high, that the slowdown in bank credit prevented the increase in the money supply necessary to maintain the rise in prices and, therefore, the nominal increase in the *PIA* that would have allowed the business fabric to be maintained. In any case, the increase in credit could not have been maintained for long and, sooner or later, the dreaded stagflation will appear when the granting of credit stops.

To aggravate the international situation, the Federal Reserve raised the interest rate on dollar loans, completely ignoring the fact that the dollar was the reserve currency of the rest of the world, catching all the developing economies loaded with dollar debt and in a tailspin. It was impossible for the economies of the rest of the world to deal with the two fronts that had been created: "*The need for dollars to cushion the impact of the rise in oil prices and the payment of debt servitude in dollars*". Although the US managed to escape very well from the inevitable deflationary crisis that originated the increase in the interest rate of the dollar, however, it was a real disaster for the rest of the economies that, by entering a stagflation

with no possibility of return, condemned half of the planet's population to underdevelopment. It is well understood that there is no good way out when you enter an inflationary spiral, and that is why inflation must be prevented from getting out of control, at any price.

b) **Engels' Pause**

The "Engels Pause" is a special case of evolution which describes an economy in which real production grows slowly because of the weak growth of the money supply and, therefore, of prices. Engels' pause is idealized with a straight line "$p = const$"even though prices grow, because, although they grow, they grow very slowly.

It was the evolution that followed the economy during most of the nineteenth century and from where it takes its name, since it was the time that Friedrich Engels, German communist and socialist theorist, friend and collaborator of Karl Marx and founder of the Marxist current of the economy, had to live. to the death of the latter. It is the economic evolution described in Capital and the reason why Engels and Marx wrote the Communist Manifesto.

Let us begin by understanding why it is not at all common (theoretically impossible) for production growth to be accompanied by a more or less generalized fall in prices. It is very easy for a seller to increase the prices of what he sells, since this means increasing his own profits, but it is very difficult for him to lower the prices of what he sells since he is not the one who decides the price of the goods he buys. This is what the Inflationary Principle states.

For this reason, the only way in which a process of generalized lowering of prices can take place is when there is a good or service that all sectors need to buy to produce, that has an important weight in the expenditure of any company and that, of course, for some reason, lowers its price. If such a good exists and its price falls, the economy will be able to lower prices across the board, but if these three conditions are not met, the economy will not be able to enter into a process of economic growth without inflation or with a slight fall in prices or deflation. For example, such a product would be oil, so a generalized and persistent drop in the price of oil could lower prices (that has never happened), but so could wages, since it is a service that has a very important weight in prices and is used by all companies.

If wages fall, the price of all other goods can fall without a fall in profits and real output could grow without an increase in nominal *GDP* (or the flow of nominal exchange or *PIA*). But why would wages fall? What could force workers to lower their wages?

In a situation of high unemployment, it is not implausible that wages will stagnate, or fall, while the economy as a whole achieves strong output growth, sustained by an environment of technological innovation and productivity growth.

This is the situation that prevailed, at least, during the second and third quarters of the 19th century, when the industrial revolution produced increases in productivity unseen since the dawn of humanity. It was this miserable, sad time that wrote the Communist Manifesto and gave birth to Das Kapital, which is why it is known as *Engels' Pause* (that's what economist Robert Allen called it, according to Pikety). But what was the cause of the chronic unemployment that occurred at the time, when technology and industrial development favored a continuous increase in the productivity of labor and, therefore, a strong need for work?

Let us analyze the situation from the perspective of the Principle of Asymmetry and the Principle of Closure:

1) The money supply cannot be increased because gold stocks cannot be increased, and without a banking system which assumes the creation of credit money backed by a central bank, bank notes cannot be used as money. Neither of these two situations existed in the middle of the nineteenth century, when the growth of the gold stock was conditioned to its physical extraction and there was no central bank to guarantee the deposits of the banks.
2) As a result of the use of the gold standard, monetary growth is limited by the growth of the quantity of gold, which prevents the nominal *IPA* from increasing at the rate that the strong real growth of the economy is printing.
3) The number of workers is increasing in the surroundings of the big industrial cities because of the strong migration from the countryside to the city (empty Spain has been emptying for centuries).
4) Strong technological innovation significantly increases physical productivity per worker. New inventions create new products and open new markets, but, above all, they leave a considerable number of people unemployed when the old techniques most in need of work are abandoned (for example, the looms moved by steam engines significantly reduce the number of people dedicated to the production of fabrics) and are replaced by others made with more machinery and less work.

Everything was in place at that time to create, out of sheer ignorance of the capitalist dynamic, one of the greatest aberrations carried out by humanity:

"An economy of widespread hunger and misery thanks to stagnant wages, at a time when technology is incredibly increasing productivity and thus

enabling widespread and sustained growth in wages, wealth and overall well-being."

To understand what caused unemployment during the industrial revolution we must understand the serious limitation to nominal growth that the Closure Principle imposes on a monetary economy. When we formulate the Closure Principle with the different growth rates implied, we have:

$$\tau_{\bar{q}} = \tau_M - \tau_{\bar{p}}$$

We see, that if the real growth rate of the economy is large, the growth rate of the money supply is $\tau_{\bar{q}}$ is large, the growth rate of the money supply must be large enough to allow at least a slight inflation, since prices cannot fall. τ_M must be large enough to allow at least a slight inflation, since prices cannot fall. But if the growth rate of the money supply is not endogenous, but depends on the physical extraction of gold, then the growth of production itself will be limited to a generalized fall in prices, even though they cannot fall in a monetary economy.

In a monetary economy prices cannot go down unless a commodity or service which is used by all the companies and which is an important expense for all of them goes down in price. And there is only one service which has these characteristics: *"labour"*. During the fifty years between 1830 and 1880, the epoch in which Engels lived, unemployment was chronic and an army of reserve workers survived in the midst of some of the most exuberant periods ever experienced by humanity. Economic growth at the time was limited throughout the period because of the monetary restriction imposed by the use of the gold standard. It was not until the 1880s, when the massive issuance of bank notes without gold backing allowed the economy to grow without restraint, that unemployment decreased significantly. Those were the years at the end of the 19th century, after Engels' Pause, the epoch that gave rise to the syndicalist revolution and the birth of social democracy.

One of the great merits of the economist Thomas Piketty's "Capital in the 21st Century" is to denounce in fluent prose the disastrous economic situation that existed throughout the industrial revolution. It is from his book that we have drawn many of the ideas we are expressing here:

The most important case, which I discussed briefly in the introduction, is undoubtedly the rise of capital's share of income during the early stages of the Industrial Revolution, 1800-1860. In Britain, for which we have the most complete data, the available historical studies, particularly those of Robert Allen (who gave the name "Engels' pause" for the long stagnation of wages), suggest that capital's share increased by something like 10 percent of national income, from 35-40 percent in the late 18th and early 19th centuries to around 45-50 percent in the middle of the 19th century, when Marx wrote the Communist

Manifesto and went to work on capital. The sources also suggest that this increase was offset by a more or less comparable decline in the share of capital in the period 1870-1900, followed by a slight increase between 1900 and 1910, so that in the end the share of capital was probably not very different at the turn of the twentieth century from what it was during the French Revolution and the Napoleonic era (see Figure 6.1). Therefore, we can speak of a "medium-term" movement rather than of a lasting long-term trend. However, this transfer of 10 per cent of national income to capital during the first half of the nineteenth century was by no means insignificant: to put it in concrete terms, the lion's share of economic growth in this period went to profits, while wages - objectively speaking - remained miserably stagnant. According to Allen, the main explanation for this was the exodus of labor from the countryside and into the cities, along with technological changes that increased the productivity of capital (reflected by a structural change in the production function), the vagaries of technology, in short order.

Thomas Piketty (Capital in the 21st Century)

The most striking fact of the period was the misery of the industrial proletariat. Despite the growth of the economy, or perhaps partly because of it, and because, in addition, of the great rural exodus, due to both population growth and increased agricultural productivity, the workers were crowded into urban slums. The working day was very long, and wages were very low. A new urban squalor emerged, more visible, more shocking, and in some respects even more extreme than the rural squalor of the ancien régime. Germinal, Oliver Twist, and Les Misérables did not spring from the imagination of their authors, any more than did laws limiting child labor in factories to children over eight (in France in 1841) or ten in mines (in Britain in 1842). Tableau de l'état physique du Dr. Villermé et des morales ouvriers Employés dans les manufactures, published in France in 1840 (leading to the timid passage of a new child labour law in 1841), describes the same sordid reality of the condition of the Working Class in England, which Friedrich Engels published in 1845.

Thomas Piketty (Capital in the 21st Century)

7. DYNAMICS OF SELLER-BUYER ASYMMETRY

The formulation of the Asymmetry Principle has been obtained assuming that each agent spends as much as he earns, which is a quite demanding restriction within an economy. Although taxation does not prevent either the nominal growth of the economy or monetary transfers through savings, the truth is that it does force both flows to cancel out and be identical for any of the sectors into which the economy has been divided:

$$y_i = x_i \quad \xleftrightarrow{y_i = x_i + ah_i + \frac{1}{k_F}\frac{dx_i}{dt}} \quad ah_i = -\frac{1}{k_F}\frac{dx_i}{dt}$$ (Say's Economics)

The doubt arises as to what extent the conclusions we have reached, which we have summarized in the form of "principles", can be generalized to any monetary economy, whether or not it fulfils the demanding conditions we have imposed to be able to prove them.

It must be clear in this sense, that the causal line that relates some variables with others cannot depend on the restrictions we impose in the analysis. If in a particular case we show that prices depend on the decision made by sellers on the profits they obtain from the sale, then that will always be so for any economy, no matter if the restrictions we imposed on the economy to reach the conclusion are being fulfilled or not.

It cannot happen, because it has no logic, that the fact that companies do not produce at constant yields or that some other circumstance related to the flow of savings changes, corporate profits cease to be the cause of prices or the number of companies ceases to be a consequence of people's consumption preferences.

That wouldn't make any sense.

In spite of this, we will try to analyze up to what point the restrictions we have imposed on the economy can be relaxed to obtain the Asymmetry Principle, so that the latter remains valid and the variables continue to appear in the money circuit and the circuit of goods uncoupled. The conservation equation of the monetary flow, without simplifications, is:

$$y_i = x_i + ah_i + \frac{1}{\mathrm{k_F}}\frac{dx_i}{dt}$$

The expression tells us that, in general, sales revenues in any industry are different from their expenditures on purchases, and the set of (N+2) equations dependent on prices and the number of firms is different from the one we obtained when we imposed equality between revenues and expenditures. Specifically, the set of equations is:

Vector Equation of Conservation of Money Flows

$$\left(y_i - ah_i - \frac{1}{\mathrm{k_f}}\frac{dx_i}{dt} = x_i\right)$$

$$\underbrace{\boldsymbol{X = G \times I}}_{expenses} \qquad \underbrace{\boldsymbol{Y = G^t \times I}}_{income}$$

$$\downarrow \qquad\qquad \downarrow$$

$$x_i = \sum_{j=1}^{n} \lambda_i Q_{ij} p_j + \lambda_i B_i^{cap} + \lambda_i B_i^{job} \qquad \lambda_i Q_{ii}^o p_i = \sum_{j=1}^{n} \lambda_j Q_{ji} p_j + q_i^{cap} p_i + q_i^{job} p_i$$

$$x^{cap} = \sum_{i=1}^{n} q_i^{cap} p_i \qquad y^{cap} = \sum_{i=1}^{n} \lambda_i B_i^{cap}$$

$$x^{trab} = \sum_{i=1}^{n} q_i^{job} p_i \qquad y^{trab} = \sum_{i=1}^{n} \lambda_i B_i^{job}$$

Let us observe that the set of equations that define income by means of the expenditure matrix, does not change and it is possible to decouple the circuit of goods in the general case, but the expression of income shown by the conservation equation now does not allow decoupling the circuit of money in the general case:

$$x_i \neq y_i \;\rightarrow\; x_i \neq \lambda_i Q_{ii}^o p_i$$

Without the restriction, the equations explicitly show the difference in the treatment of the expenditure flow and the income flow in the general case, while the set of N equations on the right (the goods circuit) remains exactly the same:

$$\lambda_i Q_{ii}^o - \sum_{j=1}^{n} \lambda_j Q_{ji} = q_i^{cap} + q_i^{job} \xrightarrow{E_i = q_i^{cap} + q_i^{job}} \boxed{\boldsymbol{\lambda = (Q^o - Q^t)^{-1} \cdot E}}$$

But now, in the general case, the money circuit changes so much that it is no longer possible to eliminate the variable number of firms from the equations. What interests us now is to try to decouple the dependence with the variable number of firms, and recover the causal line that allowed us to formulate the Asymmetry Principle (although it is not really necessary to do this to generalize its validity). To achieve this, we have to make the savings term and the time derivative of expenditure dependent on the number of firms.

$$\lambda_i Q_{ii}^o p_i - ah_i - \frac{1}{\mathrm{k_f}} \frac{dx_i}{dt} = \sum_{j=1}^{n} \lambda_i Q_{ij} p_j + \lambda_i B_i^{cap} + \lambda_i B_i^{job}$$

The components of the savings vector do not give problems. A very reasonable hypothesis is to accept that the aggregate saving of any sector is the sum of the typical saving of each one of them. ah_i of any sector is the sum of the typical savings of each of them. In such a case, the credit or saving needs of any sector is proportional to the number of basic companies in the sector and to the credit or saving needs of each basic company. In other words:

$$ah_i = \lambda_i ah_i^{tipo}$$

It has the functional form we are looking for, so the term does not give any problems.

The problem comes from the differential term $\frac{1}{\mathrm{k_f}}\frac{dx_i}{dt}$ that it is necessary to make it also depend on the number of firms in the sector, which will only be true in first approximation when we assume that the number of basic firms changes slowly (even if this means cheating, since it assumes what it wants to prove, that production does not change):

$$\frac{dx_i}{dt} = \frac{d}{dt}\left(\sum_{j=1}^{n} \lambda_i Q_{ij} p_j + \lambda_i B_i\right) =$$

$$= \lambda_i \left(\sum_{j=1}^{n} Q_{ij} \frac{d}{dt} p_j + \frac{d}{dt} B_i\right) + \frac{d\lambda_i}{dt}\left(\sum_{j=1}^{n} Q_{ij} p_j + B_i\right)$$

Therefore, when we assume that the number of basic firms changes very slowly, the second term is very small and we can eliminate it:

$$\xrightarrow{\frac{d\lambda_i}{dt}=\mathbf{0}} \qquad \frac{dx_i}{dt} = \lambda_i \left(\sum_{j=1}^{n} Q_{ij} \frac{d}{dt} p_j + \frac{d}{dt} B_i\right)$$

In this case, we can decouple the two systems of equations with respect to the variable prices and quantity of firms and recover the causal line we have named the Principle of Asymmetry. The dependent equation of the variable prices now remains:

$$Q_{ii}^{o} p_i = \sum_{j=1}^{n} Q_{ij} p_j + B_i + ah_i^{tipo} + \frac{1}{\mathrm{k_f}}\left(\sum_{j=1}^{n} Q_{ij} \frac{d}{dt} p_j + \frac{d}{dt} B_i\right)$$

Where it is very clear that the dependence is much more complicated than the one we obtained before, although prices still depend only on profits, because they are the only two variables that appear in the expressions.

We can also observe that the causal line is recovered when we assume that expenditure in each sector does not change over time, although income and saving may change. In such a case the variation of the expenditure vector is zero and the expression relating prices to profits is:

$$\boxed{\frac{dx_i}{dt} = 0} \rightarrow \quad Q_{ii}^{o} p_i = \sum_{j=1}^{n} Q_{ij} p_j + B_i + ah_i^{tipo} \rightarrow \quad \boldsymbol{P} = (\boldsymbol{Q}_0 - \boldsymbol{Q})^{-1} \times (\boldsymbol{B} + \boldsymbol{Ah})$$

Which is a more general result that can be arrived at when the change in savings is taken into account, and contains as a particular case the equality between income and expenditure.

It tells us that prices depend on the value of the **profits available to** each basic company in the sector:

$$profits\ available\ = b_i + ah_i$$

$$\begin{cases} b_i + ah_i \uparrow \rightarrow\ decrease\ in\ prices\ of\ sector\ i \\ b_i + ah_i \downarrow \rightarrow\ growth\ of\ prices\ in\ sector\ i \end{cases}$$

It can be seen that the expression allows the price of what a sector produces to fall at the cost of the sector's indebtedness ($ah_i < 0$), that is, it allows credit dumping. It is logical, if expenditure does not change and income falls, then the only possibility is that the sector is borrowing, there is no other way.

Never have so few done so much harm to so many. *We have lived for centuries in a monetary economy where money matters a lot.*

If we open "Samuelson" or "Mankiw", books on macroeconomics which serve as a guide for the university teaching of the discipline, we will see with astonishment that money does not seem to exist in today's society, even though it is practically impossible to live without a credit card in any country in the world. For economists working for private universities in the USA, we do not seem to live in a monetary economy but in a barter economy.

Engels' Pause is perhaps the most evident manifestation of the bad use which can be made of money in the monetary economies. We see how a society immersed in a revolution of productivity without precedents in the history of mankind, which should have as a consequence the increase of wages and the generalized increase of the welfare of the whole population, is condemned to general unemployment and to the decrease of the purchasing power of wages, reaching unthinkable levels of human misery. All this, as a consequence of limiting the increase of the monetary mass, either because of the imposition of the gold standard or because of restrictive policies.

Wage stagnation is by far the most damaging and miserable manifestation of the austerity imposed in the 19th century by the gold standard and which, today, economists working

for private universities in the US defend in their books as the ideal option for the material progress of humanity.

CHAPTER 6

THE REASON SRAFFA PATTERN

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1. INTRODUCTION

In the previous chapter we have developed a complete theory on the formation of prices in monetary economies, showing that the decisions made by those who sell and those who buy have a very different influence on the fixing of prices and on the quantity of goods produced. But, although we have analyzed many of the consequences of the different nature of buyers and sellers because of money, we have not found any way to compare monetary economies which produce in a similar way with different prices and number of companies.

In this sense, we are now going to continue Piero Sraffa's work in the book published in 1956, "Production of commodities by other commodities", but from a more general point of view and without limiting ourselves with the premises Sraffa was forced to use.

We will begin by finding the specific expression of the currency surplus in an economy of simple production at constant yields, in which we will impose, as we have been doing, that any agent spends all the income he obtains. Then, we will use the expression to find the vector of prices and the vector number of firms that make that monetary surplus minimum. Our intention, like Sraffa, is to find a unique or special point in which the economy can work (even if it does not work there in reality), that allows us to compare equivalent economies when they work differently.

2. THE MONETARY SURPLUS

Let us begin by finding the expression of the monetary surplus as a function of price and quantity of basic companies when two basic assumptions are fulfilled in the economy:

1) Simple Production Economy at Constant Yields.
2) Economy where the income of any agent is spent entirely on purchases of goods and services.

$$y_i = x_i$$

The monetary surplus of an economy is understood as the monetary flow dedicated to consumption not necessary to maintain production. The definition is a little imprecise because it is not easy to distinguish which part of consumption is necessary and which is not. For example, money spent on food is considered here as part of the surplus, although it is clear that if people do not eat, the economy cannot function. Here, we will identify surplus with the flow of people's income, which includes income from work and income from benefits. To obtain it, let's first recall that the functional form of the income and expenditure matrices $\boldsymbol{Y}$ and expenditure $\boldsymbol{G}$ for a simple production economy at constant returns depends on the number of firms, prices and technical coefficients**:**

$$\boldsymbol{Y} = \begin{bmatrix} \lambda_1 Q_{11}^o p_1 \\ \vdots \\ \lambda_n Q_{nn}^o p_n \\ y^{job} \\ y^{cap} \end{bmatrix}$$

$$\boldsymbol{G} = \begin{bmatrix} \begin{vmatrix} \lambda_1 Q_{11} p_1 & \cdots & \lambda_1 Q_{1n} p_n \\ \vdots & \cdots & \vdots \\ \lambda_n Q_{n1} p_1 & \cdots & \lambda_n Q_{nn} p_n \end{vmatrix} & \begin{vmatrix} \lambda_1 B_1^{job} & \lambda_1 B_1^{cap} \\ \vdots & \vdots \\ \lambda_n B_n^{job} & \lambda_n B_n^{cap} \end{vmatrix} \\ \begin{vmatrix} q_1^{job} p_1 & \cdots & q_n^{job} p_n \\ q_1^{cap} p_1 & \cdots & q_n^{cap} p_n \end{vmatrix} & \begin{vmatrix} 0 & 0 \\ 0 & 0 \end{vmatrix} \end{bmatrix}$$

The expenditure matrix $\boldsymbol{G}$ is divided into four zones that have a very specific economic meaning. The first quadrant, above and to the left, contains all the expenditure flows generated by the exchanges between the basic firms present in the economy. The second quadrant, above and to the right, contains the profit flows that firms spend on paying workers' incomes (wages) and employers' profits (rents). Finally, the third quadrant, bottom left, contains the spending preferences of workers and entrepreneurs in purchasing goods from the basic firms.

Now, let us impose on each agent that his income is equal to his expenditure, i.e., that firms, workers and entrepreneurs, each of them fulfill that $x_i = y_i$. That allows us to find

the expression that relates profits or monetary surplus $B(\lambda_i, p_i)$ with the $PIA(\lambda_i, p_i)$but as a function of the new variables, that is, prices, number of firms and technical coefficients,

$$\left.\begin{array}{l} x^{job} = \sum_{i=1}^{n} q_i^{job} p_i \\ y^{job} = \sum_{i=1}^{n} \lambda_i B_i^{job} \end{array}\right\} \xrightarrow{x^{job}=y^{job}} \sum_{i=1}^{n} q_i^{job} p_i = \sum_{i=1}^{n} \lambda_i B_i^{job}$$

$$\left.\begin{array}{l} x^{cap} = \sum_{i=1}^{n} q_i^{cap} p_i \\ y^{cap} = \sum_{i=1}^{n} \lambda_i B_i^{cap} \end{array}\right\} \xrightarrow{x^{cap} x_i = y^{cap}} \sum_{i=1}^{n} q_i^{cap} p_i = \sum_{i=1}^{n} \lambda_i B_i^{cap}$$

$$\rightarrow \left\{ Benefits = \overbrace{\sum_{i=1}^{n} q_i^{job} p_i + \sum_{i=1}^{n} q_i^{cap} p_i}^{workers\ and\ employers\ expenses} = \underbrace{\sum_{i=1}^{n} \lambda_i B_i^{job} + \sum_{i=1}^{n} \lambda_i B_i^{cap}}_{workers\ and\ employers\ income} \right.$$

Using the second expression, we have for the surplus:

$$\boxed{B(\lambda_i, p_i) = \sum_{i=1}^{n} \lambda_i Q_{ii}^{o} p_i - \sum_{i,j}^{n} \lambda_i Q_{ij} p_j}$$

Where $B(\lambda_i, p_i)$ is the monetary surplus of the whole economy, which is distributed between workers and employers. In addition, the following expressions can be shown to be valid:

1) Provided that $x_i = y_i$, the aggregate money flow, or *PIA*, can be expressed, as :

$$PIA(\lambda_i, p_i) = \sum_{j,i}^{n} \lambda_i Q_{ij} p_j + 2 \cdot B(\lambda_i, p_i)$$

Expression that is obtained by simply adding up each of the terms of the expenditure matrix $\boldsymbol{G}$ and equating the income and expenditure of workers and employers.

2) Using this last expression, and eliminating from it the benefits, we obtain:

$$PIA = 2\sum_{i}^{n} \lambda_i Q_{ii}^{o} p_i \; - \sum_{j,i}^{n} \lambda_i Q_{ij} p_j$$

3) Using the last two expressions and eliminating between them the terms in which the coefficients of the matrix appear $\boldsymbol{Q}$ we obtain the expression that links the PIA with the profits or monetary surplus:

$$\boxed{PIA(\lambda_i, p_i) = B(\lambda_i, p_i) + \sum_{i}^{n} \lambda_i Q_{ii}^{o} p_i}$$

This last expression is remarkable, since it tells us that, in an economy of simple production at constant yields, and provided that all income is spent, the *PIA* of the economy is equal to the sum of all the income obtained by the basic companies plus the profits or monetary surplus:

MONETARY SURPLUS. In an economy of simple production at constant yields, and provided that all income is spent, the PIA of the economy is equal to the sum of the income and profits obtained by the basic enterprises:

$$PIA(\lambda_i, p_i) = B(\lambda_i, p_i) + \sum_{i}^{n} \lambda_i Q_{ii}^{o} p_i$$

Where $B(\lambda_i, p_i)$ is the monetary surplus (or profit):

$$B(\lambda_i, p_i) = \sum_{i=1}^{n} \lambda_i Q_{ii}^{o} p_i - \sum_{i,j}^{n} \lambda_i Q_{ij} p_j$$

This last expression allows us to calculate the *PIA* knowing the *GDP* without much difficulty.

3. THE MINIMUM MONETARY SURPLUS

Now, using the expressions we have found for the *PIA* and for the monetary surplus, we can ask ourselves which are the components of the vector of prices ***P*** and the components of the vector quantity of firms λ that make the maximum or minimum the monetary surplus of firms $B(\lambda_i, p_i)$ keeping *PIA* constant. In other words, we want to know which values of prices and of the quantity of firms make a maximum or minimum monetary surplus, or the sum of the income flows of workers and entrepreneurs, always supposing that the *PIA* of the economy remains unchanged. The problem, thus posed, is equivalent to posing a maximization problem that can be very easily solved resorting to the method of Lagrange Multipliers.

As a reminder of the Lagrange Multipliers Method to maximize or minimize a function with restrictions, we will explain what it consists of as we apply it to the particular economic problem that concerns us here. We want to maximize, or minimize, the monetary surplus of a simple production economy with constant yields in which the expenditure of each agent is equal to his income and subject to the restriction that the *PIA* is constant.

LAGRANGE MULTIPLIERS. Given the business profit function $B(\lambda_i, p_i)$ *which depends on 2N variables* λ_i y p_i*which is to be maximized (or minimized) subject to* the *constraint expressed by equation* $g(\lambda_i, p_i) = 0$ *which is also a function of the 2N variables* λ_i y p_i *then the values of* λ_i y p_i *that maximizes (or minimizes) the objective function* $B(\lambda_i, p_i)$ *are also a solution of the system of 2N+1 equations given by:*

$$\begin{cases} \dfrac{\partial B(\lambda_i, p_i)}{\partial \lambda_i} + \eta_S \dfrac{\partial g(\lambda_i, p_i)}{\partial \lambda_i} = 0 & (N\ ecuations) \\ \dfrac{\partial B(\lambda_i, p_i)}{\partial p_i} + \eta_S \dfrac{\partial g(\lambda_i, p_i)}{\partial p_i} = 0 & (N\ equations) \\ g(\lambda_i, p_i) = 0 & (restriction) \end{cases}$$

Where the parameter η_S *is given the generic name of the Lagrange multiplier of the maximization (or minimization) problem.*

In the particular economic problem we are dealing with, the objective function we wish to maximize (or minimize) is the one that expresses the monetary surplus of the economy as a function of prices and the number of basic companies, and which is equal to the company profits distributed between workers and businessmen:

$$B(\lambda_i, p_i) = \sum_{i=1}^{n} \lambda_i Q_{ii}^{o} p_i - \sum_{i,j=1}^{n} \lambda_i Q_{ij} p_j \qquad \leftarrow \Big| \begin{matrix} maximize \\ o\ minimize \end{matrix}$$

Subject to the restriction that the *PIA* does not change and is a constant of the economy, which is expressed by saying that the restriction $g(\lambda_i, p_i) = 0$ is given in our case by the expression:

$$g(\lambda_i, p_i) = PIA - 2\sum_{i}^{n} \lambda_i Q_{ii}^o p_i \; + \sum_{j,i}^{n} \lambda_i Q_{ij} p_j = 0 \quad (restriction)$$

Both expressions, the function to maximize or minimize and the restriction, fulfill the necessary conditions that allow us to apply the Lagrange Multipliers Method and find the system of equations that must fulfill the variables λ_i y p_i that maximize or minimize the expression of the business benefits $B(\lambda_i, p_i)$ when the PIA is constant:

$$\begin{cases} \dfrac{\partial B(\lambda_i, p_i)}{\partial \lambda_i} + \eta_S \dfrac{\partial g(\lambda_i, p_i)}{\partial \lambda_i} = 0 \;\; \rightarrow \;\; Q_{ii}^o p_i - \displaystyle\sum_{j=1}^{n} Q_{ij} p_j - \eta_S \left(2Q_{ii}^o p_i - \sum_{j}^{n} Q_{ij} p_j \right) = 0 \\ \dfrac{\partial B(\lambda_i, p_i)}{\partial p_i} + \eta_S \dfrac{\partial g(\lambda_i, p_i)}{\partial p_i} = 0 \;\; \rightarrow \;\; \lambda_i Q_{ii}^o - \displaystyle\sum_{j=1}^{n} \lambda_j Q_{ji} - \eta_S \left(2\lambda_i Q_{ii}^o - \sum_{j=1}^{n} \lambda_j Q_{ji} \right) = 0 \\ g(\lambda_i, p_i) = 0 \;\; \rightarrow \;\; PIA - 2\displaystyle\sum_{i}^{n} \lambda_i Q_{ii}^o p_i \; + \sum_{j,i}^{n} \lambda_i Q_{ij} p_j = 0 \end{cases}$$

Where the constant η_S is the Lagrange multiplier associated with the restriction that the IPA remains constant. It is not complicated to show that, from an economic point of view, the multiplier η_S is the quotient between B_{min} the minimum value of the monetary surplus that can be obtained from an economy of simple production at constant yields that produces with certain technical coefficients and the PIA of the economy. To do this, we take the first set of N equations and multiply it by the variable number of firms, and add it:

$$\overset{\times \lambda_i}{\longrightarrow} \quad \lambda_i \times \left\{ Q_{ii}^o p_i - \sum_{j=1}^{n} Q_{ij} p_j - \eta_S \left(2Q_{ii}^o p_i - \sum_{j}^{n} Q_{ij} p_j \right) = 0 \right\} \xrightarrow{\sum\{\dots\}}$$

$$\rightarrow \left(\sum_{i=1}^{n} \lambda_i Q_{ii}^o p_i - \sum_{i,j=1}^{n} \lambda_i Q_{ij} p_j \right) - \; \eta_S \left(2\sum_{i=1}^{n} \lambda_i Q_{ii}^o p_i - \sum_{i,j=1}^{n} \lambda_i Q_{ij} p_j \right)$$

Now η_S is the quotient between two summations that have a very precise meaning, when we identify the monetary surplus with nominal *GDP:*

$$\left.\begin{aligned} PIB &= \sum_{i=1}^{n} \lambda_i Q_{ii}^{o} p_i - \sum_{i,j=1}^{n} \lambda_i Q_{ij} p_j \\ PIA &= 2\sum_{i=1}^{n} \lambda_i Q_{ii}^{o} p_i - \sum_{i,j=1}^{n} \lambda_i Q_{ij} p_j \end{aligned}\right\} \rightarrow \eta_S = \frac{PIB}{PIA}$$

Furthermore, it is not very complicated to demonstrate that the extreme point associated with the Lagrange multiplier is a minimum and not a maximum, as we might expect, so that the multiplier tells us what the minimum monetary surplus is in an economy that produces with certain production techniques (the technical coefficients of the matrices Q y Q^o) and when the nominal *PIA* does not change:

$$\eta_S = \frac{PIB_{mín}}{PIA} \qquad (\eta_S \equiv \ Sraffa´s\ Efficiencya)$$

The parameter η_S we call it Sraffa's Efficiency because, as we shall see in a moment, it is closely related to the "Standard Ratio" used by the Italian economist Pietro Sraffa in his work "Commodity Production by Means of Commodities". For any economy characterized by the technical matrices $\boldsymbol{Q^o}$ y $\boldsymbol{Q}$the monetary surplus with which it produces is always greater than the minimum expressed by Sraffa's Efficiency:

$$\eta = \frac{PIB}{PIA} > \eta_S \quad \leftrightarrow \quad PIB \geq PIB_{mín}$$

The result is somewhat counter-intuitive. The expression tells us that, when the *PIA* remains constant and unchanged, the nominal *GDP* of the economy can come as close as we want to the value of the *PIA,* but, nevertheless and contrary to what is expected, a monetary economy has a minimum monetary surplus or $PIB_{mín}$ which cannot be diminished, whatever the prices at which it is sold or whatever the number of firms producing.

<u>A MAXIMUM OR A MINIMUM?</u> Although it may seem strange, the monetary surplus (of a monetary economy (which here we are identifying with GDP, although strictly speaking the identification is not correct) has a minimum from which it cannot fall, and not a maximum, as we might initially expect if we allow ourselves to be carried away by appearances.

This result has an enormous importance that the brevity of this treatise prevents us from analyzing in depth, since there will be no structural impediment for the nominal profits of any sector to rise at the expense of the nominal profits of another sector, without affecting the total nominal surplus of the economy.

Note that this result implies that, given an economy consisting of any two countries, the surplus sharing between the two countries can be any and is not subject to any structural

constraint, while the productive surplus GDP relative to the IPA itself must always remain above a minimum.

4. THE REASON SRAFFA PATTERN

If we take the system of 2N+1 Lagrange equations found in the previous section and skip a few intermediate steps that add nothing new, but slow down the explanation a lot, we can regroup the terms of each expression and obtain the same system of equations expressed in a slightly different way:

$$\frac{(1-\eta_S)}{(1-2\eta_S)} \cdot \sum_{j=1}^{n} \lambda_j q_{ji} = \lambda_i Q_{ii}^o \qquad (variable\ \lambda_i)$$

$$\frac{(1-\eta_S)}{(1-2\eta_S)} \cdot \sum_{j=1}^{n} q_{ij}\, p_j = Q_{ii}^o p_i \qquad (variable\ p_i)$$

$$PIA = 2\sum_{i}^{n} \lambda_i Q_{ii}^o p_i - \sum_{j,i}^{n} \lambda_i Q_{ij} p_j \qquad (restriction)$$

The new way of expressing the same system of equations allows us to easily identify the two sets of *N* equations with the two systems of equations deduced by Sraffa in his work "Production of Goods by other Goods".

Let's observe that the first set of N equations, the ones that depend on the variable number of companies, is the same system of equations that Piero Sraffa uses to obtain the "Standard Ratio", which he calls the "Standard System". R and which he calls "Standard System":

$$(1+R) \cdot \sum_{j=1}^{n} \lambda_j q_{ji} = \lambda_i Q_{ii}^o \qquad (Srandar\ Sistem)$$

If we identify both expressions, the one we have obtained here and the one obtained by Sraffa in his search for the standard commodity, we have that:

$$\frac{(1-\eta_S)}{(1-2\eta_S)} = 1 + R$$

Moreover, it is also possible to identify the second set of N Lagrange equations, those that depend on the price variable, with the N equations that Sraffa uses to obtain the maximum profit rate for each basic firm, the same for all of them, when workers are paid a zero wage. $r_{máx}$ of each basic firm, equal for all of them, when workers are paid a zero wage:

$$(1 + r_{máx}) \cdot \sum_{i=1}^{n} q_{ki}\, p_i = Q_{kk}^{o} p_k \qquad (zero\ salary)$$

If we identify both expressions, the one we have obtained here and the one obtained by Sraffa in his search for the maximum rate of profit we have that:

$$\frac{(1 - \eta_S)}{(1 - 2\eta_S)} = 1 + r_{máx}$$

Piero Sraffa demonstrates in his work, as it could not be otherwise, that the pattern ratio and the maximum rate of profit are the same. R and the maximum rate of profit $r_{máx}$ are equal. This is not at all evident in itself, since for such a coincidence to happen, Piero Sraffa forces the demonstration by accepting the validity of two very debatable hypotheses:

1. It defines the "*rate of profit*" of any basic enterprise as *"the ratio of monetary profit to monetary expenditure, but not including wages", which is a bit of a* departure from the usual definition of the profit rate, which usually includes wages as an additional expense of the firm.
2. It assumes that, whatever the rate of profit, its value is the same for all basic companies.

The first hypothesis, the definition of the rate of profit, although a completely arbitrary definition, is, in itself, no more objectionable than other more usual definitions of the rate of profit in which wage costs are included in the calculation of the rate of profit. The definition can be considered a matter of taste and its acceptance does not change the substance of Sraffa's conclusions.

Quite different is the second hypothesis, which is completely unacceptable. There is no empirical or theoretical justification for assuming that the rate of profit, whether as defined by Sraffa or other more usual ones, has to be equal across industries. The assumption, first postulated by the Scottish economist David Ricardo some 150 years ago, has been held to be true ever since and is still accepted as valid by all economists today, although the reason for such a strange consensus in a discipline in which all economists disagree on almost everything is unclear.

Sraffa's starting assumption, which is also that of all economists, assumes as a matter of course that the entrepreneur derives his profits from the risk he takes when he advances the money necessary to carry out production. Without the advance of the money, or

investment, production cannot take place, and without the assumption that the money will be invested in the enterprises which will produce the highest rate of profit, the rate of profit will not be equalized in all industries. The reasoning is very easy to follow:

> *"...money moves freely and will go to the companies that produce the most profits, so that when the money attracted by a higher profit increases the number of companies, production will also increase, inevitably lowering the price of what it sells and, therefore, lowering its higher profit that will end up being equalized with that of the rest of the companies..."*
>
> *David Ricardo*

The reasoning was made, for the first time, by David Ricardo and has been considered an indisputable postulate of economics since then, in such a way that no one has ever doubted it. It is very clear that the reason for defining the rate of profit as the quotient between money advanced and surplus money is none other than to justify the origin of the profit received by the entrepreneur, and not so much to justify that *"the rate of profit tends to equalize in all industries"*. Therefore, it is not surprising that Piero Sraffa uses in his work the rate of profit and its equalization in all industries without even questioning it. Although in his defence we must mention that Karl Marx, not only does not discuss it either, but he uses it to show that this profit comes from the exploitation of wage labour, or surplus value.

Be that as it may, the pattern reason R obtained by Piero Sraffa is a gift we can neither reject nor overlook, since it allows us to give economic meaning to the Lagrange multiplier η_S multiplier in the analysis we are doing. If we call r_j the quotient between the monetary surplus of a generic industry and its monetary expenditure, and call the quotient between the surplus quantity of a generic industry and its monetary expenditure, and call R_j the quotient between the surplus quantity of a generic commodity and the quantity of that commodity that is spent in all industries, we have just shown that when the economy produces with the minimum possible monetary surplus, all of them have the same value RSraffa's standard ratio:

$$R = r_j = \frac{(monetary\ surplus)_j}{(monetary\ expenditure)_j} = \frac{(surplus\ product)_i}{(product\ expenditure)_i} = R_i \qquad \forall\ i, j$$

This affirmation, as has become customary, we express it as a principle:

SRAFFA'S MONETARY EFFICIENCY. A monetary economy subject to the restriction that the PIA is constant, is said to be producing with the minimum possible monetary surplus when, for any good, the quotient between the surplus produced and the consumption of the same used to produce it, measured both in monetary terms and in terms of quantity of product, has the same value, Sraffa's standard ratio R:

$$R = r_j = \frac{(monetary\ surplus)_j}{(monetary\ expenditure)_j} = \frac{(surplus\ product)_i}{(product\ expenditure)_i} = R_i \qquad \forall\, i,j$$

In such a case, the minimum monetary surplus is given by the expression $B_{mín}$ is given by the expression:

$$\eta_S = \frac{B_{mín}}{PIA} = \frac{R}{1+2R} \qquad (\eta_S \equiv Sraffa's\ Eficicy)$$

Where η_S is the Sraffa Efficiency.

From the macroeconomic point of view, the "Master Ratio" R_s is the minimum possible quotient between *GDP* (the income of workers together with the income of employers) and the combined monetary expenditure of all basic enterprises (excluding labour) when the *PIA* of the economy has a given value:

$$\frac{(1-\eta_S)}{(1-2\eta_S)} = 1 + R \rightarrow\ R = \frac{\eta_S}{(1-2\eta_S)} = \frac{\frac{PIB}{PIA}}{1-2\frac{PIB}{PIA}} = \frac{PIB}{PIA-2PIB} \rightarrow$$

$$R = \frac{surplus\ cash\ flow}{intercompany\ cash\ flow}$$

What is really remarkable in Sraffa's analysis is that the standard ratio is a quotient between quantities of goods of a very different nature. R is a quotient between quantities of goods of a very disparate nature, so it is very difficult to understand what relationship the physical world of quantities produced by basic firms has with the financial world and its monetary flows. Now we know it. Piero Sraffa's mistake was the same one that Karl Marx made and the same one that all current economists make: *"to believe that the rate of profit really exists and that it is equalized over time in all industries"*.

5. THE PRINCIPLE OF CLOSURE

In the previous topic we already commented on the great importance of the Closure Principle for economics as a complement of the Asymmetry Principle. Although it is now, when using it explicitly as a restriction to obtain the value of the variables that minimize the monetary surplus, that we begin to see the deep consequences it has on the economy:

$$k_F \cdot M = PIA = const. \quad \rightarrow \quad PIA - 2\sum_{i}^{n} \lambda_i Q_{ii}^{o} p_i \; - \sum_{j,i}^{n} \lambda_i Q_{ij} p_j = 0$$

Although on the surface the *PIA* is a function of the variables λ_i, p_i, Q y Q^ovariables, the truth is that the monetary equation tells us that it is a constant independent of all the variables insofar as the money supply is. Hence its importance:

$$PIA \neq F(\lambda_i, p_i, Q_i)$$

So the expression becomes in practice a macroeconomic linkage that the different variables that appear in the expression must fulfill. Hence, the importance of the Closure Principle and the reason to use it as a condition to obtain the Lagrange multiplier associated to the monetary surplus of the economy.

We can appreciate again the latent influence of the Closure Principle if we manipulate the set of Lagrange equations a little more and define a new parameter:

$$\omega = \frac{(1 - 2 \cdot \eta_S)}{(1 - \eta_S)} \qquad\qquad 0 < \omega < 1$$

Now, finding the minimum monetary surplus of an economy becomes the problem of calculating the maximum eigenvalue of the matrix ω of the matrix $\boldsymbol{Q} \times \boldsymbol{Q^{o}}^{-1}$dependent on the technical coefficients. Concretely:

<u>THE LAGRANGE EQUATIONS</u>:

$$\{0 < \omega < 1\}$$

$$\begin{cases} \sum_{i=1}^{n} \lambda_i Q_{ik} - \omega \lambda_k Q_{kk}^{o} = 0 \quad \leftrightarrow \quad \boldsymbol{\lambda} \times \left[\boldsymbol{Q} \times \boldsymbol{Q^{o}}^{-1} - \omega \boldsymbol{I}\right] = 0 \\ \sum_{i=1}^{n} Q_{ki}\, p_i - \omega Q_{kk}^{o} p_k = 0 \quad \leftrightarrow \quad \left[\boldsymbol{Q^{o}}^{-1} \times \boldsymbol{Q} - \omega \boldsymbol{I}\right] \times \boldsymbol{P} = 0 \end{cases}$$

$$PIA = 2\sum_{i}^{n} \lambda_i Q_{ii}^{o} p_i \; - \sum_{j,i}^{n} \lambda_i Q_{ij} p_j = \leftrightarrow \quad PIA = \boldsymbol{\lambda} \times (\mathbf{2}\boldsymbol{Q^{o}} - \boldsymbol{Q}) \times \boldsymbol{P}$$

Where Sraffa's standard ratio is $R_s = \frac{1-\omega}{\omega}$ *and the Sraffa efficiencyis,* $\eta_s = \frac{1-\omega}{2-\omega}$

Now, the calculation of the minimum monetary profit that can be obtained in a simple production economy at constant yields, and where all income is spent, is equivalent to

solving the eigenvalue problem of the matrices $\boldsymbol{Q} \times \boldsymbol{Q^{o^{-1}}}$ y $\boldsymbol{Q^{o^{-1}}} \times \boldsymbol{Q}$ described by the technical coefficients of the basic firms:

1) The eigenvalues ω are between 0 and 1 when the matrix $\boldsymbol{Q}$ y $\boldsymbol{Q^o}$describes a simple production economy at constant returns with physical surplus.
2) For each eigenvalue, the right-hand eigenvector of $\boldsymbol{Q^{o^{-1}}} \times \boldsymbol{Q}$ corresponds to a possible vector of prices and the eigenvector on the left-hand side of $\boldsymbol{Q} \times \boldsymbol{Q^{o^{-1}}}$ corresponds to a possible vector of the number of basic firms.
3) Only the maximum eigenvalue ω_m has an associated vector of prices and a vector of number of companies with all the positive components.
4) Both eigenvectors, the price vector and the quantity vector of basic firms, associated with ω_m are necessary to maximize the monetary surplus, or profit. The system of equations determines both vectors in direction, but not in modulus.
5) The Closure Equation can only determine the module of one of the two vectors, but then the other remains undetermined. I.e., the variables prices and number of firms that determine the economy have a degree of freedom when they produce with the minimum productive surplus.

What we are interested in pointing out now is not only that by knowing the concrete value of the maximum eigenvalue, we know the Sraffa efficiency or standard ratio. ω the Sraffa efficiency or the standard ratio is known:

$$\eta_s = \frac{1-\omega}{2-\omega}$$

But, in addition, the fourth and the fifth statement informs us that the eigenvectors are determined in direction, but not in modulus, so that the closing equation that links both moduli together, leaves a degree of freedom:

$$\left.\begin{matrix} \boldsymbol{\lambda} \times \left[\boldsymbol{Q} \times \boldsymbol{Q^{o^{-1}}} - \omega \boldsymbol{I}\right] = 0 \ \rightarrow \boldsymbol{\lambda}(\omega) = \lambda \cdot \hat{\boldsymbol{\lambda}}(\omega) \\ \left[\boldsymbol{Q^{o^{-1}}} \times \boldsymbol{Q} - \omega \boldsymbol{I}\right] \times \boldsymbol{P} = 0 \ \rightarrow \boldsymbol{P}(\omega) = p \cdot \hat{\boldsymbol{p}}(\omega) \end{matrix}\right\} \rightarrow$$

$$\rightarrow PIA = \lambda \cdot p \cdot \left[\hat{\boldsymbol{\lambda}} \times (\boldsymbol{2Q^o} - \boldsymbol{Q}) \times \hat{\boldsymbol{p}}\right]$$

Where each of the eigenvectors $\boldsymbol{\lambda}$ y $\boldsymbol{P}$ has been decomposed as the product of its modulus λ by its unit direction $\hat{\boldsymbol{\lambda}}$. When we understand that the term $\left[\hat{\boldsymbol{\lambda}} \times (\boldsymbol{2Q^o} - \boldsymbol{Q}) \times \hat{\boldsymbol{p}}\right]$ is the *PIA* calculated with the vector prices and unit number of firms, we have:

$$\boxed{\lambda \cdot p = \frac{PIA}{\widehat{PIA}} = const.} \qquad \widehat{PIA} = \left[\hat{\boldsymbol{\lambda}} \times (\boldsymbol{2Q^o} - \boldsymbol{Q}) \times \hat{\boldsymbol{p}}\right]$$

The same applies to the minimum monetary surplus. Bwhich is also fixed when the *PIA* is known:

$$B(\lambda_i, p_i) = \lambda \cdot p \cdot \left[\hat{\boldsymbol{\lambda}} \times (\boldsymbol{Q^o} - \boldsymbol{Q}) \times \hat{\boldsymbol{p}}\right] \quad \rightarrow \ \lambda \cdot p = \frac{B(\lambda_i, p_i)}{\widehat{B(\lambda_i, p_i)}}$$

This means that even in an economy where the *PIA* does not change, because we suppose there is no growth of the money supply, and which also produces with the lowest possible monetary profit, the economy is not completely determined and it is still possible to evolve because prices and production change. $M$and which also produces with the minimum possible monetary profit, the economy is not completely determined and evolution is still possible because prices and production change.

THE INFLATIONARY PRINCIPLE. If we now remember that the Inflationary Principle tells us prices can never fall, then we can again see the influence the Closure Principle has on the whole monetary economy, since, even though we are supposing there is no nominal growth in the economy, no changes in productivity, and that it is producing at maximum financial profit, the economy can still evolve and move towards a decrease in production as prices increase.

The consequence of the reasoning is remarkable, because the Inflationary Principle, not only tells us that prices cannot go down, but it states that in the case of no nominal growth of PIA, the economy will decrease its production. Which forces the economy to be minimally inflationary if we want to avoid going into recession.

Of course, it will be extremely improbable for a real economy to produce with the minimum possible monetary surplus because the consumption preferences of agents will never coincide with the proportion of Sraffa's standard goods. Nor is it clear why the prices at which goods are sold should be such that the different companies produce with the minimum possible monetary surplus. Therefore, there is no good reason to expect that a real economy must be close to the minimum possible monetary surplus.

6. PRACTICAL EXAMPLE OF ECONOMICS

Let's take a numerical example that, despite being very artificial, allows us to visualize a little of what has been said so far.

Basic accounting equations. Let there be an economy that produces wheat, iron and oil, and let the accounting equations that each basic company fulfills be the following:

$$
\begin{aligned}
20kg \cdot p_{wheat} = \quad & 12kg \cdot p_{wheat} + 1kg \cdot p_{iron} + 1kg \cdot p_{oil} + B_{wheat} \\
50kg \cdot p_{iron} = \quad & 10kg \cdot p_{wheat} + 5kg \cdot p_{iron} + 5kg \cdot p_{oil} + B_{iron} \\
42kg \cdot p_{oil} = \quad & 10kg \cdot p_{wheat} + 5kg \cdot p_{iron} + 13kg \cdot p_{oil} + B_{oil}
\end{aligned}
$$

Evidently, the prices at which wheat, iron and oil are sold must be such that the monetary surplus or profit which each basic enterprise generates, and which is distributed among workers and entrepreneurs, are all positive. B_i generated by each basic enterprise, and shared between workers and entrepreneurs, are all positive.

Each accounting equation informs us of the quantities of goods involved in production. For example, to produce 20 kilos of wheat, each basic company dedicated to wheat production spends 12 kilos of wheat, 1 kilo of iron and 1 kilo of oil, and the same happens for the other basic companies. It is precisely this accounting information, which allows us to build the two matrices of technical coefficients $\boldsymbol{Q}$ y $\boldsymbol{Q^o}$ that describe the economy from the production point of view:

$$
\boldsymbol{Q} = \begin{bmatrix} 12 & 1 & 1 \\ 10 & 5 & 5 \\ 10 & 3 & 13 \end{bmatrix} \qquad \boldsymbol{Q^o} = \begin{bmatrix} 20 & 0 & 0 \\ 0 & 50 & 0 \\ 0 & 0 & 42 \end{bmatrix}
$$

Let us observe that we do not know completely how many basic companies of each type there are in the economy, the vector λ. We also do not know the concrete prices of goods, the vector of prices $\boldsymbol{p}$. We do not even know how many workers there are. In spite of all this, with the information contained in the matrices of the technical coefficients on the techniques used by the basic companies, it is enough to know what is the minimum monetary profit with which the economy can produce.

To do this, we just have to find the eigenvalues of either matrix:

$$
\boldsymbol{Q} \times \boldsymbol{Q^{o^{-1}}} = \begin{bmatrix} \frac{3}{5} & \frac{1}{50} & \frac{1}{42} \\ \frac{1}{2} & \frac{1}{10} & \frac{5}{42} \\ \frac{1}{2} & \frac{3}{50} & \frac{13}{42} \end{bmatrix} \qquad \boldsymbol{Q^{o^{-1}}} \times \boldsymbol{Q} = \begin{bmatrix} \frac{3}{5} & \frac{1}{20} & \frac{1}{20} \\ \frac{1}{5} & \frac{1}{10} & \frac{2}{10} \\ \frac{5}{21} & \frac{1}{14} & \frac{13}{42} \end{bmatrix}
$$

What are they concretely:

$$
\omega_1 = 0{,}063 \quad \omega_2 = 0{,}283 \quad \omega_3 = 0,663
$$

Of which only the largest of them, $\omega_3 = 0,663$has an associated autovector of prices and number of companies with all the positive components. Explicitly, although the vectors are not normalized, they are:

$$\omega_m = 0{,}663 \xrightarrow{autovector} \begin{cases} P_m = (\ 1{,}294 \quad 0637 \quad 1) \\ \lambda_m = (12{,}165 \quad 0{,}538 \quad 1) \end{cases}$$

Knowing the maximum eigenvalue it is possible to know the minimum monetary surplus of the economy:

$$\eta_s = \frac{1-\omega}{2-\omega} = 0{,}25 \quad \rightarrow \quad PIB = 0{,}25 \cdot PIA$$

The two eigenvectors, that of prices and that of companies, represent the set of prices and the number of companies which make the monetary surplus minimum, but we see that they are determined only in direction, but not in modulus.

To determine the specific modulus of one of them we can resort to the binding imposed by the Closure Equation, since we suppose we know the value of the *PIA* with which the economy produces:

$$PIA = \lambda \cdot p \cdot \left[\hat{\boldsymbol{\lambda}} \times (\mathbf{2}\boldsymbol{Q^o} - \boldsymbol{Q}) \times \hat{\boldsymbol{p}}\right] \xrightarrow{\widehat{PIA}=\left[\hat{\lambda}\times(2\boldsymbol{Q^o}-\boldsymbol{Q})\times\hat{\boldsymbol{p}}\right]} \lambda \cdot p = \frac{PIA}{\widehat{PIA}}$$

Which confirms that the variables that describe the economic system have a degree of freedom that cannot be reduced without resorting to some hypothesis external to the model. The same happens with the minimum monetary surplus we are looking for, which we know is related to the *PIA* by Sraffa's Efficiency, even though the variables on which they depend also have a degree of freedom:

$$B(\lambda_i, p_i) = \lambda \cdot p \cdot \left[\hat{\boldsymbol{\lambda}} \times (\boldsymbol{Q^o} - \boldsymbol{Q}) \times \hat{\boldsymbol{p}}\right] \rightarrow \quad \lambda \cdot p = \frac{PIA}{\widehat{PIA}} = \frac{B}{\hat{B}}$$

In order to restrict the last degree of freedom it is necessary to resort to an additional hypothesis external to the model that is always related to the physical limitations of the economy, which is usually related to the physical limitations of the economy.

7. THE MINIMUM BUSINESS PROFIT OF AN ECONOMY

It is not at all easy to explain the difference between the distribution theory we are developing very briefly in these lines and the distribution theory developed by Piero Sraffa in "Production of goods by means of goods" more than half a century ago. It is very clear that Sraffa shows in his work that the prices of goods are fixed within monetary economies for structural reasons, and it is very clear that the Principle of Asymmetry starts from the

same mathematical structure used by Sraffa and follows the same path, though using a more general and less "ad hoc" mathematical structure than the one he used. For example, the problem of calculating the eigenvalues of the matrices of technical coefficients is common in both structures, however, we think that the condition that Sraffa uses when he postulates "ad hoc" a rate of profit common to all industries, he does it thinking that he is thinking of a profit rate common to all industries. r common to all industries does so with the physical nature of capital in mind, which we have not needed here.

Also the formulation of the Closing Equation, which links the economic variables with the *IPA,* appears as a differentiating element that has nothing to do with Sraffa's use of the surplus (the GDP of the economy) when he uses it only as a normalizing element with respect to which the rest of the variables are measured. But, in spite of all these clear differences between this work and Sraffa's, the truth is that here we are following his path from the beginning and we want to finish this chapter following his path once again.

In the analysis made so far on the monetary surplus, we have not distinguished between the profits kept by employers and the profits kept by workers in the form of wages. Now it is time to separate the monetary surplus received by both, as Piero Sraffa did, and to analyze the possible influence of a specific distribution on the minimum profit of the economy we have found in the previous section.

To do this, we only have to treat labour as just another commodity, and let all the monetary surplus produced by the economy go exclusively to pay the income of entrepreneurs. To do this, let's keep the matrix of expenditure $\boldsymbol{G}$ and income $\boldsymbol{Y}$ unchanged, but explicitly stating the number of workers in each basic enterprise T_i and their wages $w$and the basic basket of goods and services q_i^{job} consumed by a generic worker, and the total number of workers. T^0:

$$\boldsymbol{Y} = \begin{bmatrix} \lambda_1 Q_{11}^o p_1 \\ \vdots \\ \lambda_n Q_{nn}^o p_n \\ T^o w \\ y^{cap} \end{bmatrix} \quad \boldsymbol{G} = \begin{bmatrix} \begin{vmatrix} \lambda_1 Q_{11} p_1 & \cdots & \lambda_1 Q_{1n} p_n \\ \vdots & \cdots & \vdots \\ \lambda_n Q_{n1} p_1 & \cdots & \lambda_n Q_{nn} p_n \end{vmatrix} & \begin{vmatrix} \lambda_1 T_1 w & \lambda_1 B_1^{cap} \\ \vdots & \vdots \\ \lambda_n T_n w & \lambda_n B_n^{cap} \end{vmatrix} \\ \begin{vmatrix} T^o q_1^{job} p_1 & \cdots & T^o q_n^{job} p_n \\ q_1^{cap} p_1 & \cdots & q_n^{cap} p_n \end{vmatrix} & \begin{vmatrix} 0 & 0 \\ 0 & 0 \end{vmatrix} \end{bmatrix}$$

The expenditure and income matrix is still a square matrix of N+2 as before, and the changes that appear in it are only conceptual, since now labor is just another commodity and its structural cost of production is the basic basket. Therefore, the problem of finding the monetary surplus of the economy is reduced to finding the set of prices and the wage that maximize (or minimize) the surplus of entrepreneurs, but now subject to two restrictions. Specifically, we must minimize or maximize the expression:

$$B(\lambda_i, p_i) = \sum_{i=1}^{n} \lambda_i Q_{ii}^{o} p_i - \sum_{i,j=1}^{n} \lambda_i Q_{ij} p_j \; - \sum_{i=1}^{n} \lambda_i T_i w + \left[T^{o} w - \sum_{i=1}^{n} T^{o} q_i^{job} p_i \right]$$

Where the term in parentheses is identically null, since it represents the expenditure made by each worker, that is, the basic basket.

It is subject to two restrictions. The restriction that the *PIA* does not change and is a constant of the economy, which is still expressed by the restriction $g(\lambda_i, p_i) = 0$ given by the expression of the *PIA,* where neither wages nor the number of workers appear explicitly:

$$g(\lambda_i, p_i) = PIA - 2 \sum_{i}^{n} \lambda_i Q_{ii}^{o} p_i \; + \sum_{j,i}^{n} \lambda_i Q_{ij} p_j = 0 \qquad (restriction)$$

And a new restriction that links the prices of goods to wages through the basic basket, that is, it tells us what each worker spends his or her wages on:

$$f(\lambda_i, p_i) = w - \sum_{i=1}^{n} q_i^{job} p_i = 0 \qquad\qquad (restriction)$$

All the expressions, the function whose extreme is sought subject to the two restrictions, again meet the necessary conditions that allow us to apply the Lagrange Multipliers Method. We can find the system of equations which must satisfy the variables λ_i, p_i, T^0 y w so that they maximize or minimize the expression of business profits $B(\lambda_i, p_i)$ when the PIA is constant and the whole wage is spent on the basic basket:

$$\frac{\partial B(\lambda_i, p_i)}{\partial \lambda_i} + \eta_S \frac{\partial g(\lambda_i, p_i)}{\partial \lambda_i} + \eta_M \frac{\partial f(\lambda_i, p_i)}{\partial \lambda_i} = 0 \;\; \rightarrow \quad (1)$$

$$\frac{\partial B(\lambda_i, p_i)}{\partial p_i} + \eta_S \frac{\partial g(\lambda_i, p_i)}{\partial p_i} \; \eta_M \frac{\partial f(\lambda_i, p_i)}{\partial p_i} = 0 \;\; \rightarrow \qquad (2)$$

$$g(\lambda_i, p_i) = PIA - 2 \sum_{i}^{n} \lambda_i Q_{ii}^{o} p_i \; + \sum_{j,i}^{n} \lambda_i Q_{ij} p_j = 0$$

$$f(\lambda_i, p_i) = w - \sum_{i=1}^{n} q_i^{job} p_i = 0$$

Doing some operations, we obtain:

$$(1) \rightarrow \begin{cases} \forall i \rightarrow & Q_{ii}^{o} p_i - \sum_{j=1}^{n} Q_{ij} p_j - T_i w - \eta_S \left(2Q_{ii}^{o} p_i - \sum_{j}^{n} Q_{ij} p_j \right) = 0 \\ w & \rightarrow \quad 0 \end{cases}$$

$$(2) \rightarrow \begin{cases} \forall i \rightarrow & \lambda_i Q_{ii}^{o} - \sum_{j=1}^{n} \lambda_j Q_{ji} - \eta_S \left(2\lambda_i Q_{ii}^{o} - \sum_{j=1}^{n} \lambda_j Q_{ji} \right) - \eta_M (q_i^{job}) = 0 \\ w \rightarrow & \quad - \sum_{i=1}^{n} \lambda_i T_i + \eta_T = 0 \end{cases}$$

Wherein η_S y η_T are, respectively, the multiplier associated with the restriction that the *IPA* remains constant and is the multiplier associated with the basic basket of workers. Note that from the last equation it follows that the multiplier associated with the basic basket is equal to the number of workers:

$$\eta_T = \sum_{i=1}^{n} \lambda_i T_i = T^o$$

The two new systems of equations have changed little compared to the original ones. In reality, the changes reflect only what the new surplus looks like when the workers' share is removed:

$$Q_{ii}^{o} p_i - \sum_{j=1}^{n} Q_{ij} p_j - T_i w - \eta_S \left(2Q_{ii}^{o} p_i - \sum_{j}^{n} Q_{ij} p_j \right) = 0$$

$$\lambda_i Q_{ii}^{o} - \sum_{j=1}^{n} \lambda_j Q_{ji} - T^o q_i^{job} - \eta_S \left(2\lambda_i Q_{ii}^{o} - \sum_{j=1}^{n} \lambda_j Q_{ji} \right) = 0$$

Let us note that the term ($T_i w$) is what each basic firm spends on wages, and the term ($T^o q_i^{trab}$) is what all workers consume of each basic good, so the Lagrange multiplier can be interpreted in two ways, monetary and physical:

$$\eta_S = \frac{Q_{ii}^{o} p_i - \sum_{j=1}^{n} Q_{ij} p_j - T_i w}{2Q_{ii}^{o} p_i - \sum_{j}^{n} Q_{ij} p_j} \qquad \forall i$$

$$\eta_S = \frac{\lambda_i Q_{ii}^{o} - \sum_{j=1}^{n} \lambda_j Q_{ji} - T^o q_i^{job}}{2\lambda_i Q_{ii}^{o} - \sum_{j=1}^{n} \lambda_j Q_{ji}} \qquad \forall i$$

What is remarkable about the result is that it is the same result that Sraffa obtains. When the economy operates at a point where the entrepreneurial surplus is minimal, then the value of the surplus depends linearly on the value of wages, the latter varying from zero, when all the surplus is taken by the entrepreneurs and the Lagrange multiplier is at a maximum, to w_{max} when the Lagrange multiplier η_S multiplier becomes zero:

$$0 < w < w_{max} \qquad T_i w_{max} = Q_{ii}^{o} p_i - \sum_{j=1}^{n} Q_{ij} p_j \;\; \leftrightarrow \;\; \eta_S = 0$$

This is also the case when the physical surplus of any commodity is kept by the workers:

$$T^o q_i^{job} = \lambda_i Q_{ii}^{o} - \sum_{j=1}^{n} \lambda_j Q_{ji} \qquad \forall i$$

With this last attempt to show, from the perspective offered by the expenditure matrix, the physical structure behind the distribution of surplus through the formation of prices, we end this chapter. But not before remembering, as Piero Sraffa did in 'Production of commodities by other commodities', that the present study, as well as the previous chapter where the Principle of Asymmetry Buyer and Seller is stated, prove beyond any reasonable doubt the absurdity of the Production Function theory. Therefore, these two chapters, but especially this last chapter especially dedicated to Sraffa's work, want to be a tribute to the many people who have been ostracized by economists working for private universities in the United States.

PART III

THE CAPITAL MARKET

CHAPTER 7

CAPITAL GOODS

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1. THE TRUTH AND THE LIE

We can say in a very general way that the raison d'être of any economic system is to organize the production of goods and services for their later distribution among all the people taking part in the productive process. In this sense, a money economy is no different from any other system used to satisfy the many and varied vital needs of society, except in the essential role played by money in the decisions which affect the processes of production and distribution of goods. Some of the many restrictions that the existence of money imposes on the economy we have seen when we studied the Consumer Market and stated the Principle of Asymmetry, but it will be in studying the capital goods that are bought and sold in the Capital Market that the special nature that the use of money imprints on our modern society will really be shown.

One of the greatest successes of the economists working for private universities in the US, and the most irrefutable proof that they have more than earned the astronomical salaries they enjoy, has been to convince everyone that there is no such thing as income-producing assets. The magnitude of the success they have achieved can only be appreciated when we quantify the immense size of the market they have managed to conceal: *"a Capital Market in which assets are bought and sold whose value in the year of 2019 exceeded 200 million million million euros, only in publicly traded assets".* There is, therefore, no doubt that the economists who work for private universities in the USA have earned the splendid salaries they receive, and that is why, far from making us feel indignation or contempt for the immense deception to which they have subjected us, what we feel for these teachers is admiration and amazement at such a feat. Even more so, when we see how they have achieved it.

In the economics textbooks used by teachers in private universities in the United States, goods are divided into two broad categories differentiated only by who consumes them. On the one hand, there are those goods that people consume in order to satisfy one of the many immediate human needs and which are called "**consumer goods**". On the other hand, there are those other goods that are consumed in the production process in order to create consumer goods, and which are given the generic name of capital or "**capital goods**".

Everybody knows that there is something very strange and illogical in this classification of goods according to whether they are consumed or not directly consumed by people, because in a monetary economy such a difference has no relevance. First, because, even if some goods are consumed by people and other goods are consumed by companies in the production process, both goods are consumed and are, therefore, consumer goods. Second, because both goods are bought and sold in the Consumer Market and, therefore, their price is fixed in the same market and with the same rules. It is very clear that, from the point of view of the relations established by the use of money, in a monetary economy there is no difference between the products consumed by a person and the products consumed by a company: both are bought and sold with money, both are bought and sold in the same market, and both are bought to be consumed.

In that sense, to distinguish between both types of goods, those consumed by people and those consumed by companies, is very stupid from a monetary point of view, unless, of course, it is an intentional classification which aims to propagate a lie. Because, of course, lies are created and propagated with the intention that we cannot distinguish between them and the truth.

But even accepting that it is all a lie, it is hard to believe that the truth could have been kept hidden for so long, because to hide the truth it is not enough to propagate the lie, it is also necessary to prevent the propagation of the truth. Seen in this way, the undoubted success in hiding the financial nature of capital that economists working for private universities in the US have achieved can only be a consequence of their ability to prevent the truth from being explained in textbooks, published in economics journals and becoming known by economists, and not so much by the lies they tell in their university textbooks.

PAUL SAMUELSON. Paul Samuelson is surely the most famous and prestigious contemporary economist in the USA. Recently deceased, he has worked all his life for the private university of Cambridge located in the state of Massachusett s, the famous Massachusetts Institute of Technology better known by its acronym in English, MIT, being there where in 1970 he received the Nobel Prize. It was just before those dates, already in the 1960s, when the so-called Two Cambridge Controversy took place, in which Samuelson proved Joan Robinson right, when he recognized that the defense of the physical nature of capital was unsustainable.

However, that did not seem to matter much to him, and in the most widely distributed university book of the last 50 years, written in his own handwriting, capital appears as a physical factor of production, in fact, the Nobel Prize in Economics was awarded to him for defending that the nature of capital is physical, even though he himself recognized that such a thing was impossible.

Not only that, the whole book on macroeconomics written by Samuelson, which after the awarding of the Nobel Prize in Economics becomes the most widely read university book in history, is an apology for the Production Function Theory, which needs the nature of capital to be physical to have any semblance of plausibility. Why this nonsense? Why does Samuelson lend himself to be the main architect of the greatest hoax ever perpetrated in the history of knowledge and accept the Nobel Prize for a theory that he himself acknowledges to be false?

The answer is straightforward and obvious when we ask ourselves who are the people who run the private universities in the USA, or we ask ourselves about the people who award the Nobel Prize.

If money does not distinguish as different the goods that people consume from those goods that companies consume when they are engaged in production, then the distinction between one and the other is superfluous, and such a classification is only part of the lie that serves to prevent the truth from spreading.

2. CAPITAL GOODS

Undoubtedly, the most important peculiarity of the money economy, which makes it different from all the other possible systems designed to organize the production and distribution of goods, is the existence of goods which produce "money incomes":

*CAPITAL GOODS: "In a monetary economy, we call **capital goods** those goods which produce an income, or which acquire their price from the possibility of producing an income".*

In the definition, "rent" is identified with the monetary flow received for owning a good (in this case, a capital good) and, therefore, it is completely different from the flow of income received for performing a job, i.e. wages.

In this work, goods, be they consumer goods or capital goods, are assumed to be always reproducible, i.e., there is no limitation to produce them in any quantity, although the

assumption is manifestly false (there are a number of goods that are not reproducible, which can be both consumer and capital goods, but here we will obviate this issue and assume that all goods are infinitely reproducible).

In general, we will avoid the use of the word "wealth" to refer to the market value of capital goods and we will name it simply as "capital", although there are authors like Tomas Pikety who use indistinctly both words, capital and wealth, to refer to the market value of goods that produce rents.

The first thing we must understand is that the existence of goods which produce income is an inevitable consequence of the use of money in the economy. To prove it, we only need to remember that, in a monetary economy, any company fulfils an equation of conservation of the monetary flow, or accounting equation, which forces it to obtain monetary profits, so that its income from sales must exceed its expenses for purchases. In fact, in the model of a simple production economy at constant yields, and when we suppose the stationary regime, the accounting equation which any basic company is obliged to fulfil is:

$$\overbrace{q_{ii}^{o}P_i = \sum_{j=1}^{n} q_{ij}P_j + B_i^{cap} + B_i^{job}}^{\text{accounting equation}} \rightarrow \text{rent} \equiv B_i^{cap} = q_{ii}^{o}P_i - \sum_{j=1}^{n} q_{ij}P_j - B_i^{job} > 0$$

$$rent \equiv business\ profits \geq 0$$

The identification with an income of the part of the monetary surplus which is devoted to pay the business profits, is the reason why any enterprise in a monetary economy is a capital good:

<u>PROFIT AS AN INCOME</u>. The existence of entrepreneurial profit, defined as that part of the monetary surplus which cannot be accounted for by a physical expenditure necessary to carry out production, makes it possible to identify unambiguously any firm with a capital good which produces an income equal to the entrepreneurial profit:

$$rent \equiv \overbrace{B_i^{cap} = q_{ii}^{o}P_i - \sum_{j=1}^{n} q_{ij}P_j - B_i^{job}}^{accounting\ equation} > 0$$

The company is a capital good because it produces an income, and it produces an income because it produces a profit, and it produces a profit because it is obliged to fulfil an accounting equation, and it is obliged to fulfil an accounting equation because it exists in a monetary economy:

"Capital goods exist because money exists,

and can only exist within a monetary economy."

Rent" is the income received by the owners of a good by the mere fact of owning the good. Goods that produce rents are called capital goods, and goods that do not produce rents are called consumer goods.

If we accept as true that the company profit which appears in the accounting equation cannot be justified as any physical expense necessary to carry out the productive process, then we will have to take for granted that any company is a capital good which produces monetary income for those who own it, and affirm, without any risk of being wrong, that the existence of money is the necessary and sufficient condition for the existence of capital goods.

To understand that rents for possession really exist, we only have to look at what happens with oil (although it is a non-reproducible good). It is very easy to see that whoever owns an oil well, which nowadays is always the sovereign state of a country, obtains income from the exploitation and sale of oil that cannot be associated with any physical expenditure being made in the extraction of oil. For example, when the price of oil falls from 100 euros per barrel to 70 euros in a short period of time, it is very clear that the operating costs have not decreased by that amount. Therefore, the drop in the price of oil cannot be associated to any physical fact related to the improvement of the exploitation process and, consequently, the profit that was obtained before the drop in the price of crude oil cannot be the consequence of any expense. The same can be said when the price of oil rises sharply, nor can the increase in profits be attributed to a change in the production situation.

It is very evident to anyone, and it is not necessary to insist on it much, that the exploitation of an oil well produces a monetary income to its owners, whose origin can only be associated with the possession of the oil well.

Another typical example that will allow us to understand very well the difference between a consumer good and a capital good is the possession of a house. A house is a good that is produced, sold and bought to be consumed like any other good or merchandise, even if it takes a long time to be consumed. Housing is made up of the aggregation of many goods, as happens with many other consumer goods, from the pipes through which the water runs, the doors and accesses that allow entry into the house, to the furniture with which it is essential to equip it to make it habitable. In addition, its function is to provide the "service of habitability" when it is used, so it can be considered without problems as a "consumer good" that satisfies the need to provide shelter and roof to the people who use it. Moreover, it is normal for a house to be inhabited by its owner, so a house seems to have all the qualities that we attribute to a consumer good, even if it takes many decades for a house to age and we can say that we have consumed it.

However, we also know that a house can be used to rent it to other people and obtain a monetary rent from it. A use which its owner is not obliged to give it, but which, according to the definition we have given of capital goods, turns the house into a capital good even if it is not used for the purpose of obtaining an income from it.

What then is a house? Is it a consumer good or a capital good? We must be very clear that housing is always, even when it is inhabited by its owner or remains empty without even being rented, a capital good.

Why is a house that is not being rented a capital good if no rent is being obtained from it? Because the house acquires its price from the fact that it generates a rent when it is rented. A house gets its price from the possibility that whoever owns it has of obtaining an income from it when he rents it, and not from the fact of whether or not he is obtaining an income from it. This is the reason, and there is no other, why we have required capital goods to be able to produce a rent, because their market price comes from that possibility. In this sense, the price of a house does not depend on whether or not you rent it.

HOUSING IS A CAPITAL GOOD. A dwelling can be considered as a company that gives the service of habitability to the people living in it. What people are buying with the payment of the rent is a consumer good, "habitability", but housing is not the consumer good that is bought with the rent, but "the company" that is producing the consumer good that you pay for with the rent. You build housing to produce a consumer good, "habitability". Housing, seen in this way, is an enterprise that produces income and, therefore, is a capital good.

Although the two examples above, an oil well and a house, are not strictly what is meant by a business, they do make it very clear that it is the fact that they are goods that can produce an income that differentiates them from a car, a sandwich or watching a movie.

3. MONEY AS A CAPITAL GOOD

Our next step, now that we know that goods that produce rents exist, is to find out how they are priced in the Capital Market only according to the amount of rents they produce, and without falling into the easy temptation of assigning them a price according to the possible physical cost of manufacturing each one of the capital goods.

The only way to give a price to the numerous and heterogeneous set of capital goods existing in a monetary economy is to compare them with a single capital good whose price is known and which is used as a numeraire. This is the same thing which is done with money when it is used to give a price to consumer goods, so that they can be compared one with

the other. Even when money has no intrinsic value because it is fiat money, consumer goods still acquire a relative "price" from their exchange for money in the Consumer Market.

As the essential characteristic of a capital good is to produce an income, the universal capital good we are looking for must also have the capacity to produce an income. As it is used in the Capital Market to give a monetary price to capital goods, it is necessary that the universal good we are looking for also has a definite and stable monetary price. Fortunately for all of us, we do not have to look far to find in the Capital Market a good which fulfils these two essential requirements we have mentioned: therefore, to be able to give a price to each capital good, considering only the rent they produce, we must find a universal capital good which has a definite monetary price, which produces rents and which is exchanged in a generic way with the different capital goods existing in the Capital Market.

> *"Money is a capital good whose price is itself and which produces an income when it is lent out: the rate of interest."*

Everyone knows that whoever needs money can borrow it from a bank in exchange for paying an interest rate for the borrowed money. As long as the money is not paid back, the bank will receive an annual income in exchange for the borrowed money, which is what the interest rate indicates. Banks also usually pay us a small income when we give up our money and temporarily give it up as a deposit. Of course, everyone knows that the two interest rates, the one the bank charges for the money it lends and the one the bank charges for the money it borrows, are different.

Although the reason why a rent, or interest, is paid when money is lent has been interpreted in many and varied ways throughout the history of economics, what we are interested in pointing out here is that, thanks to the existence of interest, lending money can be interpreted by whoever grants it as the purchase of a capital good, whose price is the amount of money that is lent and whose rent is the annual interest or income it produces while the money is lent.

Precisely, the "annual interest rate" or "interest" is defined as the percentage of the borrowed money that is received annually as income when the money is lent.

MONEY AS A CAPITAL GOOD. Money is a capital good because it has the capacity to produce an income when it is lent, and its price as a capital good is itself:

$$income\ flow = interest\ rate \cdot borrowed\ money$$

$$r = i \cdot d \qquad \begin{cases} r \rightarrow flow\ of\ rent \\ i \rightarrow interest\ rate \\ d \rightarrow borrowed\ money \end{cases}$$

The identification of the money given in loan with the fictitious purchase of a capital good, the debt, whose price is the amount of money we give in loan and whose rent is the flow of money associated to the interest rate we receive in exchange, will allow us to use the loan as the reference capital good with which to give a price to all the capital goods.

Economists usually consider the interest rate a constant without dimensions, which is not true, since the monetary income it produces is evidently a monetary flow and not a monetary stock. We must be careful with this, because in all the calculations made here, the interest rate will always have time dimensions^{-1}:

> *The interest rate relates a monetary stock, the amount of money that is lent, to a flow of money, the annual income that is received, so its dimensions are that of "time to the minus one".*

Let us observe that it is completely consistent to state that money is a capital good. It is also consistent to consider that the interest rate of money "i", the quotient between the income received and the amount of money lent, is a constant of the economy that does not change in time.

The identification of money with a capital good is a process that appears naturally in monetary economies and what we are doing here is simply stating this empirical fact, assuming it to be true and analyzing its consequences. The strange thing is that until now nobody seems to have explicitly pointed out this fact, except the English economist Joan Robinson, who always had very clear that to define capital goods it is necessary that there is a previous interest rate, alien to the productive process, which would allow escaping from the trap that associates capital with a physical accounting stock. The curious thing is to discover that Robinson was always right and, within the complex nature of money that we used as a universal standard of exchange in the Consumer Market is also that of being a capital good. The reading of Joan Robinson's work is proof of this.

4. THE FIRST LAW OF CAPITAL OR FIRST ROBINSON'S LAW

Although lending is not usually thought of in this way, we have formally identified the act of lending money with the acquisition, or purchase, of a capital good whose income is

proportional to the interest rate of the loan and whose price is the amount of money being lent:

$$r = i \cdot d \qquad \begin{cases} r \rightarrow flow\ of\ rent \\ i \rightarrow interest\ rate \\ d \rightarrow borrowed\ money \end{cases}$$

Seen in this way, it is easy to understand why money can be used as a reference or standard to assign a price to other capital goods and compare them with each other according to the rents they produce.

The way to proceed is to compare the income produced by any capital good with the income produced by a loan. When both rents are equal we can suspect that the prices of both forms of capital, although of a very different nature, are equivalent and have the same book value. When we provisionally validate this supposition, and accept that the price of any capital good is equal to the amount of money it is necessary to lend to receive the same rent it produces, then the price of any capital good would be given by the same expression that links money with the rent it produces when it is lent:

$$price_{capital} = \frac{income_{capital}}{i}$$

> *"When the rent obtained for lending a quantity of money is the same as that obtained for the possession of a capital good it may be suspected that both forms of capital, however different in nature, have the same price in the Capital Market, it being indifferent in accounting terms to possess one form of capital or to possess the other form of capital."*

But this natural way of proceeding, which allows us to price capital goods solely on the basis of the rent they produce, regardless of the nature and origin of the rent, runs up against a serious empirical difficulty. It can be seen in the Capital Market that the price at which the different capital goods are bought or sold is not equal to the amount of money it is necessary to lend in order to produce an income equal to that which they produce. On the contrary, what we observe in the Capital Market is that the price at which each of the capital goods is bought and sold is, in general, lower than its equivalent in money.

Or, in other words, it is necessary to define a new parameter associated to each capital good, uncertainty, in order to generalize the expression linking the rent of money given in loan with its value. $\aleph_j$ in order to generalize the expression that links the income of money given in loan with its value. An empirical observation that leads us to formulate the First Law of Capital or Robinson's First Law:

ROBINSON'S FIRST LAW. "In a monetary economy, the market price of any capital good is proportional to the amount of money it is necessary to lend to obtain the same income it produces, the constant of proportionality being what is called the "Uncertainty" of the capital good."

$$capital\_income = i \cdot Uncertainty \cdot capital\_price$$

$$\downarrow$$

$$k_j = \frac{r_j}{i \cdot \aleph_j} \qquad \begin{pmatrix} \aleph_j & \geq 0 \\ \aleph_{money} & = 1 \end{pmatrix} \qquad \rightarrow \begin{cases} r_j \rightarrow capital\ income \\ \aleph_j \rightarrow uncertainty \\ i \rightarrow interest\ rate \\ k_j \rightarrow capital\ price \end{cases}$$

The expression allows to determine the price of a capital good knowing the income it produces and its uncertainty.

Joan Violet Robinson was an English economist of the second half of the 20th century, very critical of the physical conception of capital propagated around the world by economists working for private universities in the United States. Her first contributions to economics were in the study of "imperfect competition", a concept that she herself developed in depth and that only after many decades of silence, began to appear in the textbooks of private universities in the U.S. without even mentioning it. Much more important was her contribution to the concept of "capital", identical to the one we have developed here and that even today, after more than 50 years, economists working for private universities in the USA continue to prevent its diffusion. By naming the first of the three laws of capital as Robinson's First Law, we only make a posthumous, belated and just recognition to one of the best economists of the twentieth century, whose ideas have been fundamental for the development of the authors' ideas.

The expression with which capital goods have been given a price is more general than that which has been used to define the loan of money as a capital good, and contains it. The value of uncertainty for money, as it cannot be otherwise, is worth "one":

$$k_j = \frac{r_j}{i \cdot \aleph_j} \qquad \xrightarrow{\aleph_{money}=1} \qquad k_{money} = \frac{r_{money}}{i}$$

Uncertainty $\aleph_j$ is an unknown parameter, characteristic of each capital good, which is postulated in the theory for empirical reasons, and which gives sense to the name of "law" we have used to define it. It is well understood that the expression with which uncertainty is postulated will only make sense insofar as it is:

a) A constant parameter.
b) That can be determined for each specific capital asset.
c) That it does not depend on the other usual variables of the economy.

In particular, for the "law" to make sense, the uncertainty parameter associated with any capital $\aleph_j$ associated with any given capital comes has to be independent of the rate of interest:

$$r_j = i \cdot \aleph_j \cdot k_j \qquad \rightarrow \qquad \aleph_j \neq f(i)$$

It is important to note that the Law of Capital is formally equivalent to the definition of γ_j the "rate of return on capital", or rate of profit, which is usually defined as the ratio of the income a capital good produces to the physical cost of producing it (there are other definitions):

$$rate\ of\ return\ on\ capital \equiv \qquad \gamma_j = \frac{income}{cost\ of\ capital} = i \cdot \aleph_j$$

Where, of course, the cost of capital is identified with the physical price of creating the capital good, which indicates the physical origin of the concept of capital.

Although both expressions are formally identical and seem to be saying the same thing, the truth is that each of them attributes a different nature to capital. Robinson's Law shows the financial nature of capital, and states that the market price of a capital good is a consequence of the rent it produces. In contrast, the rate of return on capital shows the physical nature of capital, and states that the rent is a consequence of the physical price of making the capital good. Both statements are completely different because both show a completely different nature of capital.

DAVID RICARDO AND KARL MARX. David Ricardo is perhaps, together with Karl Marx, the most influential economist of all times. He lived in England in the first half of the 19th century, just a few decades after the Independence of the USA and the French Revolution, when liberal ideas were spreading throughout Europe at the pace set by Napoleon's armies.

It is very important to understand that the liberalism of the time needed not only to delegitimize the hereditary origin of the monarchy's power, but above all it needed to delegitimize the origin of its economic power.

As Karl Marx would also do decades later when he published "Capital", David Ricardo published the "Treatise on Political Economy and Taxation" with the intention of demonstrating that the income on which the aristocracy of his time lived came from the possession of land, and its origin was almost always inherited. They are, therefore, incomes that are obtained without doing any work and without assuming any risk. On the contrary, the income obtained by entrepreneurs is obtained thanks to the investment of money to create new wealth that did not exist before, which supposes at least an economic risk that differentiates entrepreneurs in a very clear way from landowners.

Ricardo, in his Theory of Rent, is denouncing the social structure of his time and the real reason why liberalism arises. In his book, he differentiates three sources of income: rent, profit and wages. Rent is the income obtained from the possession of land. Profit is the income from the investment of money in productive assets or capital. And wages are the income from labour. But he hides very well, and leaves out of the division into three classes, the money-lenders who derive their income from interest from the lending of money.

Ricardo's great achievement was, therefore, ideological, when with the Theory of Differential Rent he managed to demonstrate in a very convincing way, that landowners obtain their income by owning land, which at that time was the main source of wealth. While the industrious businessman, who at that time was beginning to be associated with the nascent liberal bourgeoisie, obtains his income from investing his money in the creation of new means of production.

It is against this idyllic idea about the beneficial and productive investments of the capitalist bourgeoisie that Karl Marx tries to fight fifty years later, with much success or without any success, depending on who looks at it and how one looks at it, but ignoring both in their dialectic struggle that capital goods and their benefits, in little or nothing differ from the rent produced by the possession of land.

Does Robinson's First Law make sense?

It does make sense. The very existence of the Capital Market within the monetary economies as the place where capital goods are bought and sold fully confirms the concept of capital as we have defined it, since the basic function of the Capital Market is to determine what is the concrete value of the uncertainty associated with each one of the different forms of capital goods. $\aleph_j$ associated with each of the different forms that capital goods take.

5. THE SECOND LAW OF CAPITAL OR ROBINSON'S SECOND LAW

In the previous section we postulated, in the form of a microeconomic law, the existence of uncertainty in order to explain the market's different valuation of the income of different capital goods. $\aleph_j$ in order to explain the different valuation that the market makes of the income of the different capital goods. No one is unaware that there must be an analogous parameter, but associated to the whole economy, that allows us to know the

aggregate value of all the capital goods of an economy, knowing the aggregate rent they produce.

ROBINSON'S SECOND LAW: "In a monetary economy, the aggregate price of capital is that which makes the average rate of return on capital equal to the product of the rate of interest times the Uncertainty Factor. γ equal to the product of the interest rate times the Uncertainty Factor."

$$k_{capital} = \frac{r_{capital}}{\overline{\aleph} \cdot i} \qquad \leftrightarrow \quad \gamma = \overline{\aleph} \cdot i \qquad (2^{a}\ Law\ of\ Robinson)$$

It can be shown that the uncertainty factor is equal to the capital-weighted average of the uncertainties:

$$\overline{\aleph} = \frac{\sum \aleph_j \cdot k_j}{\sum k_j}$$

Robinson's Second Law is the macroeconomic version of Robinson's First Law. It introduces a new parameter, the Uncertainty Factor $\overline{\aleph}$by considering all the capital goods present in the economy as if they were a single capital good, and calculating the uncertainty associated with the total income it produces in the same way as we have done for each of the capital goods. Evidently, the sum is performed only on the capital goods that produce rents, although here we always assume that all the capital that exists in the economy is producing rents.

As with the first law, in order for the expression to make sense and be called a "law", the Uncertainty Factor $\overline{\aleph}$ that appears in the expression must be independent of the other economic variables. In particular, it must be independent of the interest rate:

$$r_{capital} = \overline{\aleph} \cdot i \cdot k_{capital} \qquad \rightarrow \qquad \overline{\aleph} \neq f(i)$$

But this is something that is fulfilled automatically, since the value of the Uncertainty Factor is deduced from the first law, and it is valid when it is valid. $\overline{\aleph}$ is deduced from the first law, and it is valid when the first law is valid. In fact, the second law will be valid when the first law is valid, since $\overline{\aleph}$ is equal to the weighted average of the uncertainties with respect to the value of the different capital goods:

$$r_j = i \cdot \aleph_j \cdot k_j \quad \rightarrow \begin{cases} k_{capital} = \sum k_j \\ r_{capital} = \sum r_j = \sum \aleph_j \cdot i \cdot k_j \end{cases} \xrightarrow{\overline{\aleph} = \frac{r_{capital}}{i \cdot k_{capital}}} \overline{\aleph} = \frac{\sum \aleph_j \cdot k_j}{\sum k_j}$$

It follows that the rate of return of the whole economy is equal:

$$\gamma = \frac{r_{capital}}{k_{capital}} = \overline{\aleph} \cdot \mathrm{i}$$

Recall that the product $\aleph_j \cdot \mathrm{i}$ is the rate of return γ_j of a generic capital good "j" according to Robinson's First Law (microeconomics), while the product $(\overline{\aleph} \cdot \mathrm{i})$ is the rate of return γ of all capital in the economy. It is correct, therefore, to formulate the above macroeconomic relationship as a law, Robinson's Second Law, although in reality, both the parameter $\overline{\aleph}$ and the law itself are a consequence of the first law and are deduced from it.

From the interpretation that we have given in the theory to the uncertainty of the capital goods $\aleph_j$ as the lack of knowledge about the future income flow, it is not difficult to demonstrate that, in general and in the real world in which we live, the value of the Uncertainty Factor $\overline{\aleph}$ must always be greater than or equal to "1", reflecting the belief that the rents created by the different forms in which capital currently exists will not be maintained in the future. This is what is expected to happen in an evolving economy, where part of the companies disappear to give way to new companies in a process of creative destruction similar to that described by the economist Schumpeter.

But this same interpretation of the parameter $\overline{\aleph}$ also leads us to suspect that there must be capital goods that are expected not only to maintain rents in the future, but also to increase them. These assets will have an uncertainty $\aleph_j$ less than "1" and are easily identifiable in the real economy in the houses built in the centres of the most important cities, and with other forms of real estate capital, such as office premises, also in the urban centres. Unsurprisingly, capital goods with an uncertainty value of less than "1" appear in speculative bubbles, so the parameter can be used without difficulty to detect their presence.

6. THE THIRD LAW OF CAPITAL OR PIKETTY'S LAW

A question that arises naturally from the exposition we are making on the financial nature of capital and its valuation in the market, is the one that concerns the evolution over time of the Uncertainty Factor that appears in Robinson's Second Law:

> *Towards what value does the Uncertainty Factor tend to be $\overline{\aleph}$ in an economy that does not change, or changes very slowly over time?*

It can be reasoned that, if the Uncertainty Factor is measuring the unknown future income produced by capital goods, then in a quasi-stationary, or slowly growing, economy, future income will also be very stable and change in value slowly, so that the Capital Market's

valuation of capital goods is likely to be about the same as the valuation of money being lent. In such a situation, the Uncertainty Factor $\overline{\aleph}$ of the economy should have a value close to and slightly above "1", indicating that there is no substantial difference between the money that is lent (money capital) and the rest of the different forms of capital:

$$\gamma = \frac{\alpha}{\beta} = \overline{\aleph} \cdot i \quad \xrightarrow{\overline{\aleph} \to 1} \quad \begin{cases} \gamma = i \\ \beta = \frac{\alpha}{i} \end{cases} \qquad \textit{(Economics without uncertainty)}$$

The reason for such an evolution is to be found in the very concept of uncertainty. If an economy is so predictable that we know when a capital good will stop giving rents and when a new capital good will start giving rents, it will be possible to diversify investments in such a way that the rent coincides with a rent produced by a capital good whose uncertainty is equal to "1". This is the inevitable conclusion to which the financial nature of capital and the interpretation of the uncertainty parameter we introduced when we stated Robinson's First and Second Laws, and which we are going to culminate now by formulating the Third Law of Capital or Piketty's Law:

PIKETTY'S LAW: In a monetary economy, stationary, and with no changes in production or distribution, the Uncertainty Factor of capital $\overline{\aleph}$ is worth "one":

$$\gamma = \mathrm{i} \quad \text{ó} \quad \overline{\aleph} = 1 \quad \text{ó} \quad \beta = \frac{\alpha}{\mathrm{i}} \qquad \textit{Piketty's Law}$$

Or, in another way: "In an economy without uncertainty the rate of return on aggregate capital is equal to the rate of interest on money."

As we have discussed, in a stationary or unchanging economy, there will be no reason why the rents of capital goods should be subject to future uncertainty, so that the uncertainty factor in the economy, like the uncertainty factor in the economy, will not be subject to future uncertainty. $\overline{\aleph}$ of the economy, as well as the uncertainty of the $\aleph_j$ of individual capital goods, should in such a case be slightly higher than "1".

Thomas Piketty's "Capital in the 21st Century".

It is interesting to note that Piketty also asks this same question about the future value of the aggregate capital of an economy in his publication, "Capital in the 21st Century", and, like us, answers the question by formulating a law. In his case, by formulating his "Second Fundamental Law of Capitalism", going deeper and deeper into the swampy conceptual trap that defines capital as a "countable asset":

...The second salient fact concerns the comparison between Europe and the United States. As expected, the shocks of the period 1914-1945 hit Europe much harder, so that the

capital/income ratio was lower there from the 1920s to the 1980s. Excluding this long period of war and its aftermath, however, we find that the capital/income ratio has always tended to be higher in Europe.

This was the case in the 19th and 20th centuries (when the capital-to-income ratio was 6 to 7 in Europe, compared to 4 to 5 in the United States) and again in the late 20th and early 21st centuries: private wealth in Europe again surpassed U.S. levels in the 1990s, and the capital-to-income ratio is now close to 6, compared to just over 4 in the United States.

These facts have not yet been explained. Why is the capital/income ratio at historical highs in Europe, and why should it be structurally higher in Europe than in the United States? What magical forces imply that a society's capital should be six or seven years of national income instead of three or four? Is there an equilibrium level of the capital/income ratio, and if so how is it determined? What are the consequences for the rate of return on capital, and for the relationship between it and the capital-labor division of national income? To answer these questions, I will begin by presenting the dynamic law that allows us to relate the capital/income ratio in an economy to its saving and its growth rate.

The second fundamental law of capitalism: β = s/g

In the long run, the ratio capital/income β is related in a simple and transparent way to the savings rate s and the growth rate g according to the following formula:

$$\beta = s/g$$

For example, if s = 12% and g = 2%, then, β= s/g = 600%.

In other words, if a country saves 12 percent of its national income each year, and the growth rate of its national income is 2 percent per year, for large times, the capital/income ratio will be 600 percent: the country will have accumulated capital equivalent to six years of national income.

Tomas Piketty, Capital in the 21st Century (2012)

It goes without saying, that if in the Madrid Theory we have tried to answer this and other questions about the valuation of capital goods, it has been only after reading Piketty's book, so the Third Law of Capital that we have formulated would never have been possible without the precedent created by Thomas Piketty in his work, where he asks the right questions, but fails to put forward a coherent Theory of Growth with which to answer them, which is what he needs to justify the relationship between savings and the valuation of capital that he has introduced with his second fundamental law.

Regardless of whether "the second fundamental law of capitalism" as Piketty formulates it, is true or not, and regardless of whether it can be more or less supported by the empirical data he presents in his book (something that is not at all clear to happen), it is very clear that the theory that Piketty exposes, is a theory of growth based, once again, on the physical nature of capital where the value of capital increases thanks to the accumulation of physical capital that buys savings:

To see that Piketty's theory of capital speaks of the physical nature of capital, let's assume an economy in which 12% of GDP is saved and invested in capital. If the value of GDP is 1,000 euros, 120 euros per year will be saved, and the physical increase in capital will be 120 euros per year, i.e., capital grows at 12% of *GDP*. But if *GDP* also grows, the race between accumulated capital and *GDP* growth will remain even only when its quotient β has the value of 6:

$$\frac{K + \Delta K}{PIB + \Delta PIB} = \frac{6120}{1020} = 6 = \beta$$

That is, in an economy growing at 2% per year, in which 12% of GDP is saved and which has a value of β value of less than 6, capital grows faster than *GDP* . Or again, in an economy that grows by 2% per year, in which 12% of GDP is saved and which has a value of β greater than 6, capital grows slower than *GDP*. Therefore, the parameter β tends to:

$$\beta_{t\to\infty} = \frac{s}{g}$$

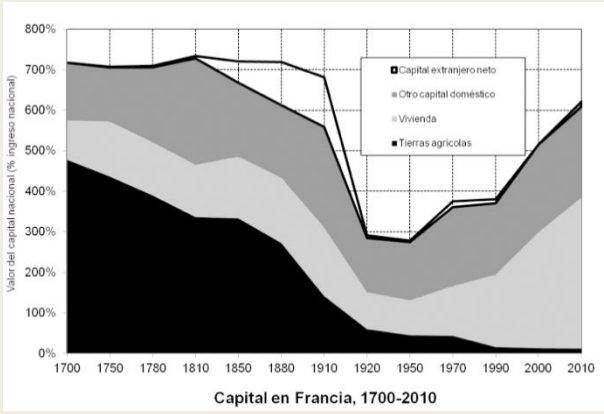
Piketty's idea is very brilliant, but only if the nature of capital is physical. In fact, it can be shown very easily that the law holds only if it also holds that *the rate of growth of an economy's capital is equal to its rate of saving,* which is not at all clear that it does.

Evidently, one must be careful not to fall into a tautology by identifying the increase of capital that individuals have with the increase of their savings, since in such a case it is evident that Piketty's second law is fulfilled. When Piketty speaks of saving he is referring to the money consumed in the purchase of physical capital goods (that is, to the goods consumed in the physical formation of firms). Strictly speaking it is money that is not spent in consumer goods but that is not saved either, so it is not at all clear how it can be measured, in fact, Piketty never shows a graph of how monetary saving evolves within the economy, so he cannot demonstrate empirically the validity of his second law.

PIKETTY'S PHYSICAL CAPITAL. Despite all the doubts that the physical nature of capital presents, the motivation that follows the whole book, and what we think is Piketty's central idea throughout "Capital in the 21st Century", is that the value of capital tends towards a constant value:

$$\beta_{t\to\infty} = \frac{s}{g}$$

This can be seen very well in the graph with which Piketty shows the evolution of β and in which it is easy to see that the parameter has remained unchanged for more than 200 years, which evidently indicates the presence of a law.



Capital en Francia, 1700-2010

Piketty thinks that he can easily justify the constant value of β equal to about 7 times GDP by associating a savings rate, also constant, of 14% of GDP. This is consistent with the flatness of the graph and allows to explain it very well.

Although then, as is logical, it is very difficult for him to find an explanation for the immense "hole" that appears throughout the twentieth century in the valuation of capital, using the same second law. Nevertheless, Piketty does make an extraordinary observation when he predicts that the value of aggregate capital relative to GDP is heading towards the value it had throughout the 18th and 19th centuries. In fact, it is the almost constant slope of the valuation of capital, when the economy comes out of the doldrums, that makes him believe that he is looking at a clear demonstration of the physical nature of capital.

The authors of this paper recognize that we would never have asked ourselves the question of what value aggregate capital tends to if we had not seen it formulated before in Thomas Piketty's book. Therefore, neither would we have ever tried to explain the evolution of the parameter β if we had not seen before the "Piketty's Hole" in the graph that appears in his book. Therefore, although we will soon see that it is very easy to explain from a financial point of view the changes observed in the graph of capital valuation, we have no doubt that the Third Law of Capital that we have formulated here, if it turns out to be true, has to be named "Piketty's Law":

$$\beta = \frac{\alpha}{i} \qquad \textit{Piketty's Law}$$

CHAPTER 8

FINANCIAL THEORY OF CAPITAL

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1. THE PARAMETERS ON WHICH THE CAPITAL DEPENDS

The three laws of capital tell us about the financial nature of capital and how capital goods are valued in the capital market, so it is necessary, first of all, to explain the meaning of the different parameters that appear in the three laws, their possible values and what they depend on. Only in this way will it be possible to verify the validity or falsity of the three laws.

In particular, it is necessary to explain in more detail what is the parameter of uncertainty, which is the interest rate and who sets it, the market or the monetary authorities? But it is also important to explain other parameters that do not appear implicitly in the laws, but that we can reasonably expect to influence the valuation of capital goods, such as inflation or taxes.

We are going to assess these issues.

2. THE MEANING OF THE UNCERTAINTY PARAMETER

From the beginning we have understood that the parameter which measures the uncertainty $\aleph_j$ must be closely linked to the probability that the monetary rent produced by each specific capital good will be maintained in the future. This is logical. If the price of a capital good comes from its capacity to produce an income, and the income is by

definition a flow of income which is maintained in time indefinitely, then it is logical to think that the greater the doubt we have about the amount of income in the future, the lower the price at which the capital good is currently sold and the greater the value of the uncertainty $\aleph_j$ that appears in Robinson's Law.

But, although this simple idea of uncertainty is very attractive, it should not be forgotten that capital goods are valued in the Capital Market by comparing them with the income that comes from the money that is lent, so that for arbitrage to take place it is necessary that any person who wishes to do so can request a loan at the current interest rate to be able to buy a capital good that he thinks is undervalued. Without this indispensable requirement, which is implicit in the financial nature of capital, it would be impossible to affirm the validity of Robinson's law and speak of a Capital Market where the law is fulfilled:

$$r_j = \aleph_j \cdot i \cdot k_j$$

Let's see why.

If we accept as true, that any person who asks for it can obtain a loan at the market interest rate to buy a capital good, then any person who thinks he will be able to pay back the interest and the principal with the income produced by a capital good, will ask for a loan and will buy that capital good. But this will happen when he thinks that the uncertainty factor of the capital good he buys with the loan is greater than "1", because otherwise he will have to put in extra money to pay back the loan. If we call k_j the price of the capital good:

$$\left.\begin{array}{ll} (income) \rightarrow & r_j = \aleph_j \cdot i \cdot k_j \\ (interests) \rightarrow & r_{money} = i \cdot k_j \end{array}\right\} \xrightarrow{\aleph_j > 1} \quad r_j > r_{money} \quad \rightarrow$$

$$r_j = r_{money} + \frac{principal}{n\ installments}$$

The expression tells us that the buyer of a capital good whose uncertainty is greater than "one" can use the income produced by the capital good to pay the interest on the loan and gradually repay the principal. r_j that the capital good produces to pay the interest on the loan and gradually repay the principal. In such a case, after some time, "the investor" will have repaid the loan and will still have the capital good.

Therefore, there must be a good reason for agents not to run out and ask for money on credit to buy capital goods whose uncertainty is greater than "1", which is almost all of them. And the reason is none other than that what is really indicating to the potential buyer an uncertainty $\aleph_j$ greater than "1" is that the income produced by the capital good will not be maintained long enough for him to repay the loan, which is the interpretation

we have given to uncertainty from the beginning. In fact, we can do some simple mathematical operations (which we will not do) and obtain the relationship between the uncertainty factor and the time during which the rent is expected to be maintained:

$$T = \frac{1}{(\aleph_j - 1) \cdot i}$$

Where T is the number of years during which the good will be kept giving an income, e i is the interest rate of money. The expression tells us that when the uncertainty is "1" the good will be maintained indefinitely giving rents, but the greater the uncertainty, the less time it will give rents.

But, the important thing to understand is that we can only be sure that the Capital Market is doing its job, when anyone who wants to can borrow at the market interest rate to buy capital goods, because only then, the uncertainty will be expressing the doubts that people have about the future of rents.

This is what happens when someone believes that a capital good has a real uncertainty that is below the value assigned to it by the market, who will try to buy it if he has access to credit. $\aleph_j$ that is below the value assigned to it by the market, that he will try to buy it if he has access to credit. And, he will do the opposite when he thinks, rightly or wrongly, that the uncertainty associated with some capital good he owns is above the value assigned to it by the market, that he will try to sell it to liquidate his savings and buy another capital good instead.

CAPITAL MARKET ARBITRAGE. From the point of view of the Capital Market, and provided that the agents participating in the economy have unlimited access to loans at the interest rate of money, we can be sure that the uncertainty of a capital good indicates the limit above which it will be advantageous to borrow to buy it, and below which it will be advantageous to sell it and lend the money. $\aleph_j$ *of a capital good indicates the limit above which it will be advantageous to borrow to buy it, and below which it will be advantageous to sell it and lend the money.*

The business of borrowing money to buy a capital good that is thought to be undervalued is known in economics as "leverage". It is a market mechanism that has a very bad reputation among left-wing economists (those who tend to hate financial markets) because they think that the profit obtained by the one who leverages himself does not come from the provision of any service, but from betting and gambling, which is completely wrong.

Unlike in the Consumer Market, where prices are set by sellers, in the Capital Market prices are set by buying and selling, so there needs to be sufficient "liquidity" for buying and selling to take place smoothly. Without liquidity it is not possible for capital goods to have their

real price because the leverage that allows arbitrage in the Capital Market cannot take place.

Of course, we are not defending speculation here, which can hardly ever be done without criminal control of the market, nor are we claiming that speculation is not harmful to the economy, but we must not forget that speculation and arbitrage are completely different things. It is precisely liquidity and the fact that anyone can borrow at the market interest rate that ensures that there is no speculation in the market.

Capital market liquidity, and therefore leverage, is vital to the capitalist economy.

3. THE INTEREST RATE OF MONEY

Since there is historical evidence of the presence of money in society, there seems to have existed along with it, the inevitable rate of interest that is claimed when money is lent. No one should be surprised then, that one of the greatest controversies in which economic theory has been involved since the dawn of time, is the inevitable question of the origin of the interest rate of money and what determines its value, without ever reaching a satisfactory answer that most economists accept as valid.

In the theory we are developing we have unequivocally identified "money" as the capital good used as a reference to give a price to the rest of capital goods thanks, precisely, to the rent it produces when it is lent. But this must not make us forget that we have not answered the question of why money produces rent when it is lent, nor have we said anything about who or what fixes its value.

Therefore, stating that the interest rate of money exists because there are goods that produce income, although it may be a very counter intuitive and almost tautological statement, the truth is that it is a very old idea that has been defended by almost all economists.

THE INTEREST RATE of money exists and is always positive, because with the money borrowed it is possible to buy capital goods that produce income. That is, the interest rate of money is positive because there are goods that produce income.

Let's start by giving an example to understand why the existence of rent makes it necessary to ask for interest on the money that is lent.

A house, as we all know, is a capital good that has a price and that the owner can rent in exchange for a rent. Let's imagine, specifying a little more, that the price of the house is 100,000 euros and that it can easily be rented in exchange for an annual rent of 5,000 euros, after removing expenses.

No one is unaware that, if a bank were to give us a loan of 100,000 euros to buy a house, with the only obligation to repay the 100,000 euros of the principal little by little, but without having to pay any interest on the money we have borrowed, we could buy the house and repay the principal of the loan without difficulty over a more or less long period of time, using only the income obtained from renting the house.

In the example, we see clearly that the existence of goods that produce rents forces the money that is lent to pay an interest, for the simple and silly reason that with the money that is lent you can buy goods that produce an income with which it is possible to pay back the principal of the loan without any problem. The existence of the interest at which they lend you the money, invariably spoils what otherwise would be a round business for people who have unlimited access to credit. We see with clear clarity that, effectively, interest exists because there are goods that produce rents.

Another way of explaining the same thing, and which surely allows to understand more easily the basic idea, is imagining a monetary economy in which there are no goods which produce rents, and showing why, in such a case, no interest should be asked when money is lent.

Let us imagine for a moment a monetary economy in which there are no income-producing goods, that is, there are no capital goods, but there is money. In such an economy, money can only be used to buy consumer goods, which leads us to ask ourselves, first of all, why anyone would want to save money. If we think about it a little, we will come to the conclusion that the only intention that someone who saves money in such an economy can have is to reduce his current consumption in order to increase it later, that is, he who saves is using money as a store of value to buy consumer goods in the future.

We must also ask ourselves about what a person's intention for borrowing might be. In an economy without capital goods, the only reason someone might borrow money is to increase his current consumption, at the cost of decreasing his future consumption when he has to pay back the loan money.

This situation is very curious, because we are facing an exchange of services between those who wish to advance consumption and those who wish to defer it. An exchange between those who save and those who spend on credit. In such a situation, it is very reasonable to suspect that the interest rate will be around zero, being negative when there are more people wanting to defer consumption, i.e., wanting to save, and being positive when there are more people wanting to advance consumption, i.e., wanting to spend on credit. In an

economy like the one described, when the flow of the expenditure that wants to defer equals the flow of the expenditure that wants to advance, the interest rate must be zero.

We see very clearly that in an economy in which capital goods cannot be purchased the interest rate is around zero, and will only be different from zero when the aggregate desire to save and the aggregate desire to spend differ (provided the legal system guarantees the repayment of loans, which is usually the case).

To sum up, if in real monetary economies the interest rate is positive, it is because whoever borrows money can use it to buy capital goods from which he expects to obtain an income with which he can pay back the principal of the loan. This is what we call leverage.

LEVERAGE. The mechanism of borrowing money to buy capital goods with the intention of paying it back with the income it produces is known as leverage. In general, leverage is frowned upon by some economists because they tend not to understand that it is through this mechanism that the price of different capital goods is arbitraged in the capital market.

How much is a capital good worth? How much is the income it produces worth? This can only be known when there are people who are willing to borrow at the market rate of interest to buy them. With such leveraged purchases, agents set the price of capital goods by fixing the uncertainty they attach to the rent they produce.

Specifically, in an economy in which any amount of money is freely available at the market rate of interest, a capital good that produces an income and has a price of r_j and which has a price k_j must have an associated uncertainty $\aleph_j$ that it is worth:

$$k_j = \frac{r_j}{\aleph_j \cdot i} \rightarrow \qquad \aleph_j = \frac{r_j}{k_j \cdot i} = \frac{r_j}{r_{money}}$$

Obviously, it is the interest rate of money that fixes the value of capital goods, but that is only possible to the extent that credit can be obtained in an unlimited way. Otherwise, when leverage cannot occur and there will be no arbitrage.

Who sets the value of the interest rate?

We can conclude that, in a monetary economy, not only does money have to be lent at a rate of interest greater than zero, but also access to credit has to be unlimited so that leverage can fix the value of capital goods. But who sets the value of the interest rate? Who decides what it is worth?

Evidently, fixing the interest rate of money at a specific value necessarily implies having the capacity to lend any amount of money requested at that interest rate. If this condition is not met, it makes no sense to speak of anyone fixing the interest rate of money. In that

sense, only commercial and investment banks have the legal privilege to create money out of nothing and lend it out, so they are the ones who set the interest rate of money when they grant credit. However, it is very clear that in deflationary crises the banking system runs out of liquidity and banks are unable to sustain the granting of credit without the help of the Central Bank, so it is not very clear that the banking system is really able to set the interest rate of money when it gives liquidity to the system.

WHAT INTEREST RATE? In today's monetary economies, it is the Central Bank which creates money out of nothing and lends it to commercial and investment banks at their request, at the "interbank interest rate" with a mechanism we will see later, when we analyze the "Banking System". But here we have called "interest rate" the price at which banks lend money when someone is going to buy a house or when a company wants to make an investment, and which is much higher than the interbank interest rate, so it seems that there are two interest rates in the economy, one used for consumer loans and investment, and the other used by the Central Bank to provide liquidity to the banking system. This is not true.

To complicate matters further, economists generally associate the interest rate of money with the interest rate paid by the government on its credits, treasury bonds, and set by commercial and investment banks when they lend money to the government.

As if the situation were not already complex enough, the current massive purchase of assets by the Central Bank in the Capital Market to provide liquidity to the economic system, alters the interest rate of treasury bonds in such a way that it is difficult to determine what the interest rate of money is, and who is setting it, the commercial and investment banks or the Central Bank.

However, here we have called "interest rate" the price at which money is lent to carry out the leverage in the Capital Market, which is not possible to identify with either of the two previous rates, because money is lent at a different interest rate according to who the debtor is and according to the creditworthiness attributed to him.

It is logical. A government borrowing 10 billion euros is not going to be charged the same interest rate as a private individual borrowing to buy a car. It would not make sense. Therefore, we cannot speak of a definite interest rate but of an interest rate ranging from the interbank interest rate to the onerous interest rate of credit cards.

We see that in the economy there is some confusion about what is meant by interest rate because there are different lenders and different access to different lenders. The confusion, therefore, has its origin in the privilege granted by the Central Bank to certain actors, such as private banks, to the detriment of other actors such as companies or individuals, without it being very clear that this differential treatment is really justified.

(see below for more on this topic, in relation to the liquidity of the Capital Market).

4. INFLATION AND THE VALUATION OF CAPITAL

In theory, "capital" has been identified with the valuation made by the Capital Market of the different income flows that occur in the economy, so it is important to know how the valuation changes when there is inflation within the economy. In particular, it is important to check if the concrete form that the three laws of capital have remains valid when the economy is inflationary, or on the contrary they suffer some change.

The economist who first worked in depth on the influence of inflation on the value of capital goods was the American Irving Fischer, whom we already know here from the constant that bears his name. Now we will limit ourselves to repeat very quickly some of the conclusions of his work, which is already more than 100 years old, without going into the details of how they are reached, but within the context of the formulation of the three laws of capital.

Inflation is defined in monetary economies as a generalized rise in the prices at which consumer goods are sold. In practice, since not all prices change in the same way or in the same proportion, the average rate of inflation is defined as the percentage change in the price of a "basket of goods" chosen for that purpose, in terms of the average price change. π as the percentage change in the price of a "basket of goods" chosen for that purpose, over a period of time, usually one year:

$$\pi \equiv inflation\ rate \quad \rightarrow \quad \pi = \frac{1}{p_{canasta}(t)} \frac{p_{canasta}(t + \Delta t) - p_{canasta}(t)}{\Delta t}$$

Since the variables used to describe the economy are not monetary stocks, but monetary flows, it is better to define inflation in reference to the expenditure necessary to purchase a standard flow of goods. In this way, inflation is the percentage by which the standard flow of expenditure that allows the purchase of the standard flow of goods changes annually. If we call $\varphi(t)$ to the flow of expenditure that allows the purchase of the standard flow of goods (the basic basket of goods), and if we call $\varphi(t + \Delta t)$ the flow of expenditure, which after a period of time Δtperiod, allows us to buy the same basket of goods, then:

$$\pi = \frac{1}{\varphi(t)} \frac{\varphi(t + \Delta t) - \varphi(t)}{\Delta t} \qquad \varphi(t) \equiv monetary\ flow$$

With this definition the inflation rate has time dimensions^{-1} (as it happens in the first expression), which can complicate our life a lot because in today's economy the inflation rate, the interest rate, the interest rate, the interest rate, the inflation rate, the interest rate, the interest rate, the interest rate, the interest rate, the interest rate, and the interest rate. $\pi$the interest rate i and the real interest rate i^o are considered dimensionless parameters that relate monetary stocks, although evidently they are not. This can be seen very well in "Fisher's equation" that relates the three parameters, where all of them are clearly dimensionless:

$$(1+i^o)=(1+\pi)(1+i) \qquad \begin{cases}\pi \rightarrow inflation\ rate\\ i \rightarrow interest\ rate\\ i^o \rightarrow real\ interest\ rate\end{cases}$$

We are not going to go into this problem of dimensions now, but to find out how Robinson's law changes when there is inflation. Let's clarify this a bit by comparing two economies, one with inflation and one without:

$$r_j = \aleph_j \cdot i \cdot k_j$$
$$r_j^o = \aleph_j \cdot i \cdot k_j^o$$

The first expression is Robinson's law in an economy in which there is inflation, while the second expression is the same law, but using the supra index zero to indicate that they are the variables in an economy without inflation. We assume that the rate of interest is the same in both economies, and that the uncertainty $\aleph_j$ that appears in the law depends neither on the interest rate nor on the inflation rate. What we are going to show is that this is only possible if, on average, both rents and the price of capital suffer the same inflation as consumer goods. Let's accept that this is true, and that income suffers the same inflation as consumer goods and let's take a generic good j:

$$r_j=(1+\pi)\cdot r_j^o \xrightarrow{r_j^o=\aleph_j\cdot i\cdot k_j^o} r_j=(1+\pi)\cdot \aleph_j\cdot i\cdot k_j^o \xrightarrow{r_j=\aleph_j\cdot i\cdot k_j} k_j=(1+\pi)\cdot k_j^o$$

We see that when capital suffers an inflation equal to the inflation suffered by rent, the expression of the 1st law is consistent and only depends on the nominal rate of interest, which is what we can expect to happen in an economy where rent comes from the profits obtained from the sale of consumer goods, so it will rise in nominal terms when these rise and fall in nominal terms when these fall. Therefore, we can expect an inflation in the valuation of capital, equal to the inflation suffered by the rest of consumer goods, which is consistent with the formulation of Robinson's law and is also consistent with the other two laws. According to the above, the uncertainty $\aleph_j$ of capital goods must also be independent of the inflation rate:

THE THREE LAWS OF CAPITAL

$$r_j = \aleph_j \cdot i \cdot k_j \qquad 1ª\ Law\ of\ Robinson$$

$$r_{capital} = \overline{\aleph} \cdot i \cdot k_{capital} \qquad 2ª\ Law\ of\ Robinson$$

$$\overline{\aleph} = 1 \quad \gamma = i \quad \beta = \frac{\alpha}{i} \qquad Law\ of\ Piketty$$

The formulation of the three laws of capital is independent of the rate of inflation, which is consistent with the statement that the value of capital goods changes nominally at the same rate at which consumer goods change, confirming the financial nature of capital.

5. EXPERIMENTAL VERIFICATION OF PIKETY'S LAW

Although, both the first law and the second law of Robinson are so logical that it seems impossible that they are not fulfilled, the truth is that the theory leaves undetermined the parameter of uncertainty $\aleph_j$ so it is always possible to choose the value of the parameter in such a way that both laws are fulfilled. However, the latter is not possible with the third law, which we have named Piketty's law, because in its statement the uncertainty parameter must be "1" for the law to be fulfilled:

$$\overline{\aleph}=1\ ,\quad \gamma=i\ ,\quad \beta=\alpha/i \qquad \text{Piketty's Law}$$

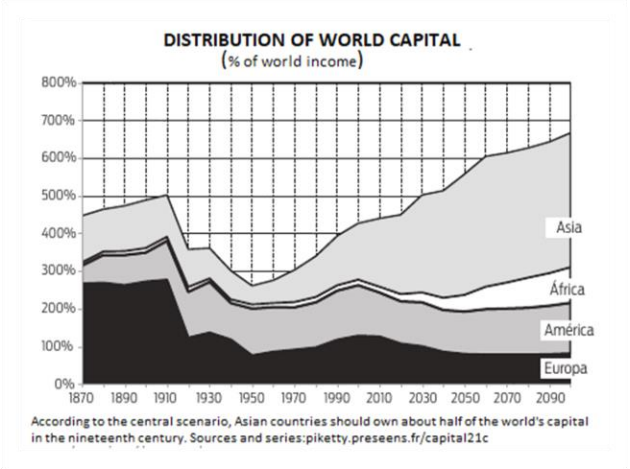
Each of the variables that appear in Piketty's formulation of the law can be determined experimentally, so it is easy to check whether the law is, or is not, valid. That is, you can check the value slightly above "1" that the theory predicts for the Uncertainty Factor when the economy is stationary, which should be the case most of the time in any economy.

The curious thing is that there is no problem in verifying it. The book written by Tomas Piketty that we have already mentioned several times here, "Capital in the 21st Century", is an excellent compendium in which all the information we have on the valuation of aggregate capital in the world's major economies over the last 300 years, specifically, from the French Revolution to the present day, is collected in a graphic way. Not only that, the book also includes the changes in the tax rate at which capital income and capital itself are taxed.

The reason Piketty collects this data is not only informative, since he needs it to try to justify the two fundamental laws of capitalism that he formulates in his book. In addition, he also needs the data to demonstrate that the decrease in the tax rate is the most likely origin of the growing inequality of income that almost all the economies of the world show, which makes Piketty's work very complete and invaluable. For example, the attached graph that

we have shown many times here is taken from Piketty's book. It shows the market value of aggregate capital as a percentage of *GDP over the* last 300 years in France, which is known as the parameter β.

The graph, which refers to the French economy, is not different from other graphs referring to other countries that appear in the book, but it is the one we are using here as a sample button to try to explain the changes in the valuation of capital that the economy has experienced over the last 300 years because it is the most complete and surely also the most accurate:



The great merit of Thomas Piketty, if it is possible to highlight one among the many merits that are treasured within "Capital in the 21st Century", is the graph that serves as a thread to explain the unstoppable increase that inequality has experienced during the last half century in our economies. In it he manages to synthesize, in a simple glance, the theoretical problem faced by economics as a science:

"The explain the sharp fall and subsequent slow recovery observed in the parameter β"

This is what we have called "Piketty's Hole", which in our opinion is more than enough reason to award him the Nobel Prize in Economics.

We will now explain what can be seen in the graph.

a) Piketty's Economics

The graph shows that during two long centuries, the eighteenth and nineteenth centuries, the valuation of capital remained constant and stable at around seven times the annual value of production in France, so that according to the financial nature of capital that we have just explained, the Uncertainty Factor $\overline{\aleph}$ which appears in Piketty's Law remained slightly above "1" throughout the whole period, the average rate of return on capital being very close to the rate of interest on capital in France. γ very close to the interest rate of money.

PIKETTY ECONOMY: We call Piketty economics an economy in which the rate of return on aggregate capital is equal to the rate of interest on money:

$$\gamma = i \qquad\qquad Piketty\ Economy$$

It is the type of economy to which, according to Piketty's Law, any stationary economy tends to tend.

For at least two centuries, the 18th and 19th centuries, the interest rate on government bonds, which we can identify with the interest rate on money, although they are not exactly the same thing, remained unchanged at around 4% or 5%, while the share of income in *GDP*, the parameter of the economy, averaged around 30% of GDP, as Piketty tells us in his book. α of the economy, was on average around 30% of GDP, according to Piketty in his book. In addition, we can see in the graph that the value of the aggregate capital of the economy remained constant at around 6 times the GDP, so it can be said that for two long centuries the world economy was a Piketty economy with an Uncertainty Factor slightly above "1":

$$\left.\begin{array}{l} \alpha = \dfrac{r_{capital}}{PIB} = 30\% \\ \beta = \dfrac{k_{capital}}{PIB} = 6 \end{array}\right\} \xrightarrow{\text{Pikety Economy } (\gamma=i)} \gamma = \frac{\alpha}{\beta} = \frac{30\%}{6} = 5\% = i$$

An economy without uncertainty in the income produced by capital goods might seem an impossible event in today's economies were it not for the empirical evidence provided by Piketty's work, and they are a very solid proof of the validity of the three laws of capital we have enunciated, but, above all, a very solid proof of the financial nature of capital.

b) Piketty's Hole

If the constancy of the parameter β during the eighteenth and nineteenth centuries that Piketty shows us confirms without any doubt the third law of capital, the same does not happen with the data showing the evolution of the parameter since the beginning of the twentieth century, which, on the contrary, seem to contradict it. If it is not at all clear what

could have caused the tremendous fall in the valuation of capital income at the beginning of the second decade of the twentieth century, it is even less clear why the valuation of capital has not yet reached, after a century, the stationary regime predicted by the third law.

We think that the abrupt fall in the valuation of capital and its prolongation for at least 20 years can almost certainly be explained by a combination of several causes, the first and most important of them being the banking panic that originated in the USA in 1907 and spread to all the economies of the world, and the second being the world war that broke out only a few years later. According to the chronicles of the early twentieth century, a severe banking crisis hit the banking system in the USA in 1907 and, although it was apparently solved thanks to the energetic intervention of the banker J.P. Morgan and the subsequent creation of the Federal Reserve, everything leads us to suspect that it affected the world economy to the point of giving rise, just a few years later, to the First World War in 1914.

In addition to these two "obvious" causes, we can add a third cause that undoubtedly aggravated the problem, which was the fall in income from the capital coming from the colonies that the Europeans, and especially the French, had invested all over the world.

What is not so easy to explain is the reason why the low valuation of incomes lasted in France throughout the 1920s until it culminated in the great final crisis of 1929 which, only ten years later, gave way to the Second World War. The three disastrous decades, that of the First World War, that of the "happy twenties" and that of the "fascist thirties", are the floor of the hole that can be seen in the graph and that it is necessary to justify from the point of view of the financial theory of capital.

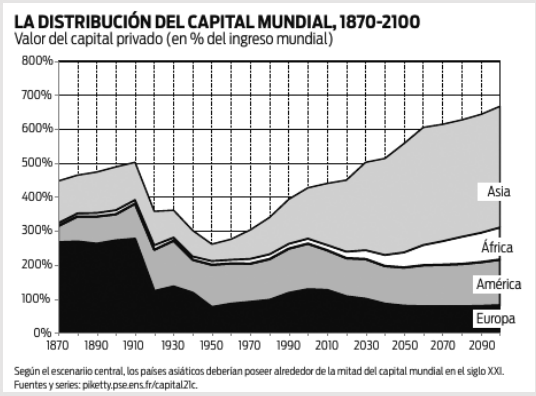
Since the first great war did not destroy appreciably the physical capital of any of the belligerent countries, and as Piketty comments in his work, the war alone cannot explain the fall in the valuation of capital goods, there must be a financial explanation for what is observed. Something very different happened years later during the Second World War, in which both Russia and the whole of central Europe were completely devastated. Even France and the United Kingdom suffered appreciable damage.

The graph shows that, only very slowly and only after almost a century has elapsed, the value of capital measured in terms of *GDP, the* parameter βseems to approach the theoretical value predicted by the Third Law. Precisely, Piketty formulates in his book the "Second Fundamental Law of Capital" to explain the almost constant slope shown by the graph during these last 80 years:

$$\beta \approx \frac{s}{g} \qquad \rightarrow \begin{cases} s \equiv saving\ rate \\ g \equiv growth\ rate \end{cases}$$

And he predicts that it will not be until the end of the 21st century that continued savings of 10% of *GDP* and an average growth of 1.5% will accumulate enough physical capital for the economy to return to a situation similar to that of the 18th and 19th centuries.

$$\beta_{t\to\infty} = \frac{10\%}{1{,}5\%} = 7$$



"The more interesting question is that of the extrapolation of this curve into the future. Here I have used the population and economic growth forecasts presented in Chapter 2, according to which world output will gradually decline from the current 3 percent per year to only 1.5 percent in the second half of the twenty-first century. I also assume that the savings rate will stabilize at around 10 percent in the long run.

Under these assumptions, the dynamics β=s/g implies that the global capital-to-income ratio will logically continue to rise and could approach 700 percent before the end of the twenty-first century, i.e., roughly the level observed in Europe from the eighteenth century to the Belle Époque. In other words, by 2100, the entire planet could resemble Europe at the turn of the 20th century, at least in terms of capital intensity. Obviously, this is only one possibility among others. As noted, these growth predictions are very uncertain, as is the prediction of the savings rate. These extrapolations are nevertheless plausible and valuable as a way of illustrating the crucial role of the growth slowdown in capital accumulation."

Tomas Piketty, Capital in the 21st Century (2012)

We see, once again, that Thomas Piketty thinks all the time of capital as an "accounting asset" that accumulates thanks to savings, and not as the financial valuation of the income produced by the physical "reality" of production. Specifically, Piketty's prediction is based on the assumption that the value accumulated by savings is equal to the growth of capital,

which seems to corroborate the evolution of the last 80 years in the industrialized countries:

$$\left.\begin{array}{r} ahorro \equiv 15\% \cdot PIB \\ \Delta capital \equiv 3\% \cdot \beta \cdot PIB \end{array}\right\} \rightarrow savings = \Delta capital \rightarrow \beta \sim 5$$

With the data assumed by Piketty, capital increases, on average, in the value of GDP every 40 years, which gives much credibility to the belief that savings is the origin of the physical accumulation of capital, since the accumulated savings in the 80 years since the end of the Second World War coincides with the increase observed in the aggregate capital, which has gone from being about 4 times the GDP when the war ended, to have at present the value of about 6 times the GDP.

However, we know that, from the point of view of the third law, the value of capital has a ceiling that is reached when the economy enters a stationary regime, no matter what the value of growth is and no matter how much is saved (as long as we do not enter into the tautology of defining saving as the increase of capital):

$$stationary\ economy \leftrightarrow \quad \beta = \frac{\alpha}{i} \qquad\qquad (Law\ of\ Piketty)$$

If the upward slope shown by the value of capital over the last 80 years seems to support the nature of the physical accumulation of capital that Piketty defends, the opposite is true for the prediction based on the financial nature of capital that we are defending here.

When we assume, as we are doing here, a share of rents in *GDP*, (the parameter α), around 30% of *GDP*, and a money interest rate of around 4%, it does not seem at all easy to justify why, contrary to what the third law of capital predicts, the economy is approaching so slowly the concrete value of about 6 or 7 times the value of *GDP*:

$$\left.\begin{array}{l} \alpha = \dfrac{r_{capital}}{PIB} = 30\% \\ i = 4\% \end{array}\right\} \xrightarrow{Piketty\ \ Economy\ (\gamma = i)} \beta = \frac{k_{capital}}{PIB} = \frac{\alpha}{i} = \frac{30\%}{4\%}$$

$$\cong 7\ times\ the\ GDP$$

In fact, our problem is to explain why the prediction has not already been fulfilled, and the value of capital has not reached six or seven times the value of *GDP* decades ago.

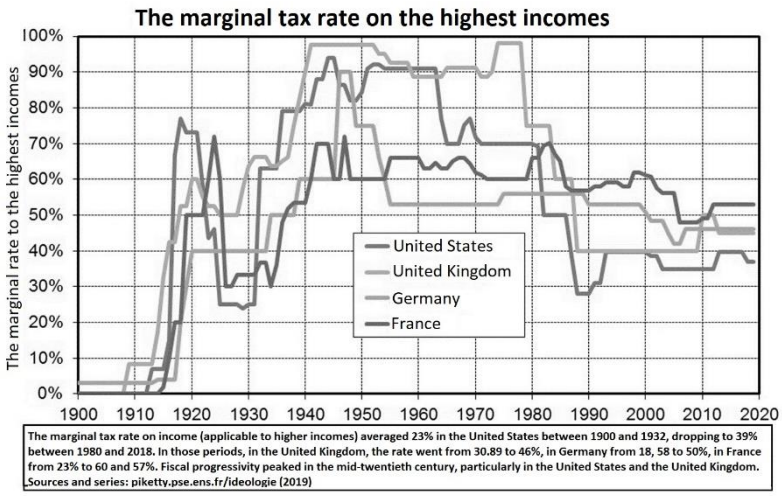
c) Marginal tax on capital income.

Unless we judge the post-war economies to be very unstable, which clearly contradicts the name "the glorious thirty years" by which the three decades after the Second World War are known, there seems to be no justification for the failure to reach the Piketty ceiling predicted by the third law. Of course, one can assume a high value for the uncertainty factor in the second law of capital. $\overline{\aleph}$ that appears in the second law of capital and justify, in this way, the low value of parameter βbut that seems a very unscientific attitude:

$$\gamma = \overline{\aleph} \cdot i \xrightarrow{i=5\% \quad \gamma \sim 8\%} \overline{\aleph} \cong 1{,}6$$

A value so far from "1", in the case of the French economy (and any other economy of the time), is at odds with the stability and growth observed in the post-war period and simply contradicts the third law. All the more so when one realises that most of the companies and large fortunes that were born and grew in those thirty glorious years are in excellent economic health today. It is impossible to think that after 80 years, the stationary regime has not yet been reached.

The discrepancy that we find between the prediction of the theory and the low valuation that during the whole second half of the twentieth century the market makes of the income produced by capital is easy to explain when we take into account a factor that we have overlooked in all the previous analysis: "*the taxes on capital that were introduced, precisely, from the second decade of the twentieth century".*



In the attached graph, also taken from Piketty's book, we can see that it was precisely at the beginning of the second decade of the twentieth century when the growing public spending began to be financed by a sharp rise in the marginal rate on income from capital

income and its inheritance. It is very well observed that the different taxes on capital income reached their peak in the 60s and 70s of the last century in the main economies of the world, decreasing gradually thereafter in all of them to levels similar to those existing in the so-called happy 20s, maintaining an inverse correlation with the evolution of the parameter βwhich began to grow almost steadily after the post-war period.

In view of the data shown in the graph, and given the inverse correlation that seems to exist between the marginal rates on capital and the value of capital, it is inevitable to wonder about the role of taxes in the valuation of capital income, and if they are not the missing piece in this puzzle about the evolution of capital, which will explain the discordance that we observe between theory and practice. βwhich will explain the discordance that we observe between theory and practice.

Recall that Robinson's law, expressed through the parameters α y βparameters, states that the value of aggregate capital depends on the share of *GDP* devoted to income, the parameter α:

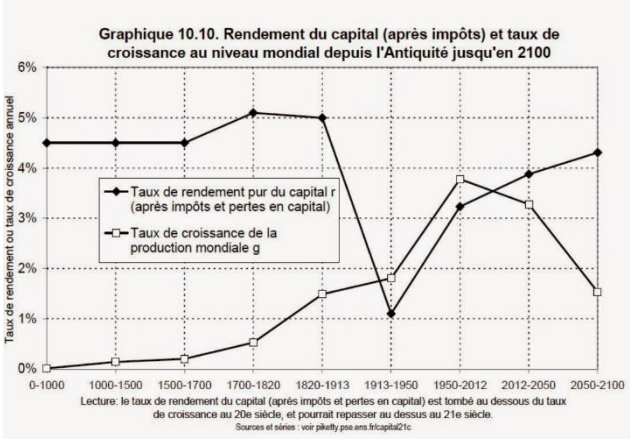
$$k_{capital} = \frac{r_{capital}}{\overline{\aleph} \cdot i} \quad \leftrightarrow \quad \beta = \frac{\alpha}{\overline{\aleph} \cdot i} \qquad 2^{\underline{a}}\, Law\ of\ Robinson$$

But the parameter α divides national income into two parts, the part that goes to pay wages and the part that goes to pay capital income, leaving out of the distribution the money allocated to public spending, which makes a lot of sense in aggregate terms, since the service provided by the "government" is to workers and companies, but it makes no sense in microeconomic terms, since the public sector captures through taxes an important part of the income produced by companies and workers' income, although it is not finally reflected in the *GDP,* which is distributed only in income from work and in income.

For all these reasons, it is necessary to calculate the parameter α which measures the share of capital income in *GDP,* after paying taxes and not before, since, from a purely economic point of view, taxes are a necessary expense to carry out the economic activity of any company and, like wages, they are not part of the income produced by the capital good and should not be counted as such.

This is much better understood when we remember that the valuation of uncertainty, and therefore of the valuation of any capital good, is carried out by arbitrage through leverage. $\aleph_j$ and, therefore, of the valuation of any capital good, is carried out by arbitrage through leverage. It is very clear that, when a capital good is bought with money that is borrowed, the income that will allow repaying the debt is the income that remains after paying taxes. If taxes are not taken into account as an additional expense, the buyer will probably find that he will not be able to repay the loan.

The luck we have is that Piketty has also done in "Capital in the XXI century" an extraordinary work of data collection on this issue of the tax rate, and despite the precautions with which he recommends us to use them, the truth is that it greatly facilitates the justification and defense of the thesis on the cause of the apparent lack of agreement between the third law and the reality that we observe, and that is none other than *"the effect of taxes on the valuation of capital*".



When we look at Piketty's curve showing the evolution of the after-tax rate of return on capital, we see that it is exactly the same as the curve showing the valuation of aggregate capital as a percentage of *GDP* over the last three hundred years. So, if in the expression of the three laws of capital we use the after-tax return to capital $\langle\alpha\rangle$which is the correct one, instead of the income before taxes α:

$$\beta = \frac{\langle\alpha\rangle}{\overline{\aleph} \cdot i} \qquad\qquad \langle\alpha\rangle \rightarrow after\ tax\ income$$

We find that uncertainty has been almost equal to "1" for almost the entire 20th century, and Piketty's Law has been almost always being fulfilled during the last 300 years, as it could not be otherwise. Except for the two world wars and the two long credit crises that preceded them, one can safely say that the most developed economies have been growing stably almost all the time. In other words, the uncertainty parameter $\overline{\aleph}$ has been slightly higher than "1" from the end of World War II to the present day, as Piketty's Law states and was foreseeable.

We can verify this very easily by normalizing the rate of return on capital to the value it had during the 18th and 19th centuries, which was 5%, and also normalizing the value of capital to the value it had during that same period, which was about 7 times *GDP*:

$$\overline{\aleph} = \frac{\langle \alpha \rangle}{\beta \cdot i} \qquad \xrightarrow{\langle \alpha \rangle = 7 \cdot PIB \cdot \langle \gamma \rangle} \qquad \overline{\aleph} = \frac{\frac{\langle \gamma \rangle}{i}}{\frac{\beta}{7PIB}} \approx 1$$

When we make the quotient between the two normalized variables, that of the rate of return and that of the value of capital, it is easy to verify that their quotient remained very close to "1" during the last 300 years. Hardly refutable proof of the financial nature of capital, and of course of Piketty's Law that we have enunciated.

THE THREE LAWS OF CAPITAL

$$k_j = \frac{\langle r_j \rangle}{\aleph_j \cdot i} \qquad 1^{\underline{a}}\ Law\ of\ Robinson$$

$$\beta = \frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i} \qquad 2^{\underline{a}}\ Law\ of\ Robinson$$

$$\overline{\aleph} = 1 \qquad \gamma = i \qquad \beta = \frac{\langle \alpha \rangle}{i} \qquad Law\ of\ Piketty$$

Wherein $\langle r_j \rangle$ y $\langle \alpha \rangle$ are, respectively, the income produced by each capital good and aggregate income as a percentage of GDP, both measured after taxes.

6. SAVINGS AND CAPITAL

We have shown, beyond any reasonable doubt, that there are two types of goods, those we buy to consume, which we call consumer goods, and those we buy because they produce income, which we call capital goods.

The essential characteristic of a monetary economy, which manifests itself in the obligation of any participant in the process of production and distribution to comply with an accounting equation which preserves the quantity of money, is what allows to distribute the productive surplus within society and what creates the income which turns any factory or means of production into a capital good, completely different from consumer goods:

$$rent \equiv \overbrace{B_i^{cap} = q_{ii}^{o} P_i - \sum_{j=1}^{n} q_{ij} P_j - B_i^{job}}^{accounting\ equation} > 0$$

The identification between business profit and rent, is the basis of the Financial Theory of Capital and what has allowed us to differentiate, without any possible mistake, the two different types of goods existing in the monetary economies, consumer goods and capital goods, and to find the mechanism used by the Capital Market to fix the price of the latter.

A very important point of the Financial Theory of Capital is the disconnection between capital and savings. Since capital is a valuation of an income, it does not have to be related to the savings made by society nor to the physical investment being made through savings. Although, it will be later when the Financial Theory of Growth is developed, it is not difficult to imagine that it is the existence of capital that is allowing saving and not the other way round, just remembering what the growth equation states:

$$\frac{dPIA}{dt} = -k_F \cdot Ah$$

The equation tells us that the growth of the IPA has nothing to do with the amount of money saved for investment, since it is only the spending of new money created that allows for growth.

$$\sum_i ah_i = Ah \neq 0 \quad \rightarrow \left\{ \begin{array}{l} ah_i > 0 \rightarrow \ saving \ \rightarrow \quad A = \sum_{ah_i > 0} ah_i \\ ah_i < 0 \rightarrow \ investment \rightarrow I = \sum_{ah_i < 0} ah_i \end{array} \right\} \rightarrow A + I \neq 0 \rightarrow$$

$$\rightarrow \frac{dPIA}{dt} \neq 0$$

We see that the amount of money saved has nothing to do with the amount of capital created in a monetary economy, since it is only the creation of money which increases capital in aggregate terms. On the contrary, it is saving which can cause a serious problem when it does not find capital to invest.

CHAPTER 9

THE CAPITAL MARKET

Clara Rojas García, Julia Rojas García, Pedro Rojas Sola
04 March of the year 2021

1. THE CAPITAL MARKET

Observing the economic reality that surrounds us, we postulated as the only logical possibility to explain it that the price of capital goods has its origin in the rent it produces for its owners, and not in the physical price of creating them (as is stated in the textbooks of economists working for private universities in the USA). That was the reason why we formulated Robinson's two Laws and introduced two new parameters that allowed us to give a price to capital goods: the interest rate of money *i*, as a common reference parameter of the whole economy and uncertainty $\aleph_j$ as a specific parameter of each capital good.

It escapes no one that we are doing all this logical-mathematical construction with the only intention of understanding the economic reality in which we live, so we can add little or nothing to what has already been stated on the nature of the uncertainty of capital $\aleph_j$ beyond trying to find traces of its existence. That is why it is very gratifying to see that there exists out there an immense specific market, the Capital Market, which at present has gigantic proportions and in which the uncertainty factor associated with the different capital goods and capital goods is valued with more or less success. $\aleph_j$ associated with the various capital goods and which, in shares of companies listed on the stock exchanges alone, currently has a price of more than 200 million million million euros.

Although the variety of capital goods is immense, covering goods as different as houses and patents, it is possible to classify them into four large groups according to the relationship they have with money:

a) The money supply.
b) Monetary capital.

c) Debt securities.
d) Capital goods

The money supply is what we understand by money, and at present it is almost entirely made up by credit money, made out of nothing by the banking system (bank deposits), and in a much smaller average by money in current currency and bank notes. Although serious doubts may be raised as to whether credit money is really a capital good, the truth is that it is, but with a nuance which we will explain later on.

Money capital, the second in the list, is also credit money and is no different from bank money, which is part of the money supply. It is hoarded money which has been extracted from the money supply and which is kept unused in the Capital Market.

The third form of capital is debt securities. This is what is normally understood as debt and always implies a commitment to repay an amount of money in the future. Debt securities should never be confused with the bank credit that can be contracted by the public sector or by the private sector with the banking system (this is what is traditionally understood as debt), and it should be understood that any debt security is equivalent to buying or holding a capital good, although there is a commitment to be repaid in money after a period of time. The reason, as we shall see below, is that the issue of a debt security does not imply the creation of credit money, as does the granting of a bank loan.

Therefore, a debt security is not money and can never be considered money because, as we shall see, it is only an indirect way of owning a capital good. The reason for the confusion comes from the fact that some debt securities, for example, government bonds, are perfect substitutes for money because the Central Bank exchanges them for money without any loss (at least this is what happens with the treasury securities of the most solvent countries), but it is clear that despite this they cannot be considered as money.

<u>THE DEBT</u>. By debt we understand the money owed to someone as a result of the granting of a loan. Part of the debt comes from the credit granted by the banking system, but it is by no means the most important part of the debt securities that exist in the market, which are mostly formed by the issuance of private debt securities.

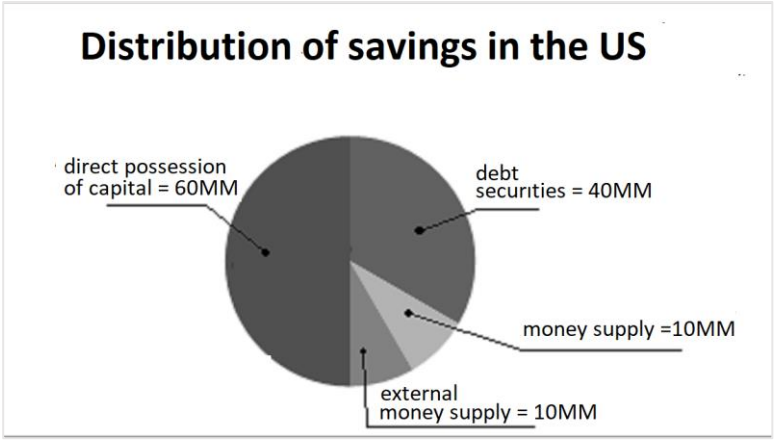
Commitments made by the issuance of debt securities cannot be considered debt, since it actually involves the indirect assignment of the equity asset backing the debt and, at all times, will be what is received in the event that the debt security is not recovered at maturity.

Technically, a debt security is equivalent to the object that a lender receives in exchange for a sum of money. The pawner can return the money and get the object back, but if the money is not returned, the pawnbroker keeps the pawned object. Therefore, whoever buys a debt

security must make sure that the capital asset backing it is of sufficient value to cover the debt.

The fourth form of capital is capital itself. This is what we identify with housing, property rights, various publicly traded assets, debt securities, bank money, and the many other assets that also fall into this category because they produce income or have the potential to produce income.

We know that the arbitrage of the Capital Market converts all capital goods into equivalents, and although the reason for the existence of capital goods is only physical, i.e., productive, the function capital has within a monetary economy goes beyond this, since it is the means used within the economy to conserve savings. We will have to wait for the exposition of the Financial Theory of Growth to know the relation between saving and capital goods. For now, it is enough to indicate how much saving (wealth) is conserved in each of the forms of capital we have named. We are going to choose a large country like the USA to show this, which will give us a very general and exact vision of the composition of the Capital Market:



The accompanying chart shows what proportion of wealth is held in each of the four forms of capital in the US and in the year of 2019:

$$\begin{array}{ll} capital\ goods & \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 120\ MM \\ debt\ securities & \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 40\ MM \\ bank\ money & \begin{cases} monetary\ capital \ldots\ldots\ldots\ldots\ldots\ldots\ldots 10\ MM \\ money\ supply \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 10\ MM \end{cases} \end{array}$$

Thus, the total value of wealth (the valuation of aggregate capital) in the U.S. amounts at the beginning of 2019 to about $120 trillion, of which about $60 MM, 50 percent, are retained through the direct possession of capital goods (land, homes, offices, businesses, assets, etc.),

while the rest is held indirectly in the form of debt securities. About 40 billion, or 33 percent of total savings, are debt securities on capital assets: corporate bonds, bank debt, treasury bonds, etc. Debt is only an indirect way of owning capital assets, since the interest paid on the debt comes from the income produced by the capital backing it (although this is not entirely true for student and consumer credit). The rest, about $20 billion, is bank money circulating in the economy, which in today's economies is bank money (at least it is in the US). About half of it, about $10 billion, 8 percent of all capital, is money that is not used to buy inside the US, while the other $10 billion is used to buy in international markets (the dollar is the reserve currency) so it is not hoarded money capital (although here we will consider it money capital to differentiate it from the money that forms the money supply inside the US). We see that little or no money is kept hoarded as money in the Capital Market.

(Bank money is not, nor can it ever be, a debt security, since it is not a debt for those who possess and use it, but it is formally a debt assumed by those who create it when they accept a credit. This invites credit money to be counted twice, once as someone's possession, and once as a debt title issued in favor of the bank that granted the credit).

THE CAPITAL MARKET. The gigantic Capital Market, in which capital goods are bought and sold, must never be confused with the much more modest Consumer Market, in which consumer goods are bought and sold, although the two markets seem to be entangled and it is very difficult to distinguish one from the other. The truth is that the nature of both markets is so different and both are so uncoupled one from the other that we can affirm that "the money with which one buys and sells in the Consumer Market is different from the money with which one sells and buys in the Capital Market".

This is the reason, and no other, why Fisher's constant seems to be so volatile and the monetary equation does not seem to hold:

$$k_F \cdot (M + MC) \neq PIA \qquad \begin{matrix} M = \ monetary\ mass \\ MC = monetary\ capital \end{matrix}$$

When we add up the money used in the Consumer Market (which forms the money supply) and the money hoarded as money capital, and we use it to calculate the money supply M of the economy, it is very evident that the monetary equation will not be fulfilled.

2. DIFFERENCE BETWEEN THE CAPITAL MARKET AND THE CONSUMER MARKET

Once we accept that there are two types of goods in monetary economies, then we must accept that the laws by which the Capital Market is governed to fix the prices of capital

goods are also very different from the laws by which the Consumer Market is governed to fix the prices of consumer goods. In fact, this is what we have been trying to show in the last few chapters. Let us list explicitly some of the many differences between the two markets:

1) The capital market is, first of all, the place where people save. Although capital as such has nothing to do with savings, nor does its growth have anything to do with the growth of savings, the fact is that people keep their wealth (what they save) in capital goods because the price of capital goods will be constant to the extent that the income it produces is constant. That is why, under normal conditions, people tend to keep very little money hoarded as money, because money tends to suffer inflation and lose its value, while this does not happen to capital goods.

2) It can be said that there are two different kinds of money in the economy, that which is used to buy in the Consumer Market and which forms the money supply, and that which is used to hoard in the Capital Market and which forms the money capital. The two markets are so different and so strongly decoupled that it can be said that the money used in one market is different from the money used in the other market. Though this, of course, is only a figure of speech.

3) In the Consumer Market, Fisher's constant links a specific quantity of money *M* with the monetary flow generated by the purchase of goods, the *PIA*:

$$k_F \cdot M = PIA$$

In the Capital Market, on the contrary, no concrete quantity of money is needed to maintain the flow of purchase of capital goods, and there is therefore no equation equivalent to the monetary equation. Monetary capital is just another capital good, and in this sense, the Capital Market functions as a barter economy. This is the reason, as we have already said, why the total quantity of money in the economy, the sum of the monetary mass M and the monetary capital MC, does not fulfil the monetary equation:

$$k_F \cdot (M + MC) \neq PIA \qquad amount\ of\ money = M + MC$$

This does not prevent the monetary equation from being true when only monetary mass M is used in the expression.

4) As for how the prices of different goods are determined, one market is also very different from another. At the microeconomic level, the equation that governs the Capital Market and gives value to capital goods is Robinson's 1st law:

$$r_j = \mathrm{i} \cdot \aleph_j \cdot k_j$$

Whereas it is profits that determine the price of goods in the Consumer Market (the Principle of Asymmetry):

$$\boldsymbol{P = (Q^o - Q)^{-1} \cdot B}$$

The same can be said of the difference in the way average prices are set in both markets at the macroeconomic level. Thus, the Closing Equation is in charge of assigning an average price to all goods consumed in an economy:

$$\bar{p} \cdot \bar{q} = PIA$$

Wherein $\bar{q}$ y $\bar{p}$ are the average value of prices and the average quantity of goods consumed. Whereas it is Robinson's 2nd Law that tells us the aggregate price of all capital goods that exist in the economy:

$$K = \frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i} PIB \qquad\qquad 2^{\underline{a}}\ Law\ of\ Robinson$$

Both markets, the one for capital goods and the one for consumer goods, are very different and are used for different things, being their double existence the essential feature of the money economy, which has nothing to do with a barter economy.

Perhaps the best way to understand the essential difference between mass money and money capital money is to show two processes of the real economy in which both forms of money are clearly differentiated:

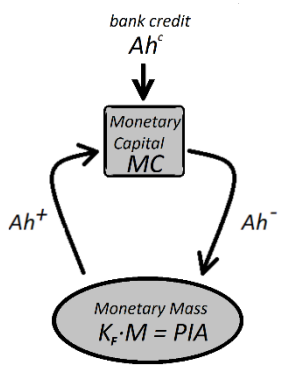
a) Quantitative *easing*.

The economic mismatch between the Consumer Market and the Capital Market explains very well why after the deflation of 2008, the immense amount of money spent by the Federal Reserve on buying assets of all kinds has not produced any inflation in the US (more than 4 trillion dollars were created out of thin air and spent by the Federal Reserve between 2009 and 1012). When one accepts that all the money spent on asset purchases tends to stay mostly within the Capital Market as money capital, without ever being spent in the Consumer Market, then one can understand very well why no inflation appears.

Although the cause that originates and maintains an inflationary process is very diverse, an increase in the monetary mass without an equal increase in real production always has as a consequence an increase in prices. Although this is by no means the only cause that produces price inflation, nor is it the most frequent, it is a very clear consequence of the Growth Equation, so it is impossible that the more than 4 trillion that the Federal Reserve

created and spent in the purchase of assets, could have been spent in the Consumer Market. Not even a small part of that amount has been able to become part of the money supply, and that is the reason for the lack of inflation:

> *"The money injected by the Federal Reserve has either remained hoarded as monetary capital in the Capital Market, or has replaced the money destroyed by the repayment of bank credit."*



Creation of Monetary Capital

The attached figure can help us understand the process and the difference between the money used in each of the markets. It shows that the only connection between the Consumption Market and the Capital Market takes place through the flows of savings and savings of the agents that participate in the economy, however, the purchase of assets made by the Central Bank with money created out of nothing, occurs within the Capital Market. It is part of the flow Ah^C and it does not have to change the amount of money in the money supply, which is what can affect inflation. What has happened is that savers have exchanged the dubious assets they hold for money in fear of a general fall in their price, but without any intention of spending the money on consumer goods (in aggregate terms). This is why the huge injection of over $4 trillion into buying stocks of all kinds starting in 2008 has had virtually no influence on the prices of consumer goods, because savers have no intention of spending their wealth, which they now hold in money and not in assets.

Of course, some of the money injected by the Federal Reserve has ended up replacing the bank money destroyed by credit repayment, but it has never been spent in the Consumer Market. When we develop the Financial Theory of Growth and understand the nature of credit money we can also understand what it really means that the money that is used in the Consumer Market and the Capital Market does not easily convert into each other.

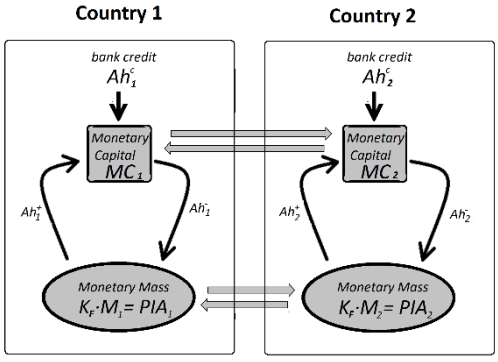
b) <u>The international balance of payments</u>

Another place where we can appreciate very well the immense difference existing between the money of the monetary mass and the money kept in monetary capital can be seen in the exchange problems originated by trade between countries which work with different currencies.

While the decoupling between the Capital Market and the Consumer Market of each country continues to depend only on the flow of savings and dissaving which change slowly, the same does not happen with the monetary flows between the capital markets of both countries, which change rapidly to the extent that the free circulation of capital is allowed. The same happens with the exchange flow of buying and selling between the Consumer Markets of each of the countries, when we suppose there are legal limitations, although their changes, as it is logical, are slow (the figure below describes the real situation in which the exchange flows between the two markets appear).

Let's analyze the situation, considering trade between two countries as a single economy divided between two sectors, with the added difficulty that the currencies of each country are different. To simplify the problem without losing realism, we will assume that:

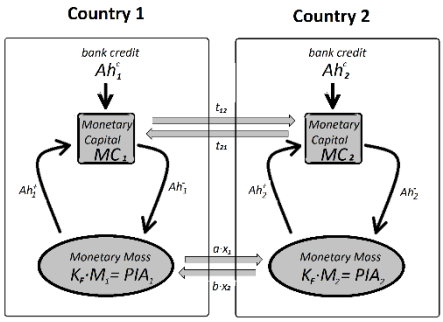
a) There is an exchange ratio between the two currencies.
b) There are two interbank interest rates, one for each country.
c) There is a non-deficit balance in the monetary flow of exchange between the two countries (the most important thing). That is, there is no accumulation of any amount of currency in either country. We know that the last assumption is very unrealistic in the real economy, where it is very difficult to find any country that does not accumulate foreign currency to stabilize the exchange rate of its currency. However, it is easy to conclude that any accumulation of foreign currency, no matter how large it is, will not be able to avoid for a long time the permanent imbalance between currencies, so imposing the condition of equality in the exchange currency flows (equilibrium) is a necessary imposition to know



Trade between countries

where the difficulties appear that force equilibrium to be fulfilled.

We have already deduced in chapter 2, the basic equation that an economy divided into two sectors has to fulfil. Specifically, the set of two equations is as follows:



Balance of payments between countries

$$\frac{1}{k_F}\frac{dx_1}{dt} = -a\cdot x_1 + b\cdot x_2 - ah_1$$
$$\frac{1}{k_F}\frac{dx_2}{dt} = a\cdot x_1 - b\cdot x_2 - ah_2$$

(economy of two countries)

Where parameter "a" is the percentage of *IPA* spent by the first country on the second country, and "b" is the percentage of *IPA* spent by the second country on the first country. The variable x_1 y x_2 are the *IPA* of each of the countries (which we identify here with the expenditure), and the variables ah_1 y ah_2 are the net savings flows between the consumption and capital markets within each of the countries (recall that the equations have their equivalent equations expressed with *GDP*, just substitute the Fischer constant for the equivalent one for GDP). In other words:

$$a \cdot x_1 \rightarrow \textit{ expenditure of country 1 in country 2}$$
$$b \cdot x_2 \rightarrow \textit{ expenditure of country 2 in country 1}$$
$$ah_2 \;\; y \;\; ah_1 \rightarrow \textit{ net savings of country 1 and country 2}$$

The attached figure clarifies a little the meaning of each of the parameters and flows. What we are interested in showing now is that imposing that the monetary flow between countries is zero is equivalent to imposing that the trade deficit between countries is equal to the flow of credit between the capital markets of both countries (the negative saving).

When we assume an exchange rate e_{12} between currencies, then from the point of view of the first country it has to be fulfilled that the money entering or leaving the country, in its own currency, is zero:

$$a \cdot x_1 - e_{12}(b \cdot x_2) = t_{12} - e_{12} \cdot t_{21}$$

In which a new parameter has been introduced t_{ij} has been introduced to account for the financial flows of exchange between the capital markets of different countries. The expression tells us that, when equilibrium is imposed on the balance of payments, the trade deficit by purchases of a deficit country ends up in the Capital Market itself as foreign

savings, either by purchasing capital or by granting credit. Which can be really surprising when you understand what it means:

> *"The net money spent by one country in another country on consumer goods, has to come back as a flow of savings, in one's own currency, that the surplus country makes in the deficit country."*

Evidently, the necessary saving of the surplus country within the deficit country, which the balance of payments equilibrium condition obliges, is very rarely fulfilled between countries and when it is, the fulfillment is temporary and only keeps the balance of payments balanced for a limited period of time, which can be easily verified with empirical data. What we are trying to say, and we will demonstrate this a little later when we study the exchange rate crisis, is that it is impossible to maintain a deficit balance of trade.

THE CAPITAL MARKET. The existence of the Capital Market is the most important social consequence of the monetary economy. If in feudalism, and in other complex forms of social organization, the division of the population into two social classes is based on the "pure and simple" appropriation of what the land produces by the aristocratic class (the only means of production at that time), it is in the property rights on the means of production that capitalism finds the basis to structure society in two different classes, those who get their income from the possession of goods which produce rents, and those who get their income from their work.

Although at present, the two social classes are not separated into clearly distinct castes, it is very predictable that when the economy stabilizes and economic crises are avoided, the concentration of wealth in the hands of a few, will make real the separation into two distinct castes according to the origin of their income. In fact, as Thomas Piketty denounces in his book "Capital in the 21st Century", in the USA and Japan the two differentiated social classes are becoming more and more visible.

Let us observe that the division into three social classes, rentiers, capitalists and wage earners, made by David Ricardo at the beginning of the eighteenth century according to the origin of income, is ideological and is made with the sole intention of legitimizing the moral superiority of the nascent and enterprising bourgeoisie of Ricardo's time, as opposed to the old and parasitic aristocracy. But the truth is that, from the monetary point of view, business profits are no different from land rent.

Although the German economist, Karl Marx, denounces in "Capital" the tricky conception behind attributing the capitalist's profit to the risk assumed by those who advance the investment money, he fails to see where the trap of Ricardo's argument lies and is misguided when he points to work as the only source of wealth creation, without understanding that, in sufficiently complex structures, the total is always greater than the sum of the parts. Society creates wealth thanks to the cooperation of the parts, but it is

stupid to affirm that it can be distributed in a "fair" way among the parts, which is very evident that it belongs to all.

3. HOUSING AS A CAPITAL ASSET

One of the great social problems of all times has been, and continues to be, the high price of housing in relation to wages. The rare mixture that comes together in a house, where the nature of a non-reproducible capital good is combined with the provision of an essential service for people's lives, makes housing a particularly attractive object for those who wish to save at the same time as they ensure the risk-free capture of a monetary income.

If to these two general characteristics, we add two other particular properties that make housing especially attractive as an investment, then no one should be surprised that housing has become a unique capital asset that is almost always behind all speculative bubbles, and whose price rises steadily. We are referring, first, to the ease with which investment in housing adapts to any pocket, whether poor or rich, since investment in housing ranges from the modest purchase of a single home to rent it out, to the large and anonymous investment funds that own, in the centres of the most important cities in the world, entire buildings with a large number of homes and offices for rent. The second great attraction of housing is that it can be kept uninhabited without any appreciable decrease in value.

We can understand then that the housing problem comes from far away, as far away as the ancient, legendary and monetary Rome. The chronicles tell us that Marcus Licinius Crassus, who would later go down in history as the consul who defeated Spartacus, owed his immense fortune to obscure and unclear real estate speculation in the old city centre of Rome. We see that the problem of housing is far from being a new problem, and the world, which has always been a monetary economy in economic terms, has always had to fight against the nature of housing as a capital good, which inevitably makes it a source of all sorts of monetary speculations.

We are going to explain one of the few things that can be done to, if not solve the problem, at least alleviate as much as possible its most harmful consequences.

If housing were a reproducible good, the only thing that would have to be done to solve the problem would be to build housing until the need for it is satisfied, as happens with cars and other reproducible goods. But, as housing can only be produced in very limited quantities and further and further away from the place where it is needed, any solution to

its scarcity must be sought on the side of the buyers: *limiting the number of people or institutions that can buy a house*.

Let us note that there are two reasons why someone may want to buy a house. One, to live in it and, another, to save or to acquire an income from it. Although it is very clear that many times both motives can go together and become difficult to differentiate, no one is unaware that if the acquisition of housing as a means of saving or investment is limited, the demand for housing will be greatly reduced and its price will most likely fall in the average in which this is one of the main reasons for which housing is acquired and, therefore, the cause that is pulling up prices.

According to the logic of the above reasoning, we can distinguish four sequential levels that must be followed in order to lower prices:

LEVEL ONE. Illegalize the purchase of houses for all legal entities (companies, investment funds, banks, etc.) so that only natural persons can retain ownership of houses, whether they use them as their first home or use them for renting. In this way, a good number of potential buyers will be eliminated from the market and the sale prices will fall more or less significantly depending on the real contribution to the purchase of homes by institutional investors.

LEVEL TWO. It is very possible that there are not as many institutional savers as we tend to believe, and if there are, they may be interested in very specific sectors, such as city centers or select neighborhoods, and do not influence housing prices outside those sectors. In that case, we should also limit the purchase of housing to individuals, for example, by limiting the amount of savings they can accumulate in housing to one or two or three times the price of the official housing they enjoy, setting a maximum ceiling, of course. This can greatly reduce the number of people competing to buy a home and will not harm almost anyone who uses a second home as a source of income, savings or inheritance for their offspring, but will leave out of the market many other people who use housing as a means to protect a large estate from the risks of other more risky investments.

LEVEL THREE. It is possible that, even by taking the above two measures, there may be certain areas that will not see a significant drop in house prices or rents, particularly in urban centres and certain areas that are considered luxury for a variety of reasons. In such a case, and when it is considered necessary to lower the price of housing in these "special zones" for reasons of social utility, possession per person can be limited to a single dwelling within a special zone, whether or not it is the habitual residence, allowing more dwellings in zones that are not limited. In other words, it is not permitted to have more than one dwelling in any one of the many areas considered special.

LEVEL FOUR. In areas where the above measures fail, then the only thing left to do is to limit the rental price of housing. This is often done as a last resort at present in large city

centres, but we believe that it is highly unlikely that the measures proposed in the first three levels will fail, even in large city centres. Bear in mind that price pressure in the centres of a large city is also a consequence of price pressure in the periphery.

It is clear that the implementation of the four recommended actions may involve some roguery and certain traps, but that will be inevitable in any proposed solution and should not be taken into account as a criterion for discarding the proposed solution. There is no reason why the right to private property should be above the right to have a decent first home, especially when the proposed solution only limits the purchase of a home to those who already have a home. The two rights are not incompatible because limiting a right does not imply annulling it.

PART IV

FINANCIAL THEORY OF GROWTH

CHAPTER 10

THE CONVERSION OF MONEY INTO INCOME

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March 6, 2021

1. THE RATE OF PROFIT

Since ancient times it has always been understood that the money spent on the creation of companies, which is usually called investment, is the engine of economic growth. So much so that in the texts of 200 years ago the word "capital" is identified with the money that is lent or spent in order to obtain an income. This idea, for example, can be seen very well in the writings of David Ricardo:

> *Rent is that portion of the produce of the land, which is paid to the owner for the use of the original and indestructible powers of the soil. It is often, however, confounded with the interest and profits of capital, and, in popular language, the term is applied to what is paid annually by a farmer to his landlord. If, of two adjoining farms of the same extent, and of the same natural fertility, one had all the conveniences of agricultural buildings, and, besides, was properly drained and cleared, and advantageously divided by hedges, fences, and walls, while the other had none of these advantages, more remuneration would naturally be paid for the use of the one, than for the use of the other; yet in both cases this remuneration would be called rent. But it is evident, that a part of the money to be paid annually for the improved farm, would be given for the original and indestructible powers of the soil; the other part would be paidfor the use of the capital which had been employed in improving the quality of the land, and in erecting such buildings as were necessary to secure and preserve the produce.*
>
> *David Ricardo (1817)*
> *Principles of political economy and taxation*

We have already commented that Ricardo differentiates the profit obtained by an investor, from the rent obtained by the owner of the land, that is why Ricardo observes in the text that, in popular language, there would be no difference between the rent paid for the "*use of the original and indestructible powers of the soil"*, and the rent paid for *"the improvement of the quality of the land, and for the construction of buildings".* However, we have also commented that this way of interpreting profit responds to purely ideological reasons that seek to justify the physical nature of capital.

From Ricardo onwards, the nature of capital becomes physical and is associated with the physical expense of creating the capital good, and ceases to have a financial nature associated with the financial valuation of the profits it produces, as associated with ... *"the popular language*":

$$profit\ \ rate = \frac{monetary\ surplus}{amount\ of\ money\ invested}$$

It is the same vision that we can find, already in the twentieth century, in the work of Piero Sraffa. In his work, "Production of commodities by other commodities", he defines the rate of profit exclusively according to the physical nature of production, as the quotient between the physical surplus of a commodity and the quantity of that same commodity that is spent in production:

$$profit\ \ rate = \frac{quantity\ produced - amount\ spent}{amount\ spent}$$

Sraffa does not seem to realize that what he identifies in his work as "the amount spent" is actually a part of the final production that is reused in the process and, even if it is not used, it is not an expense and cannot be considered an expense because nothing has to be paid for it. For example, part of the oil obtained in the extraction of oil must be spent in the extraction process, which reduces the amount of usable oil obtained, but it makes no sense to consider it an expense because what is consumed is being generated in the same production process.

The abandonment of the financial nature of capital and its replacement by the physical nature of capital is a path of no return that began with David Ricardo, but which is very well exploited by economists working for private universities in the USA to hide without embarrassment what capital really is: *a good that produces an income.* It is therefore a pity that an economist of the stature of Piero Sraffa has not read with sufficient attention the writings of Joan Robinson, where he shows that capital can only be valued using a rate of interest unrelated to the productive process, and has been seduced by the apparent logic of the physical nature of capital when he defines the rate of profit as a quotient linked to the physical nature of production, even though a deeper analysis reveals that the terms that appear in the definition make no sense at all.

When an investor buys a barrel of unfermented must and after three years sells it as fermented wine at a higher price, it is clear that one can consistently define the rate of return on investment as the ratio of the profit from the sale of the wine to the expenditure made to buy the barrel of must. But this apparent clarity in the definition of the rate of profit when it refers to the profit obtained from the timely sale of a service, as in the example of wine, clashes with the lack of clarity when trying to generalize the idea to the business of a winery, that is, when trying to explain the profit in the production of a reproducible good.

What is the profit to be made from a winery engaged in the business of fermenting wine? Let us explain why this question cannot be answered using the rate of profit.

The accounting equation which must necessarily be fulfilled by any company in a monetary economy is the one which equals the income of the company with the expenses, including in the latter the profit which is distributed between workers and businessmen. To be precise, for a basic company it is fulfilled:

$$Q_{ii}^{o} p_i = \sum_{j=1}^{n} Q_{ij} p_j + B_i^{cap} + B_i^{job}$$

Let us notice that in the expression there is no term which can be associated to the money supposedly advanced by an "investor". Any expense which is necessary in the company, for example, to replace the machinery, we suppose it is included in the expenses of the accounting expression and it is paid, as it happens with all the expenses, separating them from the monetary income obtained by the company. Also the income obtained by the owner of the firm, and the salaries received by the workers, come out of the income. All expenses, whatever they are, are paid out of the income.

All the money spent by the company, the running and maintenance expenses, the expenses to pay the workers, or the expenses with which the income received by the businessmen is satisfied, come out of the income generated by the economic activity, so the term "amount of money invested" which appears in the expression of the profit rate is meaningless. The company works without any investor having to contribute any money from outside.

When, instead of analysing the profit from the sale of a single barrel of wine obtained from the purchase of a single barrel of must, we analyse a winery in which barrels of must are continuously bought and in which barrels of wine are continuously sold, we find that it is not possible to identify any investment expenditure. In the case of a winery, talking about investment only makes sense at the beginning, while the winery is being created and no monetary surpluses are produced, but it stops making sense when the company is already operating and any necessary expenses to carry out the economic activity are being paid

with the difference between the income from the sale of wine barrels and the expenses for the purchase of must barrels. When this happens, the company is giving an annual flow of profits that does not require any investment, and it is not at all clear how a rate reflecting the profit associated with the winery's business activity should be defined.

We see that the difficulty arises because it is impossible to identify "money which is invested" when the company is already producing monetary surpluses, since there is no "money which is invested". The very idea of investment on which the usual formula of the rate of profit is based is meaningless for a company that is already producing. So, if companies do not need continued investment to make a profit, how is the money that appears in the rate of profit to be understood as a necessary expense advanced by the investor? Worse still, how do you justify the rent received from owning the company when, as we see, no money needs to be advanced for the company to produce a surplus?

It is quite evident that *"the rent that a capital good distributes to its owners is not the benefit they get for risking the money needed by the enterprises to produce, and is in no way different from the rent that a landowner receives.* The idea that profits are received for risking the money needed for production does not hold water, just as the very idea of rate of profit does not hold water.

Lies never walk alone. They are always accompanied by many other lies with the sole purpose of preventing us from distinguishing among them all the truth, which is none other than the pure and simple privilege of the few over the many which is none other than the pure and simple privilege of the few over the many. The simplest truth of all.

2. THE CONVERSION OF MONEY INTO INCOME

The problem of defining a parameter that, being consistent with the financial nature of capital, determines the profit obtained by those who create a capital good is easily solved when we approach the problem in aggregate terms, focusing our attention on the reaction that exists between the aggregate rent and the amount of money needed to obtain it, forgetting for now the problem of knowing the concrete profit that a particular entrepreneur can obtain when creating a capital good.

Let us begin by defining a macroeconomic parameter which informs us of the value of the aggregate capital of the whole economy and which will show us the not at all evident reason why the monetary economies are so terribly efficient in their performance at the time of putting into operation all the productive capacity of society, regardless of the

destruction of natural resources which this implies, nor the terrible consequences for the environment of their unstoppable eagerness to grow.

The extraordinary facility of a monetary economy to reach the maximum possible productive capacity is to be found in the immense economic incentive for the conversion of a stock of money into a flow of income, that is, in the immense incentive for the creation of capital goods. To see it, let us suppose an economy in which the *GDP* grows thanks to an injection of money, no matter now if this growth is merely inflationary or, on the contrary, it is real and increases production. In such a situation we know, thanks to the Aggregate Conservation Equation, that GDP grows proportionally to Fisher's constant:

$$\frac{dPIB}{dt} = -k_F \cdot Ah \qquad \rightarrow \qquad \Delta PIB = -k_F \cdot Ah \cdot \Delta t$$

The expression says that *when an annual stock of money is injected into the money supply, of value* $(Ah \cdot a\tilde{n}o)$the *national income increases proportionally to Fisher's constant and to the annual stock injected*. If we now use the expression to calculate by how much the value of capital goods increases, supposing that the parameters αβ, γ change very little annually, we have:

$$dK = \beta \cdot PIB \;\rightarrow\; \frac{dK}{dt} = -\beta \cdot k_F \cdot Ah \;\rightarrow\; \Delta K = -\beta \cdot k_F \cdot Ah \cdot \Delta t$$

The expression relates the aggregate growth of capital to the cause that causes it, the monetary injection, which can be stated as a principle:

THE PRINCIPLE OF GROWTH: In a monetary economy, the nominal growth of capital is proportional to the growth of the money supply. M*being the constant of proportionality the product of* β *by Fisher's constant:*

$$dK = \beta \cdot k_F \cdot dM \qquad\qquad \beta = \frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i}$$

Where $\langle \alpha \rangle$ *is the share of capital income in after-tax GDP. Specifically, for a Piketty economy in which* $\overline{\aleph} = 1$*, we have:*

$$dK = \frac{\langle \alpha \rangle}{i} k_F \cdot dM$$

THE PRINCIPLE OF ACCUMULATION: The amount of capital that exists in an economy is proportional to the monetary mass of the economy, being the constant of proportionality the product of β *by Fischer's constant:*

$$K = \beta \cdot k_F \cdot M \qquad \beta = \frac{\langle \alpha \rangle}{\bar{\aleph} \cdot i}$$

This is a remarkable result because it tells us not only that there is a limit to the amount of wealth that can be accumulated in an economy, but also that the amount is fixed and does not depend on savings within the economy.

Although we will return to this important point later, what interests us now is not so much to point out that the financial nature of capital limits its value to a multiple of the amount of money used to carry out exchanges, something that in itself is very remarkable, but that the relation allows us to define a parameter that tells us what benefit is obtained when the money invested is converted into capital goods:

The "Capital Efficiency" of the whole economy is defined as the quotient between the increase of capital and the increase of the monetary mass that causes it:

$$Capital\ Efficiency \equiv \qquad \mu = \frac{\Delta K}{Ah \cdot \Delta t} = \beta \cdot k_F = \frac{\langle \alpha \rangle}{\bar{\aleph} \cdot i} \cdot k_F$$

The parameter, although it is defined in increments, is clearly a static parameter which is obtained by dividing the aggregate capital by the money supply. K by the monetary mass M of the economy and allows us to understand without any difficulty, given the high value it has, the origin of the immense resource devouring capacity of the monetary economies. Remembering that β is at present "six" and that Fisher's constant is "two", we have:

$$\mu = \beta \cdot k_F \cong 12 \qquad \rightarrow \begin{cases} \beta \cong 6 \\ k_F = 2 \end{cases}$$

The efficiency of the conversion of money into income has a value close to 12. That is, for every euro injected annually in the money supply, we obtain, on average, about 12 euros in capital goods, even if, of course, nothing prevents the value of the new capital from being only inflationary. Such a high value of the conversion of money into income gives us a very exact idea of the reason why the monetary economies tend to the full use of all the resources when the necessary growth of the money supply is not restricted, for some reason or other.

<u>THE CONVERSION OF MONEY INTO INCOME</u>. With a value of capital efficiency close to 12, it is not very difficult to understand why, when the economy is left to the mercy of markets, they become a terrible threat to all the ecosystems that inhabit the planet.

Any natural resource, no matter how insignificant its value may seem to us, will undoubtedly obtain funding to be exploited and produce rents as long as there is such an immense promise of profit.

What is left of the Amazon rainforest will be completely devoured in less than a decade by the immense monetary incentive presented by the destruction of a unique ecosystem to replace it with immense soybean plantations, which will not even be viable in the future because of the low quality of the land on which it sits.

If, at least, the most disadvantaged people in Brazil were to obtain some benefit from the destruction of the forest, we could bow our heads and look the other way thinking of the people who will get out of poverty and have a better life, but unfortunately we won't even have that consolation and what will happen will be very different. Those who have nothing will get no benefit, because the logic of those who use money to convert it into income will not allow wages to increase at the expense of income and what the destruction of the forest will bring will be more misery and more poverty.

Nor is it difficult to understand why the Borneo rainforest, one of the few remaining primary rainforests, will be converted into a huge palm oil plantation. Nor should it surprise anyone that the forests of Canada or the Siberian tundra will soon follow in the same footsteps. Capital has its own logic.

Only through politics is it possible to successfully fight against the immense incentive that feeds the growth of monetary economies. Natural resources belong to all of us, and we have an obligation to preserve them in order to sustain life for generations to come. We cannot continue to let rent-seeking turn human beings into a plague of locusts that ravage the environment in which they live without any real benefit. That is what this work is for, so that we become aware of what is pushing us to the physical destruction of the planet we live in and we can learn to control it.

THE INCENTIVE OF CAPITALISM: A monetary economy, even if it is already at full employment, has a very strong incentive to find a way to further increase production, and with it the share of GDP that will pay the rent of capital, since any increase in expenditure implies an increase in the stock of capital proportional to the parameter β:

$$\Delta K = \beta \cdot \Delta PIB$$

Obviously, when the increase in expenditure is only inflationary, the growth of capital will also be only nominal, but this should not prevent us from seeing that what drives us blindly to the physical destruction of our planet has its origin in the immense profit to be made from the use of money to organize ourselves:

"the conversion of a stock of money into a flow of income."

This being the essential characteristic of any monetary economy and wherein lies both its strength and weakness.

Capitalism, or rather the money economy, is the most efficient machinery ever conceived for the creation and accumulation of goods which produce money income, what we vulgarly call capital. This last point is very well appreciated when we express efficiency as a function of the interest rate and the rest of the variables:

$$\mu = \frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i} \cdot k_F \quad \rightarrow \quad K = \frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i} \cdot k_F \cdot M$$

1) The value of capital depends inversely on the rate of interest, so that the conversion of money into income will be greater the lower the rate of interest in the economy. Not only will newly created capital be more valuable when the interest rate is reduced, but also existing capital will see its value increase.

2) The value of capital added will also increase when the share of income in after-tax *GDP* rises, the parameter $\langle \alpha \rangle$. That is why the share of capital income in *GDP* should be measured after taxes and not before taxes, because the value of capital depends only on the income it produces for its owners.

   (It is also the reason, and there is no other, why economists working for US universities propagate in textbooks that lowering taxes is good for the economy).

3) Last but not least, the value of uncertainty should be as close as possible to 1, which will only happen to the extent that there is legal certainty. $\overline{\aleph}$ should be as close as possible to 1, which will only happen to the extent that there is legal certainty. Or to put it bluntly, the more guarantees there are that legislation will not change capriciously or that taxes will not go up, the closer the value of uncertainty will be to 1. Therefore, the fewer political decisions that can be taken, the more peace of mind there will be that the status quo will not be altered and the closer the uncertainty will be to "1". Also in this, economists who work for private universities in the US play a very active role, and they are unceasingly propagating economic theories that advise governments not to act.

Summarizing, the variables on which the value of capital goods depends are:

- The interest rate.
- Taxes on capital.
- Legal security over private property.

The origin of the monetary injection that makes the economy grow can be diverse, and we will deal with this subject in more detail when we study the Financial Theory of Economic Growth. In the case of an isolated economy, the origin of the injection is twofold, credit

money backed by debt, or money hoarded in the Capital Market that is spent in the Consumption Market (we will see it in the next chapter). In the case of a non-isolated economy, to the two sources already mentioned we must add a third one, money coming from outside the economy, either because of imbalances in the trade balance or because of imbalances in the inflow or outflow of monetary capital.

In the next article we will analyze in depth the Credit System and we will see the mechanism of money creation in monetary economies, but all this does not affect us now.

3. THE MICROECONOMIC EFFICIENCY OF CAPITAL

The analysis in the previous section is based entirely on the aggregate conservation equation and is therefore a macroeconomic analysis. Monetary efficiency relates the aggregate value of capital goods attending to the cause that causes it, the quantity of money that forms the money supply, but it does not answer the question of what is the profit obtained by creating a specific capital good, such as, for example, any of the basic companies into which we have divided the economy. To answer the question, and continue being coherent with the macroeconomic definition we have given of efficiency, we must relate the price of any capital good with the money supply needed to carry out the economic activity:

$$\mu_j = \frac{(capital\ value)_j}{(monetary\ mass)_j}$$

The monetary efficiency μ_j of any capital good is defined as a quotient between two monetary stocks, the market value of the capital good (e.g. a firm) and the amount of money it brings into play during economic activity, as the definition states:

$$\mu_j = \frac{k_j}{m_j} \quad \rightarrow \quad \begin{cases} k_j = \dfrac{\alpha_j}{i \cdot \aleph_j} \cdot \left(B_j^{cap} + B_j^{job}\right) \\ m_j = \dfrac{1}{k_F} \cdot \left(B_j^{cap} + B_j^{job}\right) \end{cases} \quad \rightarrow \quad \mu_j = \frac{\alpha_j \cdot k_F}{i \cdot \aleph_j}$$

Where the different parameters that appear have the usual meaning. Thus, the term α_j is the part of the surplus $\left(B_j^{cap} + B_j^{trab}\right)$ the firm devotes to paying the rent on capital, and the uncertainty parameter is determined in the market. $\aleph_j$ is determined in the market. It should also be noted that the Fisher constant k_F which appears in the expressions is that which relates the money supply to the surplus or *GDP,* and which we are assuming remains

valid in each of the sectors and for each of the basic companies into which production has been divided. The monetary mass, $m_j$associated to a basic company or sector of the economy is the same monetary mass that was postulated so that the monetary equation also holds at the microeconomic level; what we call the Fischer Equation. Now we use the currency mass to generalize currency efficiency to each and every basic company.

The "Microeconomic Capital Efficiency" is defined as follows μ_j of a generic company is defined as the quotient between the valuation of the company in the Capital Market and the monetary mass it puts at stake when it carries out the economic activity:

$$\mu_j = \frac{(capital\ value)_j}{(monetary\ mass)_j} = \frac{\alpha_j \cdot k_F}{i \cdot \aleph_j}$$

The expression makes sense to the extent that it makes sense to assign to each company the same value that Fisher's constant has for the whole economy. Otherwise, the expression does not make any sense.

The meaning of Microeconomic Efficiency is very subtle, because unlike what happens with the rate of profit, there does not seem to be anything in the definition related to the physical cost of creating the company, which is not entirely true. The monetary mass appearing in the denominator is the amount of money which must be immobilized to be able to carry out the economic activity of the company, and although it can never be considered a physical expense, it cannot be extracted, saved, or used for anything other than to support the economic activity of the company.

<u>But what is the benefit of creating a new company?</u> That matters very little.

When an entrepreneur sees an opportunity to build a company at a price lower than the price it will fetch in the capital market, he is very likely to build it by borrowing money. This is what Keynes was referring to when he coined the term "animal spirits". But it is well understood that the profit an entrepreneur obtains from an investment will be completely uncertain and will depend on the real difference he obtains between the money he has spent in building the company and the price at which the capital market finally values it, which, as we know, will depend on the rent he has been able to capture.

There is, therefore, no such thing as a rate of profit that is equalized in all industries by the free flow of capital, as David Ricardo assumes. Nor is there such a thing as capital as a factor of production, as propagated by economists working for private universities in the US. Although that does not prevent, obviously, that the "money" that is borrowed to carry out the investment (which was how they called in David Ricardo's time to "capital") is directed towards those industries where entrepreneurs think there are more business opportunities. In Ricardo's words:

"It is then the desire, which every capitalist has, to divert his funds from a less profitable employment to a more profitable one, which prevents the market price of commodities from continuing for a period of time far above or far below their natural price. It is this competition which adjusts the exchangeable value of commodities, that after paying wages for the labour necessary for their production, and all other expenses necessary to place the capital employed in its original state of efficiency, the remaining value or surplus of each trade must be proportioned to the value of the capital employed."

David Ricardo, 1817
(Principles of Political Economy and Taxation)

In this paragraph, Ricardo explains that entrepreneurs who pay a higher rate of interest on borrowed money attract the money that capitalists have to invest into their industry, which will eventually equalize the rate of profit in all industries (which we know is a misconception). In David Ricardo's time, the term "capital" is used to refer to money that lends in exchange for interest, which is what a lender lives on and that is very clear from the paragraph.

Ricardo also makes it very clear with the phrase "...the remaining value or surplus of each trade must be proportional to the value of the capital employed...", that the value he assigns to a company is the physical cost of creating it, understanding it proportional to the surplus, although he never explains why it has to be proportional. That is to say, Ricardo affirms that the business profit is proportional to the invested capital without it being clear why.

Ricardo also distinguishes between the "lender" and the "investor", surely because he realizes the trap that is fallen into when both figures are identified, since it is very clear that who lends money is a rentier not very different from who owns land, even more so when a legal system supports the repayment of debts. On the contrary, the investor is someone who risks his own money, with nothing clear that differentiates him from a lender who lends to himself.

However, thanks to the tireless work of economists working for private universities in the US, there are no rentiers today; they are all investors who earn their income from risking their money.

What is the Monetary Efficiency of money? Money is a capital good and, as such, has a certain efficiency:

$$\mu_{\text{dinero}} = \frac{\alpha_{\text{money}} \cdot k_F}{i \cdot \aleph_{\text{money}}} \xrightarrow[\aleph_{\text{money}}=1]{\alpha_{\text{money}}=1} \mu_{\text{money}} = \frac{k_F}{i}$$

What is the monetary efficiency of a house? Very high, indeed. The amount of money spent annually to maintain a home is usually very small in relation to the market value of the home.

-.-

What is the relationship between the efficiency of the whole economy and the efficiency of each of the capital goods that make up the economy? The efficiency of the whole economy is the weighted average of the efficiency of each of the capital goods with respect to profits:

$$\mu = \frac{\Delta k_{\text{capital}}}{Ah \cdot \Delta t} = \frac{\sum \mu_j \cdot (B_j^{\text{cap}} + B_j^{job})}{\sum (B_j^{\text{cap}} + B_j^{\text{job}})} = \beta \cdot k_F$$

The same can be said for the efficiency of any good formed by the sum of several capital goods.

Influence of inflation. We have only to comment briefly on the influence of inflation on the creation of capital. As we have already said, and according to the theory we have explained, for an economy to grow it is necessary for the money supply to grow without hindering economic processes:

$$\frac{dPIA}{dt} = -k_F \cdot Ah$$

But, the Conservation Equation cannot tell us which part of the monetary flow injected in the economy will produce inflation and which part will increase the production of goods. In general, we must suppose that both events are occurring to a greater or lesser extent and, both the average prices of products $\bar{p}$and the total quantity of goods in the economy will be growing. $\bar{q}$ present in the economy, will be growing. It is easy to see that when real capital growth is separated from inflationary growth, and the real growth rate of capital and the inflationary growth rate of capital are defined in the same way as they are defined for *GDP,* both coincide:

$$\begin{cases} inflatión\ rate & \equiv \quad \pi = \dfrac{\bar{q} \cdot \Delta\bar{p}}{\bar{q} \cdot \bar{p} \cdot \Delta t} = \dfrac{\Delta k_{inflatión}}{k \cdot \Delta t} = \pi_k \\ growth\ rate & \equiv \quad g = \dfrac{\bar{p} \cdot \Delta\bar{q}}{\bar{q} \cdot \bar{p} \cdot \Delta t} = \dfrac{\Delta k_{real}}{k \cdot \Delta t} = g_k \end{cases}$$

Which is not an unexpected result, since *GDP* and capital are related by the parameter β which we assume changes little over time. So the real growth rate of capital is equal to the real growth rate of *GDP,* and the same is true for the inflationary growth rate, which are both identical for capital and *GDP*. Taking both rates to the conservation equation we have that:

$$\pi + g = k_F \cdot \frac{Ah}{PIB} \rightarrow \boxed{\pi + g = k_F \cdot \tau}$$

$$\pi_k + g_k = k_F \cdot \frac{Ah}{PIB} \rightarrow \boxed{\pi_k + g_k = \beta \cdot k_F \cdot \tau_k}$$

$$\begin{cases} \tau = \dfrac{Ah}{PIB} \rightarrow money\ creation\ rate/PIB \\ \tau_k = \dfrac{Ah}{K} \rightarrow money\ creation\ rate/K \end{cases}$$

The new money injected into the money supply has a double function, part is dedicated to the inflationary increase of the existing capital and part is dedicated to increase the real quantity of new capital, or what is the same, to increase the quantity of consumer goods which support the new capital.

CHAPTER 11

FINANCIAL THEORY OF GROWTH

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1. CREDIT MONEY

All the work developed up to now would be condemned to the most absolute irrelevance, if we did not deal with the most important question which underlies a monetary economy:

Who makes the money?

But it is very evident that, to answer this question, it is first necessary to answer the question of what money is and what money is being used in economics, because we can verify, with no little astonishment, that when money is talked about in any book on economics, money is never defined and it is taken for granted that whoever reads the book knows what it is.

Of course, we all have a very clear idea of what money is, but it is very scary to think that those who run the Central Bank have no idea what money is, even though they are quite capable of creating 4 trillion dollars without even blinking an eye.

MONEY. We define money as that which exists within a monetary economy that fulfills:

1) You may purchase any goods or services offered for sale.
2) It fulfills the Monetary Equation:

$$k_F \cdot M = \sum p_i \cdot q_i$$

where M is the amount of money used within the economy, k_F is a constant and the sum represents the monetary flow of purchases.

Throughout history, many things have been used as money. From gold, a scarce metal with which we almost always associate money, to salt or tobacco, which in specific regions and in a very specific way have been used as money without too many problems. It can be said that almost anything can be used as money, and it can be proved that almost anything has been used as money at some point.

Therefore, the nature of money cannot be material, and whatever is used as money, it cannot be its material nature from which its value derives. In this sense, neither what money is, nor what gives money its value, can have its origin in the physical nature of what we use as money. Its nature and its value must come from somewhere else.

Here we have defined money by stating the only two properties "something" must fulfill to be considered "money". There is no other coherent way to define it.

In today's economies, although it may seem strange to us, what has been used for more than a century as money is bank credit. It is not difficult to see that bank credit fulfills the two properties that define money:

1) You can buy with it anything that is for sale, at least within the country where the bank credit is issued.
2) Its use complies with the Currency Equation, at least that is what we believe we have shown to happen in economies where production goods are mostly private.

Therefore, from now on, we are going to consider that all the money that exists within the economy is credit money, that is to say, *"the money that banks lend when they grant a credit"*, so commercial and investment banks are the only ones that have the legal privilege of creating money when they grant a credit and of destroying it when it is returned, always assuming that:

a) All money is created through credit.
b) Money has no physical value.
c) Money can be manufactured in any quantity desired.

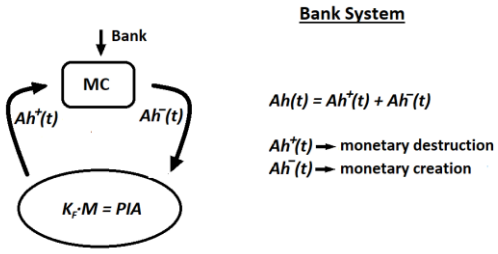
The current confusion about the nature of money is tremendous, and the reason for this is not because it is difficult to know who, how and when money is made, but because economists working for private universities in the US do their best to hide who, how and when money is made in the US. Now that we know what money is and that it is being used we can create a coherent theory of how the banking system works.

Let us remember that, whatever the nature of what is being used as money in the economy, it is the saving and dissaving flows that appear in the Vector Conservation

Equation, what creates and destroys the money in the money supply, no matter if the money is cash, credit money or of any other nature:

$$y_j = x_j + ah_j + \frac{1}{k_F}\frac{dx_j}{dt} \qquad \begin{cases} ah_i^+ \equiv \ ah_j > 0 \ \rightarrow saving \\ ah_i^- \equiv \ ah_j < 0 \rightarrow dissaving \end{cases}$$

In the equation, the positive components of the saving vector represent the flow of money extracted from the money supply, which we identify with the savings that go to the Capital Market; while the negative components represent the money injected in the money supply, which we identify with what we call dissaving (or credit) and which comes from the money in the Capital Market.



Monetary creation and destruction

In fact, the Aggregate Conservation Equation, which relates the *PIA (*or *GDP)* with the aggregate flow of savings, was obtained starting from the relation that the money supply has with the flows of savings and dissavings M with the flows of savings and dissaving:

$$\frac{d}{dt}PIA(t) = k_F \cdot \frac{dM}{dt} \xrightarrow{\frac{dM}{dt} = -[Ah^+(t) + Ah^-(t)]} \frac{1}{k_F}\frac{d}{dt}PIA(t) = -[Ah^+(t) + Ah^-(t)]$$

But in the above equation it is not at all simple to know what the flows of savings and credit are$Ah^+(t)$ and credit flows $Ah^-(t)$ in an economy where money is created by banks when they grant credit.

In today's economies, money has no physical nature and is only a bank record which changes its owner when it is used to pay in exchanges, and which is created out of nothing when a bank credit is granted and destroyed when it is repaid. For all these reasons, it would be desirable to express the flows of saving $Ah^+(t)$ and credit flows $Ah^-(t)$ that appear in the conservation equation, as a function of the flow of credit and the flow of hoarding. $Ah^C(t)$ and the flow of hoarding $Ah^S(t)$These are variables that we can know and predict very well because they are closely related to the changes in the banking records.

In the analysis, we will not introduce new concepts neither on money nor on the economy, and we will limit ourselves to explaining the relation that the bank records have with the savings vector Ah that appears in the Vector Conservation Equation. For this, we will begin by making a simplified and idealized description of the Banking System, but at the same time completely realistic, which will help us to establish in a very general way, the

limitations imposed by the creation and destruction of money on the economic growth of the economy.

2. PURE CREDIT MONETARY ECONOMY

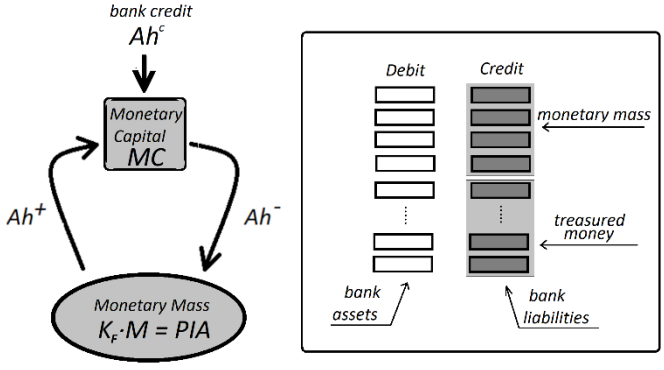
The process of creation of credit money is extremely simple, and is the result of the evolution from an economy based on metallic money (gold standard) to an economy based on bank money created as a bank credit. The process of the creation of money by means of a credit is represented in the attached figure in a very simplified but completely rigorous way, and supposes accepting that there is only bank money created by banks as an accounting notation when they grant a loan, which is in agreement with the reality around us and with the idea that the Central Bank does not produce any money, as in fact it happens, however strange it may seem to us.

The left-hand side of the figure shows the two markets, the Capital Market and the Consumer Market, together with the monetary inflows and outflows that reflect banking activity, while the right-hand side shows the double-entry banking records with which accounting is carried out within the banking system.

Credit Flow Ah^C

The banking system creates money by an extraordinarily simple procedure:

1) When a bank gives a loan, it creates two bank accounts in the name of the person



Credit Money

who receives the loan. In one of them a positive balance is recorded, which will allow the person who receives the credit to spend more than what he has earned

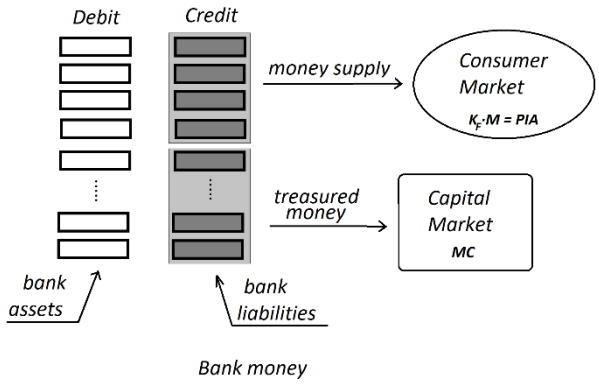
for his economic activity. This is what we call credit money, bank money, or simply money, and it will increase the money supply when the loan is spent on consumer goods. In the other account a negative balance is recorded, indicating the amount of money he has to pay back to cancel the loan, either in the form of periodic instalments, at maturity, or in some other way. The latter record is generally considered an asset of the bank, while the record with the borrowed money is considered a liability. The annual flow of bank money that is created by credit is the flow that comes out of nowhere in the picture. Ah^C that comes out of nothing in the drawing and ends up in Capital Market.

2) When the person spends the positive balance in the credit account, the money will end up spread among the accounts held at different banks. It is a part of the flow Ah^- that appears in the figure leaving the Capital Market and entering the Consumer Market, indicating three things. First, that bank money is accepted by everyone and is the money with which the economy works. Second, that it is money that did not exist before the loan was granted. The third, that it is virtual money which has no reality outside the banking system and the legal system which supports it, so it always remains within it (we have assumed that there is no other type of money, such as paper bills, gold, etc.).
3) No bank "formally" creates any money when it grants a credit because the net balance of all bank records is always zero: *"when a credit is granted, two accounts are created, one with a positive balance (the liabilities) and one with a negative balance (the assets), which cancel each other out"*. However, the account with a positive balance is the legal tender that is used to buy goods. It is the "fiduciary" money which will circulate from then on all over the economy and which forms both the money supply and the money capital. This money can be destroyed, and in fact it will be destroyed, when the credit is returned and the bank cancels the two registers, the positive balance and the negative balance. This is the reason why bank money always fulfils the following conditions:

Bank money = credit debt

The mysterious equality that always exists between the amount of bank money owned by agents and the amount of money owed by agents to banks shows that all the money being created in the economy is being created as debt.

This is precisely where the magic and charm of a fully credit economy lies: *"All the money in the economy is a debt that someone owes to the bank and it is being backed by someone's assets or someone's income"*. It can be said that those who are actually making the money are the people or institutions to whom credit is granted, and that is why they are obliged to pay it back in the future. When they spend the money they borrow, it belongs to other people, even though they are the ones who are backing it up with their assets or income. From this point of view, it is not the banks that really make the money, they are not even the ones who are really backing it, and that is the reason why banks fail when the loans are not repaid.



The attached figure shows the result of the credit creation process we have described. It shows the bank registers that act as money, and which are used for accounting purposes, indicating the function of each one of them:

a) The registers on the right are the money in the economy, what we have called "credit money" or "bank money", and they are part of the money mass or money capital, depending on the use given to it by its owners. Both types of money, the one used in the Consumer Market and the one used in the Capital Market, are only registers, and therefore indistinguishable one from the other, but they have in common that they are money which is always owed by someone. ALL BANK MONEY IS SOMEONE'S DEBT.
b) The registers on the left are the registers in which the money owed to the banks is recorded, but they are not money, nor can they make money. They are an *"asset"* of the bank that backs up the money that has been created in the form of credit.

Note the pairing of debit records (the bank's assets) and credit records (the bank's liabilities) which forces the sum of the two to always be zero, indicating that all money created by the bank is credit and backed by debt. Although net money has been created, the flow Ah^C The flow of money, which passes into the real economy, is able to sustain the exchanges because it has purchasing power.

<u>Who creates bank money?</u> Let us note that the one who has really created the credit money is the one who receives the loan money and spends it, since it is he who backs it with his wealth or income thereafter.

The role of the bank in all this story is of vital importance for the confidence in "the fiduciary system", because it is the bank which guarantees before the Central Bank and before the

whole society that the real issuer of the bank money will return the money the bank has created for him or, if not, it will be the bank itself who will return it. In this sense, it is the bank that is backing the money issued by the debtor.

The beauty of credit money, and its danger, lies in the fact that the money is created with the commitment to be repaid, which forces banks to find new debtors to take over the old credits as they are cancelled, otherwise the money with which the economy works will be destroyed and its quantity will decrease, with disastrous consequences for the economy:

"Money is a debt, and when the debt is repaid the money disappears."

The immense beauty of this fact is not without a very real danger, since the amount of money in the economy depends on the fickle desire of agents to spend money on credit.

Aggregate Savings flow Ah

The figure also shows the flows Ah^+ y Ah^-which still have the same meaning as always and represent, respectively, the money which is extracted from the money supply through saving and the money which is injected through dissaving, the latter being able to come both from previous saving and from credit. The sum of both flows is the aggregate saving $Ah(t)$ which appears in the conservation equation and governs the changes in the economy's *PIA:*

$$\frac{1}{k_F}\frac{d}{dt}PIA(t) = -Ah(t) = -(Ah^+ + Ah^-) = -\sum(ah_i^+ + ah_i^-)$$

$$ah_i = ah_i^+ + ah_i^- \qquad \rightarrow \begin{cases} ah_i^+ \rightarrow agent\ saving \\ ah_i^- \rightarrow \begin{vmatrix} agent\ credit \\ agent\ disaving \end{vmatrix} \end{cases}$$

The components of the savings vector represent the sum of the two different flows that each one of the agents extracts or enters in the Consumption Market (the money supply).

Savings Flow Ah^S

In the same way that the Banking System creates money granting credits, it also destroys money when the credits are repaid; monetary creation implies also, in the case of credit money, monetary destruction, and both are indissoluble. For this reason we have defined only one vector $Ah^C$to represent both the creation and the destruction of money by the banking system, the sign of the vector indicating which of the two processes dominates in aggregate terms.

However, not all the money that is created when banks grant credit ends up being spent on consumer goods, nor is all the money that is saved (and has been extracted from the

money supply) used to pay off the bank credit. In both cases, the money may end up hoarded in the Capital Market and not go into the money supply. This is what we have called money capital, and it can have its origin both in the creation of money by means of bank credit and in the extraction of money from the money supply with savings. The changes in the quantity of money capital is what we call the flow of savings Ah^Salthough it would have been correct to call it the flow of hoarding.

THE PROBLEM OF CREDIT MONEY. When the quantity of bank money decreases because more credit is repaid than is granted, it is very likely that savings are extracting more money from the money supply than is injected with credit. Then the amount of money in the money supply decreases and the economy goes into recession:

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = -Ah(t) \quad \xrightarrow{Ah(t)>0} \quad \Delta PIB < 0 \qquad (recession)$$

Almost always, the granting of a credit ends up being injected into the economy and, almost never the extraction that makes savings ends up cancelling a credit, so the credit system can create bubbles when it grants credits and recessions when it does not grant them.

The problem, or the great disadvantage, of using bank money created in the form of credit is that the amount of money in the money supply depends on the amount of bank debt agents want to maintain. If for some reason (e.g., the interest rate is very high) agents decide to decrease their debt to banks, or banks decide to reduce the amount of credit they have granted, then most likely the money in the money supply will also decrease, which will inevitably push the economy into recession.

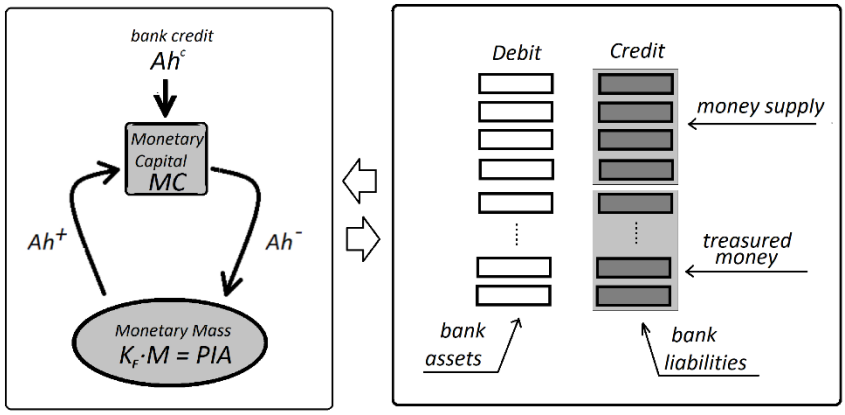
Although we have just briefly sketched where we must look for the origin of credit crises (the destruction of bank money because of the explicit obligation to pay it back), it is necessary to go a little deeper in our analysis, before deducing with precision the equation which governs economic growth in monetary economies.

3. THE GROWTH EQUATION

People often think of money as a physical thing that has value in and of itself, however, the money that every economy in the world runs on is credit money that has been created by commercial and investment banks through credit and has no value in and of itself. At least 90% of all money circulating in the economy is someone's debt and the banks make their profits from the interest they are charging on that debt.

For example, in the US there is about $20MM of bank money of which $10MM is the money that forms the money supply and the other $10MM is almost entirely the money that is used for international trade. So here we have assumed from the beginning that the real economy is a pure credit economy in which all the money there is is credit money that has been created as debt, which is almost entirely true. This will not alter the generality of the conclusions we are going to reach, even though bank money can coexist with another type of fiat money, such as bank notes.

Our problem is not so much to understand that money is a bank credit that can be created



Creation of bank money

as well as destroyed, but to express the aggregate conservation equation as a function of the changes in bank records due to flows Ah^C y Ah^S flows, instead of making it depend on the flow of saving Ahas the equation is now expressed:

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = -Ah(t) = -(Ah^+ + Ah^-) = f(Ah^C, Ah^S)$$

To do this, let us look again at the right side of the attached figure where the bank records are shown with the two types of money, the one that forms the money supply and the one that forms the money capital. We know that both types of money are used for different things, since one is used for buying and the other remains idle, but we also know that both types of money are indistinguishable one from the other because both are a bank register that in no way differ. For this reason, expressing the monetary flows Ah^+ y Ah^- which enter and leave the Consumer Market, according to the changes which take place in the bank registers is not at all simple, though it is not an impossible task to carry out:

1) The flow $Ah^C(t)$ that comes from nothing to end up in the Capital Market, is the amount of (bank) money that is created or destroyed by banks when they grant and cancel loans. It represents the annual change in the amount of bank money, MB, which is created by credit and can become negative when the flow of credit repayment is greater than the flow of credit creation, which basically destroys bank money. Therefore:

$$\frac{d\,MB}{dt} = Ah^C \qquad\qquad MB \equiv Bank\ Money$$

2) Money capital, MC, is the amount of money that agents keep for various reasons (mainly for liquidity reasons) in the Capital Market. It is, of course, savings or hoarded money, and in the figure it is implicitly assumed that all credit money is always created as money capital and that it is then, when it is spent in the Consumption Market, that it becomes money in the money supply. Therefore:

$$\frac{d\,MC}{dt} = Ah^C + Ah^+ + Ah^- \qquad\qquad MC \equiv monetary\ capital$$

3) The flow $Ah^-(t)$ leaves the Capital Market and ends in the Consumption Market, it is what we have been calling dissaving. It is the annual amount of monetary capital that is spent in the Consumption Market becoming monetary mass and its origin can be the previous saving or the bank credit that is spent in investment or consumption. It is also the sum of the negative components of the savings vector ah_i which appears in the conservation equation.

4) The flow $Ah^+(t)$ leaves the Consumer Market and ends up in the Capital Market. It is the annual amount of money which extracts savings from the money supply and becomes money capital. Its origin can be real savings or savings forced by the repayment of a credit, although this is irrelevant.

From the figure we deduce that the quantity of money of the monetary mass *M*, the quantity of monetary capital *MC*, and the quantity of bank money *MB* (credit), are related to each other by the Banking Equation:

Banking Equation

$$bank\ debt = monetary\ mass + monetary\ capital$$
$$(MB = M + MC)$$

The Banking Equation is the basic expression which describes the whole financial system, and we must not let its apparent simplicity deceive us. Its importance is very well appreciated when, thanks to it, we can relate in aggregate terms the different monetary flows with the changes in the bank records:

$$\left.\begin{aligned}\frac{dM(t)}{dt} &= -Ah^{+} - Ah^{-}\\ \frac{dCM(t)}{dt} &= Ah^{S} = Ah^{+} + Ah^{-} + Ah^{C}\\ \frac{dBM(t)}{dt} &= Ah^{C}\end{aligned}\right\} \xrightarrow{BM=M+CM} \quad \frac{dM}{dt} = Ah^{C} - Ah^{S}$$

This last expression that when substituted in the aggregate equation of conservation, gives us the most important expression of the whole economy, the equation of Growth:

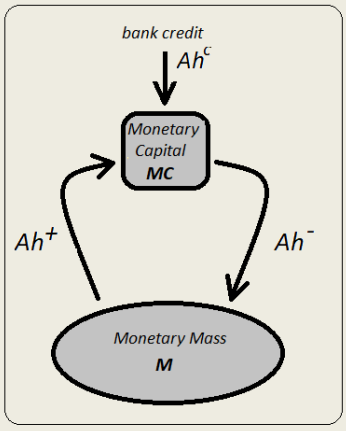
$$\frac{d}{dt}PIB(t) = k_F \cdot [Ah^{C} - Ah^{S}] \qquad Growth\ Eq.$$

The Growth Equation tells us that *"economic growth is proportional to the difference between the growth of the quantity of bank money Ah^C and the growth of the quantity of hoarded money. Ah^S"*:

$$\frac{d}{dt}PIB(t) = k_F \cdot \left[\frac{dMB(t)}{dt} - \frac{dMC(t)}{dt}\right]$$

Which is logical, since the difference between the money that banks create when they grant credit and the money that savings hoard, is the money that flows into the money supply and makes *GDP* grow.

DEDUCTION OF THE GROWTH EQUATION



Deduction of the Growth Equation

$$\left.\begin{aligned}\frac{dM(t)}{dt} &= -Ah^{+} + Ah^{-}\\ \frac{dCM(t)}{dt} &= Ah^{S} = Ah^{+} - Ah^{-} + Ah^{C}\\ \frac{dBM(t)}{dt} &= Ah^{C}\end{aligned}\right\} \xrightarrow{BM=M+CM} \quad \frac{dM}{dt} = Ah^{C} - Ah^{S}$$

$$\frac{d}{dt}PIB(t) = k_F \cdot [Ah^{C} - Ah^{S}]$$

The curious thing is to see that the expression states that, in aggregate terms, it is possible to hoard any amount of money you want, as long as the amount of credit money grows

faster than the amount of money you hoard; or to put it another way, the flow of savings (hoarding) can be as large as desired as long as the money comes from bank credit creation and not from the money supply (This is what explains why the monetary injection of more than 4 trillion dollars has not affected the real economy or inflation, because the money is hoarded in the Capital Market).

Evidently, the reason why credit crises appear and the economy goes into recession is none other than because the money supply decreases, regardless of the amount of savings accumulated:

$$\underline{Crisis\ Crediticia}$$

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = [Ah^C(t) - Ah^S(t)] \quad \xrightarrow[Ah^C(t) < Ah^S(t)]{} \quad \Delta PIB(t) < 0$$

Later we will see that this is what explains the economic crises that periodically plague the real economy.

We call the expression of the Aggregate Conservation Equation as a function of the flow of credit and savings the Growth Equation because it is the equation that governs economic growth in currency economies. We will use the rest of this chapter to explain the exact meaning of the Growth Equation.

<u>STEVE KEEN</u>. In the first edition of Madrid Theory, at the end of 2019, we named the Growth Equation with the name "The Keen Equation". We thought that, by naming it this way, we were just acknowledging the work of Australian economist Steve Keen in identifying debt growth as the origin of economic crises. Something all economists would agree with, even though Keen was actually very clueless in 2010 when he formulated a relationship between aggregate demand, an economy's GDP and debt to explain the fall in output, completely ignoring that it is bank credit that drives changes in GDP in the economy:

"This is obvious when you look at aggregate demand according to my definition: as the sum of GDP plus the change in debt (where that demand is diffused through goods, services and asset markets). Even if debt levels are still falling, since they are falling less rapidly, there has been a boost to aggregate demand coming from debt, because debt is falling less rapidly in 2010 than in 2009."

The problem is private debt and the future of the US is deleveraging.
Steve Keen, 20 September 2010

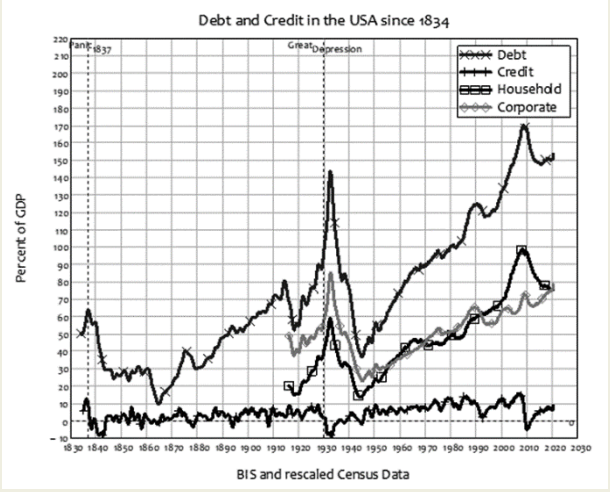
However, his way of thinking changes completely at the end of the second decade, when he seems to realize that it is only in the destruction of bank money that we must look for the cause of the credit crisis that periodically afflicts monetary economies. Thus, it can be

seen in a draft of chapter 2 of a forthcoming book to be published in December 2020, that Steve Keen has changed his mind, and seems to have understood that aggregate demand does not depend on debt, but on bank credit:

"This is similar to Aristotle's theory of comets (which was retained in Ptolemaic astronomy) that comets were unpredictable, because they were atmospheric phenomena (Aristotle 350 BC). The Copernican scientific revolution, which overthrew this worldview, showed that comets were inherently predictable, since they are celestial objects orbiting the Sun.

Similarly, the "unpredictability" of crises like the Great Recession is a product of the false money model of loanable funds of the neoclassical paradigm. The correct model of bank-originated money and debt shows that crises are caused by credit turning negative (Vague 2019), and that most recessions are caused by credit declining, but not entirely negative. This causal relationship between credit (which is identical in magnitude to the annual change in private debt) and economic performance endows capitalist economies with a tendency to accumulate higher and higher levels of private debt. This phenomenon is most evident in most capitalist economies, the United States of America, see Figure 6.

Figure 6: Private Debt and Credit in the U.S. since 1834



This chart identifies America's three great economic crises: the Great Recession, the Great Depression, and the "Panic of 1837". What, you haven't heard of the "Panic of 1837"? Neither had I, until I put together this chart (Census 1949, Census 1975), but after I did, it struck me at the time as "an economic crisis so extreme as to erase all memories of previous financial upheavals" (Roberts 2012, p. 24). In each of these crises, credit plummeted from a historically high level, turned negative, and remained negative for a substantial period, see Table 4.

Table 4: Credit size and duration of negative credit in major U.S. economic crises.

	Credit			
	% GDP			Years
Crisis	Maximum	Minimum	Change	Negative Duration[18]
Panic of 1837	12.2	-8.9	21.1	6.2
Great Depression	9.1	-9.1	18.2	8.2
Great Recession	15.4	-5.3	20.7	2.6

Each crisis changed only when the credit decline stopped. But the renewed growth generated by rising credit came at the expense of a rising private debt-to-GDP ratio, with this rise terminated either by another crisis, or by wars that caused the private debt ratio to fall sharply due to the "War Economy" boost to GDP: nominal GDP growth reached 32% p.p. a. during the U.S. Civil War in (1861-65), 29% during World War I (1914-1918) , and 29% again during World War II (1939-45), far exceeding the maximum rate of credit growth during those periods (0.2% of GDP p.a., 8.6% and 4.5%, respectively)."

Steve Keen, 2021

This remarkable change in the way of looking at the problem of the crisis allows us to prove that the Growth Equation is indeed valid, which makes Steve Keen even more deserving of having the equation named after him. However, we have the impression that Steve Keen is not sincere when he says that already in 2010 he thought otherwise. We sent him the Madrid Theory at the beginning of 2020, and we believe that it was in reading it that he has found the inspiration for the change in the way he views the credit crisis.

We can't disagree with a person changing their way of looking at reality, but we don't think it's decent to hide the fact that they have changed their mind and the reason for the change of opinion. If, as in this case, we affirm that we sent him the Madrid Theory in January 2020, then Steve Keen should inform us what his source of inspiration was and not try to appropriate ideas that are not his, even if he values them and considers them valid, which has a lot of merit.

We can only denounce this unusual and unethical behavior of Steve Keen.

4. FINANCIAL THEORY OF ECONOMIC GROWTH

Now that we know how banks manufacture money through credit, it is possible to explain how money ends up as capital goods (as income) and to outline, even in a very brief way,

a theory of growth that is consistent with the financial nature of capital goods and with the role of bank credit in economic growth. Let us begin by explaining two basic aspects that are always present when new capital goods are created:

a) The monetary injection that involves the investment in physical goods thanks to the loan.
b) Repayment of the loan.

Although, nowadays, the most likely source of the money a company uses to invest comes from its own money that it does not distribute as company profits, here we are going to assume that any investment is always made with borrowed money that the company has to pay back by paying interest.

When an entrepreneur is granted a loan, either a bank credit or by issuing a debt security, and invests it in the creation of new capital, he receives an amount of money that will end up being spent on wages and goods in the Consumer Market. In this sense, who invests by means of a loan, first injects money into the economy in the short period of time that the investment lasts, to extract it later slowly from the economy and finally pay it back. Therefore, the question that always underlies the granting of any loan is very simple to ask: *where does all the money that the borrower has committed to repay come from?* More concretely, we ask where the debtor gets it from:

- The principal money you have to pay back.
- The interest money, which you have to pay.
- The money from the profits, which must be distributed.

The question is not an idle one because, in aggregate terms, it implies that lending money at interest implies that more money has to be paid back than was given in the loan, which is clearly impossible. Specifically, the amount of money that the firm has to take out of the economy to meet the loan commitments is always higher than the amount of money it received with the loan, so it is very important to understand where the greater amount of money it has to pay back to meet the debt commitments comes from, because, while it is obvious that an individual debtor can take money out of many places, the same is not true in aggregate terms.

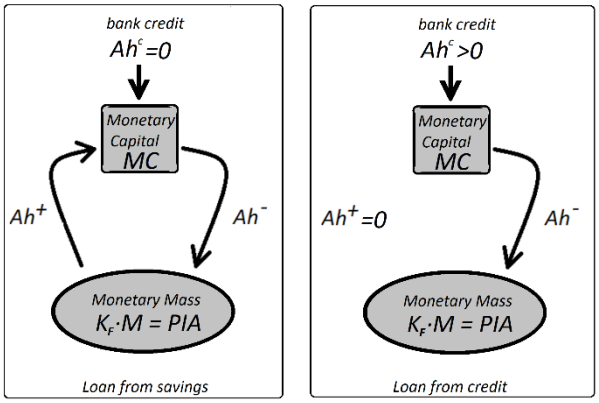
> *The investment necessary to create a capital good, always demands to return a greater amount of money than was spent to create it, but where does that extra money come from in aggregate terms?*

Let us observe that, in aggregate terms, even when we think that the money spent on the investment was created out of nothing, it is urgent to answer the question of how it is possible to extract from the economy more money than is injected with the expenditure, since the repayment of the credit always implies returning a greater amount of money

than was received with the loan, and this without counting the money that is also necessary to extract to pay the benefits that the investment must produce. Here we will answer the question from a strictly financial point of view, and we will soon see why. To do this, let us analyse separately the consequences for the economy of spending the loan on investment from the consequences of repaying the loan money.

a) <u>The monetary injection of the loan.</u>

The attached figure shows the two possible sources of the money used to make an investment: previous saving and the creation of bank money. When the money comes from previous saving (we assume that through the issue of a debt security) there will be no net creation of bank money and no increase in the money supply of the economy. Whereas, in the second case, when the money comes from a bank credit and has been created out of nothing, there will be an increase in the money supply.



In the left zone of the figure we can see the case in which there is no money creation, $Ah^C = 0$ all the money of the investment comes from the previous saving. In the right zone, we show the case in which all the money of the investment comes from monetary creation, $Ah^C > 0$and there is no previous saving. From the visual analysis of the figure we conclude that when the investment money comes from previous saving, the net injection of money in the monetary mass is null and the *GDP* of the economy does not undergo any change, since the amount spent by the businessman in investment Ah^- is the same amount that was previously withdrawn from savings Ah^+. On the other hand, when the money spent by the entrepreneur Ah^- comes from the creation of bank money, then *GDP* grows because there is a net injection of money into the money supply. To see that this is true, we can put the growth equation directly and decompose aggregate saving into its two components, saving and dissaving or credit:

$$\frac{d}{dt}PIB(t) = -k_F \cdot [Ah^+ + Ah^-] \quad \rightarrow \quad \begin{cases} Ah^+ = Ah^- & \rightarrow \ \Delta PIB = 0 & previus\ saving \\ \begin{cases} Ah^+ = 0 \\ Ah^- < 0 \end{cases} & \rightarrow \ \Delta PIB > 0 & bank\ creation \end{cases}$$

From the relationship which exists between the value of aggregate capital and GDP, we can also conclude that when the investment money comes from previous saving, the growth of capital will be zero in aggregate terms, while when there is monetary creation, since Fisher's constant is worth about "two" and β has a value of about 6, the increase of capital will be about twelve times the flow of monetary injection that has caused it:

$$\Delta k_{capital} = \beta \cdot k_F \cdot Ah \cdot \Delta t \quad \rightarrow \qquad \Delta k_{capital} \approx \ 12 \cdot \ loan$$

We see that the result on the growth of aggregate capital poses us a problem, because, although an individual entrepreneur can capture with his productive activity the necessary income so that the value of the capital created by investment is greater than the debt he has contracted, in aggregate terms there will only be net capital creation when the investment money comes from newly created bank money:

> *"Savings money can invest and create new capital in individual terms, but it cannot increase capital in aggregate terms. Only credit money, which is created out of nothing, can be invested and increase capital in aggregate terms."*

(The process by which new capital goods are created using only previous savings is the typical process of creative destruction described by the early 20th century Austrian economist Joseph Schumpeter, where the creation of new capital is always at the cost of the destruction of existing capital. It is explained in detail a little further on).

b) <u>The repayment of the debt.</u>
But, in aggregate terms, we still don't know where the extra money needed to repay the loan principal and interest is coming from.

Suppose an entrepreneur has borrowed money for the creation of a new capital good (either from individuals or from a bank) and spent it on making the investment. Suppose he has managed to raise enough income so that the market value of the capital good he has created is greater than the debt he incurred. It is now, on repaying the loan, that it is realised that in aggregate terms the debt can never be repaid.

Let us imagine the most favourable case for the entrepreneur, when the creditor (be it a private individual or the bank) does not ask him to pay back the principal of the loan, but only asks him to pay him indefinitely the interest on the debt. In such a case, the income produced by the capital good he has created must be enough to satisfy, at least, the interests of the debt. Concretely, and according to Robinson's First Law, we have:

$$B_i^{cap} = q_{ii}^o P_i - \sum_{j=1}^{n} q_{ij} P_j - B_i^{job} > \text{bank } interest \rightarrow \qquad k_i = \frac{B_i^{cap}}{i \cdot \aleph_i} > loan$$

Let us note that when the entrepreneur manages to capture sufficient income from his entrepreneurial activity and the market value of the newly created company is greater than or equal to the value of the debt he has incurred to create it, he can meet his commitments in three different ways. k_i is greater than or equal to the value of the debt he has incurred to create it, he can meet his commitments in three different ways:

1) You can use the income produced by the new capital to repay the principal and interest on the loan, since it is satisfied that:

$$B_i^{cap} > \textit{bank interest + share of principal}$$

2) You can repay the debt by selling some of the new equity, as it has a higher market value than the debt:

$$k_i > \textit{debt}$$

3) You can indefinitely use part of the income produced by the new capital to satisfy the interest on the debt, without ever repaying the principal of the loan:

$$B_i^{cap} > \textit{bank interest}$$

And here is the surprise. From the individual point of view, an entrepreneur can pay back the debt in any of the three previous ways without any problem, but, in aggregate terms, this is not possible and the principal of the credit can never be paid back. Let us observe that, in aggregate terms, the repayment of the principal together with interest, the first option, implies extracting from the money supply, as much or more money than was injected in the investment, that is, it implies a positive net hoarding. It implies this, even when the credit money comes from the creation of bank money, since the payment of interest means that more money must be returned than was invested in the creation of the capital good. This is also what happens in the second option, when the entrepreneur decides to sell part of the new capital to obtain the money with which to repay the principal of the debt plus interest, since whoever buys the new capital must have saved it previously. In both cases, to pay back the loan, it is necessary to extract as much money from the money supply as was injected in the investment and, therefore, there can be no net growth of the money supply, nor can there be net growth of the *GDP*, nor of capital.

We see that only in the third option, when the principal of the debt is never repaid and the payment of interest on the loan is maintained indefinitely, can there be growth of the money supply and there is, in aggregate terms, growth, since it guarantees that no more

money is ever extracted from the money supply than was injected by investment. That is, only in the third case, when the debt is never repaid, can aggregate inequality be fulfilled:

$$loan \geq savings$$

Only in this case, we can guarantee in aggregate terms that there will be economic growth and, therefore, growth of capital, since the excess of loans over savings can only come from bank credit, i.e., from monetary creation. This condition is confirmed by the Growth Equation, since the condition for growth to occur is:

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = [Ah^C(t) - Ah^S(t)] \xrightarrow[\text{Economic Growth}]{Ah^C(t) > Ah^S(t)} \Delta PIB(t) > 0$$

The expression is consistent with the identification, of the difference between the flow of credit and hoarding, with the difference between the flow of lending and saving (in the expression, the *PIA* and the Fisher constant related to the *PIA* usually appear):

$$loan - saving = Ah^C(t) - Ah^S(t)$$

And they explain why loans for investment, whether they come from savings or from money creation, can never be paid back in aggregate terms, because, in that case, there would be no growth of *GDP,* and no growth of capital. Recall that the entrepreneur will only succeed in investment when he succeeds in creating a capital good of greater value than the money he borrowed:

$$k_i = \frac{B_i^{cap}}{i \cdot \aleph_i} > debit$$

But, in order for there to be capital growth (although there is no guarantee that there will be), the money from the loans cannot be paid back in aggregate terms, which is what we wanted to point out.

THE LAW OF CAPITAL ACCUMULATION. In a monetary economy, the aggregate value of capital is proportional to the quantity of money which forms the money supply, the proportionality constant being the product of β by Fischer's constant:

$$K = \frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i} k_F \cdot M$$

COLOUR 1: In a pure credit monetary economy, credit money is backed by a part of the value of the capital it supports, so that, in aggregate terms, credit money cannot be repaid without also destroying the capital that supports it.

COLORARY 2: The amount of accumulated capital does not depend on the amount of savings in the economy, but on the increase of the monetary mass.

The Law of Capital Accumulation is a more profound formulation of Robinson's Second Law, but it says the same thing Robinson's Second Law says. Now, it shows very clearly that capital goods are the inevitable consequence of using money to organize our economy, since it states unequivocally that wealth within a monetary economy is proportional to the amount of money used for exchanges. To see that this is so, let us remember that the Growth Equation relates the nominal increase of *GDP* to the flow of monetary injection that has caused it. The increase in *GDP* causes the part that goes to pay capital income to also increase:

$$\Delta PIB = k_F \cdot Ah(t) \cdot \Delta t \quad \xrightarrow{r_{capital}=\alpha \cdot PIB} \quad \Delta r_{capital}(t) = \alpha \cdot k_F \cdot Ah(t) \cdot \Delta t$$

Specifically, the quantity of capital goods, or their price, increases proportionally to the Fisher constant and to the flow of bank money injection that is created to make the investment:

$$\Delta k_{capital} = \beta \cdot k_F \cdot Ah \cdot \Delta t \quad \rightarrow \qquad \Delta k_{capital} \approx 12 \cdot \Delta \textit{ bank money}$$

From the aggregate point of view, as long as the investment money comes from the bank loan (monetary creation) and as long as it is not repaid, the monetary injection produces in capital goods, about twelve times the value of the money used in the investment. A result we have already reached before, but which allows us to explain now why the credit money with which the new capital is created can never be repaid.

Let us observe that the Growth Equation states that money in the money supply cannot decrease without the economy going into recession, since it is production and not prices, which decreases when *GDP* decreases, which always forces money coming from savings to return to the economy or, at least, bank credit to grow faster than the money hoarded. But savings is not what is creating the new capital, but the increase in bank money that is created by the granting of bank credit (the flow of credit, when we assume it is zero hoarding):

$$\Delta K = \frac{\langle \alpha \rangle}{\bar{\aleph} \cdot i} k_F \cdot \Delta M = \frac{\langle \alpha \rangle}{\bar{\aleph} \cdot i} k_F \cdot Ah^C \cdot \Delta t \sim 12 \cdot Ah^C \cdot \Delta t$$

The expression tells us that, although savings money is used to create new capital in physical terms, in aggregate terms it does not contribute to increase the quantity of capital

goods, since only the increase in bank money creates new capital. But, in aggregate terms, savings money must be invested in the purchase of new capital so that it can be returned to the economy through investment spending, which is only possible if the monetary injection produced by credit succeeds in creating it in sufficient quantity. Let us observe that the new capital created by the increase of the monetary mass, must be distributed in aggregate terms between savings money, bank credit and businessmen, being the part of the new capital kept by businessmen, the real profit they obtain and the reason why they invest:

$$\Delta K = \Delta K_{saving} + \Delta K_{credit} + \Delta K_{businessman} \sim 12 \cdot Ah^C \cdot \Delta t$$

In fact, the distribution of the new capital between those who invest their savings, those who invest on credit and entrepreneurs, is not guaranteed, far from it. To see it, let us take the previous expression and let us accept that the amount of capital that the bank credit is going to satisfy covers it in its totality (the rents it produces are equal to the bank interests). Then $\Delta K_{credit} = Ah^C \cdot \Delta t$

$$\Delta K_{saving} + \Delta K_{businessman} = \left[\frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i} k_F - 1\right] \cdot Ah^C \cdot \Delta t$$

The new capital created by the monetary injection will be distributed, almost entirely, between the businessmen who create it and the savers (lenders) who finance them, which seems logical and coherent until we realize that the previous relation forces us that:

$$\Delta K_{saving} \ll \left[\frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i} k_F - 1\right] \cdot Ah^C \quad \rightarrow \quad \Delta K_{saving} \ll 11 \cdot Ah^C \cdot \Delta t$$

Or, in other words, in aggregate terms, the increase of the money supply, which we are identifying with the annual flow of credit, Ah^C (the creation of bank money), must be sufficient for the growth of capital to absorb savings.

Simple numbers tell us that this is not always going to be easy to achieve, especially when the economy is growing slowly. For example, when the real growth of an economy is 1%, the real creation of new capital is around 6% of the annual value of GDP, so annual savings must be kept well below that figure (in order to be saved). When we accept that part of the new capital is the profits kept by entrepreneurs, then the constraint is even stronger and will surely fall to no more than 4% (part of the new capital must be kept by entrepreneurs, or else they would not start any new business), which is clearly going to create a serious problem.

The problem with saving is that it requires a minimum growth of the economy to be able to absorb it, which is not always going to be possible in an environment of little or no

growth. In fact, what we have just shown is that in a monetary economy, GDP growth has to be at least one-sixth of the money that is saved:

$$\Delta K_{saving} \ll \frac{\langle \alpha \rangle}{\bar{\aleph} \cdot i} \cdot \Delta PIB \quad \rightarrow \quad saving \ll 6 \cdot \Delta PIB$$

Which is a remarkable result.

Beyond the vision offered by the financial nature of capital, there is much beauty in credit money, since in aggregate terms it is a fish that bites its own tail: *"credit increases aggregate expenditure, the increase in aggregate expenditure increases aggregate income, the increase in aggregate income increases aggregate capital and, finally, the increase in capital supports credit money".*

MARX AND THE PROBLEM OF TRANSFORMATION. Understanding Marx is simple when one understands, as he thinks, that reproducible commodities have an intrinsic 'value' proportional to the social labour it costs to produce them. Because, when it is also accepted as true that the price at which the merchandise is sold is proportional to its "value", what he calls the Law of Value, then it can be demonstrated that the profit obtained by the businessman when he sells the production, is proportional to the social work incorporated in them.

This result, consequence of accepting the Law of Value which states that the price at which commodities are sold is proportional to the social labour they contain, is what allows Marx to identify the profit of companies with the surplus value that the employer stops paying to the worker and thus demonstrate human exploitation. We see, that all Marx's reasoning rests on the fragile belief that the Law of Value is fulfilled, a law that can be easily proved to be not true and, therefore, that his demonstration on the exploitation of the businessman is not valid, or at least, that it is very inconclusive.

However, the financial nature of capital changes the perspective of the problem of what is the origin of profit and to whom it should be attributed, whether to the entrepreneur or to the worker, because now the entrepreneurial profit is identified with the capture of an income, which has nothing to do with work and even less to do with the money invested in the creation of the capital good.

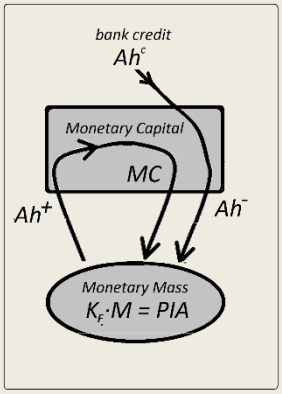
The vision of reality is now much darker than the one described by Karl Max in "Capital", when, thanks to the Law of Value, he attributes the entrepreneur's profit to the wage not paid to the worker, because the entrepreneurial profit, or if we prefer, the value of capital, is clearly a product of the whole structure of society which is impossible to attribute, neither to labour nor to the money advanced by the entrepreneur, even if the mediation of both is indispensable to create capital.

Now, capital is a social relation that has to be identified with the participation of, not only the workers and entrepreneurs working in a particular company, but of all the work and all the production that is being done within society, since capital appears as the inevitable consequence of organizing social production by making use of money.

Since capital is the valuation made of an income by the society that has created it, and by allowing capital to become the private property of a part of society, two different social classes are created, those who own capital goods (and obtain rents) and those who do not own capital goods (and do not obtain rents). A hasty decision that should be discussed a little more slowly by society as a whole.

The analysis we have made runs through a sequence of statements that we can call the Financial Theory of Economic Growth and which we summarize below:

Financial Theory of Economic Growth



FIRST. Entrepreneurs, either with money previously saved, or with credit money created out of thin air by banks, invest by buying goods in the Consumer Market. This is the flow Ah^- of the figure.

The flow Ah^C is the annual amount of credit money (bank money) that is created by banks from nothing when they grant credit, whereas Ah^S is the flow of hoarding that increases the amount of money that is saved. The difference $(Ah^C - Ah^S)$ is the annual amount of money that is injected into the money supply, and it holds that:

$$-(Ah^+ + Ah^-) = (Ah^C - Ah^S)$$

SECOND. In aggregate terms and so that the nominal economy can grow, all the money extracted from the money supply through savings, must be lent and returned to the economy in the form of expenditure, but this is only possible when the money from savings that is lent is never returned in aggregate terms. In case the money extracted by savings is returned, then the

money supply of the economy is going to decrease and the economy is going to go into recession, as the Growth Equation states:

$$\frac{d}{dt}PIB(t) = -k_F \cdot [Ah^C - Ah^S] \xrightarrow{Ah^C - Ah^S > 0} PIB < 0 \ (recession)$$

It is also what happens when the bank money granted in credits is returned, that in aggregate terms there will be no change in the money supply, since the return of a credit implies the destruction of the money created when it was granted and, in such a case, the economy will not grow.

<u>FOURTH</u>: The amount of capital created in an economy depends on the amount of GDP captured as income, so as GDP increases, so does the amount of capital. Specifically, according to the Law of Growth, the value of capital goods increases by about 10 to 12 times the annual amount of the monetary injection:

$$\Delta K = \frac{\langle \alpha \rangle}{\aleph \cdot i} k_F \cdot (Ah^C - Ah^S) \cdot \Delta t = \frac{\langle \alpha \rangle}{\aleph \cdot i} k_F \cdot \Delta M \qquad \textit{Growth Eq.}$$

How much real GDP grows and how much real capital grows is uncertain, but it is true that both the rate of inflation and the rate of growth of real capital grow. π and the growth rate g is the same for GDP and for capital K:

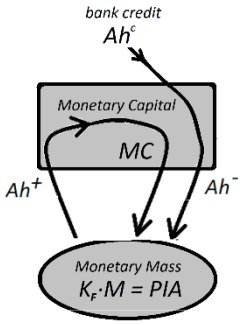
$$\boxed{\pi + g = k_F \cdot \tau = \beta \cdot k_F \cdot \tau_k} \begin{cases} \tau = \dfrac{(Ah^C - Ah^S)}{PIB} \rightarrow inyection\ rate/PIB \\ \tau_k = \dfrac{(Ah^C - Ah^S)}{K} \rightarrow inyection\ rate/capital \end{cases}$$

5. GROWTH WITHOUT MONEY CREATION AND GROWTH WITHOUT SAVINGS

To understand a little better the role that the Financial Theory of Growth reserves for savings, let's analyze the growth of the economy in two not entirely unrealistic cases.

A first case will be that of an economy where there is no significant monetary growth, which we think is the situation that has been going on for the last 10,000 years because of the widespread use of gold as money.

The second case will be that of an economy in which there is no significant net saving (hoarding), which is the situation a monetary economy tends to reach when there is a discrete inflation which invites to keep wealth in the form of money. It is the normal



situation of an economy, where loans are granted with money coming partly from savings and partly from bank creation.

Let us observe in the attached figure that the loan for investment or for consumption, the flow Ah^-can come both from previous savings Ah^+as well as from the creation of bank money Ah^Cbeing impossible to distinguish one from the other, in aggregate terms. Now we are going to study how the economy changes according to the origin of the loan money:

a) **Economy without monetary creation**

A very interesting situation is the case of an economy where the amount of money does not change because banks do not increase the amount of money they lend. In such a case, the money for investment comes from money previously saved, which is lent out when debt securities are purchased or when the bank grants a new loan after cancelling an existing loan. In such an economy, according to the Growth Equation, there can be no growth of *GDP* or capital, but nothing prevents the emergence of new, more productive firms, thanks to the advance of technology, which eliminate the existing less productive firms.

SCHUMPETER'S ECONOMY: "We call Shumpeter's economy, an economy in which there is no monetary creation and necessarily any loan is made with saved money":

$$\frac{d}{dt} PIB(t) = k_F \cdot [Ah^C - Ah^S] = 0 \qquad \textit{Shumpeter Economics}$$

In a Shumpeter economy, both GDP and the value of aggregate capital remain unchanged.

Let us observe that a Schumpeterian economy has several characteristics that can be quite confusing:

1) It is a zero-sum economy. Although there may be real productivity growth, it is not reflected in income and *GDP* does not grow. Nor does the value added of capital grow, so any new capital goods that are created have to be at the cost of the destruction of existing capital goods. The new companies, probably much more productive, are replacing the old companies, which are much less productive, but the economy's income does not increase because of this, nor does the added value of capital.

2) There may be hoarding. Savings may not necessarily flow back into the economy as credit spending. When there is no borrowing because the technological

momentum has dried up, or there is no population growth, the economy will go into recession when the flow of savings (hoarding) is not lent out and is no longer invested or spent.

In practice, this is a paradoxical situation, since any increase in production will force prices down, which we have already said cannot happen in aggregate terms without the economy going into recession. However, for practical purposes, an overvaluation of the currency is taking place, since the increase in production is hidden in the increase in the quality of what is produced, so that now, a product of much higher quality than before is bought for the same price. In other words, income has not changed, but much more is consumed than before, not because more products are consumed, but because higher quality products are consumed.

(This process of overvaluation will be noticed in the increase of the exchange rate of the currency with respect to the rest of the currencies, since its price will increase. It was also what happened all the time with the gold standard, that gold was continuously overvalued with respect to the quality of the goods, without the economy ever entering into a recession).

Joseph Alois Schumpeter was an Austrian-American economist who lived in the first half of the 20th century. With a very conservative mentality, he stood out more for his capacity for observation than for his ability to interpret the economic reality around him. His is the idea of "the creative destruction of capital" which shamelessly extols the central role of the entrepreneur in economic growth, and which is the reason why he is remembered.

SCHUMPETER'S CREATIVE DESTRUCTION

There is nothing to prevent an economy from having strong productivity growth and yet weak nominal GDP growth because the money supply is growing very slowly.

Such a situation, with a slow nominal growth of the economy together with a strong increase in productivity, was the situation throughout the eighteenth and nineteenth centuries in Europe. Most especially, during the period of time from 1820 to 1870; the period known as the Engels Pause. This was a very strange time, in which an extraordinary development of technology coexisted with the most absolute working-class misery, without it ever being possible to understand how both facts, which in themselves seem contradictory, could come about. We think it is very important to understand what was the cause of this apparent contradiction of capitalism in order to prevent it from happening again in the future.

In an economy, nothing prevents people from saving and banks from channelling that saving towards investment, granting credit to create new productive capital. In fact, until the advent of bank money and because of the monetary rigidity required by the gold standard, all new investment depended on previous savings, since the growth of gold stocks

was limited to very specific moments when new deposits were found, such as the discovery of gold in California.

Evidently, the Growth Equation does not prevent that in an economy based on gold and with a very slow monetary growth, there is a great creation of new companies thanks to investment expenditure financed with money from savings, but it does force existing companies to disappear so that in aggregate terms there is no nominal increase of income or capital.

The new companies, created with the loan of the money previously saved, will only make their way if they succeed in capturing a part of the income captured by the already existing companies, since as there will be no increase in the money supply there will be no increase in expenditure, nor in production in nominal terms. But this is guaranteed in an environment of strong technological innovation and great scientific discoveries, such as the one which accompanied the first industrial revolution. When the introduction of a new technology reduces the number of workers needed to produce the same amount of goods as before, there is a strong increase in profit in the new firms thanks to the reduction in spending on wages. This makes the new, more productive firms will have made way by eliminating the existing, less productive firms.

Everything seems a perfect world to a great observer like Joseph Schumpeter, who is ecstatic at the destruction of the old industrial fabric that makes way for a new industrial fabric with much less need for work. Extraordinary increases in productivity are shown before his eyes without perceiving the tremendous incoherence represented by the slow nominal growth of the GDP that accompanies it:

Investors' savings provide the necessary funds for investment in new companies.
- The creation of new and more productive firms replaces the old ones almost continuously, but there is not an even growth of production.
- Near-zero inflation rounds out the extraordinary landscape.

Of course, Schumpeter is enthusiastic about the extraordinary increases in production that he sees at the end of the nineteenth century, which shows a business fabric constantly being renewed and becoming more and more productive thanks to heavy investment. But when we look more closely at this "brave new world" that shows us a booming capitalist economy, but with slow nominal growth, we see that the economic situation in which the workers are left is inhuman and terrible, and the misery of the workers reaches heights unthinkable only a few decades before, when the economy was still based on agriculture and there was hardly any technology. Schumpeter does not see the poverty in which the working population moves because of the structural unemployment caused by the increase in production, in an environment without nominal growth. A situation in which low wages are imposed and mere subsistence becomes difficult even when one has a job, something

that Engels did see a few years earlier, and which is the reason why he wrote the Communist Manifesto together with Marx:

1) Thanks to the spectacular increase in productivity, goods are produced with less and less labour, which creates a strong structural unemployment that could easily absorb a rapid growth of the economy, but that does not happen because the slow growth of money is being limited by the nominal growth of the economy. There will be unemployment everywhere because the economy continues to produce almost the same, but with a much smaller number of workers.

(Especially when structural unemployment is coupled with rural migration, as in fact occurred throughout the industrial revolution, but most especially during Engels' Pause).

2) Although the economy is not growing fast enough to absorb the growing surplus of the working population, there is enough savings to invest in new and increasingly productive technologies that replace the old ones almost without discontinuity, and that need less and less labor. A process of "creative destruction" that will cause more and more unemployment and more and more workers' misery in the midst of a binge of technological progress without precedent in the history of humanity.

That was the epoch Engels lived in. It was the epoch that saw the birth of The Communist Manifesto. It was the epoch that saw the growth of the "reserve army" so magnificently narrated by Karl Marx in Capital. It was also the epoch in which the gold standard and the absence of a Central Bank turned any expansion of bank credit into a credit crisis that spread misery everywhere:

"...a ghost is haunting Europe, the ghost of communism..."

(Banking crises occurred without apparent discontinuity throughout the 19th century, in cycles that lasted between 7 and 11 years. So much so, that the French physician and economist Joseph Clément Juglar, identified them without difficulty in his book "The commercial crises and their periodic reappearance in France, England and the United States" published in 1862, being the reason why they are known as Juglar cycles).

Perhaps at this point, it would be good to quote Karl Max when he wrongly attributes the structural unemployment of his time to the capitalist form of production, and not to the use of the gold standard:

> *"...if the existence of a workers' overpopulation is a necessary product of the accumulation or development of wealth on a capitalist basis, this overpopulation becomes in its turn a lever of capitalist accumulation, indeed, one of the conditions of life of the capitalist mode of production. It constitutes*

*an **industrial reserve army**, an available contingent, which belongs to capital as absolutely as if it were bred and maintained at its expense...."*

b) **Economy with monetary creation, but without net saving.**

It is normal in an economy for loan money to come both from previous savings and from bank money that is created out of thin air. In fact, there is no way of distinguishing one money from the other, and it can be seen that most large companies do not resort to credit from banks, but use the issue of debt securities, or the issue of shares, to raise money from savings, while bank credit and the monetary creation it implies, generally serves to finance small and medium-sized companies, mortgage lending and consumption, and also, though less, to finance the public deficit.

This combination of savings and credit creation allows growth rates as high as China's, which in some years has been well over 10% of *GDP*, with hardly any inflation. It is also what produced the productive miracle of the USA during the Second World War and the 30 glorious years that followed, also with hardly any inflation.

Therefore, it is interesting to analyse what happens in an economy where there is no saving and where banks can create all the bank money needed for investment by granting credit. According to the Growth Equation, will be the flow of bank credit Ah^C when it is spent and becomes part of the money supply, which determines the nominal growth of the economy, whether it is inflationary or not:

$$\frac{d}{dt}PIB(t) = k_F \cdot [Ah^C - Ah^S] \quad \xrightarrow{Ah^S=0} \quad PIB(t) = k_F \cdot \int Ah^C(t) \cdot dt > 0$$

We see that there is no need for prior savings for the economy to invest, take advantage of technological innovations and grow, since all the money necessary for the nominal growth of the economy comes from monetary creation through bank credit:

$$\pi + g = k_F \cdot \frac{Ah^C}{PIB} \;\rightarrow\; \boxed{\pi + g = k_F \cdot \tau} \qquad \begin{cases} \tau = \dfrac{Ah}{PIB} \rightarrow rate\ of\ money\ creation \\ \pi \rightarrow rate\ of\ inflation \\ g \rightarrow growth\ rate \end{cases}$$

The value of the inflation rate of the economy will depend on whether or not the increase in income caused by the injection of money from bank credit is captured by the sale of new products or, on the contrary, is limited to raising the prices of existing products.

c) **Economy without monetary creation and without net saving.**

At this point, we could ask ourselves the question: what is the purpose of savings? If only with the growth of bank money it is possible to satisfy investment needs, then what is the function of savings in the economy? It is not easy to answer this question, because the only reasonable answer is probably: "because people like to save".

However, this way of looking at things can lead us to the misconception that companies only invest when they expect to increase the value of their companies, i.e. their capital, which is almost never true. Recall that, in general, the economy grows slowly and without too many technological shocks, so it can be considered that, for all practical purposes, there is a fixed amount of capital within the economy that forces entrepreneurs to fight for it. Entrepreneurs do not only invest to obtain new capital, but most of the time they invest to conserve the capital they already have, precisely because capital is limited and is not produced by savings but by monetary injection:

$$K = \frac{\langle \alpha \rangle}{\bar{\aleph} \cdot i} k_F \cdot M$$

For this reason, a very important quantity of the investment made by the companies is made trying to keep their market share intact, that is to say, to keep their income, and they do it with the money of their profits, that is, with the money of their own savings. In such a situation, in which neither bank credit nor money from other people's savings is borrowed, there is no monetary growth or growth of capital, and the situation can be interpreted as a creative self-destruction to which companies are forced in order not to lose the share of sales they already have, and which has as a consequence the increase of the general productivity of the economy, in spite of the fact that the company does not increase its value.

Let's look at the graph presented by Thomas Piketty in his book, "Capital in the 21st Century" to understand it:

Although it is not visible in the graph because it is normalized to *GDP*, from 1700 to 1900, for almost two hundred years, the economy grew very slowly mainly because of the impossibility of creating money out of nothing. However, despite the slow nominal growth of the economy, we can see very well in the graph that there was a very strong redistribution of the existing income among the different sectors. Agriculture, for example, went from accounting for 2/3 of the income at the beginning of the 18th century to only 1/7 of it at the beginning of the 20th century. This important loss of relative income of some sectors in favour of others was a consequence of the increase of productivity in agriculture, which strongly reduced the expenses and the amount of work necessary to produce the same, and which ended up being dedicated to produce in other industries. This is precisely what can be intuited in Piketty's graph, in which it can only be intuited that agriculture, in spite of everything, kept its nominal income intact.

(For example, food needs grow as the population grows, but technological innovation can reduce the cost of producing it very quickly, which frees up resources in agriculture that are used in other sectors and causes the share of food in *GDP to* fall sharply, even though agricultural prices and incomes do not fall in nominal terms.)

Evidently, the redistribution of corporate income across sectors does not mean that the nominal income of each sector declines. Thus, farmers did not see their nominal income decrease, quite the contrary, but it does indicate that the increase in profits in agriculture did not go hand in hand with the increase in its productivity, and this is so because the increase in productivity is a global phenomenon that almost never benefits those who carry it out, because the increase in productivity in one sector is distributed in productivity increases in all sectors.

We have already named an economy without monetary growth, as a Schumpeter economy, but what we are looking at now is an economy in which companies can grow using only their internal savings and without needing to ask banks or individuals for any money. Such a situation is very similar to a society as developed throughout the 19th century, but without "creative destruction" to give new entrepreneurs the hope of being the next "Bill Gates", on the contrary, the current owners of capital will perpetuate their wealth indefinitely and an authentic capitalist class will be created, which will simply rule the world.

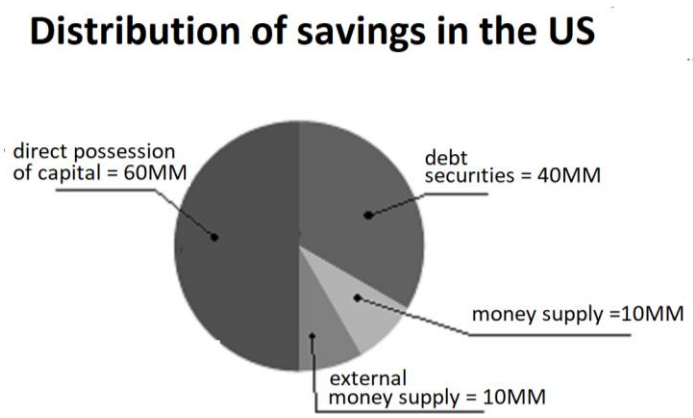
6. CAPITAL, DEBT AND MONEY

The Financial Theory of Capital shows us a vision of the economy very different from the mechanistic vision that derives from the physical nature of capital. When we stop seeing the growth of capital as the accumulation of productive goods in which savings are invested, and we accept that capital is the valuation made by the Capital Market of the income obtained from the possession of a capital good, then savings show their true nature, which is none other than the accumulation of wealth, without having anything to do with the productive process. Or in other words, saving can be done because there are capital goods that can be bought, but saving is not the one who creates capital goods. This is very important, because now savings can increase only to the extent that the amount of capital grows, which creates a serious problem, since the growth of capital is endogenous and may not be able to absorb the savings that are made within the economy.

The idea is not difficult to understand. People save money and then use their savings to purchase capital assets in the logical belief that they will be safe from the vagaries of inflation. It is not very practical to hold wealth as money in a typically inflationary economy,

when the assets that can be bought with money produce incomes in excess of 4% of their value, and tend to hold their value very well over time.

Let us note that the distribution of wealth among the different capital goods that people might be expected to make on the basis of the financial nature of capital is what is actually observed:



The accompanying chart shows what proportion of wealth is held in each of the four forms of capital, within the US in the year of 2019:

$$capitalgoods \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 120\ MM$$
$$aggregate\ debt \begin{cases} bonds \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 40\ MM \\ monetary\ mass\ international \ldots .10\ MM \\ monetary\ mass \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 10\ MM \end{cases}$$

Thus, the total value of capital goods in the USA (land, houses, offices, companies, etc.), amounts to about 120 million dollars at the beginning of 2019. That is, wealth, as defined by Piketty.), amounts to about 120 trillion dollars at the beginning of 2019, of which 50%, about 60MM, are held with the direct possession of capital goods, while 33 percent of the total, about 40MM, are debt securities on capital goods (corporate bonds, mortgage debt, treasury bonds, student debt, etc.). Recall that debt securities, or bonds, is an indirect way of owning capital assets because the income it pays comes from a portion of the income produced by the capital asset backing it. About 10MM, 8 percent of savings, are dollars held in the Capital Market (although we will show later that this is the money with which international trade is conducted, since the amount of money held by Americans as monetary capital is very small and falls far short of that figure), while the remaining 8 percent, another 10MM, is the money supply used in the Consumer Market to support purchases.

The data on the existence of 20MM dollars is correct, and is a figure taken from the Federal Reserve's accounts. However, the money supply of $10MM is derived from the capital equation, which states that the value of aggregate capital is about 12 times the money supply:

$$K = \frac{\langle \alpha \rangle}{\bar{\aleph} \cdot i} k_F \cdot M \qquad \begin{cases} K = 120MM \\ M = 10MM \\ \dfrac{\langle \alpha \rangle}{\bar{\aleph} \cdot i} k_F = 12 \end{cases}$$

Given that the US GDP is about 120MM, then the money supply that sustains the US economy is about 10MM dollars. From this, we have deduced that the savings held in monetary capital are the other 10MM dollars, of the total 20MM dollars in bank money, although later we will see that, most probably, most of this money is being used to support international trade between countries, so the real amount held as monetary capital is very small or almost nil.

Let us look very briefly at the difference between capital, debt securities and money, and the relationship between them.

We know that the arbitrage of the Capital Market converts all capital goods into equivalents and that the reason why people or institutions keep savings in one or another form of capital depends only on the expectations they have about the evolution of its price in the future. We also know that the Financial Theory of Capital states that the aggregate value of all capital is inexorably related to the money supply of the economy by the equation:

$$K = \frac{\langle \alpha \rangle}{\bar{\aleph} \cdot i} k_F \cdot M$$

Therefore, everything would be much simpler if there were only capital goods and money, but this is not the case. The economic reality around us is not so simple, and the simplicity of the expression linking the value of aggregate capital and the quantity of money in the economy is only apparent.

What is debt? Is it a capital good? Is bank money a debt that is created when a bank loan is taken out?

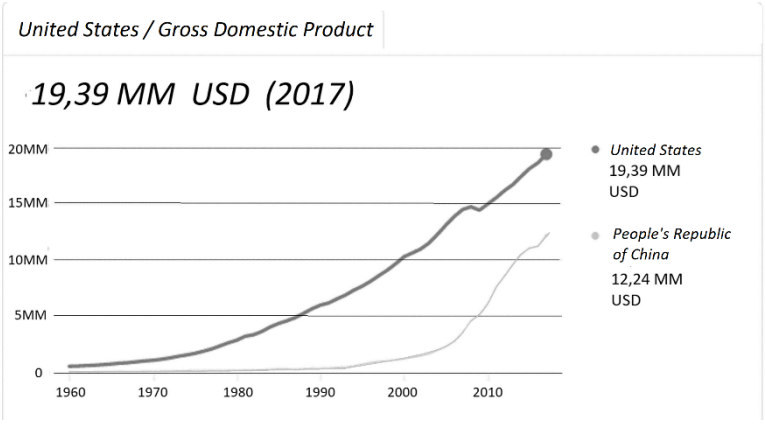
Let's look in a little more detail at where the different forms of capital come from:

a) The money supply.

If we look closely at the attached graph showing the evolution of the *GDP* of the US and China in recent decades, we can see very well that the US has gone from having a *GDP of* around 500,000 million dollars in the early 1960s, to having a *GDP* close to 20 trillion dollars at the end of the decade of 2010. In other words, in an evolution that can be identified very well with an exponential nominal growth, the nominal *GDP* of the USA has multiplied almost 40 times in the last 60 years. Even more impressive has been the evolution of China's *GDP*, where nominal growth has been clearly exponential and in a much shorter period of time, only 20 years.

Let us note that, *"to increase the nominal flow of spending by more than 40 times, US banks have necessarily had to increase the money supply by more than 40 times during this half-century, according to the monetary equation."*

$$k_F \cdot M = PIB$$



Specifically, by resorting to the Aggregate Conservation Equation it is possible to calculate exactly, the average annual flow of money that private banks have been making in the US during the last half century, assuming that the flow of credit has remained proportional to GDP all this time:

$$\frac{dPIB(t)}{dt} = -k_F \cdot Ah(t) \xrightarrow{Ah(t)=a \cdot PIB(t)} PIB(t) = PIB_o \cdot e^{k_F \cdot a \cdot t} \rightarrow a \approx 2\%$$

The result we get from applying the equation is very close to the real result. Let us bear in mind that a nominal growth of 4% per year, half real growth and half inflationary growth, such as the US economy has followed during the last half century, needs an annual flow of money creation equal to 2% of the *GDP,* which accumulated during the last 60 years is about 35 trillion dollars at current prices, that is, 1.7 times the current *GDP* already corrected for inflation (this only to create the money supply, and without counting the

other 10MM dollars which we suppose are used to maintain international trade. If we also count that money, the monetary creation has doubled).

Of course, that money doesn't belong to the banks, but they charge an interest rate on it as if it did. Although economists working for private universities in the US always blame the government for making the money and causing inflation with their deficit budgets, the truth is that the only ones who make money are the commercial and investment banks when they extend a bank loan. Therefore, they have had to be the ones who have manufactured the immense amount of money that the Consumer Market needs to function.

Seigniorage" is the term used in economics to refer to the privilege of those who make money, and today it is a privilege held by commercial and investment banks. The charging of interest on the money they create is the main source of profit for commercial banks, while the liquidity business, a much more lucrative business than the banking business, is the main source of income for investment banks. We do not ask what economic argument can justify an accumulated gift to private banks of $35 trillion (an amount that rises to almost $70 trillion when money used to conduct international trade is included).

<u>THE LORD IN SPANISH TERMS.</u> Let's look for a moment at the following figures for the Spanish economy for the year 2019:

$$\left.\begin{array}{l} PIB\ en\ 2019 \ldots\ldots\ldots\ldots\ldots\ldots 1.244.757\ M.€ \\ nominal\ growth\ 3\% \ldots\ldots\ldots\ldots\ldots 37.342\ M.€ \\ real\ growth\ 2\% \ldots\ldots\ldots\ldots\ldots\ldots 24.895\ M.€ \\ public\ deficit\ 3\% \ldots\ldots\ldots\ldots\ldots\ldots 37.342\ M.€ \end{array}\right\} \rightarrow\ \Delta M = 1.5\%\ PIB$$

The data tell us that, during 2019, the money supply has increased in Spain by 1.5 percent of GDP (although the amount may have nothing to do with domestic bank creation, as the money may have come from outside, either thanks to super-skillful trading or thanks to foreign investment, as Spain belongs to Europe and its currency is the euro).

Who has manufactured this money? It is not at all clear, since any bank in the European Union can have manufactured it and grant credits that end up being spent in Spain, but it is very clear that the Spanish government would have been able to pay half of the public deficit in 2019 if it had been able to issue the necessary money to allow the nominal growth of the economy. But is it desirable for it to do so? We think not, that public spending

<u>THE BANKING SYSTEM</u>. Money is that which the community has decided, for one reason or another, to make money and it acquires its value because it is the universal element of exchange, otherwise, it acquires its value because the whole community is ready to sell in exchange for money everything it has put on sale. For this reason, and in spite of the fact

that the present fiat money is a register which costs nothing to make, it has value and is a part of our wealth.

Throughout history, there have been many goods that have made money (wheat, salt, copper, iron, silver, gold, tobacco, but nowadays, what makes money is the bank register made by the banks when they grant a credit. Therefore, money is part of the wealth of the one who possesses it, but it is a debt contracted with the bank that received the credit. For this reason, money runs the risk of being counted twice, once as money, and once as an asset that earns interest for the bank: the debt or credit title with which the bank money was created.

If we ask the director of a bank what the book value (the capitalization) of his bank is, he will most probably add his assets with his liabilities to calculate it and tell us that his patrimony is the own assets contributed by the owners of the bank, which is very clearly false, even though, the bank records that they make of money have the same amount as the credits granted and owed to the bank. The reason is that the banking system is charging interest on all the bank money it has created by granting credits, money that, although it does not belong to it, does not prevent it from charging interest as if it did. When you take into account all that income, the book value of the whole banking system should be close to all the credit granted, in the case of the US, close to 20MM dollars (accepting that all the money pays the average interest rate of money).

Monetary seigniorage is taught in private universities in the US always associated with the privilege of the Central Bank (the government) to make money out of thin air, which, although it may be true because the FED can force banks to make any amount of money for it, a simple look at its accounts shows that it is false, and the FED has only made about $4MM worth of money during the 2008 crisis, when it had to bail out the banks, a simple look at the Fed's accounts shows us that the statement is false, and the Fed has only made about $4MM worth of money during the 2008 crisis, when it had to bail out the banks, the publicly traded companies, but not the government.

Evidently, no matter how much they lie or try to hide the truth, it has not been the Federal Reserve that has manufactured the 10 MM dollars that maintain the exchanges in the USA (to which we must add another 10 MM dollars to sustain world trade). On the contrary, it has been the banking system that has manufactured that money and it would be good if it continued to do so, but under greater public control.

<u>Who BACKS THE BANKING MONEY?</u> When we look at who is backing the money created through credit by the Banking System, we can find three different types of debtors, who back the credit in different ways:

- *The Central Bank. Without any backing (does not usually pay interest to banks).*

- *The private sector. Supports with capital goods (with the market interest rate).*
- *Consumers. Backed by their income (with a high interest rate).*

For the last 200 years, it has been the private sector that has backed the credits with which the economy's money has been created and who have paid the interest, while the Central Bank has intervened little or very little and the debt it has contracted with the Banking System has been very modest, according to the historical data that are preserved. However, the situation has changed dramatically with the recession of 2008. Today, a very significant part of the money in the economy is being backed by the Central Bank. Specifically, the amount of money owed by the Federal Reserve to the Banking System has gone from almost zero to about $5 billion, which is about half of the money the US economy needs to function. That is a lot of money, although it is unclear how long it will continue to hold that money.

Evidently, the money created for the Federal Reserve by the banking system, does not pay interest and neither has it gone to pay government expenses, nor to buy consumer goods, but it has gone to buy securities (capital goods) of all kinds to provide liquidity to the Capital Market. A part of that money we believe has gone to replace the money of the bank loans that have failed and that their cancellation would have forced the banks to replace the money of their own capital (that is, to rescue the private banks), so the money will have ended up in the money supply. Also a part of that money will have gone to repay private loans, which will have prevented the money from being extracted from the money supply. The rest of the money seems to have been used to provide liquidity to the capital market, remaining and being hoarded in the capital market.

To summarize, before 2008 bank money was backed entirely by credit granted to the private sector, whereas after 2008 a quarter of bank money is credit granted to the Federal Reserve (the Federal Reserve does not create money itself) and is being backed by it, without paying any interest:

- Before 2008 → 100% of bank money is private credit.
- After 2020 → 25% of bank money is credit owed by the Central Bank.

In 2020, of the 20MM dollars of bank money existing in the USA, about 5MM will be owed by the Federal Reserve (bear in mind that half of this money, about 10MM, is used to carry out commercial exchanges). In the other countries of the world the situation must be similar, and a good amount of the existing money will have been backed by the Central Bank.

Why are commercial banks crying?

It is not very difficult to understand. The Banking System has gone from charging interest on 100% of the money that makes up the money supply, to charging interest on only half

of that amount, since the Central Bank does not pay interest at present. In addition, the interest rate charged by the banking system for loans has been greatly reduced, which is a direct torpedo to its source of income. If we add to this the non-payment of many loans due to the severe economic crisis (e.g. Spain), it is rare that all of them are not bankrupt. It is also not uncommon to observe that they charge commissions for almost anything they do.

Commercial banks have many good reasons to cry, but not so with investment banks. They are still the liquidity providers in the capital market (despite central bank intervention), and they are the real pirates of the economy and should be banned.

b) Monetary capital

Within a monetary economy there is not only the money used to buy in the Consumer Market, there is also the money hoarded in the Capital Market, which we have called "**money capital**" and which is often used to buy the different capital goods. All the money that exists in the economy is, as the case may be, either money used for purchase in the Consumer Market, or money hoarded in the Capital Market, although the two are not distinguishable because both types of money are only an accounting record in a commercial or investment bank.

As we have already said, the Capital Market works as a "barter market" in which there is no money, or rather, in which money is only one more good which is no different from the other capital goods. This is the reason why both forms of money, the one kept as savings and the one kept for purchases, are not easily converted into each other, so that a sudden change in the quantity of bank money kept in the Capital Market does not affect the quantity of money in the money supply.

The latter has been seen very clearly after the immense monetary injection carried out by the Federal Reserve with the purchase of more than 4 trillion dollars in assets of all types in the Capital Market, and which has not affected prices in the Consumer Market at all.

It makes sense. Saving is done with the intention of having consumption capacity in the future, and the fact that the way in which savings are held, whether it is an asset, a house or money, changes does not change the reason why they are held. When the Federal Reserve bought all those assets in the Capital Market, what it did was to satisfy the desire of savers to exchange the financial assets in which they held their savings for money, but at no time did the saver have any intention of spending his savings, whether or not he held them in money.

MONETARY CAPITAL. We call "money capital" the savings kept hoarded in the Capital Market, that is, the amount of savings kept as money, and which is usually used to carry

out the purchase of capital goods. Unlike what happens with the money used in the Consumer Market, there does not seem to be any relationship between the flow of purchase of capital goods and the amount of money needed to carry them out, as it does in the Consumer Market, so the amount of money capital can go from being zero to containing millions of millions in a short space of time, as it happened in the years following 2008.

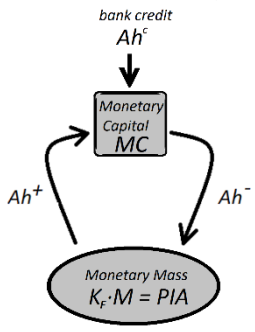
In the Capital Market very little money can create an immense flow of exchanges of capital goods, and a large amount of money can generate very little flow of exchanges when it remains idle. To put it in a more technical way, the flow of purchase in the Capital Market is not limited by the amount of existing monetary capital, and there is no monetary equation in the Capital Market that links the flow of exchange to the amount of monetary capital, as there is in the Consumption Market.

The great difficulty of any monetary analysis has to do with the great difficulty to differentiate both forms of money, since both money capital and money supply are only a bank notation that can only be distinguished by the use made of them within the economy.

There are, in general, two different ways in the economy of creating money capital. One is through savings, and the other is through the creation of bank money.

1. <u>By saving</u>

Money capital is created when someone extracts money from the money supply and saves it. And vice versa, it is destroyed when someone injects money into the money supply, spending the hoarded money. Both are the flows Ah^+ y Ah^- which can be seen in the attached figure. It is very clear that in the process of saving and dissaving the total quantity of bank money in the economy does not change, but its nature does change, it goes from being money supply to being money capital, or vice versa.



Creation of Monetary Capital

Let us remember that it was following this idea about the flow of money that is extracted or injected in the Consumption Market, that the savings vector was introduced in the accounting equation that describes the activity of any agent:

$$y_j = x_j + ah_j + \frac{1}{k_F}\frac{dx_j}{dt} \qquad \begin{cases} saving & \equiv\ ah_j > 0 \ \rightarrow monetary\ extraction \\ credit \\ dissaving \end{cases} \equiv\ ah_j < 0 \ \rightarrow monetary\ injection$$

Where the negative components do not always come from previous savings, as they can also come from bank creation.

2. By creating a bank

When banks lend money, they do not use the already existing money previously extracted from the money supply by saving (the mechanism we have just seen), but it is created out of nothing. It is the flow Ah^C which appears in the figure coming from nothing, and represents the capacity of the banks to increase the total money in the economy by granting credits. Here we suppose that the loan money is created as monetary capital, and only when it is spent in the purchase of consumer goods, is when it becomes part of the monetary mass with which the Consumer Market works. Although it is very clear that it does not always have to end up this way, and it can also be spent on the purchase of capital goods and remain in the Capital Market, as happened with the purchase of the more than 4MM dollars that the Federal Reserve spent on capital goods of all kinds.

(For example, when a residential house is assumed to be a capital good, then a mortgage loan taken out for the purchase of a house remains in the Capital Market without going into the money supply. But whoever sells the house can then spend the money on consumer goods. For example, when the builder pays with the money from the sale the expenses of the construction, or when he spends his profits.

HOW MUCH MONEY IS KEPT IN THE FORM OF MONETARY CAPITAL? The answer is very little (we will see why later).

If we accept as valid the data we have shown about the US economy, then, the debts contracted with the banks by public and private institutions in the US amount to about 20 trillion dollars. This is what we have called the ***Bank Credit*** *or* ***Bank Mass*** *and corresponds to all the credit money manufactured by the banks:*

$$Bank\ Mass \approx 20\ million\ of\ million$$

If the amount of money used in the Consumer Market is about 10MM, then the rest of the money, the other 10MM, must be monetary capital:

$$Monetary\ Capital = Bank\ Mass - Monetary\ Mass \approx 10\ million\ of\ million$$

That is, the total money made by banks in the US until 2020 is about $20 trillion, roughly equal to the value of GDP, of which half is being used to run the productive economy and the other half seems to be kept "liquid" in the Capital Markets.

But our calculation is false.

A little further on we will see that the amount of savings kept hoarded as money is very small. The remaining 10MM dollars are mostly being used to maintain trade exchanges between the

different countries and are not monetary capital (it is money of the money supply needed to maintain purchases between countries).

CREDIT MONEY. Banks always create money in the form of monetary capital, and it is those who receive the loan who pass it on to the money supply when they spend it on consumer goods. Therefore, the $20 trillion that is deposited in banks around the world is two things at once. It is money held by the owners of the bank deposits, but it is also money that someone owes to the banks and for which the banks charge interest:

"the bank money is owned by someone, but there is also someone who owes it".

The really magical thing about credit money is that there is a non-consensual debtor/creditor relationship between those who own the money and those who owe it, in which banks appear as mere intermediaries. The beauty of credit money is twofold, first, because the cost of the interest which has to be paid by those who made it when they accepted the credit, makes them have a strong incentive to return it, and second, because the return of the loan makes the money be destroyed in an inverse process to the one which was used to create it. A perverse beauty, since as we shall see, the quantity of credit money cannot decrease without the economy going into deflation, and keeping the money supply unchanged requires that any credit which is repaid be taken over by some other debtor, which will not always happen.

The obligation to pay interest as long as the credit is not repaid prevents banks from creating too much credit, since the only thing that limits credit expansion will be the absence of solvent debtors, but it is clear that it is not the banks that create the need for indebtedness, but the moment the economy goes through.

On the contrary, a very serious problem will arise when businessmen no longer wish to take out loans or when they wish to reduce the loans they have already taken out, because in that case bank money will start to be destroyed, with disastrous results for the economy, which will go into recession if the Central Bank does not prevent it, as we shall soon see.

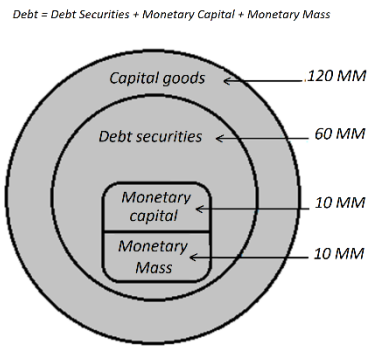
Credit money is one of the greatest intellectual achievements of mankind and should be placed on an equal footing, and without any demerit, with the invention of fire or the wheel.

(c) The debt

In general, what is meant by "debt" is the sum of all the commitments that exist in the economy to repay an amount of money within a certain period of time. A debt is basically

a commitment to make a transfer of money in the future without the purchase of any service. It is not, therefore, an exchange of purchase and sale.

Debt includes private debt securities, public debt securities, and bank credit (the mechanism by which bank money is created). Debt securities are colloquially called "bonds" and include both public debt and private debt. The figure shows the distribution of debt in the US.



Debt Distribution

All debt is backed in one way or another by capital assets. So, in 2019, the $60MM owed by Americans, which includes the $20MM in bank debt, is backed by the $120MM Americans have in capital assets.

But this way of looking at things is very misleading because a debt is a future obligation to repay an amount of money, and while Americans have more than enough wealth to back up the debt, the truth is that nowhere near the $60 trillion that Americans owe exists in the economy.

If the creditors decide not to roll over the debt securities, and that may happen, the debt could never be satisfied because there is not enough money in the economy to satisfy it. That tells us that debt securities are not capital goods per se, but are an indirect way of owning capital goods and can never be converted into money, even though they are issued with that intention.

All this was demonstrated for bank debt when the Financial Theory of Growth was explained and it was concluded that "*the debt with which capital is created can never be repaid in aggregate terms", and it is also* true for debt securities issued by companies and government, because the money with which the securities were bought is already in the money supply and cannot be extracted from there if it causes a recession. What debt securities do is collect the money that savings takes out of the economy and puts it back into the economy, but once the money becomes part of the money supply, in aggregate terms, it can no longer be returned: *"Debt can never be satisfied in aggregate terms without the economy going into recession"*.

<u>DEBT SECURITIES</u>. It is necessary to understand that debt securities are a way of capturing the income produced by a capital good without actually owning it, so they should not be thought of as money, because in aggregate terms they are not money, nor can they ever become money. The only difference between a debt bond and the direct possession of the capital good that supports it is that, apparently, the debt bond becomes money at maturity,

which can be true in individual terms, but cannot be true in aggregate terms, as we have already shown.

Some savers prefer debt securities to the outright purchase of the capital asset (e.g., a stock) because they tend to have some advantages over them, but they certainly do not avoid any of the risks that already come with owning the capital asset outright. In this sense, the value of the debt security will be maintained as long as the income produced by the capital asset backing it is maintained, which is the same thing that happens to the value of the capital asset.

Thus, when there is a general flight of savers into liquidity, the problem caused by debt securities when they are not rolled over and the promised money is demanded at the maturity date, is the same, in aggregate terms, as those caused by the direct holding of capital goods, since these will be offered for sale in an attempt to liquidate their value. In this sense, it will matter very little how much saving is held in the form of debt securities and how much is held in the form of capital assets, since it is the lack of liquidity that creates the problem, and not whether the saving is held in one form of capital or the other.

From the aggregate point of view, there is no difference in the liquidity problem that debt securities can pose from those that capital goods can pose, since both are intended to be converted into money at the same time, as we shall see below.

PART V

MONETARY THEORY OF THE CREDIT CRISIS

CHAPTER 12

THE CREDIT CRUNCH

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March 6, 2021

1. THE INEVITABLE CRISIS

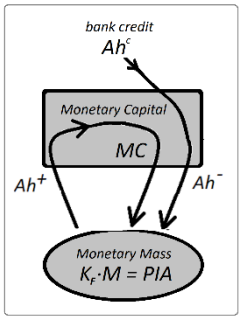
When we analyze the changes in production that the world economy has undergone in the last 300 years, it is very surprising to see that it is full of strong and abrupt periodical decreases, which are called with the very appropriate name of "economic crisis". The frequency and periodicity of the economic crises suffered by capitalism is so constant that theories have even been formulated that relate it to the periodic appearance of sunspots.

Therefore, since ancient times, economic crises are part of the mythology that surrounds and accompanies the scientific development of economics and there is no economist that does not have a more or less elaborated explanation on the reason why they appear. As it could not be less, the Madrid Theory will also elaborate a theory to explain it, but in our case, based on the consequences of the Growth Equation, the inflationary Principle and the creation and destruction of credit money, or bank money. We will see that these three specific aspects of the economy are sufficient to explain recessions, which is the name given to the fall in production suffered by monetary economies.

2. THE CREDIT CRITERION

Since the Aggregate Conservation Equation was derived we know that the extraction of money from the money supply automatically causes a decrease in the *PIA* of the economy (and *GDP*):

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = -Ah(t) = -[Ah^{+}(t) + Ah^{-}(t)] \xrightarrow{Ah(t)>0} \frac{d}{dt}PIB(t) < 0$$



The expression says that when the amount of money needed to carry out exchanges decreases, the nominal *GDP* of the economy must also decrease, which would not be a problem if it were not for the Buyer-Seller Asymmetry Principle, which tells us that the decrease in *GDP* is carried out decreasing production and not decreasing prices. I.e., any nominal decrease of the monetary mass causes the economy to go into recession by decreasing real production, which allows us to explain the deflationary crises that periodically plague monetary economies, explaining the cause that leads the economy to decrease the monetary mass.

The practical problem raised by the use of the Growth Equation, as it is now, lies in the difficulty to measure the two monetary flows which appear in the expression. Not even in the past, when we only have to go and look at the accounting records and check what has happened, it will not be easy to measure the evolution of the flow of savings $Ah^{+}(t)$ and the credit flow $Ah^{-}(t)$So there is not much hope that the conservation equation, as it stands now, can be used to predict the evolution of the economy and future credit crunches. In fact, the reason for introducing the flow of bank money creation and the flow of hoarding is that the conservation equation, as it stands now, cannot be used to predict the evolution of the economy and future credit crises. $Ah^{C}(t)$ and the flow of hoarding $Ah^{S}(t)$ into the expression was because they are variables that are closely related to bank records and are easily measurable, and can be incorporated into economic models without much complication:

$$-[Ah^{+}(t) - Ah^{-}(t)] = Ah^{C}(t) - Ah^{S}(t)$$

When we replace the flow of savings by its expression as a function of the flow of credit and hoarding, the Growth Equation does not lead directly to the condition that the economy must fulfil to avoid ending up in a serious recession, which is none other than to prevent the flow of credit from falling below the flow of hoarding:

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = [Ah^{C}(t) - Ah^{S}(t)] \xrightarrow{\frac{d}{dt}PIB(t) < 0} \boxed{\begin{array}{c}\underline{Credit\ Crisis}\\ \downarrow \\ Ah^{S}(t) > Ah^{C}(t)\end{array}}$$

Put another way, when the increase in the amount of bank money (the flow of credit) is less than the increase in the amount of hoarded money (the flow of hoarding), economic activity will be extracting money from the money supply and will inevitably enter a recession:

<u>The credit criterion</u>. The necessary and sufficient condition for a monetary economy not to go into recession is that the growth of the bank credit flow is greater than the flow of hoarding. $Ah^C(t)$ is greater than the flow of hoarding $Ah^S(t)$:

$$Recession \leftrightarrow Ah^C(t) < Ah^S(t) \qquad Credit\ Criteria$$

When the flow of hoarding is null, it will only be the flow of monetary creation that governs the Growth Equation and the criterion of credit is reduced to:

$$Recession \leftrightarrow Ah^C(t) < 0 \qquad Credit\ Criteria$$

Almost always, it is going to happen that the flow of hoarding is null or almost null, at least until the economic crisis Ah^S is null or almost null, at least, until the economic crisis does not show itself in all its rawness, or until the Central Bank intervenes and starts buying debt securities to prevent the Capital Market from collapsing. Until that happens, the economy is driven by the flow of bank credit:

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = Ah^C(t) \rightarrow \begin{cases} Ah^C(t) < 0 \rightarrow salving\ spiral \\ Ah^C(t) > 0 \rightarrow credit\ spiral \end{cases}$$

From this slightly more simplified view, economic growth and economic recession are the two sides of the same coin, depending on whether the flow of credit is positive and increases the amount of money in the economy or, on the contrary, is negative and decreases it. That is, depending on whether money is being created or destroyed, the economy will be growing or shrinking. In this context, it is well understood that the flow of hoarding is the quantity of money which is extracted from the money supply and is hoarded without being destroyed, which does not normally happen, especially if the economy is growing.

Both the credit spiral, growth, and the savings spiral, recession, have been well documented in the science of economics since the mid-19th century. In 1863, the Frenchman Clement Juglar demonstrated with statistical evidence that the dramatic drops in economic activity at intervals of 7 to 10 years were not isolated phenomena, but part of a cyclical fluctuation of commercial, stock market and industrial activity. Today, although every university professor explains the causes of crises according to their religious beliefs in the afterlife, none denies the existence of the boom and bust cycles that have characterized monetary economies since ancient times. Not even economists working for private universities in the United States dare to deny them, although they always blame them on unpredictable and inexplicable exogenous causes, which is not very different from denying them.

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = Ah^C(t) - Ah^S(t) \rightarrow \begin{cases} Ah^C(t) < Ah^S(t) \rightarrow salving\ spiral \\ Ah^C(t) > Ah^S(t) \rightarrow credit\ spiral \end{cases}$$

But, although the growth equation allows us to know the exact condition that makes an economy go from the credit spiral to the savings spiral, it does not allow us to know the exact condition that makes an economy go from the credit spiral to the savings spiral. $Ah^C(t) > Ah^S(t)$to the savings spiral $Ah^C(t) < Ah^S(t)$but it tells us nothing about what specific aspects of economic activity converge to cause hoarding and credit to change and a credit crunch to occur.

Let us note that the growth equation does not even tell us what causes the credit crunch, nor whether it can be avoided. Nor does it say anything about how to get out of a recession once the economy has entered it, so, first of all, we must clarify the nature of the flow of savings and the nature of the flow of credit that appear in the expression in order to analyze what relationship there is between both flows and what other variables of the economy depend on.

3. THE SAVINGS CYCLE AND THE CREDIT CYCLE

The problem of credit and the consequences it has on the evolution of the economy are much more serious than a quick reading of the Growth Equation makes it appear at first sight, because if growth is endogenous, it will be the expectations of growth that create the need to invest in credit and not the other way round. In that case, there seems to be no obvious way to prevent the economy from going into recession when growth expectations disappear and with them credit investment disappears as well. It is very clear that when that happens, when credit stops being requested and the credit already granted is repaid, the economy will enter a recession because the flow of credit will become negative and bank money will start to be destroyed. It won't even be necessary for credit to become negative, it will be enough for the flow of hoarding to be significant and exceed it.

If we assume that the flow of savings Ah^+ is endogenous and maintains a stable relationship with *GDP,* which is almost always the case, we can explain the boom and bust cycle of the economy without difficulty by resorting only to changes in credit spending. In particular, when we assume that saving is proportional to spending (Keynes' Law of Thrift) and there is no hoarding, i.e. that all saving is returned to the economy in one way or another, either by buying assets or by buying debt securities, we can forget about the flow of hoarding and pay attention only to changes in the flow of credit to explain the business cycle:

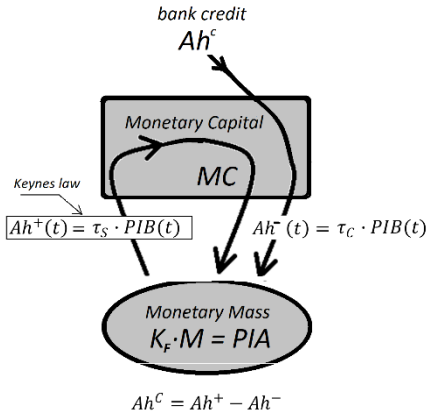
$$\overbrace{Ah^+(t) = \overbrace{\tau_S \cdot PIB(t)}^{Keynes´Law}} \quad \rightarrow \quad \frac{d}{dt}PIB(t) + k_F \cdot \tau_S \cdot PIB(t) = k_F \cdot Ah^-(t) \qquad \textit{Keynes Eq.}$$

(The parameter τ_S is the rate of saving relative to *GDP* and we assume it to be constant). The growth equation is again expressed as a function of savings and dissaving and tells us that, in order to avoid negative *GDP* growth, it is necessary that the flow of dissaving Ah^-must grow at least proportionally to *GDP*, just as savings does:

$$Ah^-(t) = \tau_C \cdot PIB(t)$$

Since the savings rate is τ_C greater than the savings rate τ_S so that *GDP* can grow. Now, the condition for the economy not to go into recession is that the flow of credit must also be proportional to *GDP (*at least):

$$Ah^C(t) = -Ah^+(t) + Ah^-(t)$$
$$= (\tau_C - \tau_S) \cdot PIB(t)$$



This is completely logical, since it tells us that the monetary mass grows proportionally to the *GDP*, which is nothing more than what the Currency Equation states, which is at the base of the Growth Equation. Let us observe that the solution of the equation will be of the exponential type and the nominal *GDP* will grow or decrease according to the flow of credit manages to remain positive, or not:

$$\frac{d}{dt}PIB(t) - k_F \cdot (\tau_C - \tau_S) \cdot PIB(t) = 0 \quad \rightarrow \quad PIB(t) = const.\ e^{k_F \cdot (\tau_C - \tau_S)t}$$

This condition will be easily met in an environment of technological change, when the economy demands strong investment to meet the expected increase in productivity, but it may be a difficult condition to meet in an environment of technological stagnation where there is no clear way to increase productivity and therefore no good reason to invest. In the latter situation it will be difficult to avoid recession because it will be difficult for the flow of credit to repay the money that pulls savings out of the economy.

We can see that, according to the evolution of credit, we can clearly distinguish two economic cycles, one of credit boom and one of credit bust, with an intermediate phase to pass from one to the other:

a) <u>The boom cycle or credit cycle</u>.

The credit cycle can be described as having three phases that feed back on each other:

1) When, thanks to technological change, there are expectations of increasing production, and with it capital income, businessmen borrow money to invest. We know that the economic incentive that moves investment is very high, since, in aggregate terms and when we assume that hoarding is negligible, the growth of capital is about 12 times the flow of bank creation:

$$dK = \frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i} k_F \cdot dM = \frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i} k_F \cdot Ah^C \cdot dt \approx 12 \cdot Ah^C \cdot dt$$

In aggregate terms, the growth of capital is more than enough to more than support the money borrowed for investment, which can come either from previous savings or from bank creation. The reward for capturing as income a portion of the increase in income is very large, and it is easy to make large fortunes in a very short time. There is thus a strong incentive to invest.

2) In such an environment, the money from savings will be insufficient to satisfy the desire to invest, and the banks will have few problems to find solvent people willing to get into debt and, in this way, to complete with bank credit the money necessary to cover the investment needs. It is very clear that the economy will start a generalized process of economic growth, sustainable as long as the monetary injection coming from credit investment is maintained.

3) The origin of the money for loans is twofold. One part comes from the savings of people who see their incomes increase and another part comes from the creation of bank money. The part coming from savings we know that it does not increase in aggregate terms the quantity of capital goods, but it does allow renewing the existing capital in a process of creative destruction of the type described by Schumpeter. The other part of the loan, which comes from monetary creation through credit, is what increases the money supply and the nominal *GDP* of the economy, which will allow not only to renew and modernize the existing companies making them more productive, but will also increase the value of the existing aggregate capital that is backing the bank credits that are granted. The result is an economy of full employment with relatively low inflation, in spite of monetary creation, which absorbs without problems the work left free by the implementation of new technology and the general increase in productivity:

$$\begin{matrix} monetary \\ inyección \end{matrix} \quad [Ah^C(t) > 0] \quad \rightarrow \quad \begin{matrix} growth\ with \\ full\ employment \end{matrix}$$

The injection of new credit money increases the disposable income that sustains the increase in aggregate spending, both in consumption and investment, i.e., it increases *GDP*. This keeps open the expectation that

entrepreneurs will capture part of the increase in *GDP* in the form of income, thus initiating a self-sustaining process that lasts as long as investment leads to increases in output and productivity.

We see that, in aggregate terms, the need for loans to invest over and above available savings is what allows the money supply to grow, which allows income to increase, which increases consumption, which will generate the growth of capital income, which will support the new bank money created.

b) The transition between boom and bust.

The three phases we have described for the credit cycle, run with continuity until the technological impulse is exhausted. It is easy to see that the credit cycle can run in the opposite direction without any problem and with dire consequences because prices cannot fall when *GDP* falls, as the Buyer-Seller Asymmetry Principle states, but before it gets to that, there is a "transition" stage:

1) When there is little expectation of growth because the technological momentum that drives productivity growth has dried up, entrepreneurs stop borrowing money to invest. But the economy continues to function normally and the flow of savings, like the economy's income, remains unchanged.

2) Now, banks are starting to have problems finding investors to whom to grant new loans as the loans granted are being paid off. The flow of credit is declining while the flow of savings, which we assume to be proportional to *GDP*, remains flat and threatens to find nowhere to be invested to be returned to the economy. The creation of bank money begins to stop as the decreasing need for credit is first satisfied with money from savings.

3) The granting of loans for investment is ceasing to be the mechanism by which bank money is created, and now the banks are beginning to replace it with credit aimed at maintaining the consumption of those agents and those companies that, although solvent, have seen their income decrease due to the halt in the monetary injection.
But unlike credit for investment, which is not repaid in aggregate terms because it is backed by the income from the capital goods it creates, credit to cover deficit spending is only backed by existing income, and sooner or later it will cease to be granted.

4) The creation of new bank money is slowly coming to a halt as lending to cover deficit spending stops, but saving is still not stopping or is stopping much more

slowly than credit is stopping. It is only a matter of time before savings do not find their way back into the money supply and the economy enters a savings spiral in which banks barely extend credit and agents desperately try to pay off their debts by slashing their deficit spending. When this happens and bank credits stop being renewed, then, not only money will no longer be created, but the bank or credit money which forms the money supply and keeps the economy going will have started to be destroyed.

Declining spending, both in investment and consumption, lowers expectations of economic growth and further decreases credit spending, initiating the "savings cycle" that will rapidly destroy the entire industrial fabric of the economy.

c) <u>The down cycle or savings cycle</u>.

Once the flow of credit decreases until it becomes negative, a process begins that leads to the physical destruction of the entire business fabric.

1) When credit becomes negative, what we have is the physical destruction of the money that has been created by credit. That is equivalent to the net extraction of money from the money supply, or in other words, what we have is a constant decrease in disposable income, i.e., in the *GDP* of the economy:

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = [Ah^C(t) - Ah^S(t)] < 0 \quad \rightarrow \quad \Delta PIB < 0$$

2) Consumer spending, which is nothing other than *GDP*, is falling and with it, so is business income. There is too much production for the expenditure that is being made and this does not stop decreasing. Many companies will have to close. Which ones? Most probably those that are more indebted and can no longer maintain a deficit spending.

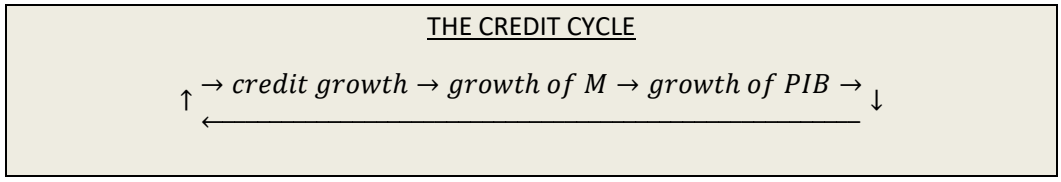
3) Now everyone is trying to cut costs in the face of declining income, starting with the liquidation of loans. Companies in difficulty are asking banks to renew loans, but the banks understand that in a deflationary environment and without any expectation of growth it will be very difficult for them to repay them without resorting to liquidation of the company. The banks are unwittingly exacerbating the problem by forcing companies to repay loans. The repayment of loans is leading to the physical destruction of the money that forms the money supply, making the environment even more deflationary.

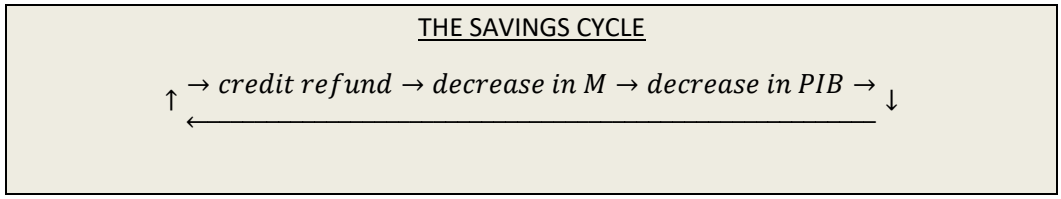
To aggravate the situation, the decrease in the income of the companies implies a decrease in the income they produce and, therefore, a decrease in the value of the capital that is backing the credits. The banks will find their very existence threatened, since part of the debt will be irrecoverable when the capital backing it is liquidated.

Little more can be added to the bleak picture presented by an economy in the midst of deflation. It only remains to add that the destruction of the business fabric stops when the repayment of credit stops and saving becomes impossible. When that happens, the flow of savings becomes very small and the scarce credit that is being granted restarts the growth process, but that can take a long time to happen spontaneously and it is important, as Keynes stated, that the government starts injecting money into the money supply through public spending as soon as possible.

The first cycle, the credit cycle, is initiated and maintained by the desire of businessmen to invest in new capital goods, which increases credit spending that increases the money supply and with it, the economy. The second cycle, the savings cycle, is initiated and maintained by the decline in credit spending due to poor expectations about future income growth. To describe both cycles we have assumed that the flow of savings remains relatively stable with respect to *GDP*, while the weight of changes in the money supply is attributed to the flow of credit, which decreases or increases according to the technological moment and expectations. Of course, neither the theory nor the conclusion changes if this assumption about saving is not met and it turns out that saving decouples more or less on average from the evolution of *GDP*.

The following diagram shows the two cycles:





They are the two sides of the growth equation, and they soar as credit spending exceeds hoarding (the latter flow, which we assume to be almost always zero, although it is normally proportional to *GDP*, as Keynes thought):

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = Ah^C(t) - Ah^S(t) \rightarrow \begin{cases} Ah^C(t) < Ah^S(t) \rightarrow saving\ spiral \\ Ah^C(t) > Ah^S(t) \rightarrow credit\ spiral \end{cases}$$

As we have already mentioned, economists teaching in private universities in the US do not deny the existence of booms and busts in the economy, but they do deny the role of private banks in creating the money that produces them and, of course, the role of savings. For them, the crisis is explained by exogenous shocks, which is like blaming aliens.

<u>THE SAVINGS PROBLEM</u>. But what really creates the credit crunch? The Growth Equation along with the Principle of Asymmetry states that you cannot decrease the money supply without the economy going into recession, which forces money from savings to be returned to the economy. But saving is not what is creating the new capital, but the increase in the quantity of money that is created with the granting of bank credit (the flow of credit, when we assume it is hoarding). Ah^C when we assume zero hoarding):

$$\Delta K = \frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i} k_F \cdot \Delta M = \frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i} k_F \cdot Ah^C \cdot \Delta t \sim 12 \cdot Ah^C \cdot \Delta t$$

The problem arises because the increase of capital has nothing to do with saving and, in aggregate terms, saving money can be greater than the amount of new capital created, which as we know depends on money creation.

Let us note that entrepreneurs create new capital by borrowing money coming both from savings and from money creation, so that a part of the new capital they manage to create does not belong to them, but belongs to those who have lent them the money. In aggregate terms, a part of the new capital belongs to the loan coming from savings and another part belongs to bank credit. The rest of the capital is the real profit that the entrepreneur gets from his investment:

$$\Delta K = \Delta K_{salving} + \Delta K_{credit} + \Delta K_{entrepreneur} \sim 12 \cdot Ah^C \cdot \Delta t$$

Let us note that it is only possible for the equation to be fulfilled when the growth of new capital is sufficient to absorb the savings made within the economy. Otherwise, when the growth of bank credit is insufficient, there will not be sufficient capital growth and part of the savings cannot be lent out (buying debt securities or buying capital goods directly). In reality, the problem is more serious than it seems, because first money is lent out from savings and then money is created with credit, so savings will start to be hoarded long before credit becomes negative and the economy will go into recession before bank money starts to be destroyed:

$$\frac{\Delta K}{\Delta t} = \frac{\Delta K_{salving}}{\Delta t} + \frac{\Delta K_{credit}}{\Delta t} + \frac{\Delta K_{entrepreneur}}{\Delta t} \sim 12 \cdot Ah^C$$

But, $\frac{\Delta K_{crédit}}{\Delta t} = Ah^C$ *is the amount of new capital that the loan retains, so:*

$$\frac{\Delta K}{\Delta t} = \frac{\Delta K_{salving}}{\Delta t} + \frac{\Delta K_{entrepreneur}}{\Delta t} \sim 11 \cdot Ah^C$$

The new capital created by the monetary injection will be distributed, almost entirely, between the businessmen who create it and the savers who lend their money (the investors), which seems logical and coherent until we realize that the previous relation forces that:

$$\frac{\Delta K_{saving}}{\Delta t} \ll 11 \cdot Ah^C$$

Or, in other words, in aggregate terms, it is not guaranteed that all the savings that are made in the economy will end up coming back into the economy as investment. In fact, some simple numbers tell us that this is not always going to be easy to achieve when the economy is growing slowly. For example, when the real growth of an economy is 1%, the real creation of new capital is around 6% of GDP, so annual savings must remain well below that figure, since some of the new capital is kept by entrepreneurs as profits (some of the new capital must be kept by entrepreneurs, or else they would not start any new businesses).

The problem with saving is that it forces the economy to maintain a minimum growth rate in order to absorb it, which is not always going to be possible in a low-growth or no-growth environment. In fact, what we have just shown is that in a monetary economy it is true that GDP growth has to be at least one-sixth of the money that is saved in order for savings to be absorbed:

$$\Delta K_{saving} \ll \frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i} \cdot \Delta PIB \quad \rightarrow \quad saving \ll 6 \cdot \Delta PIB$$

Which is a remarkable result. Although the expression is not a very accurate criterion for determining when saving is going to become a problem, it does at least indicate that saving is the problem behind credit crises:

$$\tau_S \ll 6 \cdot \tau$$

In other words, the savings rate τ_S *has to be less than about six times the real growth rate of the economy (actually, quite a bit less if we count the share of capital kept by entrepreneurs).* τ *(actually quite a bit less if we count the part of the capital that is kept by entrepreneurs). The expression shows in all its crudeness, what causes the credit crisis, since*

the problem is not that economic growth is insufficient, but that private savings are excessive.

4. CAPITAL MARKET LIQUIDITY

The criterion of credit and the Growth Equation from which it comes, speak exclusively of the dependence of *GDP* on money, or in other words, it tells us about the deflationary crisis that destroys the real economy when money in the money supply decreases, but at no time does it tell us what role the value of capital goods plays in the booms and busts of production.

Although we know that the capital market and the consumer market are decoupled and only exchange money slowly through the difference between credit flows and hoarding, we also know that the price of each capital good is a consequence of the income it produces within the Consumer Market, so it would be logical to expect that any decline in *GDP*, or even the mere threat of a future decline in *GDP, would* affect the price of capital goods and cause their valuation within the Capital Market to fall.

Moreover, the influence between the price of capital goods and spending on consumer goods is reciprocal. Given that, in aggregate terms, a good part of capital goods are owned indirectly through debt securities, any threat of a decrease in the income they produce is a threat to their price, which will cause the holder of the security to try to make it liquid and not renew it at maturity. Not only that, but the direct holders of capital goods will also try to sell them because of the threat that the income they produce will not be maintained in the future. The expectations, or the belief, that in the near future there will be a decrease in the income produced by the capital goods, whether or not it is true, causes their generalized sale and the generalized fall of their price due to the lack of liquidity of the market, to the point that their price can be below the debt they support, which is clearly an unsustainable situation from the accounting point of view, which forces the creditors to request the return of the credits that support the value of those capital goods, before the simple possibility that something like that happens.

The dependence of the value of capital goods on the income they produce, together with the support offered by these incomes to the debts that are assumed with them, creates a circular dependence between the price of capital goods, the flow of expenditure (*GDP*) and bank money that is crucial to understand the dynamics of the capitalist economy, being perhaps this particular aspect where the perverse attitude of economists who are dedicated to research within public universities around the world can be better appreciated. By not differentiating in their analysis between the Consumer Market and the

Capital Market, economists are unable to understand how the interdependence between both markets affects the growth of the economy and, therefore, they are unable to understand the dire consequences that the lack of liquidity of the Capital Market has for the entire productive economy.

To understand the terrible consequences for the whole economy of the lack of liquidity within the Capital Market, let's start by remembering how people and institutions allocate their savings among the different capital assets that exist. For example, in the US and in the year 2019, the allocation is as follows:

Capital assets.....120MM (100%)
Bonds.....40MM (30%)
Monetary capital.....10MM (8%)
Monetary mass.....10MM (8%)

We see that the US saver keeps most of his savings in capital goods, either directly, $60MM, or indirectly through debt securities, the $40MM, and it is for that reason that they always fear losing their savings because of a sudden drop in the price of capital goods. Not because the expectations that savers have formed about the income of the particular capital assets in which they hold their savings are not met, which is a risk the saver assumes when he buys it, but because the price of all capital assets collapses. The fear that any saver has is that there will come a day when everyone will want to sell their assets because any saver foresees that everyone will want to sell their assets, which turns the fall in prices into a self-fulfilling prophecy from which it is only possible to escape by selling them and keeping the savings in money.

This is the great contradiction and the great danger implicit in the valuation made within the Capital Market, and understanding the reason why a generalized fall in prices cannot be prevented is not very difficult: where are the 120MM dollars worth of assets held by Americans going to come from when they all decide in unison to sell them in order to keep their savings in money? Nowhere, obviously. Therefore, we are going to define "liquidity" of the Capital Market in a way that allows us to have, if not a quantitative idea of what liquidity is, at least a qualitative and very exact idea of the great problem that causes its absence:

EQUIVALENCE AMONG CAPITAL GOODS. Perhaps the most important consequence of Robinson's 1st Law, and that we did not mention at the time, is that all capital goods are equivalent, so, from an economic point of view, it is indifferent to own one or the other.

DEFINITION OF LIQUIDITY. We say that the Capital Market is "liquid" when it is possible to sell any amount of capital goods without affecting their price. We say that the Capital Market is "illiquid" when this is not possible, which is always.

(the definition of liquidity only makes sense if the capital goods are all equivalent, as it follows from the 1st law. That is why it is important to understand that the 1st Law implies that there are no capital goods that are more liquid than others).

No one is unaware that this definition of "liquidity" is very vague, and has nothing to do with the usual idea of liquidity in economics, which is usually associated with the amount of money hoarded by agents for very different reasons and which was first introduced by Keynes in 1936. The definition of liquidity here is macroeconomic and informs us that, when the market is "liquid", capital goods have an intrinsic price that should not be affected by the quantity of goods being bought and sold. We see that liquidity is not an internal quality that each capital good has, in the sense that it is more or less easy to sell a large quantity of the capital good without having to lower its price, which is what usually happens with some government bonds, and is the other way economists define liquidity in order to characterize it. No. Here, liquidity is a quality that the entire capital market has, depending on whether prices are more or less sensitive to an increase in the quantity of capital goods being sold. Liquidity characterizes the market, not capital goods or savers.

Furthermore, it is easy to deduce from the definition that the Capital Market is necessarily "illiquid", since the small amount of money that may be hoarded as monetary capital is totally insufficient to guarantee that a capital good will always be paid for what it is worth, regardless of the amount of capital goods offered for sale. It is very clear that nowhere are there the $120MM that would be necessary to provide liquidity to the huge US Capital Market.

If the Capital Market is, by definition, illiquid, where can the money necessary to satisfy the desire to make $120MM in assets of all kinds liquid come from? We have already said, nowhere, but in thinking that way, we are little different from those who search from tree to tree trying to find the forest and conclude, in despair, that it is because of so many trees that it is impossible to find it:

<u>THE LIQUIDITY OF THE CAPITAL MARKET</u>. If we remember that the Capital Market is very decoupled from the Consumer Market because the flow of savings and dissaving is very stable, then it is easy to understand that the Central Bank can buy, with money made out of thin air, all the assets that are put on sale without there being any risk that the money will end up creating inflation because it is spent in the Consumer Market.

For example, if necessary, the Federal Reserve can manufacture out of thin air the $120MM that Americans' capital was valued at in 2019 and buy it, being completely certain that this immense amount of money will not produce any inflation because it will not be spent in the Consumer Market, precisely, because the $120MM are the savings that Americans want to continue to keep as savings.

In fact, something similar was done in 2008 by the Federal Reserve to prevent the US stock market from collapsing and repeating the disaster of 1928. In a period of time of only a few months, more than 4MM dollars were created out of thin air and all kinds of financial assets were bought in the Capital Markets, thus preventing their price from collapsing, and with it, the entire US economy. The result was that the Federal Reserve took over $4MM in assets (and started collecting rents on them), while savers took over $4MM in money, which was what they wanted to keep their savings safe, even though they were not collecting any rents on them.

But is it ethical and moral for the Central Bank to intervene in the Capital Market by buying all kinds of assets to prevent their price from sinking? Why should the Central Bank intervene and save the wealth of those who speculate on stock prices? Why should the Central Bank save the wealth of the rich? There are two good reasons. First, because wealth is not only for the rich, even the poor save, and second, because the collapse of the economy does not benefit anyone, but hurts, above all, the poor:

> *In a monetary economy, capital goods are what are backing all existing debt securities, including a good part of the credit money that drives the real economy, and which, as we know, was created as someone's credit debt. This was demonstrated very clearly in the development of the Financial Theory of Growth, when it became very clear that the money borrowed, whether to create new capital goods or to maintain deficit spending, could never be paid back in aggregate terms because it had become part of the money supply that maintains the buying and selling exchanges in the Consumer Market.*
>
> *When someone has a debt and wants to pay it off, normally he sells a part of his capital goods to be able to pay it back, but the money with which the capital goods are bought can only come from previous savings, which implies monetary extraction if the person who receives the money to pay off the debt keeps it as part of his wealth and does not spend it. In aggregate terms, the money with which a debt is paid off becomes part of the creditor's wealth, who before had a debt bond and now has money, and will only spend it on the purchase of other capital goods, so the money with which the debt is paid off does not return to the money supply, in aggregate terms.*
>
> *If the reason for selling a capital good is to pay off a bank credit, the situation is even worse, because, as before, the origin of money is still monetary extraction, with the difference that now money is not even kept as money in the Capital Market, because the bank destroys it when it cancels the credit.*
>
> *Paying off debts implies, in aggregate terms, the net extraction of money from the money supply, and therefore the destruction of the whole economy. The only way to avoid disaster is for the money with which the assets are bought to be made out of nothing, and that can only be done by the Central Bank.*

It is very clear that the Central Bank has to intervene in the face of a generalized fall in the value of assets, even though the generalized sale of securities is only the first symptom that things are not going well and that the economy is going to collapse in a short time.

QUANTITATIVE EASING: Where did the more than $4MM that the Federal Reserve used for asset purchases end up?

The essential characteristic *of credit money is that it is a debt that has to be repaid, or that has to pay interest as long as it is not repaid. Therefore, it is well understood that there is a strong incentive to repay credit money, especially when it is being backed by someone's income rather than by the rents produced by capital goods.*

Therefore, we think that a part of the *4MM, the most significant, went to replace the money destroyed by the non-renewal of a good part of the bank loans, and another part, the least significant, ended up hoarded as monetary capital. The result, in aggregate terms, was that the Central Bank became indebted to the Banking System for 4MM dollars and from then on backed about 4MM dollars, of the 10MM dollars needed by the US economy to function (if we do not count the other 10MM dollars used in international trade).*

It is important to remember that the 20MM of bank money we have accounted for, refers to the year 2019. In 2008, that amount was about 14MM, so the 4MM decrease would have destroyed the US economy almost instantly, had the Fed not created the money to buy the assets.

In individual terms, any debt can be repaid without creating any solvency problem, since the liquidation of a capital good either covers the amount of money it backs or the lender assumes the losses. But, the situation is completely different in aggregate terms, and the payment of the debt, whether or not it is satisfied with the liquidation of the capital good, implies the destruction of bank money when the debt is credit, and the hoarding of the money repaid when the debt is private, which causes the decrease of money in the money supply and the fall of the economy.

A HISTORICAL VIEW OF THE CREDIT CRISIS. There is clear evidence that during the whole nineteenth century credit crises occurred periodically, precisely because money was metallic gold and the use of fiat money was very marginal.

The paradox of why when money is metallic gold, what is called the gold standard, credit crises are inevitable, is very well understood when it is understood that the increase in the money supply that the economy needs to grow is carried out thanks to the issuance of paper money without gold backing. Since growth is exogenous, it is quite possible that the quantity of gold will not grow fast enough to allow the economic growth induced by technological change. In such a case, it will be inevitable that private banks will issue paper money without gold backing to increase the money in circulation and enable growth.

(In fact, there is no way of knowing whether a particular banknote is, or is not, backed by gold, since the backing of banknotes is always done in aggregate terms and never in individual terms. One piece of gold is indistinguishable from another piece of gold, and one gold-backed banknote is indistinguishable from another gold-backed banknote).

As it is logical, when economic growth stops, lenders begin to claim their debts, and then it becomes evident that a great part of the bank notes cannot be exchanged for gold, which leads to the liquidation of all paper money. But it has been the paper money which has been sustaining the growth of the economy, and its liquidation because it cannot be exchanged for gold, will also liquidate the money of the monetary mass which is sustaining the exchanges. In such a situation, the economy will inevitably collapse because the existing gold will not be enough to sustain the GDP reached thanks to the emission of paper money.

Credit crises followed one after the other throughout the 19th century, and particularly in the USA, until at the beginning of the 20th century the American banker J. Morgan united all the banks in the USA and managed to avoid the banking crisis that threatened to devastate the country in 1905. That was when the Federal Reserve was created, which in theory is still a private bank, a union of all the private banks in the USA. From that moment on, at least in the US, paper money issued by any of the banks in the United States was backed by the gold of all the banks in the US. Evidently, this allowed the issuance of paper money to increase and with it, the growth of the US economy to levels that could hardly have sustained the real growth of the amount of gold in the country.

The problem, as we know, is that it was only a matter of time before the increasing amount of paper money was claimed in gold: "Only the belief that the gold of all the banks together was sufficient to satisfy the exchange of paper money into gold, kept the paper money in circulation".

In 1929 disaster struck. The price of the assets listed on the stock exchange began to collapse, and the banks began to reclaim the credits they had granted. The problem was no longer that people went to the banks to exchange their banknotes for gold (in the US, this level had already been transcended and banknotes had not been exchanged for gold for a long time), but that practically all the money in existence were banknotes backed by the Federal Reserve and recorded in a bank register. The problem was that the bank registers in which the money that everyone hoarded was recorded were being destroyed, not because they could not be exchanged for gold, but because the credits that created them were being liquidated, either because the credit money was returned, or because of non-payment.

Of course, at that time, understanding that what was making money were bank records and not just bank notes, was too big for those running the Federal Reserve and they were unable to understand that what was sinking the US economy, and with it, the world economy was the cancellation of bank records, not the lack of gold. The US authorities clung to gold in a posthumous attempt to keep from sinking, without understanding that gold is the worst

lifeline anyone can choose when they are drowning. International trade virtually disappeared because no one wanted to use what little gold they still had to back purchases. The world economy simply... collapsed, and only began to recover after 5 years had passed, when World War II was inevitable.

After World War II, the Breton Woods agreements gave a respite from the exchange rate problems of trading in different currencies, and Keynesian policies allowed savings to be recycled at a time when technological change could hardly make savings a problem. However, the world changed from 1970 onwards, when the Liberal Doctrine and the private universities in the US that supported it began to select the economists who were to run public institutions around the world. Since then, the crises of change have been occurring without discontinuity and with dire consequences for all the countries of the world, especially for the developing countries. The cause of this change was the acceptance of the dollar as the reserve currency in world trade. Logically, the only countries that have never suffered any exchange rate crisis have been the USA (it only suffered a slight stagflation in the seventies) and the countries with a trade surplus, such as Australia, Germany or China.

What was completely different was the 2008 US stock market crisis, which became a global crisis as the dollar was the international reserve currency. Like all credit crises, the 2008 crisis begins with a generalized credit crunch that affects disposable income and causes GDP to fall. This fall in GDP in turn drives down the prices of capital goods (either before or after), which feeds back into the fall in GDP as banks begin to default on credit across the board. It is the repayment of debts that causes the extraction of money from the money supply and the fall in GDP, which in turn causes the price of assets to fall, which then feeds back into the repayment of debts, creating a credit crunch.

Of course, swift action by the Federal Reserve prevented a repeat of the 1929 disaster a century later, but that did not prevent Europe's economy from near collapse.

A situation of lack of liquidity in the Capital Market (as liquidity has been defined here) is what is currently happening in all countries of the world due to the pandemic at the beginning of 2020. Specifically, in Spain the stock market price reflected by the IBEX35 has fallen more than 30% of its value without the European Central Bank doing anything to prevent it.

The pandemic in Spain. In the first months of 2020, the Spanish government decreed the total confinement of the non-essential population. From that moment and in just two weeks the IBEX35, the Spanish stock market index fell almost 30% of its value.

Is the fall in the valuation of assets of this magnitude justifiable in terms of expectations of future returns? No, clearly not. The possible one-off loss of 20% or 30% of the companies' annual profits cannot justify a fall in their price, some 20 times that value. It is very clear

that a fall as large as the one observed is only a consequence of the lack of liquidity in the market.

What happens in these cases in which a generalised drop in the valuation of the assets listed on the stock exchange is expected, even if it is a small amount, is that nobody wants to be the one to pay for that small drop in the price. Everyone wants to be the first to sell the assets before they fall, trying to make others bear the expected loss, even if it is small and very affordable in average terms for savers. But once the race to sell assets has begun, the structural lack of liquidity makes its appearance and prices plummet to levels that do not justify the expected loss of income.

The cause is, evidently, that there is not enough money in the Capital Market to buy at their real price all the assets that are put up for sale, which makes their price fall far below the price that reflects the real situation of the company and the economy as a whole:

"the market has stopped arbitraging prices because it lacks the money to do so".

A small economic standstill, which will undoubtedly mean an economic loss for someone, becomes, due to the structural absence of liquidity, a generalised fall in asset prices of around 30%, which not even a war disaster could justify. We must understand that a flight to liquidity is no different from the banking panic that sent people running to the banks to withdraw their money a century ago. Just as in a banking panic, savers want to sell their assets because they think they will lose their value and will not be able to get their money back. It's exactly the same, there's no difference. Before they had a little piece of paper that indicated how much savings they had deposited in the bank, and now they have a little piece of paper that indicates how much savings they have in assets.

Why did the European Central Bank not intervene in the same way as the Federal Reserve did in the USA? Perhaps because the US authorities know what they are doing and the European authorities do not?

It is very clear that the liquidity of the Capital Market cannot be left to the free will of the economic agents, not only because they do not have, by far, the necessary money to provide liquidity to the Capital Market, but also because the private agents who have "liquidity" are the first ones interested in letting the price of capital goods sink in order to be able to buy them later at the lowest possible price. This is the main business of the Investment Banks and where they get their incredible profits, the business of giving liquidity to big companies, and even to governments. However, those companies whose market price is allowed to sink, are the ones that form the industrial fabric of any country and are the ones on which the people of any country live.

The problem of "liquidity" is a real problem facing any monetary economy, and it shows very clearly the immense sword of Damocles hanging over the heads of the more than 8

billion people living on this planet. The sad part of all this is that the political authorities are doing nothing to prevent it, even though the solution offered by the Central Bank is so simple.

5. THE CRISIS WOULD CHANGE

Perhaps the most important event of the whole twentieth century, even more important than either of the two world wars that ravaged the century, was the definitive abandonment of gold as money and its replacement in all the countries of the world by bank money created through credit. From the moment when all the economies of the world accepted to issue their own currency and fixed at will an exchange rate between them, it was inevitable that the currency considered as the safest would become the reserve currency with which to carry out commercial exchanges between countries.

The explicit consensus with which all economies had accepted an almost fixed exchange rate with the dollar, but, above all, the commitment to solve monetary imbalances with the active intervention of the different central banks and the granting of interest-free loans by the International Monetary Fund, gave way to the greatest and most continuous world growth in history: the so-called "thirty glorious years". However, the emerging liberalism, already very powerful in 1971, put an end to this situation of collaboration between countries and the USA realised that they would be much better off on their own, thanks to the market's choice of the dollar as reserve currency. From that moment on, each country maintained the value of its currency as best it could, and exchange crises, almost non-existent until then, followed one after the other almost without discontinuity throughout the next half century.

The count of the exchange rate crises that have occurred since then is innumerable, and the poverty and desolation that they have left in the countries that have suffered them is unspeakable, despite the fact that almost all of them were easily avoidable. Perhaps for this reason, because they are easily avoidable, is where the dire consequences for millions of people of the false economic theories that economists working for private universities in the US manufacture on purpose can be seen most clearly. Not only that, the economists who work within the public institutions of the countries are in charge of advising the government and warning it of the consequences of doing one thing or another. But for that they have to meet two requirements, first, they have to know about economics, and second, they must not be at the service of those who allow them to fatten their CVs. Neither of these two requirements is currently met by economists working in public universities, and the consequences of this are visible all around us, increasing inequality

and environmental destruction. Now we are going to develop a theory to explain the formation and dynamics of exchange crises, based on the Conservation Equation, so that the monetary authorities of any country, with or without its own currency, know what they are facing and can avoid them, since we will show that an exchange crisis (or a debt crisis) is no different from a credit crisis.

Let us begin by remembering that the Growth Equation is a macroeconomic equation that treats the economy as a single isolated country, while the economic reality we wish to describe, on the contrary, groups a large number of countries that use a different currency for internal exchanges. But, in spite of the evident difference between an isolated economy with a single currency and a group of countries which trade with each other with different currencies, we will see that the vision we have of the credit crisis, as caused by the extraction of money from the money supply when the flow of saving Ah^+ is greater than the flow of dissaving Ah^-will still be valid and we will have to keep looking there for the reason why an exchange rate crisis occurs:

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = Ah^C(t) - Ah^S(t) < 0 \xrightarrow{Ah^C(t)-Ah^S(t)<0} \textit{Crisis of Change}$$

With the only difference that, now, to the flows of credit and hoarding we will have to add the two differentiated monetary flows which create international trade between the two consumer markets and the two capital markets of the countries.

To study the economy of many countries that trade with different currencies, it makes sense to first study an economy divided into only two sectors, the country with its own currency under study and the rest of the world that trades with the reserve currency, at present the dollar. To do so, we will use the system of two equations that we deduced in the second topic of the exposition when we talked about Empty Spain:

$$\begin{aligned} \frac{1}{k_F}\frac{dx_1}{dt} &= -a \cdot x_1 + b \cdot x_2 - ah_1 \\ \frac{1}{k_F}\frac{dx_2}{dt} &= \ \ a \cdot x_1 - b \cdot x_2 - ah_2 \end{aligned} \qquad (1)$$

The equations can also be used to describe an economy divided into two countries using two different currencies. Now, the coefficients "a" and "b" in the expression indicate the percentage of *GDP* that each country spends in the other country and are, by definition, positive ("1" is the country under study and "2" is the rest of the world). The savings flows, ah_1 y $ah_2$are still the financial transfers between the Consumption Market and the Capital Market within each of the countries, i.e. equal to the flow of savings minus the flow of dis-saving $(Ah^+ - Ah^-)$ of each of the countries:

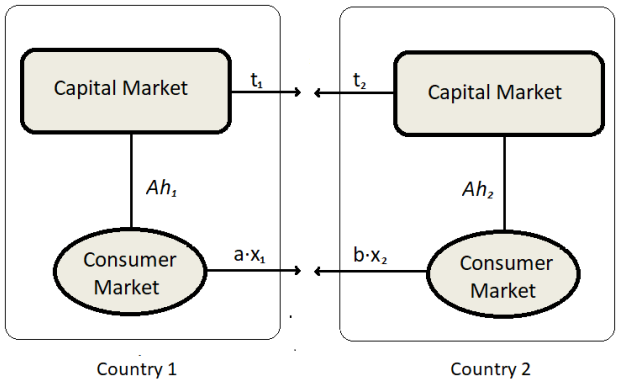
$$ah_i = ah_i^+ - ah_i^-$$

In addition, the flows that appear in each equation are expressed in the currency of each country, so that the term $(a \cdot x_1 - b \cdot x_2)$, which indicates the trade flow between both countries or regions, will have different values depending on whether the term appears in one equation or the other, because each of the equations will be expressed in a different currency. If we want to know what is the exchange rate between the currencies of the two countries:

$$-a \cdot x_1 + b \cdot x_2 = e_{12} \cdot (a \cdot x_1 - b \cdot x_2)$$

Where e_{12} the exchange rate between currencies, and where the exchange flows are now expressed in each of the currencies and, evidently, are different.

The attached figure helps to clarify the situation a little. The flow t_1 y t_2 are the investment flows that each country makes in the other and their sum is the net exchange flow between the Capital Market of each of the countries, while the flow $(a \cdot x_1)$ and the flow $(b \cdot x_2)$ are the expenditure flows that each country makes in the other and their sum is the net exchange flow between the Consumption Market of each of the countries. All the flows in the same equation are expressed in the same currency, and have a different value depending on which equation they appear in. Thus, the two equations that describe the economy of two countries that trade with different currencies are formally identical to the one that expresses the relationship between two different regions of the same country, but with the understanding that each of the equations is expressed in a different currency.



Let us observe that the expressions reveal the important role played by the commercial deficit in the exchange crisis, since the term $(a \cdot x_1 - b \cdot x_2)$ acts, depending on its sign, as a flow of extraction of money from the monetary mass, or as a flow of monetary injection, which is added to the extraction already carried out by domestic savings, so that the amount of money that must be injected by the dissaving to avoid the credit crisis is greater for the deficit country and less for the surplus country. Concretely, the criterion for the economy not to enter a recession is now different, being necessary that the sum of the flow of aggregate savings and the trade deficit be less than zero:

$$\frac{1}{k_F}\frac{dx_1}{dt} = -a \cdot x_1 + b \cdot x_2 - ah_1 \xrightarrow{\Delta x_1 > 0} -a \cdot x_1 + b \cdot x_2 - ah_1 > 0$$

The expression indicates that the trade surplus helps the country to grow by allowing savings to exceed savings without the economy going into recession. Conversely, a country with a trade deficit can go into recession, even when dissaving exceeds saving, because of the extraction of money from the money supply by the trade deficit. Or in other words, the net monetary injection (when we assume there is no hoarding) that credit, whether public or private, must create to prevent the economy from going into recession is greater in a trade deficit economy than in a trade surplus economy.

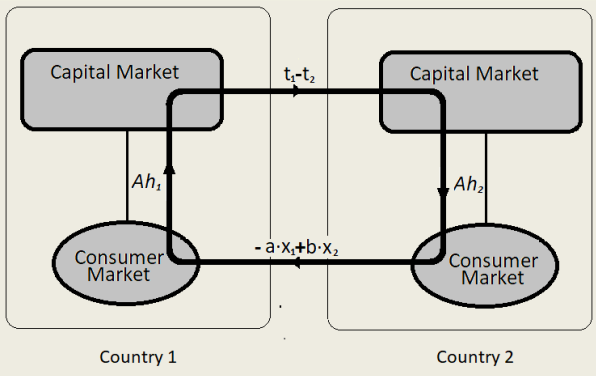
Although it is not explicitly shown in the figure, we are assuming that none of the countries can manufacture the currency of the other country, nor can it accumulate it, so the balance of payments between both countries is always zero (in reality the Central Bank can accumulate any amount of currency of the country it trades with, which is called the "foreign exchange reserve", but this does not invalidate the analysis). This forces the currency flows of each country to be zero, in its own currency:

$$(-a \cdot x_1 + b \cdot x_2) - (t_1 - t_2) = 0 \qquad (2)$$

Or in another way, when we assume that there is no accumulation of foreign currency, we are implicitly assuming that the flow of trade expenditure of one country in the other country has to be balanced by the financial transfer of the latter country in the former. The figure below clarifies what happens, and shows that, as a consequence of the balance of payments having to be balanced, the monetary flow between countries that trade creates is equivalent to a circular flow that forces financial transfers between capital markets to equal trade transfers between consumption markets. This is what equation (2) expresses and, as we will see, it will be when this condition threatens not to be fulfilled, when the Exchange Crisis occurs and the currency will have to devaluate until the expression is fulfilled again.

Let's look at this last statement a little more closely.

THE CRISIS OF CHANGE



The two conservation equations that describe the evolution of the consumption of a country with its own currency that trades with the rest of the world as if it were a single country are:

$$\begin{aligned} \frac{1}{k_F}\frac{dx_1}{dt} &= -a \cdot x_1 + b \cdot x_2 - ah_1 \\ \frac{1}{k_F}\frac{dx_2}{dt} &= \ a \cdot x_1 - b \cdot x_2 - ah_2 \end{aligned} \qquad (1)$$

Where, $(-a \cdot x_1)$ is the country's spending in the rest of the world, $(b \cdot x_2)$ is the expenditure of the rest of the world in the country, ah_1 is the country's aggregate savings flow, and ah_2 the aggregate flow of savings from the rest of the world. The attached figure clarifies a little the global situation and also shows the financial transfers between the country's Capital Market and the Capital Market of the rest of the world, the flows t_1 y t_2.

It follows from the equations that the condition for a credit crunch to occur within the country is now different, and to the aggregate flow of savings must be added the monetary flow created by trade:

$$-a \cdot x_1 + b \cdot x_2 - ah_1 < 0$$

What is interesting is to see that, in spite of international trade, the credit criterion does not change and continues to state that the local economy goes into recession when there is a net extraction of money from the money supply. To verify this, let us observe that when there is no accumulation of currency, the trade deficit must be equal to foreign transfers, either in the form of loans (foreign investment) or repatriation of income, so the economy functions as a region within a larger economy, in which there is only one currency (it is the circuit drawn in the figure):

$$-a \cdot x_1 + b \cdot x_2 = -t_1 + t_2 \quad \rightarrow \quad D(t) = T(t)$$

Where we have called D(t) the trade deficit of the country and $T(t)$ the country's trade deficit and foreign transfers:

$$D(t) = a \cdot x_1 - b \cdot x_2 \qquad and \qquad T(t) = t_1 - t_2$$

After some simple algebraic manipulations we conclude that the condition for a credit crunch to occur remains unchanged:

$$\begin{aligned} Ah^S &= Ah^C - T + Ah \\ Ah^S &= Ah^C - D + Ah \end{aligned} \quad \rightarrow \quad Ah^C(t) - Ah^S(t) < 0 \qquad \textit{Credit Crisis}$$

That is, the needs of monetary creation do not change because there is, or is not, a commercial surplus, since we have imposed that when there is a commercial imbalance, this must be compensated with the monetary flow between the Capital Market of each region. That is, the flow of credit Ah^C remains the same, and depends exclusively on local hoarding. However, to the monetary extraction made by savings, we must now add the

trade deficit, since this must also be returned to the economy in the form of a loan (as if it were savings). The flow of savings must now compensate not only the money extracted by domestic savings, but also the money extracted by deficit trade. Therefore, although the criterion to avoid an exchange crisis is still the same: the flow of credit must be greater than the flow of hoarding, the implicit condition we have had to impose on the economy to reach this conclusion must also be added to the criterion. I.e., to avoid the credit crisis within the local economy, it is necessary that the commercial deficit be returned to the economy as a transfer from abroad, so this condition will be the real criterion an economy must fulfill to avoid the exchange crisis, in addition to monetary creation compensating hoarding:

$$\left.\begin{matrix} Ah^C(t) - Ah^S(t) < 0 \\ D(t) > T(t) \end{matrix}\right\} \rightarrow \textit{Crisis of Change}$$

What the condition says is not very difficult to understand, as well as expected. The exchange rate crisis occurs when the borrowing from foreign investment is insufficient to cover the trade deficit; in fact, we have assumed all along in the analysis that equality between the two flows is always true. When that happens, the currency has to devalue to restore equality between the trade deficit and foreign investment. However, the underlying condition for avoiding a credit crunch remains in place and hangs like a sword of Damocles over the local economy.

To see this, let's look at who captures the rent from the new capital that is being created within the economy when there is foreign investment. Now the new capital goods are shared between savings, credit, foreign investment and corporate profit. The appearance of the new eater claiming a share of the rent produced by the new capital should not surprise anyone, because it is the raison d'être of foreign investment, but it makes it more difficult to create enough capital to absorb the savings made within the country:

$$\Delta K = \Delta K_{salving} + \Delta K_{credit} + \Delta K_{foreign} + \Delta K_{entrepreneur} \sim 12 \cdot Ah^C \cdot \Delta t$$

Or in another way:

$$\Delta K_{salving} + \Delta K_{foreing} \ll \frac{\langle \alpha \rangle}{\bar{\aleph} \cdot i} \cdot \Delta PIB \quad \rightarrow$$

$$\rightarrow \quad salving + foreign\ investment \ll 6 \cdot \Delta PIB$$

That is to say, only when high economic growth is expected can foreign investment be justified. The above expression shows very clearly that what causes the credit crunch is still that economic growth may be insufficient to meet the needs for capital goods that the savings demand to be absorbed, a part of which is now also demanded by foreign investment that balances the trade deficit.

In general, to avoid an exchange crisis it is necessary to avoid a credit crisis within the country, for which it is first necessary that the trade deficit is returned to the economy as a loan, but with the big difference that the loan comes from foreign investment, and is made in foreign currency that cannot be manufactured by local banks. That is, the main problem facing a country with a trade deficit that wants to avoid the exchange rate crisis, is not only the difficulty of finding within the country itself to people or institutions that want to spend on credit, which as we know can become a difficult problem to solve, but also must be found within foreign countries to people or institutions that want to lend (or invest) within the country, since the balance of payments of each of the countries must be zero:

$$-a \cdot x_1 - t_1 + e_{12} \cdot (b \cdot x_2 + t_2) = 0 \quad \rightarrow \quad D(t) = T(t)$$

This is the opposite of what happens with countries that have trade surpluses, which find it easier to avoid a credit crunch because they can maintain a positive local currency hoarding equal to the trade surplus, the only problem they face being to find a way to invest the surplus in foreign capital goods, since the balance of payments must be balanced and the surplus must be spent on foreign capital goods.

An exchange rate crisis is no different from a credit crisis and what causes it is the same: "the extraction of money from the country's money supply".

<u>THE PROBLEM OF THE TRADE DEFICIT</u>. A country with a currency other than the reserve currency (other than the dollar) and a continued trade deficit will necessarily go into recession in a time not much longer than about 15 years, depending on the specific situation of each country and the interest rate paid on the foreign currency. Let's see why.

Suppose the following three statements are true:

1) We suppose that a country cannot manufacture money of another country, nor can it accumulate it. Both conditions force the balance of payments of each of the two trading countries to be zero in its own currency:

$$-a \cdot x_1 + b \cdot x_2 - t_1 + t_2 = 0$$

2) We will also assume that all the income obtained by foreign investment is repatriated in the reserve currency and is not reinvested in the country. If we call "i" the average return on foreign investment and call Q(t) the amount of foreign investment accumulated in the country, then the annual flow of rents that is repatriated, is:

$$i \cdot Q(t)$$

3) We assume a constant trade deficit. That is:

$$-a \cdot x_1 + b \cdot x_2 = const. = -d$$

With these assumptions we can calculate without difficulty what is the flow of foreign investment $t_1(t)$ necessary to keep the balance of payments balanced, since it has to cover not only the trade deficit of country d, but also the outflow of the profits of the investment made up to that point, the term $i \cdot Q(t)$. To calculate it, the first thing we need to know is the amount of foreign money that has been invested in the country. $Q(t)$ that has been invested in the country since the beginning of the deficit trade:

$$\textit{Invested quantity} = Q(t) = \int_0^t t_1(s) \cdot ds$$

Amount that when multiplied by the interest rate, gives us the annual flow that the country pays in interest (we assume that they are repatriated) for the money that remains invested within the country.

$$\textit{Repatriated interest} = i_1 \cdot Q(t) = i_1 \cdot \int_0^t t_1(s) \cdot ds$$

Finally, the expression we are looking for is:

$$t_1(t) = d + i_1 \cdot \int_0^t t_1(s) \cdot ds$$

The expression tells us that the annual flow of foreign investment $t_1(t)$ is equal to the sum of the current trade deficit, which we have assumed constant, plus the interest payments on the accumulated investment, and which we have assumed are repatriated in foreign currency (the term of the integral). The solution of the integral equation above, which is what we are interested in, is:

$$t_1(t) = d \cdot e^{i_1 \cdot t}$$

The mere presence of the exponential in the solution informs us that the trade deficit can only be maintained for a very limited time, since it requires foreign investment to grow exponentially. We see that it is the trade deficit that is creating the problem when it must be met by borrowing, although it has relatively little influence on the final outcome, since it is the repatriation of income, which grows exponentially, that is the real cause of the disaster.

The analysis suggests that the higher the interest rate, the sooner the disaster will occur, so a low interest rate on foreign currency loans may delay the problem for a while, just as a rise in the interest rate will accelerate it.

That's what happened with the exchange rate crisis that hit Latin America in the 1970s, when the US raised the interest rate on the dollar without thinking of the consequences. All the economies of the world collapsed in unison, and only the surplus countries were spared from burning.

From the analysis it is clear that there is no problem in having a trade deficit as long as the origin of the monetary flow in foreign currency comes from the repatriation of income and not from borrowing. This is what is happening in the US, where part of the trade deficit is being sustained by the repatriation of profits from investments abroad.

Let's take an example with figures to visualize the size of the flows. If we assume that the situation becomes unsustainable when interest payments on foreign investment exceed 5% of GDP (because it is accepted that beyond that amount it will be difficult to avoid widespread investor flight and exchange rate crisis), then if the economy has a continued trade deficit of 2.5% of GDP and an interest rate of 5% is paid on the debt, the situation will become unsustainable when that happens:

$$t_1(t) = d \cdot e^{i_1 \cdot t} \qquad \rightarrow \qquad 5\% \cdot PIB = 2{,}5\% \cdot PIB \cdot e^{5\% \cdot t}$$

$$t \sim \frac{0{,}7}{5} 100 = 14\ years$$

In other words, a deficit country will have an exchange rate crisis before 15 years have passed. Of course, each country's situation will be different and a small trade deficit helps to delay the exchange rate crisis, as does a low interest rate, but the bad thing about an exponential function is that it ends up being intractable, sooner or later. Moreover, the exchange rate crisis is likely to occur long before interest on the debt exceeds 5% of GDP, as domestic and international savers will realize much sooner that foreign currency debt is unsustainable.

It is easy to see from the analysis that countries with trade deficits are doomed, at best, to stagnation and, at worst, to a systemic succession of exchange rate crises. The really important part of the analysis is to understand that having your own currency will not help you protect your economy from foreign trade threats. That is a misconception fabricated by private universities in the US, so that there is no currency backed by a large enough economy that can overshadow the dollar. The US does not want a euro backed by an economy of 15MM dollars a year, as Europe currently has. So they point out over and over again the disadvantages for small countries of belonging to a larger economy, but hide the much bigger problems those small countries face when they trade with a reserve currency backed by the $20MM annual US dollars and manipulated at will by the Federal Reserve.

The thirty years of the Bretton Woods agreements was a legacy of the then recently deceased President Franklin Delano Roosevelt, someone who believed that the best way

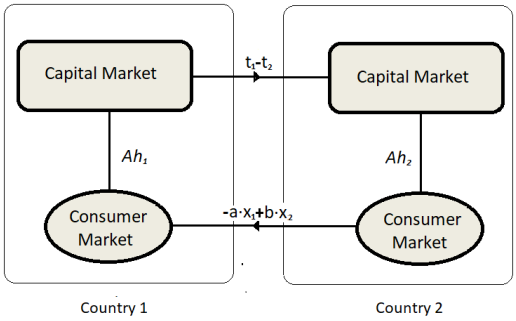
to avoid repeating history was to maintain close cooperation between different countries. We have Roosevelt to thank for that, but now we face another legacy, this one created by economists working for private universities in the United States: the dollar. We will not survive if we are not able to free ourselves from this other legacy and put a stop to the exchange rate crises that the Federal Reserve creates when it raises the interest rate of the dollar.

6. LIQUIDITY AND THE EXCHANGE RATE CRISIS

Where the magnitude of the problem created by the lack of liquidity in the Capital Market can be seen most clearly is in a globalized economy such as the present one, made up of many small countries that use their own currency, but trade with each other with the reserve currency (currently the dollar).

The above analysis, as it has been carried out, seems to indicate that it is possible to escape exchange rate crises when there is a surplus or, at least, a balanced trade flow with the rest of the countries. However, when the previous statement is analyzed more slowly and we ask ourselves if it is really a conclusion that is deduced from the analysis, the answer is that no, neither can a surplus country guarantee that an exchange crisis will not appear when trade with other countries is done in a foreign currency (although it is also true that when the country's economy is big enough, it is possible to avoid them without too many problems).

The attached figure explains graphically where the problem lies.



There are two markets and there are two flows in local currency that must be exchanged for foreign currency. One of the flows comes from the Capital Market and has its origin in the desire to keep savings in foreign assets, and the other flow comes from the

Consumption Market and has its origin in the desire to buy foreign goods. Both flows are in local currency and both must be equal and of opposite sign, because, as we have already mentioned, we assume all the time that there is no accumulation of reserves and it is fulfilled:

$$-a \cdot x_1 + b \cdot x_2 - t_1 + t_2 = 0$$

However, as we have already shown in the previous section, it is not possible to balance indefinitely the trade deficit with foreign investment in the reserve currency because of the growing debt caused by interest payments, so the only solution is to balance each of the flows independently. That is, to make the balance of payments equilibrium be fulfilled independently in each of the two markets:

$$-a \cdot x_1 + b \cdot x_2 = 0 \qquad \textit{trade balance}$$

$$-t_1 + t_2 = 0 \qquad \textit{balance of capital}$$

In fact, what the monetary authority of a country is looking for is the independent and simultaneous equilibrium of the monetary flow of each of the two markets and, to achieve it, it has at its disposal two parameters whose manipulation guarantees that both conditions can be fulfilled simultaneously: *"the interest rate and the exchange rate"*.

THE EXCHANGE RATE. By lowering or raising the exchange rate between the local currency and the reserve currency, the amount of goods bought and sold between countries changes, and it is easy to keep the balance of trade balanced and stable.

THE INTEREST RATE. Although capital flows are very fast and almost always unpredictable, the actual effect of raising and lowering the interest rate of money is very slow, although it is clear that it raises or lowers the flow of foreign money and keeps investment balanced independently of what may be happening in the consumer market with the balance of trade.

By using both mechanisms, the manipulation of the interest rate and the manipulation of the exchange rate of the local currency, the monetary authority believes that it is possible to keep the flow of investment and the flow of trade balanced independently, and thus avoid an exchange rate crisis. Despite this, in practice, the monetary authorities end up letting the two rates float in the face of the impossibility of controlling the monetary flows, so that in the end it is the market itself that determines their value and makes the monetary flows balance in the two markets, which can only be considered collective suicide from any point of view.

The origin of the problem lies in the fact that they do not want to limit the free movement of money, nor do they want to impose tariffs in order to control the trade deficit, which would be logical in an economy that has this problem. Therefore, the idea propagated by

economists working for private universities in the US is that you can keep the economy stable by letting the exchange rate and the interest rate of the local currency float, which is completely false, and only serves to justify the convenience of not limiting the freedom of movement of money, nor limiting the flow of trade with the imposition of tariffs. Let us remember that the interest rate of local money is what fixes the value of the country's capital goods, so the monetary authorities should fix it and keep it unchanged, and not leave it to the market to fix its value. Recall also that the exchange rate determines the exchange of goods between a country and the rest of the world and is therefore a measure of the productivity of local labor, so it should not be allowed to be determined by the market either. We conclude then that the only sensible thing for the authorities to do is to keep the two rates fixed and not allow anyone to manipulate them, letting them change slowly as the productive reality of the country changes.

However, this cannot be done by the authorities without hindering the free circulation of money and goods, and this is what forces them to let both rates float. The importance of the above conclusion is fully appreciated when we see that the recommendation derived from the theories fabricated by economists working for private universities in the US, is to let the exchange rate and the interest rate of the currency float, so that the international market can set them. This is what has been happening in the exchange rate crises that have plagued all the countries of the world in the last 50 years. It is therefore understandable that, when the market determines values for both rates that favor production and the growth of the economy, the authorities do nothing to prevent it and continue to let the markets do as they please. But it is also understandable that the authorities intervene when the value of the rates determined by the market threatens to sink the real production of the country in an obvious way, even though then it is already too late and nothing can be done to prevent the economy from entering an exchange rate crisis, the currency from devaluing and the real productivity of the economy from sinking.

LIQUIDITY AND THE EXCHANGE RATE CRISIS. It is important to understand the underlying reason why no Central Bank, nor local monetary authority (other than the Federal Reserve), can sustain a fixed exchange rate with the reserve currency, without imposing limitations on the free circulation of money and goods.

The reason is, as we have already said many times, that there are two markets, the Consumer Market and the Capital Market, where the same money is being used in two different ways. When the money to be exchanged for the reserve currency comes from the activity in the Consumption Market, it almost never creates any problem, because the flows of saving and dissaving are very constant and evolve in a very predictable way. However, the opposite happens with the money coming from the Capital Market, since its volume can be immense and its changes are usually unpredictable.

When a saver sells a capital good in the local currency and then exchanges the money for the reserve currency, there is pressure on the exchange rate that becomes unsustainable when there is a generalized flight to the reserve currency. Then, the value of the capital goods to be exchanged for the reserve currency can be more than 5 times the value of the country's GDP, and it is impossible for the local monetary authorities to hold even a small fraction of that amount of reserves.

What the Federal Reserve did when it spent more than 4 trillion dollars in the Capital Market to allow the controlled flight of investors into liquidity (and which more than five years later was imitated by the Central Bank of Europe), no other country can do, because no other country can manufacture dollars. The Central Bank of a country can support the price of capital goods by creating local currency to buy them, allowing savers who wish to do so to keep their wealth in money, but it cannot then exchange the local money for dollars, which is what savers will surely want to do. The authorities can prevent the collapse of the Capital Market and save the real economy, but they cannot then prevent an exchange crisis, caused by the money they themselves have put into circulation.

That is why it is so important to understand that the Central Bank has to buy all the financial assets of its country that are necessary to prevent their price from sinking when there is a flight to liquidity, but it is more important to understand that, in such a case, it is not possible to allow the free circulation of money, because the Central Bank will not be able to exchange the local money for the reserve currency. No matter what the theories fabricated by economists working for private universities in the United States say, any country with its own currency cannot allow the free circulation of money, because sooner or later it is exposed to an exchange crisis.

THE OPTIMUM MONETARY AREA. At the end of the last decade of the twentieth century, it was clear that Europe had consolidated politically, while in monetary terms the euro was entering its final phase, replacing the local currencies. The franc, the mark, the lira, the peseta, among other currencies, were going to disappear thanks to the firm will of the Europeans not to repeat history. Never before had anything of this magnitude happened in the world and the economists working for the private universities of the United States had orders to do everything possible from the propagandistic point of view to prevent it.

In 1999 Robert Mundell was awarded the Nobel Prize in Economics for his work on the performance of the economy when different areas trade, each with its own currency. Mundell's work, which was never intended to be a theory, was called the Optimal Currency Area Theory because it suggested the silly idea that there was an optimal country size for using a single currency. If the country is larger than the optimal size, then monetary imbalances appear between some regions and others that make it advisable to divide the

country and use several currencies. On the contrary, if the size of the country was smaller than the optimum, the logistic problems created by the use of several currencies to carry out trade with other surrounding countries would weigh on the economic performance of the small country, advising its incorporation into a larger currency area. In short, Mundell's theory stated that there was an optimal currency area which, of course, the theory did not say what it was, but that it was possible to determine (almost all the theories that economists working for private universities in the USA fabricate are based on creating a hypothetical concept that must exist, even though the theory never says how to find it).

It is important to understand that Mundell's work was written in 1961, when, in fact, there was a common currency in the world, the dollar, with which the currencies of other countries managed to maintain a fixed exchange rate thanks to the collaboration between central banks. Besides, the theory does not contemplate the manufacture of money by private banks, because Mundell thought that money was only created by the Central Bank (this is common in all theories manufactured by private universities in the USA). In other words, Mundell's work was already obsolete in 1999, because: a) it does not take into account the consequences of international trade being done in reserve currency, b) it does not take into account the free circulation of money, c) it ignores the manufacture of money by banks and the effect of the interest rate on the quantity of money in the economy. Or, to put it more honestly, Mundell's work was completely unrealistic already in 1999, and the reasoning he makes and the conclusions he reaches completely unrealistic.

So why was he given the Nobel Prize?

We have already said many times, that the reason why someone is awarded the Nobel Prize in Economics is because he or she claims something that is false, but wants to pass it off as true. Thanks to this apparently "scientific" backing, the network of liberal economists who occupy public universities around the world can defend in their countries recommendations that would otherwise be considered nonsense by those who listen to them.

Seeing is believing. But, let's not fool ourselves, December 1999 is not just any date. It was the last days of the century that had seen the US become the world's hegemonic power, and Mundell was not going to fail to point out how they had achieved it:

Growth continued until the nine-month downsizing recession of 1990- 1991, which probably cost President George H. W. Bush reelection. Expansion resumed in the spring of 1991 and continued at least until the end of the decade, making the combined period 1982-2000 the greatest expansion in the history of any country. Over the period no less than 37 million new jobs were created! The Dow-Jones average soared from below 750 in the summer of 1982 to over 11,000 by the turn of the century.

Robert A. Mundell, Nobel Prize Lecture
8 December 1999

Let us remember that, in 1999, the Asian crisis had already sunk a large part of the world economy, Russia was entering a deep recession, and it was very clear that the European monetary area had been subjected to an unprecedented speculative attack by investors from which it was not yet known whether it would emerge unscathed. By then, it was already very clear that the persistent rise in the dollar interest rate had caused the Latin American debt crisis in the 1980s and was also the cause of all the exchange rate crises of the 1990s. Mundell doesn't say it, but the economic success of the US was a consequence of the economic disaster of the rest of the world.

From 1999 onwards, after the Nobel Prize was awarded to Mundell's theory, the origin of any exchange rate crisis had to be sought in the local monetary authority that either did not allow the exchange rate to float or did not allow the interest rate to float because it was trying to conduct local monetary policy. This is what is known in macroeconomics as the Impossible Trinity. An idea that is attributed to Robert Mundell and Marcus Fleming, and that affirms in Krugman's words:

"The point is that you can't have it all: a country must choose two out of three. It can fix its exchange rate without weakening its central bank, but only by maintaining controls on capital flows (like China today) it can allow free capital mobility while maintaining monetary autonomy, but only at the expense of letting the exchange rate fluctuate (like Britain - or Canada), or it can choose to allow free capital movement and stabilize the currency, but only by opting out of any possibility of adjusting interest rates to fight inflation or recession (like Argentina in 1999, or most of Europe)"

Paul Krugman

The falsehood of the Impossible Trinity lies in what it "takes for granted" without ever saying it, that "one" of the "three" possible options listed by Krugman can be chosen. As we have shown here, it is necessary to independently balance the flow of money between the two markets, consumption and capital, and this can only be done by using tariff barriers while preventing the free flow of money, which is what China or Argentina are doing. There is no other option. The other two options Krugman lists do not exist: Britain or Canada are not doing what Krugman says they are doing, nor is Argentina, which has exchange controls and tariff barriers. Of course, there is no "majority" of Europe, since all of Europe trades in a single currency and is a single currency area.

We would laugh at the nonsense that Nobel Prize winners in economics say, especially what they say about monetary areas, if it weren't for the fact that such nonsense kills people who don't live in the United States. The question the famed Nobel laureates should ask themselves is simple: If the monetary authority of any country cannot put tariffs on foreign goods to balance its balance of trade, and cannot prevent the free circulation of money within its borders to maintain a given interest rate, why does it want to have a local currency and why does it want to be the country's monetary authority?

CHAPTER 13

SOLUTIONS TO THE CREDIT CRISIS

Clara Rojas García, Julia Rojas García, Pedro Rojas Sola
March 10, 2021

1. INTRODUCTION

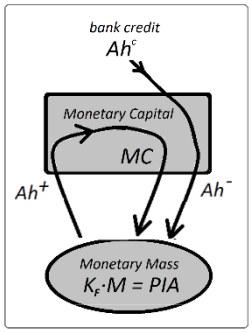
Given that we have explained the credit crunch that an economy suffers, as a consequence of the flow of credit decreasing until it is less than the flow of savings, and given that investment is exogenous and depends a lot on the expectations that entrepreneurs have about future growth driven by technology, it seems very clear that, if we want to prevent the economy from going into recession, it must be savings that have to adapt to the changes in investment spending, and not the other way around.

However, saving, the "propensity to save", is an endogenous variable that increases progressively with people's income. It was what Keynes called the most important psychological law of economics, and it was the law he used to demonstrate the multiplier effects of public spending on investment, so it does not seem very clear how the monetary authorities can influence saving to prevent it from surpassing dissaving and thus avoid credit crises.

Understanding the meaning of this last point is very important, because nobody seems to realize that the imbalance caused by people who save can only be avoided, in aggregate terms, with the deficit spending of people who do not save. This is a very serious and transcendental fact because the indebtedness assumed by those who spend in deficit to compensate for the savings made by people with more income, not only increases the inequality of income as long as there are no limits to savings with tax collection, but also makes the credit money which forms the monetary mass with which the economy works depend on the people with fewer resources to be able to sustain it.

Let us transfer the reasoning we have just done to the growth equation, trying to understand the consequences of saving in aggregate terms.

If we look at the attached figure, we see that the credit flow is not the only monetary flow coming from the Capital Market which is spent and becomes part of the money supply. Ah^C is not the only monetary flow coming from the Capital Market which is spent and becomes part of the money supply, but there is another flow coming from previous saving which can be much more important in magnitude than that one. The sum of both, the credit flow and the flow coming from the previous saving, form the flow Ah^- which must be greater than the flow of savings Ah^+in order for the economy to grow:



$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = -[Ah^-(t) + Ah^+(t)] \xrightarrow{Ah^- + Ah^+ > 0} \Delta PIB > 0$$

So the question that arises from the perspective that the growth equation offers us is: *How can we guarantee that the money that is extracted by savings will return to the economy?* Because that implies that somebody has to borrow what is being saved, and it will be when this is not achieved that the economy will go into recession.

<u>THE FAILURE OF THE STANDARD THEORY</u>. At a time when technological change needs a lot of money to introduce new technologies, investment is more than enough to return money from savings to the economy without any problem. Not only that, part of the investment will need to be covered by bank credit, guaranteeing the necessary growth of the money supply that allows economic growth without difficulty. But in an environment of little technological growth, when companies have few investment needs, returning to the economy the money extracted by savings becomes a serious problem that is difficult to solve, and it is not at all clear what can be done to return it to the economy.

The answer to the question becomes much more complicated when we understand that the solution we give to the problem of saving will depend on the vision we have of the relationship between capital goods and saving.

Let us observe that when we think of capital as an accumulation of physical goods, as propagated by economists working for private universities in the USA, then savings, however large they may be, can always be spent on buying the physical goods that make up capital and returned to the economy in the form of investment, without ever causing any problems. It is then easy to understand that, in such a case, the only difficulty will be to bring the saver and the investor into agreement, which is achieved by lowering the interest rate and not hindering the investor from borrowing and investing the money from savings.

However, when capital is the valuation of income, the situation is completely different. Now capital (wealth) only grows when income grows and not when the physical goods that are supposed to form the capital (the accounting stock) increase, so it is the growth of the

quantity of capital goods that allows absorbing savings and not the other way round. The flow of savings has to be spent on the purchase of new capital, and if this does not grow enough, because the technological moment is not propitious or for some other reason, the savings will not find something to spend and will not return to the economy.

The calculation is very easy to do. Let's assume an economy that saves 10% of GDP, but has a real GDP growth of only 2%. In such a case, the real growth of capital is about 5 or 6 times the GDP, that is, between 10% or 12% of GDP, a very low value to absorb all the savings that are being made in the economy, since part of the new capital is kept by entrepreneurs, or else they will not borrow to invest.

We see that the creation of wealth is an exogenous macroeconomic variable on which there is no real influence, since it depends on technology and the technological moment, and it must be society's savings which must adapt to it. The whole problem created by savings in the economy, as we already know, comes from the fact that the nature of capital is financial, not physical, and its growth does not come from the physical accumulation of capital goods made by savings, but from the technological moment.

According to this analysis, it is very clear that the lack of control over savings, and our inability to increase or decrease it by adjusting it to changes in the economy's need for investment, is what causes bank credit to decrease until it becomes negative and the economy goes into recession:

$$-(Ah^{+} - Ah^{-}) = Ah^{C} - Ah^{S} \quad \xrightarrow{Ah^{C}<0} \textit{ recession}$$

In spite of this, all the solutions proposed by economists working for private universities in the USA to avoid recession involve acting on credit and not on savings, which is really absurd, since savings is an endogenous variable that depends on other variables that can be controlled, while credit is an exogenous variable that depends on the financing needs that technological change brings with it and it is not possible to control it.

What we are going to analyze in this chapter are the solutions the monetary authorities have been using to avoid the problem created by savings. With the passing of time, and thanks to the evolution of the Banking System, to the appearance of the Central Bank and, above all, to the generalized use of bank money in the economy, we have reached a sort of book of recommendations on what the monetary authorities must do to avoid economic crises. Apparently, and at least this is what the university textbooks in which students study economics say, the recommendation is always to maintain a reduced public deficit, lower wages, and open markets to foreign competition, although it can be seen that these are recommendations that are never followed by the US monetary authorities, especially those who run the Federal Reserve, who seem to have studied economics in another galaxy.

If we were to summarize the economic paradigm that the Federal Reserve seems to be following today, it would be more or less this:

1) Raise the interest rate to decrease bank money and avoid inflation.
2) Lower the interest rate to increase bank money and avoid deflation.
3) Increase deficit public spending to help credit expansion.
4) Reduce deficit public spending to help the credit crunch.
5) To provide liquidity in the Capital Market, buying assets to prevent their price from falling.

To which we should add the systematic lowering of taxes on the highest incomes and the loss of progressivity of these, although this cannot be considered strictly part of the monetary policy of the Federal Reserve. In other words, the policy that the Federal Reserve has been following for the last 40 years is based on acting on investment, encouraging or discouraging it so that it is capable of absorbing savings.

For example, it is also the policy that Japan has followed for the last 20 years and with which it does not seem to have done badly, especially if we ignore, of course, that the public debt has reached levels close to 3 times Japan's GDP and that the slightest rise in the interest rate will clearly make it unsustainable. But why would public debt have to pay interest and be unsustainable? Or why would it even have to be paid back, instead of being bought directly by the central bank? In fact, this is what every economy in the world is doing today.

In short, we can say that there are two basic mechanisms used by the Federal Reserve to prevent the US economy from entering a credit crunch, and both mechanisms try to influence the amount of money that is created in the economy and not the amount of money that is saved, as would be logical:

a) Deficit public spending or "Keynesian policy".
b) Lowering the interest rate on loans.

We will analyze in some detail each of these two mechanisms and how they act on the Consumer Market and the Capital Market, and we will deal separately with the issue of financial instability, or the "*black swan theory*", which is what causes the generalized fall of prices in the Capital Market. Then, finally, we will analyze how it is possible to avoid credit crises by acting on the flow of savings.

2. KEYNESIAN POLICY

Since to avoid the credit crisis it is necessary to return to the money supply all the money extracted by savings, Keynes proposes that deficit public spending should be in charge of it, directly borrowing the money saved by the private sector (and not spent) and spending it on public services or public investment. Although Keynes put forward the proposal in 1936, when the economic crisis had already happened and what we are trying to do is to get out of it, the context that we are now considering, of an economy trying to avoid a credit crunch, is not very different and his proposal is very coherent and easy to understand, as well as being a good solution, since it is not at all complicated to guarantee that government deficit spending is taking the savings and returning them to the economy.

The only problem with Keynes' proposal, which is also very easy to understand, lies in the possibility that deficit public spending becomes unsustainable over time, because the interest payments on the debt grow indefinitely. Even Keynes did not believe that it was possible to maintain deficit spending on a sustained basis. His proposal was limited to a punctual action in a situation of clear economic depression, such as the one existing in the 1930s, and not an economic policy action continued over time indefinitely. To see this, let us imagine an economy divided into two sectors, the public sector and the private sector:

$$\begin{aligned} \frac{1}{k_F}\frac{dx_1}{dt} &= -a \cdot x_1 + b \cdot x_2 - ah_1 \\ \frac{1}{k_F}\frac{dx_2}{dt} &= \ \ a \cdot x_1 - b \cdot x_2 - ah_2 \end{aligned} \qquad (1)$$

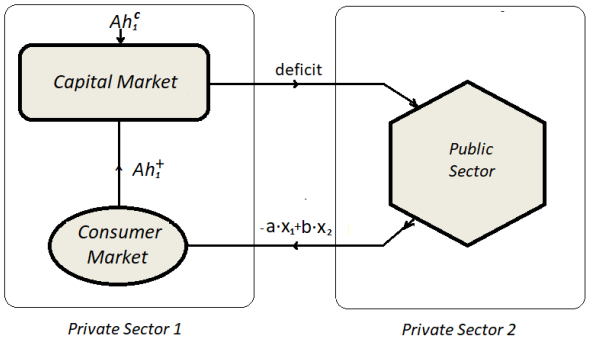
Where the private sector is the first sector and the public sector is the second sector. Now the term $(a \cdot x_1 - b \cdot x_2)$ is the public deficit, the difference between the money the government collects in the private sector $(a \cdot x_1)$ and the money the government spends in the private sector $(b \cdot x_2)$. Let us also assume, for simplicity, that there is no growth of the money supply, which is equivalent to assuming that the net saving of the economy is zero (which also implies that the aggregate expenditure of both sectors does not change, so that the growth of one sector will be what the other sector decreases):

$$ah_1 + ah_2 = 0 \quad \leftrightarrow \quad ah_1 = -ah_2$$

What this simply means is that *"the savings being made by the private sector are equal to the deficit being made by the public sector, or vice versa"*. The attached figure shows the circuit.

The private sector has decreased spending without changing its income, and its net saving is positive. Ah^+ is positive. While in the public sector the opposite happens; it increases its spending without changing its income and, therefore, it gets into debt. The consequence is that the public sector deficit becomes the savings that are not invested and the

government enters into a dilemma, either it lets the public debt increase indefinitely, or it maintains the budget balance and lets the economy enter into a credit crunch because the



excess savings are not returned to the economy. Now it is very easy to understand the proposal made by John Keynes in 1936 to avoid the deflationary crisis: *"the government has to spend on credit, either in investment or consumption, all the surplus savings not spent by private investment".*

$$Public\ Deficit = a \cdot x_1 - b \cdot x_2 = Private\ Saving$$

Keynes was the first economist who became aware of the consequences of the mismatch between people who save and people who invest with loans. According to the dominant theory of his time (and which is the theory still defended today by economists working for private universities in the USA), saving is balanced by investment thanks to the interest rate. This is the so-called Lendable Funds Theory, but for Keynes it was very clear that this theory was only a mirage, because when businessmen's expectations ceased to be flattering, private savings stopped returning to the economy through lending to investment, the economy went into recession because of insufficient spending, what he called aggregate demand. Keynes thought that, in such a situation, any attempt to stimulate investment by lowering the interest rate would be futile:

"You can take the horse to the river, but you can't force him to drink."

Keynes,1936

And the only sensible thing to do is for the government to act and borrow the savings that the private sector does not lend for investment, and spend it, compensating the insufficient private spending on investment with public investment. In this sense, the theory Keynes put forward in 1936 and the vision he has on the origin of the credit crisis is similar in many aspects to the Financial Theory of Growth we have exposed here, and the solution he proposes is the right one, and it really manages to avoid the mismatch between savings and credit.

KEYNESIAN POLICY. The economic policy proposed by Keynes, which uses deficit public spending to return to the economy the money extracted from excess savings, was not used in the US until well into the 1980s, for the simple reason that before then economies had only faced inflationary crises, for which Keynes' recommendations did not seem to make much sense.

After World War II, private investment financed by bank credit grew steadily, more than pumping the money needed for growth into the world economy. Meanwhile, growing public spending was financed everywhere without the need to resort to deficits, thanks to the progressive tax rate left by the Roosevelt presidency after the war, which was imitated in almost every country in the world. These were the so-called "thirty glorious years" of the post-war period, which for many only lasted until the early seventies, when stagflation appeared, induced by the rise in the price of oil. It was then, at the end of the 1970s and the beginning of the 1980s, that the rise in the dollar interest rate turned stagflation everywhere into a debt crisis.

Supply-side fiscal policy, as Keynesian policy was called, began with the arrival of the Reagan presidency in the 1980s, when stagflation was being left behind in the United States. It was like Mayday, and while the US was flourishing the rest of the world was entering the worst debt crisis humanity had ever seen.

It is very curious, but the narration of the events that took place during the 1980s differs greatly from the one propagated by economists working for private universities in the United States, and has nothing to do with what actually happened.

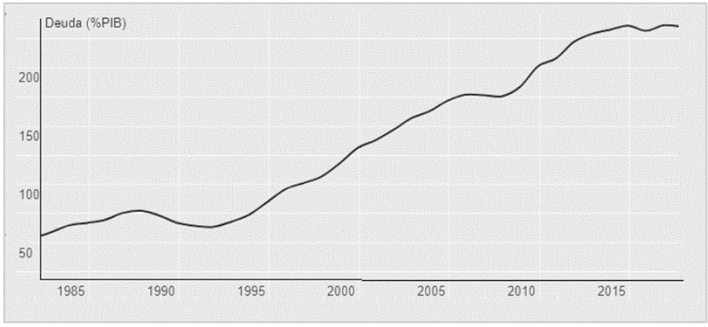
The lowering of taxes on higher-income earners, which had been steady since the end of World War II, took a major boost with the Reagan presidency, at the same time that the public deficit was becoming chronic and the public debt was rising to levels not seen since World War II (deficits far higher than those that supposedly financed the Vietnam War). It was then that what can be called without exaggeration the "Golden Age of Keynesian Politics" began, with three decades of Republican presidencies with high public deficits coupled with a sharp reduction in the progressivity of taxation, which allowed private savings to be returned to the economy.

It's curious, but the long period of Keynesian policy only suffered a slight blip under Clinton's Democratic presidency, who slightly increased taxes on the richest and steadily decreased the public deficit until it was in surplus at the end of his eight years in office, and without the economy suffering any recession, something difficult to explain given the high interest rate at the end of his term. Of course, it should also be noted that the interest rate on the dollar was very low at the beginning of his presidency. Seeing is believing, all Republican presidents applied Keynesian policies, while Clinton, the only Democratic president in thirty years of presidency, reduced the fiscal deficit until it was eliminated and slightly raised

taxes. Although, as it could not be otherwise, the story told by economists working for private universities in the US is very different.

The great disadvantage of Keynesian policy, as we have already mentioned, is that public debt increases steadily as long as aggregate savings are maintained, becoming unsustainable over time, especially when there is no technological advance that invites spending on investment and is capable of absorbing savings.

Nowadays, the dimensions that public debt can reach, when public deficit is used to avoid a credit crisis, are in some cases truly scandalous. The attached figure shows the evolution of the public debt of Japan, which is the country that is usually used as an example in this case, because since the 90s of the last century it has been trying to get out of a chronic stagnation by applying Keynesian policies.



We can observe the constant increase of the Japanese public debt since the 90s of the last century, reaching in 2019 an accumulated value of about 2.5 times the country's GDP. The evolution is very consistent with a Keynesian policy aimed at absorbing an annual saving of the private sector of around 10% of GDP, which after 30 years, accumulates a public debt with the private sector of about 2.5 times the current GDP.

It is difficult to justify such nonsense, the origin of which is to be found in the bursting of a large real estate bubble in the early 90s of the last century, and whose consequences have lasted for almost three decades, although to the authorities' credit it should be noted that it is difficult to propose an alternative plan, once you have allowed a real estate bubble of such dimensions to grow and burst without warning.

3. INTEREST RATE MANIPULATION

As we already know, in the present monetary economies, what makes money is the bank register created when a loan is granted, that is, what we have called bank money, therefore when the interest rate of money goes up and credits are more expensive to maintain, they are renewed in a smaller quantity and the quantity of bank money grows more slowly. The opposite happens when the interest rate is lowered and credits are easier to pay, then, the amount of credits granted increases and with it the amount of bank money also grows.

It is therefore understandable that the manipulation of the interest rate appears as a very powerful tool to control the quantity of money existing in an economy, thanks to the direct effect it has on the flow of creation of bank money, what we are calling the flow of credit. Such is the confidence aroused by the manipulation of the interest rate in the monetary authorities, that since ancient times they have placed almost all their hopes in the control exercised by the interest rate on the flow of credit, to avoid that this decreases below the flow of hoarding producing a recession, or that it increases in excess producing inflation.

However, it is very clear that such an idea is a mirage that leads the economy towards inevitable disaster. This becomes clear when we divide the economy into two groups, the group of savers and the group of non-savers. In such a case, the system of equations describing the evolution of each of the groups is identical to the one we already saw when we studied Keynesian policy and, therefore, the conclusions we reached then are repeated now:

$$\begin{aligned} \frac{1}{k_F}\frac{dx_1}{dt} &= -a \cdot x_1 + b \cdot x_2 - ah_1 \\ \frac{1}{k_F}\frac{dx_2}{dt} &= \ \ a \cdot x_1 - b \cdot x_2 - ah_2 \end{aligned} \qquad (1)$$

The only difference is that the deficit sector is now a part of the private sector, not the public sector as it was when we looked at Keynesian policy. When the Central Bank lowers the interest rate, the quantity of bank money increases because it is cheaper to hold credit, but it also makes it cheaper to accept loans from savings. What actually happens in aggregate terms is that it is inducing one part of the private sector, the one with the lowest income, to borrow from the other part of the private sector, the one with the highest savings, and to spend on credit the money that the other part of the private sector saves, thus preventing the economy from going into recession. We must understand that entrepreneurs are not going to invest more because the interest rate on loans is lower, but consumers will consume more if they can finance their consumption more cheaply, and in doing so they are returning excess savings to the economy at the price of being indebted to the higher income sector.

We are not going to repeat the reasoning we already did when we described Keynesian policy, which does not make much sense. What is important is to understand from where the interest on the new debt comes from, since it does not have to be backed by capital goods, but by current income. This is also what happens with public debt, which is supported by public sector revenues, but now it is different for two reasons. First, because the part of the private sector that is getting into debt is usually the one with the lowest income, so it will not be able to get into debt indefinitely, and just like the public sector, it will stop absorbing the savings at some point in the not too distant future. And second, because unlike what happens with a debt backed by a capital good, which there is no rush to pay it off as long as the capital good produces income, what happens now is that the income is being backed by the debtors' current income, so any change in the interest rate or in the economic situation can cause the debtor to pay off the debt, leading to a net extraction of money in aggregate terms.

In both cases, lowering the interest rate on loans is only going to buy some time, and as we will explain below it cannot be kept low indefinitely either because it is the benchmark against which capital goods are valued.

PAUL VOLCKER. The manipulation of the interest rate as a basic tool to control the flow of credit began to be used by the Federal Reserve in the early 1980s. It was right at the beginning of Reagan's presidency, when Paul Volcker carried out the three major changes that were to mark the Federal Reserve's monetary policy for the next 30 years:

1) A large tax cut was made on the highest incomes, which significantly increased savings and with it, income inequality.
2) The public deficit increased very significantly.
3) The interest rate was raised very significantly.

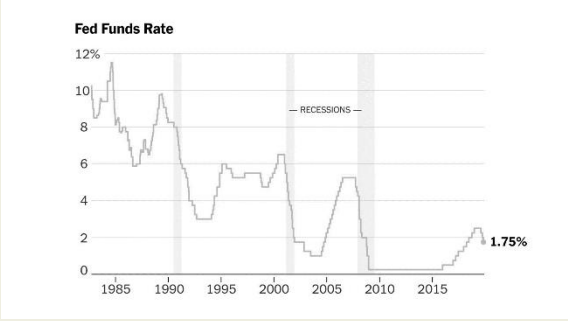
The economic consequences of such a course of action are not difficult to predict. At first, the interest rate hike led to a recession, but the increase in the government deficit soon boosted the economy. US government spending continued virtually unchanged thanks to the deficit and the middle class did not protest. The high interest rate reduced bank money producing a slight recession, but it also lowered inflation and that benefited everyone, even the banks who usually suffer the most in recessions. The tax cut mainly benefited people with higher incomes, but it also increased the incomes of a part of the middle class. Is it any wonder that Reagan is one of the most popular presidents of the second half of the 20th century?

ALAN GREENSPAN. Paul Volcker was replaced, still at the beginning of Reagan's presidency, by Alan Greenspan, who elevated to the category of "art" the manipulation of the interest rate to regulate the amount of bank money in the economy and lower inflation, while the Republican administration of the day maintained the public deficit to absolve the increase in savings caused by the decrease in taxes on the richest, preventing everything from ending in a credit crisis.

If there is one thing that can be said about Greenspan, and no one doubts it, it is that he is the person who has shaped the last 40 years of capitalism. Although it would be foolish for us to attribute such merit to a single person, the truth is that Greenspan represents the visible head of an oligarchy of liberal intellectuals who have used the Federal Reserve to restore to the rich the splendor lost when the Roosevelt administration increased the progressivity of taxes and regulated the activity of the banking system.

Greenspan is, first of all, an economic fundamentalist who identifies his liberal beliefs with scientific knowledge, as all liberals tend to do, so that what is only a belief, the goodness of the "free market", becomes a scientific fact, even more so when the result of the time spent leading the Federal Reserve has been the undoubted continued growth of the US economy for a quarter of a century. In this sense, it is undeniable that Greenspan is the person who has done the most to make the US the world's hegemonic power, and it is for that reason that he has held the chairmanship of the Federal Reserve for almost 30 years, undoubtedly the most important position on this planet.

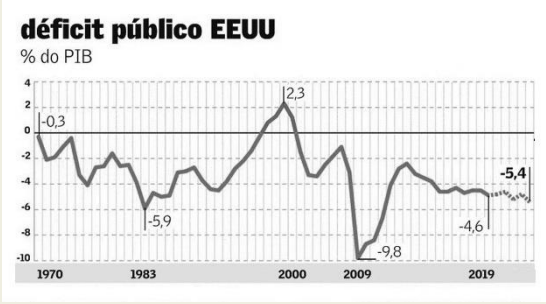
To understand Greenspan, and to understand how the Federal Reserve shapes the entire world economy, let's look at the attached figure to see the changes in the interbank interest rate made to stabilize the money supply since the beginning of the 21st century.



You can see very well how the interest rate decreases very fast from a level of 6% in 2001, at the beginning of Bush's presidency, to around 1% in 2004, almost at the end of his presidency. The reason for lowering the interest rate, although it does not appear in the graph, was to get out of a small recession that started in the US just at the turn of the century, when Greenspan had raised the interest rate on the dollar to 6% and kept it there for the last 5 years of the 20th century.

Then, for some inexplicable reason, he initiates a rapid rise in the interest rate to 5%, which could only end in a recession, as in fact it does. Why does Greenspan "lower and raise" the interest rate in such a short period of time? What can justify such abrupt changes in the interest rate?

Let's look now at the public deficit in the same period.



It is easy to see that the public deficit, non-existent at the beginning of the century, rises sharply from 2001 to reach 5% of GDP, coinciding with the lowest level of the interest rate, and begins to fall again in 2004, coinciding with the rise in the interest rate. We see that both policies are very coordinated, so that interest rate hikes are associated with decreases in the public deficit, and vice versa. It seems that the Federal Reserve follows a policy during the period very similar to the one followed during the Reagan presidency, lowering the interest rate and increasing the public deficit to avoid the recession of 2001, and raising the interest rate and lowering the public deficit to avoid inflation in 2005.

But is that why the Fed lowers rates and then raises them?

In the late 20th and early 21st centuries, near the end of the Clinton presidency, Greenspan had raised the interest rate sharply while Clinton's fiscal policy reduced the government deficit to surplus, which was bound to push the economy into a recession, which occurred just before the turn of the century, and shortly after the start of the Bush presidency. In fact, the rise in the dollar interest rate was so high and so persistent that it produced an exchange rate crisis in Southeast Asia and Russia, sinking their economies (was it on purpose?). It became necessary, therefore, to increase the amount of dollars in the economy by lowering the interest rate to 1%, while increasing the public deficit and helping the US economy to recover.

In 2004, Greenspan decides to reverse the situation and return to a more "normal" interest rate, around 3% or more, and begins to raise it. Again, it is observed that the public deficit is reduced, coordinating both policies to reduce the amount of money in the economy. Not because Greenspan thought that the economy was overheating and that there was a possibility that a housing bubble was developing in the country, but because he thought that the US economy was very solid and could withstand a further drop in the inflation rate, which had already disappeared since the beginning of the century (whether the rest of the world could withstand it or not, I don't think, was part of Greenspan's considerations).

Said and done, the Federal Reserve began to raise the money rate again, at the same time that the Bush administration was cutting the public deficit, stopping short the two sources of credit money injection into the economy: deficit public spending and private spending financed by bank credit, and driving the US economy into recession.

A recession was inevitable and, in fact, it was expected, but Greenspan hoped that first some other economy in the rest of the world, preferably Europe, would collapse. He hoped that when recession came to the US, it would be brief and transitory, as it had been on previous occasions. For example, as happened at the beginning of the Reagan presidency, as happened at the end of the Bush Sr. presidency, and as happened at the beginning of the Bush Jr. presidency, just four years earlier. But that's not what happened.

Everything seemed to be going well at first. From 2005 onwards, the US economy slowly came to a halt as interest rates rose and the public deficit decreased. Alan Greenspan, the father of interest rate manipulation, was euphoric and rightly so: he had been chairman of the Federal Reserve for almost 20 years, raising and lowering the interest rate of money, without the US economy having had a serious setback in all that time. From 1987, when he took office, until 2006, when he left it, the US GDP had multiplied by 3 in real terms, with no shadow on the near horizon (what was happening in the rest of the world was another story).

Alan Greenspan left office in glory.

In 2006, Ben Bernanke, perhaps the most suitable person in the world to occupy that position, replaced him without knowing that, just one year later, he would have to deal with the most serious crisis of capitalism since 1929. But what made the interest rate hike different this last time?

4. WHY 2008 WAS DIFFERENT (THE BLACK SWAN)

Logically, Keynesian policy can only be maintained until the country's capacity to pay the interest on the growing public debt is reached. From that moment on, the annual public deficit will be very limited and will become insufficient to continue returning the excess savings to the economy; even when the interest rate is lowered to zero. The same, or worse, will happen when the interest rate is lowered to try to absorb the savings with the increase in spending on credit, because the weight of interest will stop the indebtedness.

Of course, lowering the interest rate always gives the economy some breathing space by easing interest payments on both public and private debt, and allows the economy to

continue to maintain deficit spending, but it clashes with the zero interest limit that offers money at no cost. Both alternatives, maintaining the public deficit and maintaining private credit thanks to an interest rate close to zero, keep the economy away from a recession and allow to absorb the savings of people with more income, but causes a great discomfort without defined origin that warns us that something has to be wrong in an economy where the price of money is zero or almost zero.

The real problem that the economy presents once it has reached a situation in which a very low interest rate and a large credit debt come together is twofold. On the one hand, savings have not disappeared and must continue to be drained, because they depend on income and this has not diminished, that is to say, nothing has been solved. On the other hand, a new actor has appeared on the scene, an unsuspected one, which dashes all the hopes of the Central Bank that an interest rate close to zero can avoid the credit crisis:

"*financial instability or the black swan*".

Why was 2008 different? Why didn't the US economy, after slowing to a complete halt because of the interest rate hike, return to growth when the government deficit began to rise and the interest rate was lowered to zero?

Although it is easy to see that after doing all that, the US economy finally recovered, this time the drop in the stock market price that accompanied the small recession that always caused the interest rate to rise, was of such magnitude, that the monetary injection that had to be made to save the Capital Market is incomparable to the small injections of the previous recessions. This time, it took almost three years before the economy began to show the first signs of growth. Why the change?

THE RELATIONSHIP BETWEEN THE TWO MARKETS. The Madrid Theory we have developed revolves around the existence of two markets, the Consumption Market and the Capital Market, very decoupled one from the other thanks to the stability of the monetary flows of savings and non-savings, but both highly correlated by the value of the interest rate of money. It is precisely the ability of the interest rate to influence both markets when it changes that characterizes a monetary economy and that makes monetary policy terribly dangerous and unstable when the interest rate approaches zero.

Let us observe that raising or lowering the interest rate, not only makes credit debt more or less expensive or cheaper, and therefore makes the price of maintaining the amount of bank money that forms the money supply more or less expensive or cheaper, but it also makes the value of capital goods more or less expensive, since the interest rate is the reference used to determine their price.

So when you lower the interest rate to prevent the flow of credit from falling below the flow of hoarding, you are also increasing the value of all capital goods, which is not a bad thing

in itself when the interest rate is high, but what is a disaster when the interest rate approaches zero.

Let's see why.

The equation relating the change in the aggregate value of capital to the money supply is given by:

$$K = \frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i} k_F \cdot M$$

In which we suppose that all the parameters that appear in it do not change, or change much more slowly than the money supply changes, which as we know is equal to the quantity of bank money not hoarded. But let us observe that the expression states that when monetary policy decreases the interest rate, the value of capital goods increases and, on the contrary, when the interest rate increases, the value of capital goods decreases.

Any change in the interest rate will not only change the amount of bank money in the economy, but it will also change the value of capital goods. The problem arises when the interest rate approaches zero, because then the valuation of capital goods tends towards infinity:

$$K = \frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i} k_F \cdot M \quad \rightarrow \left[\frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i}\right]_{i \to 0} \approx \infty \quad \rightarrow \underset{i \to 0}{K} \approx \infty$$

The expression tells us that the decrease in the rate of interest decouples the value of capital from the income flows that sustain it, by making the relation between the value of capital and income tend towards infinity. As the interest rate approaches zero, the Capital Market's valuation of the present value of any future income becomes increasingly uncertain because of its high value. Its value fluctuates greatly in the face of future changes in income.

Thus, for example, if the interest rate is 5%, then, in an environment without uncertainty ($\overline{\aleph} = 1$) and with an income share of 30% of GDP, the ratio of aggregate capital to income is 6. $\langle \alpha \rangle$ of 30% of GDP, the ratio of aggregate capital to income is 6. Whereas, in the same environment, but with an interest rate of 1%, the ratio is 30:

$$\left[\frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i}\right]_{i=5\%} \sim 6 \qquad \left[\frac{\langle \alpha \rangle}{\overline{\aleph} \cdot i}\right]_{i=1\%} \sim 30$$

Any small inaccuracy about the future income of a capital asset is transmitted to the calculation of its present value multiplied by a factor of 30 when the interest rate is 1%, which makes any valuation of capital very inaccurate as the interest rate approaches zero.

When we remember that what the Capital Market is arbitrating is the relation between the value of a capital good and the income it produces, what we have called uncertainty. $\overline{\aleph}_j$ then we understand very well that a flight towards liquidity of savers will be much more probable the closer the interest rate is to zero, because the greater will be the losses suffered by the saver in the case of not fleeing in time towards liquidity.

$$dK = \frac{\langle \alpha \rangle}{\overline{\aleph}_j \cdot i}\ dPIB \quad \rightarrow \left| \begin{array}{ll} \xrightarrow{i=5\%} & dK = 6 \cdot\ dPIB \\ \xrightarrow{i=1\%} & dK = 30 \cdot\ dPIB \end{array} \right.$$

We see, that the interest rate close to zero makes the valuation of capital goods very imprecise, making that any change in the income that produces a capital good, changes a lot its value, which will make the flight to liquidity become much more frequent, besides much more expensive in the case that it occurs. because the fall of the valuation is made from a higher value. Or in another more graphic way, it is more likely to appear:

"the black swan"

The disaster that the world economy would have ended up in would have been enormous, if the Federal Reserve had not acted quickly to inject liquidity into the Capital Markets, saving the banks and many other companies that needed to sell their assets in order to pay off their debts. But let's remember that the problem is being created by the savings money that needs to be returned to the economy one way or another, and none of the mechanisms the Fed is using to avoid a credit crunch is reducing income inequality, which is what keeps savings very high. Those who save are the ones who have surplus income that they don't need to spend.

5. THE PROBLEM OF OVERSAVING

If we had to point out one of the most important consequences of the financial nature of capital, it is the one which states that capital goods are not the product of the accumulation of savings, but that savings are possible in a monetary economy because capital goods are created which can be bought with savings. It is this fact that identifies excess savings as the cause behind all the problems a monetary economy suffers.

The growth equation shows us that *GDP* growth depends on the difference between the flow of savings and the flow of dissaving, but it does not make it clear what we should do, or how we should manipulate both flows, to avoid the economy going into recession.

However, the situation changes completely when we study, not the growth equation, but the conservation of money flow equation from which it comes.

When we divide the economy into two large sectors, the agents (or people) who save and the agents (or people) who do not save, and we assume that both are two distinct groups of agents, it is possible to use for their description the system of two equations that describes an economy divided into two sectors:

$$\begin{aligned} \frac{1}{k_F}\frac{dx_1}{dt} &= -a \cdot x_1 + b \cdot x_2 - ah_1 \\ \frac{1}{k_F}\frac{dx_2}{dt} &= \ \ a \cdot x_1 - b \cdot x_2 - ah_2 \end{aligned} \qquad (1)$$

Where now:

$a \cdot x_1 \rightarrow$ *the fraction of savers' spending that ends up as income for non-savers.*
$b \cdot x_2 \rightarrow$ *the fraction of non-savers' spending that ends up as savers' income.*
$ah_1 \rightarrow$ *the net savings of savers.*
$ah_2 \rightarrow$ *the net savings of non-savers.*

The system of equations is very general, and although normally each equation represents a different sector of the productive system, or even different countries, the truth is that it can also be applied to any division of the economy into two parts, with the only condition that each sector is a different sector to which an accounting equation can be associated, and which also fulfils Fischer's equation, that is, that in each sector it makes sense to define a monetary mass:

$$k_F \cdot m_i = x_i \qquad \textit{(Fischer Equation)}$$

If we suppose that the division between savers and non-savers makes sense because each sector is formed by different agents and because it is possible to associate to each one of them a monetary mass that satisfies Fisher's equation, then it is possible to understand what the real problem that originates saving is, analyzing the system of equations (1).

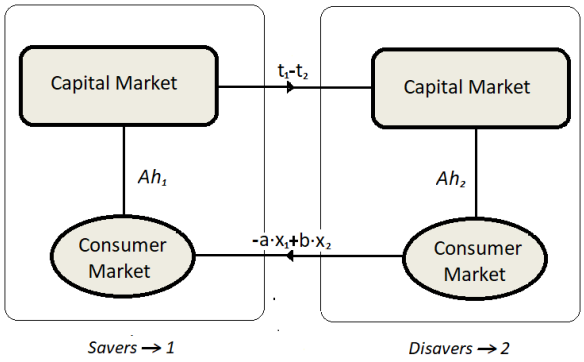
For this, let us separate the Consumption Market and the Capital Market of each of the two sectors, the one belonging to savers and the one belonging to non-savers. Now, the exchange flows that appear in each of the two equations of the system (1) represent outflows or inflows between the respective consumption or capital markets of each of the sectors, as it appears in the attached figure.

Let us remember that the solution of the system of equations (1) was studied in a very general way in the second chapter, where it was used to explain the phenomenon of the Empty Spain and trade between countries taking into account the Capital Market. According to that analysis and when we suppose, as it was supposed there, that there is

no monetary creation and, therefore, when we suppose that the saving made by savers must be equal to the dissaving made by non-savers, we reach a quite logical conclusion for large times:

$$ah_1 = -ah_2 \xrightarrow{t\to\infty} \begin{cases} x_1 = const. \\ x_2 = const. \\ a \cdot x_1 = b \cdot x_2 - ah_1 \end{cases}$$

The expression tells us that non-savers are able to maintain a deficit spending $(-a \cdot x_1 + b \cdot x_2)$ above income, thanks to the money they borrow from savers. $(-ah_1)$. But it escapes no one's notice that this flow of dissaving can only be financed, in aggregate terms, by the sale of the capital goods of the non-savers.



There is a money circuit, which has to be closed when we assume there is no credit creation, in which the deficit flow between the Consumption Markets has to be being fed as a flow of lending between the Capital Markets, but it is evident that this circular flow of money has to be compensated in the Capital Market by a flow of capital goods from the non-savers to the savers. Or to put it another way, the excess consumption of non-savers must necessarily be financed by the sale of capital goods, and savers must be increasing their wealth at the expense of the loss of wealth of non-savers.

To see this more clearly, let us calculate the amount of money that non-savers would owe at each moment if they did not repay the debts they are incurring. When we assume that the flow of loans is constant, the accumulated debt must increase linearly over time. $Q(t)$ should increase linearly over time. However, in the money owed we must also include the interest payments on the debt already accumulated, so that the increase in the accumulated debt $\frac{dQ(t)}{dt}$ is given by the differential expression:

$$\frac{dQ(t)}{dt} = ah_1 + i \cdot Q(t) \qquad Q(0) = 0$$

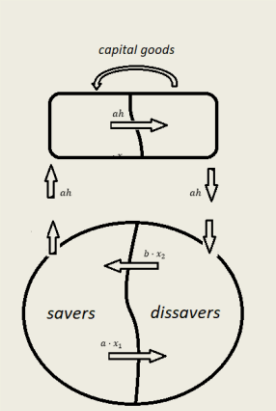
Where "i" is the interest rate of the debt. The solution of the equation is an exponential function that grows without limit:

$$Q(t) = \frac{ah_1}{i}(e^{it} - 1)$$

Evidently, debt cannot grow without limits and must eventually stop and be paid off. In the figure we can see that the monetary flow between the capital markets closes the monetary circuit and compensates the deficit spending that exists between the consumption markets between savers and non-savers, so there must be a flow of capital goods from non-savers to savers that liquidates with their sale the debt that is accumulating. Or, in other words, it is the sale of their capital goods that is allowing the group of non-savers to maintain deficit spending (in aggregate terms).

The result is really remarkable, as well as very problematic, because it says very clearly that the flow of credit between savers and non-savers cannot be maintained indefinitely, and will stop when the non-savers have no capital goods left to sell. But what really makes the analysis hair stand on end, is to see that the reason why non-savers go into debt, has its origin in money extracted from the economy by savers, who are the ones inducing a monetary deflation that reduces the income of non-savers and forces them into debt.

<u>THE WEALTH OF THE RICH IS THE POVERTY OF THE POOR</u>



The relation between savers and non-savers can be written with the same system of equations used to describe an economy divided between two sectors. When we also suppose, for simplicity, that there is no monetary creation, which implies that the saving made by some is the non-saving made by others, we have:

$$\frac{1}{k_F}\frac{dx_1}{dt} = -a \cdot x_1 + b \cdot x_2 - ah$$
$$\frac{1}{k_F}\frac{dx_2}{dt} = \ a \cdot x_1 - b \cdot x_2 + ah \qquad (1)$$

And it can be shown that, in stationary regime, the relation between the income of savers and non-savers is given by the expression:

$$a \cdot x_1 = b \cdot x_2 - ah$$

Moreover, the debt accumulated by non-savers is given by the expression:

$$Q(t) = \frac{ah}{i}(e^{it} - 1)$$

Where "i" is the interest rate paid on the debt. Of course, the debt is unsustainable, and in practice, inter-sectoral borrowing continues as long as the debt is repaid by the sale of the capital assets held by the savers.

That is, when we consider non-savers as a statistically separate group from savers, in aggregate terms, non-savers have to part with capital goods to maintain indebtedness. The figure explains this process a bit.

It is now possible to understand without much difficulty why for the last 30 years or so, the rich are getting richer and the poor are getting poorer.

Of course, not all the savings of savers have been spent by non-savers. Government deficits also absorb some of the savings. For example, Japan's public debt is already about 2.5 times GDP, with treasury securities being a part of the savings that Japanese savers have been making. Moreover, another part of the savings will have been used to buy new capital goods or to finance their creation, which is the same thing, because they will now belong to savers. Therefore, it is clear that when savings are not absorbed by the public deficit or by the purchase of new capital goods, it will be the indebtedness to which a large part of the middle class has had to resort to maintain their expenses in a slightly deflationary environment, which will return it to the economy, but in exchange for their wealth, which will now belong to the savers.

Clearly, the analysis we have done indicates that in a no-growth economy aggregate savings are not possible for long times, which is evident when the financial nature of capital goods is taken into account.

6. THE TAX SOLUTION TO THE SAVINGS PROBLEM

Once it is understood that it is saving that creates the credit crunch, then it is not difficult to find a solution to the problem. Let's look once again at the growth equation that shows the evolution of spending as a function of savings and dissaving flows:

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = -[Ah^{-}(t) + Ah^{+}(t)] \xrightarrow{Ah^{-}(t)+Ah^{+}(t)>0} \Delta PIB < 0$$

We know that the flow of money extracted by saving should never exceed the flow of money injected by credit and borrowing. The problem is, as Keynes said a century ago, that those who save are different from those who spend and invest with borrowed money, and there is no reason why the two flows should remain balanced.

We also know that the fiscal and monetary policy that has been used for the last 40 years is wrong because it is aimed at maintaining the flow of credit above the flow of savings, when the logical thing to do would be to act on the flow of savings and force it to remain below the flow of credit. What this policy does, as we know, is to lower the interest rate of money and maintain indefinitely a public deficit spending, but, as has been shown, neither policy can be maintained indefinitely in time, because the interest rate is dangerously close to zero and public debt increases to the point of endangering the financing of public services, so that, in the best case, both policies can only be punctual, without ever being a definitive solution.

This is logical. Investment spending through credit depends on the technological moment and, although it can be stimulated by deficit public investment or by lowering the interest rate, it is an exogenous variable over which there is no control. Savings, on the other hand, is an endogenous variable that depends primarily on the income of each of the agents, so it can be manipulated very easily by changing the amount and progressivity of the income tax. In other words, it is to be expected that by increasing and decreasing the income tax it will be possible to reduce saving so that it always remains below the flow of dissaving.

What we propose here is to put a progressive tax on income in order to limit savings, but separating very clearly the financing needs of public spending from the fiscal policy aimed at avoiding the credit crunch. The idea is that the tax rate that is used to finance public spending is clearly differentiated from the tax rate that is used to limit savings through fiscal policy. We think that public spending should be financed with the money that is collected from the income tax and without having to resort to the deficit, while the money that is extracted to solve the savings problem should be used separately and for different purposes. Furthermore, it should be the Central Bank that independently signals the extra annual amount to be collected to reduce excess savings.

Specifically, and since we assume that saving depends progressively on income (Keynes' Law of Saving), the rate must be progressive with income. There is, therefore, no reason why it should be different from the rate used to finance public spending, and what we propose, in fact, is that it should be the same.

The attached table sets out the proposal:

The parameter ε is a positive factor decided by the Central Bank in good time and according to the economic situation. The first table is the proposal for a capital tax, which is discussed later, but has nothing to do with what we are dealing with now. The second table shows the usual rate levied on income, no matter what the origin of the income is, whether it comes from labour or income; it is the revenue used to pay the cost of public services. The third table shows the tax that we propose to reduce savings; it is a tax that is just as progressive as the usual tax on income but which is made to depend on a parameter ε that changes as the general economic situation changes, so that the tax ensures that no savings are left uninvested.

The table is taken from a very similar table proposed by Thomas Piketty, although the reason that leads him to make it is different from the one that moves us here. Let us note that now, it is not necessary to manipulate the interest rate to increase the flow of credit, nor is any deficit public spending necessary. Moreover, the money collected with this last tax on savings should never be used to finance public spending, but should be devoted to facilitating investment by people with lower incomes, since the function of the tax is to reduce the amount of savings of those with higher incomes.

THE SOURCE OF RISING INEQUALITY. The savings problem is not trivial, and can be aggravated for many reasons. Although we do not wish to go into detail here, we will point out two of them because they are a deliberate consequence of certain fiscal policies that are propagated as desirable by economists working for private universities in the United States:

Capital tax	
Multiple of the average equity	Annual property tax
0,5	0%
2	0%
5	2%
10	2%
100	2%
1.000	2%
10.000	2%

Income tax	
Multiple of median income	Effective tax rate
0,5	10%
2	40%
5	50%
10	60%
100	70%
1.000	80%
10.000	90%

Savings tax	
Median income multiplier	Effective tax rate *
0,5	ε·10%
2	ε·40%
5	ε·50%
10	ε·60%
100	ε·70%
1.000	ε·80%
10.000	ε·90%

* The parameter ε is a positive number that the Central Bank decides

1) *<u>The decrease in the progressivity of taxes</u>. The continuous decrease in the progressivity of taxes, which has been happening since the second half of the 20th century, redistributes the tax burden and causes the tax burden of the people who have more income to increase relatively to that of the people who have less income. This, in addition to causing an increase in inequality, increases the savings rate, given that the propensity to save is greater the higher people's income (Keynes' Law of Saving).*

2) *<u>The increase of indebtedness</u>. The greater saving of one part of society induces the decrease of the income of the other part of society, which forces the latter to support its expenses with borrowed money. Let us remember that the saving of some is the dissaving of others, and that only the creation of bank money tips the balance towards credit. Therefore, and even if it is only true when there is no money creation, we can say that it is true:*

$$\sum ah_i^+ + \sum ah_i^- = 0$$

That is, those who save are forcing the rest of the population into debt. It is very clear in the expression, that aggregate consumption can only be maintained thanks to the deficit spending of those who do not save, which redistributes income through the payment of interest or the loss of capital goods, to those who save. In aggregate terms, savers are not only saving, they are forcing non-savers to dissave and aggravating inequality of wealth and, therefore, of income.

Both causes feed back on each other and pull in the same direction, increasing savings and making it more difficult for credit to keep up with savings: "The loss of tax progressivity increases income inequality, and the increase in income inequality induces the increase in aggregate savings". The conclusion is very clear, the lack of tax progressivity aggravates inequality.

PART VI

FISCAL POLICY

CHAPTER 14

FISCAL POLICY

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March 04 of the year 2021
Garcia, Pedro Rojas Sola

1. THE MADRID THEORY

We have used the previous chapters to answer in a very concise way some of the many basic questions raised by monetary economics since its origin:

- The nature of money
- The basic equations that govern within a monetary economy.
- Price formation within the Consumer Market.
- The financial nature of Capital.
- Price formation within the Capital Market.
- The Financial Theory of Growth.
- Causes of the credit and exchange rate crisis.

All this, implicitly based on three very simple principles or postulates on the nature of money:

1st Postulate. The quantity of money is conserved in buying and selling exchanges.
2nd postulate. The quantity of money satisfies the monetary equation, where k_F is Fisher's constant:

$$k_F \cdot M = PIA$$

3rd Postulate. All the money in the economy is bank money, created when credit is granted.

Although we are not unaware that we have left unstudied aspects of vital importance such as the influence of public expenditure, we believe we have developed a theory sufficiently complete and exact, and with sufficient predictive capacity, to analyze with great precision the consequences of the decisions taken daily in the field of political economy. In this sense,

we think we have successfully completed the main purpose which has moved us to write this treatise on monetary economics, which has been none other than to point out the mathematical structure which underlies what is called free market economy and the limitations it imposes on our social way of organizing ourselves.

Specifically, we think we have demonstrated, beyond any reasonable doubt, that within a monetary economy there coexist two markets of a very different nature, where two types of goods of a very different nature are bought and sold: *consumer goods and capital goods*. We think we have also shown, beyond any reasonable doubt, how the Principle of Asymmetry, the Financial Theory of Capital and the Theory of Bank Money come together to explain one of the most remarkable equations of economics, the Growth Equation:

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = Ah^C(t) - Ah^S(t) \qquad \textit{(Growth Eq.)}$$

Equation, with which we can obtain a very global and exact vision of the cause that originates the credit crisis and the exchange rate crisis, at the same time that it shows us the best way to avoid them.

Having reached this point, it is now time to summarize, as a brief compilation, the set of statements which we have been stating little by little throughout the chapters of this treatise and which we have named The Madrid Theory. The intention of the summary is to present the new economic paradigm and the set of general lines of monetary and fiscal policy which we advise the monetary authorities to follow in order to get out of the impasse to which we have been dragged by the loss of progressiveness of the tax rate on income, the absurd and growing public debt and the absurd interest rate close to zero at which money is lent.

The purpose that has guided the elaboration of this treatise has been none other than to denounce the ridiculous and dangerous economic paradigm propagated by economists working for private universities in the USA, who advise public indebtedness without justification, who advise reducing tax progressivity that increase income inequality, that advise lowering the interest rate to zero that raise the valuation of capital goods to the point of bringing the world's stock markets to an announced disaster, but above all, the purpose that guides us has been to denounce the dangerous silence that they keep on those who manufacture the money in the shadows, who are none other than the investment banks. It is these American investment banks that, with their loans in dollars, unbalance the real economy of the rest of the countries of the world, which do not have, nor can they have, a currency strong enough to face them. It was the US investment banks that were responsible for the Asian crisis or the Russian crisis, or the 2008 crisis, even if they needed the necessary collaboration of the Federal Reserve to do so.

2. THE NEW PARADIGM OF MADRID THEORY

On the nature of money.

The usual economics definition of money is quite imprecise and inaccurate. For example, the world's most widely distributed macroeconomics textbook, "Samuelson", defines money as... *"anything that serves as a commonly accepted medium of exchange".* Another very common definition, no clearer, but perhaps a little more redundant would be:

> *"Money is any asset or good universally accepted as a means of payment for exchanges and which also serves as a unit of account and store of value".*

It is redundant because "being a unit of account" and "store of value" is the direct consequence of "*being universally accepted as a means of payment*" and, nevertheless, the definition is still imprecise because "*being accepted as a means of payment"* allows us to know what is being used as money in an economy, but it does not tell us if we are really in a money economy, that is, if it is really money. For example, there is evidence that, during the Second World War and in the concentration camps, the prisoners used cigarettes as a universal means of exchange, but it is not at all clear that we can really say that there was a money economy inside the camps. Another example which shows that such a vague definition of money is insufficient to characterize it is shown by some present countries, such as the Cuban Republic, where it is very clear that money exists and it is very easy to identify it, but where it is not at all clear that there is a monetary economy.

Therefore, in the Madrid Theory we define what a monetary economy is, defining at the same time what money is, so that both concepts always go together:

DEFINITION OF MONEY ECONOMY. It is said that an economy is a monetary economy when there is a good with which it can buy any other good or service offered for sale and whose total quantity M satisfies the monetary equation:

$$k_F \cdot M = \sum q_i \cdot p_i = PIA$$

The monetary equation tells us that the value of money does not come from the material it is made of, but from the relation between the quantity of money which exists and the monetary flow of buying and selling, or PIA.

In other words, what characterizes a monetary economy is the existence of money, which as it is defined implies the fulfilment of a quantitative relation, measurable, and of an aggregate or statistical nature:

1) That there is a universal good, money, with which any good or service offered for sale can be bought.
2) That the quantity of money M satisfies the Monetary Equation, in which k_F is Fisher's counter:

$$k_F \cdot M = \sum q_i \cdot p_i$$

The definition characterizes what money is, as well as the monetary economy in which it exists.

In short: Money is not only "that" which allows us to buy any good or service that is for sale in the economy, but it is also the character it gives to the economy in which it is used. We say that an economy is a monetary economy when money exists and is used. Throughout history, and since the most remote antiquity, innumerable things have been used as money. From gold, the best known merchandise which has been used as money, to tobacco or salt, being the essential characteristic of all of them, the true fact that their value does not come from the value of the merchandise itself which is used as money, but from the fact that the flow of purchases fulfils the monetary equation. In fact, it is the monetary equation which indicates the social origin of the value of money, relating the existing quantity of money with the maintenance of the exchange flows within the economy. At present, what is mostly used as money is "bank money" which is created when a loan is granted (and destroyed when it is repaid), and its value comes from the fact that it verifies the monetary equation:

$$k_F \cdot M = \sum q_i \cdot p_i = PIA$$

About credit money

What makes money in today's monetary economies is the bank money created by banks when they grant a loan. The public authorities -and, therefore, the citizenry- have granted commercial and investment banks the privilege of creating the necessary money, subject to some limitations.

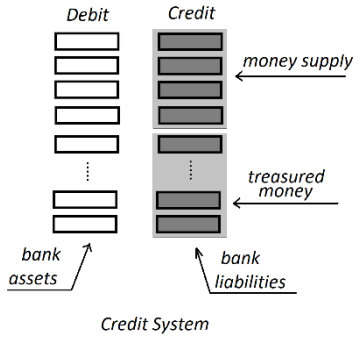
It is not difficult to prove that money is created when a credit is granted, that is why we call it credit money or bank money, and in this sense, who is really creating the money is the one who receives the credit, since it is he who backs it, by committing himself to pay it back or to pay interest as long as he does not pay it back. The bank only acts as a subsidiary responsible, and that is why it can go bankrupt, because its assets are insufficient to

support all the money created. For example, the money created by banks in the USA is more than 20 trillion dollars, clearly much more than the banks' equity backing.

The attached figure shows the result of the process of creation and destruction of bank money through the granting and repayment of credit.

When a loan is granted, the bank creates two entries or registers, one reflecting the amount of money the bank lends (and which is then used as money), and another reflecting the money owed to the bank (it is an asset of the bank, but it is not money and cannot be used as money). Obviously the sum of all the records of all the banks must always give zero, indicating that all the bank money being used in the economy is someone's debt (even the bank money used by the central bank).

When a loan is repaid, the opposite happens, and the money is destroyed. The bank liquidates the record where the contracted debt is recorded (the record on the left in the figure) and deletes the record containing the money that has been repaid (the record on the right in the figure).



Credit System

Calculating the amount of money that needs to be created for an economy to function is not difficult. Using the monetary equation and giving it Fischer's constant of a value of 2, we have for 2019 and for the US:

$$k_F \cdot M = PIB \xrightarrow{PIB=20MM \quad and \quad k_F=2} M = 10MM$$

In present day terms, the 10MM manufactured over the last 50 years are worth about $35MM, to which must be added the other 10MM plus dollars that have also been manufactured and are used to maintain international trade, bringing the present day value of the money manufactured by US banks alone to about $70MM at today's prices.

The problem, or the great advantage, of bank money is that it is created as a debt that has to pay interest as long as it is not paid back, so there is a strong incentive to pay it back and destroy the money created. It is a great advantage because the flow of interest that has to be paid for maintaining a credit prevents banks from being able to create too much money and cause an inflationary process. And, it is a great disadvantage because there is a strong incentive to repay the bank loans, destroying the money and causing a price deflation which, in times of recession, will end in a credit crunch or an exchange rate crisis.

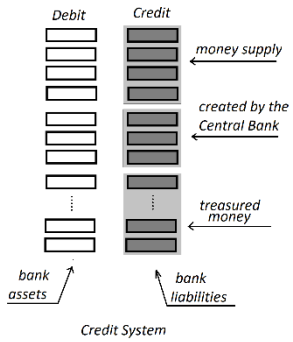
Sustaining the equilibrium of the quantity of credit money is the magic that sustains the monetary economy in which more than 8,000 million people are born, live and die. Credit

money is perhaps our society's greatest display of genius, or perhaps its greatest display of recklessness, and it is not at all easy for the authors to take a position on it. However, we are inclined to think that credit money, which we know represents a debt that must be repaid, has many more advantages than disadvantages, in spite of the fact that it is very easy to prove, as we believe we have done in the Madrid Theory, that it is its existence which condemns the economy to suffer periodical credit crises.

In short: What is currently used as money is bank money, which is created when banks grant credit and destroyed when the credit is repaid. The essential nature of bank money is that it is a debt that stands behind who takes on the credit, while the bank that granted the credit is only secondarily liable. The great advantage of credit money is that it can grow and adapt to the growth needs of the economy, in addition to being the whole of society as a whole who supports it, but it has the great disadvantage that it can be destroyed when no one wants to assume the credit and interest payments involved.

About the money created by the Central Bank

It is important to understand that the Central Bank can be seen in two different ways, as just another bank in the banking system that can make money out of nothing, or as a private individual that needs to borrow from a bank in the system in order to create money. Here we will use the second option because it is simpler to analyze, although both are equivalent.



Historically, the Central Bank was created by giving that name to an already existing bank, or to several already existing banks which joined together to create the Central Bank, which is the same thing. That made the bank money manufactured by the Central Bank appear as a special money, the so-called "high power money", which made it different from the money issued by the rest of the banks, although it was not different. Therefore, we prefer to analyze the banking system supposing that the Central Bank cannot manufacture money by itself, and that only the rest of the private banks can do it, so that when the Central Bank needs to issue money it will have to borrow it from a bank of the system, being the interest rate it pays for the money, null.

The attached figure shows us once again, the bank records, but now when there is also a Central Bank that, for practical purposes, have to borrow money when they want to have money, the same as any other agent has to do:

1) The Central Bank requests a loan to any bank in the banking system, and this creates the money as another credit, which is no different from the credit granted to a private individual.
2) The Central Bank has, from that moment on, two records in the Banking System, one that indicates the amount of money that the Central Bank owes to the Banking System, and another where the money that the Central Bank can spend appears.
3) Once the Central Bank has been granted credit (which no commercial or investment bank can refuse), it can spend it on the purchase of assets (capital goods), it can lend it to commercial or investment banks that ask for it, or it can do nothing with it, which is not usual (the Central Bank is forbidden by law to buy consumer goods with the money it orders to be made in the form of a loan, for example, a red porch).

It is very clear, that if the Central Bank does not pay any interest for the money lent to it, it will have no problem to ask for any amount. If, besides, the banking system can never refuse its requests for credit, it is very clear that, for practical purposes, there will be no difference with a central bank separated from the rest of the banking system which manufactures its own money. But, as what we are interested in analyzing now are the bank records, it is more convenient to see it in this other way.

The overall result of the Central Bank's performance is presented in the accompanying figure:

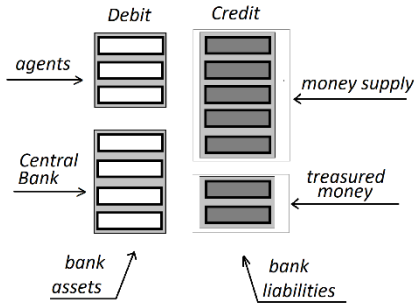
1) The Banking System keeps as an asset the amount of credit money that it has created for the Central Bank and that the Central Bank owes it (these are the bank reserves used by the banking authorities to limit the amount of bank money that each bank can grant).

2) The Central Bank has real money (the credit register) and can spend it in various ways. It can buy capital goods with the money it orders to be created for it, or it can lend it to the banks to balance the amount of reserves with the amount of money they have made, or it can lend it to the banks to pay off bad loans without them having to declare bankruptcy (which is the equivalent of bailing them out). In the last two operations the Central Bank usually charges interest in exchange for the money, but not always.

Let's observe that all the operations that the Central Bank does, occur in the Capital Market, so the money it creates never goes down to the Consumer Market and therefore, should not be expected to cause any inflation, whatever the amount of money it creates.

The effects of the money created by the Central Bank will occur only in the Capital Market, since that is where it is spent, and only indirectly, the consequences of the Central Bank's

money creation will be felt in the Consumer Market. It is the same thing that happens with the money that the Investment Banks create and lend out for Capital Market operations, which have no effect on inflation, no matter how much money they are lending out.



Credit System

In short: For all practical purposes**,** the Central Bank is just another user of the banking system and any amount of money it manufactures ends up appearing in the records of the banking system as just another credit, indistinguishable from the rest of the credits requested by users (regardless of whether we consider it an independent bank that can manufacture money, or not). Seen in this way, the Central Bank is not the one who really creates the money of the economy, as it is stated in the textbooks written by private universities in the USA, but it is the one who sets the interest rate paid by agents for the money lent by banks (the mechanism of setting the interest rate is too complicated to analyze here).

About the Banking System

The Central Bank does not manufacture any money, but it does have the function of regulating the amount of money that commercial and investment banks can manufacture. Throughout the slow evolutionary process that has led the economy to replace metallic gold (commodity money) with bank records and banknotes (fiat money), governments have also been limiting, little by little, the possibility of creating bank money by private banks (as it is logical and anyone can understand). At present, almost all central banks use the interest rate to ensure that bank money is created in the amount necessary to sustain the growth of the economy, although the detailed mechanism of how this is achieved has never been clear to anyone. It is assumed that the obligation of each bank to maintain an amount of money issued by the central bank, proportional to the amount of bank money granted as loans, in turn forces each bank to borrow money from the central bank when it has over-borrowed, which is apparently not cheap and which apparently ultimately forces

it to limit the amount of money that each bank creates. However, this mechanism based on the interest rate, which seems to work very well for the Federal Reserve, without anyone knowing exactly why, does not seem to work at all well for the rest of the central banks, surely because the latter are manipulating the interest rate of a currency that is not the reserve currency.

Therefore, when we hear economists working for private universities in the United States affirm that, by manipulating the interest rate of money, the Central Bank can control the amount of money in the economy, and they do not explain how and why this happens, we fear that it is just another of the many theories they have fabricated exprofeso to mislead the rest of the countries and lead them to disaster. Why does the manipulation of the interest rate to control the amount of dollars seem to work for the Federal Reserve and yet it seems to work so badly for the rest of the Central Banks?

Why do the textbooks used to teach economics insist on affirming that money is produced by the Central Bank, when this is manifestly false? Why do the textbooks used to teach economics blame the government deficit for inflation, when one thing has nothing to do with the other?

In short. It is the commercial and investment banks that manufacture bank money and not the Central Bank. That is a very dangerous privilege for the whole economy, especially the one granted to the investment banks that create bank money for leveraged buyouts of financial assets. Of course, the Central Bank sets the interest rate on loans, but it is not clear that this controls the amount of bank money in the economy, especially the amount of monetary capital with which assets are bought for leverage, in a process very similar to the *Quantitative Easing* we have seen the Federal Reserve do, with the difference that the Fed intervened by providing liquidity to prevent asset prices from sinking, while the investment banks wait for asset prices to sink before buying them with money created out of thin air and without any risk.

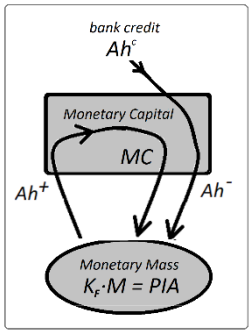
On the Consumer and Capital Markets

One of the most important consequences of the use of money within society is that it divides all goods that exist within the economy into two distinct categories, goods that are consumed, called consumer goods, and goods that generate income, called capital goods.

Specifically, consumer goods are easily identified with those goods or services that are manufactured in companies with the intention of being consumed, which are almost all of them, and in which we must also include the physical goods with which the companies are manufactured. While capital goods are identified with the goods that have the essential

characteristic of producing income, as are the companies that produce consumer goods. For example, capital goods are companies that are listed on the stock exchange, houses, or natural resources, ... that is, those goods whose main function is not to be consumed, but to produce other goods.

Capital goods are bought in the Capital Market, while consumer goods are bought in the Consumer Market, being one of the essential characteristics of a monetary economy the differentiated existence of both markets, which fix prices in a very different way and are, therefore, very uncoupled.



The attached figure shows the two markets and the monetary flows that move between them, with the savings flow coming from the consumer market and the savings flow coming from the consumer market. Ah^+ the flow of savings coming from the Consumer Market and the flow of Ah^- the flow of dissaving that is spent in the Consumer Market. While Ah^C is the flow of money creation, which in the present banking system is done by granting credits. That is the reason why, in the figure, Ah^C it comes from nothing. The two flows that relate the Consumption Market and the Capital Market, the savings and the dissaving, are usually very stable in time, so we can say that the amount of money in one and the other market is relatively stable and changes slowly. Very different is the situation that is created with the flow of credit, which the intervention of the Central Bank or the intervention of commercial and investment banks can make it change very quickly.

The money used to buy in the Consumption Market is the money that forms the monetary mass *M* that appears in the Currency Equation. While the money hoarded in the Capital Market we have called "money capital", MC. It can be said that the two forms of money, money mass money and hoarded money, are very different one from the other, in spite of the fact that both types of money are indistinguishable one from the other, since they are both bank money.

In short: the use of money divides the goods existing in a monetary economy into two different types, consumer goods, which are those goods which are produced with the intention of being consumed, and capital goods, which are those goods which produce rents. Both goods are bought in different markets, they fix the price in a different way and are connected by monetary flows which change slowly, so we say they are very uncoupled one from the other (the monetary flows between both markets are very stable because they come only from saving and dissaving).

About the Consumer Market

The question economists have been asking for at least 2,000 years, without receiving a coherent answer, is how prices of consumer goods are fixed. At present, the lack of a scientific theory explaining how prices are set in a monetary economy has its origin only in the fact that economists working for private universities in the USA do not want such a theory to exist.

Therefore, the first thing that is done in Madrid Theory, after determining the basic equations, is to link the explanation of how prices are fixed to showing what other economic variables prices depend on. It can be shown, and this is done under very general conditions, that prices are set when sellers set the profits they obtain from the goods they produce. It can also be shown, and this is done under very general conditions, that the quantity of each commodity to be bought is decided by buyers when they distribute their income according to their consumption preferences. This link, between prices and profits, on the one hand, and between the quantity of goods (to be exact, quantity of companies) and consumption preferences, on the other, is what we call in the Madrid Theory, the Principle of Buyer and Seller Asymmetry, and we complete its consequences with a set of very important statements, such as the Inflationary Principle or the Principle of Closure.

In this sense, the Madrid Theory follows the ideas of the Italian economist, Piero Sraffa, supporting all the conclusions he reaches in his book "Production of goods by other goods", in particular the one that states prices are fixed in a monetary economy for structural reasons, but filling in the gaps Sraffa leaves unexplained in his theory. However, despite having the precedent of Piero Sraffa and many other economists, the official theory propagated by private universities in the US in university textbooks states that, under perfect competition, both producers and consumers are price-accepting, so nobody sets the prices. This creates a serious problem, which the theory circumvents by appealing to the "god of perfect competition" to come down to the markets and set prices.

(When economists working for private universities in the US claim that both producers and consumers are price-accepting, you have to resort to divinity to find someone to set the right ones, because there is no one else left in the economy who can do it).

In short: The price and quantity sold of each good is fixed by the "Buyer-Seller Asymmetry Principle", which states that *"prices are fixed when sellers decide how much profit they make on what they sell, while the quantity produced of each good is fixed when buyers decide how much of each good they buy with their income*". The principle has very profound consequences in the productive economy and shapes the entire social structure in which we live.

On the Inflationary Principle

One of the most important consequences of the difference between the decision to buy and the decision to sell, we call the Inflationary Principle. The inflationary principle states that, "*in aggregate terms, the prices of goods or services can only go up and can never go down*". The reason is easy to see, because when you try to lower prices across the board, what happens is that the number of goods sold decreases (production decreases), but not prices. That is, when the economy tries to go into deflation what happens is that the productive fabric is destroyed, reducing production, but without ever managing to lower prices in a sustained manner.

Let us observe that the monetary equation states that a specific quantity of money is necessary to maintain a specific flow of exchanges:

$$k_F \cdot M = \sum p_i \, q_i = PIA$$

It is very evident then that a decrease in the quantity of money present in the economy will cause, according to the monetary equation, either a decrease in prices or a decrease in production, or both at the same time. But it is not difficult to show that in the case of a decrease in the quantity of money, it will be production which decreases and not prices. This is what the Inflationary Principle states, that the price of goods cannot fall in aggregate terms, so it is inevitable that production will fall in the case of a decrease in the money supply.

This last statement is really remarkable, because the Financial Theory of Growth is going to explain the crises that periodically plague the economy as the consequence of the destruction of bank money due to the non-renewal of credits.

In short: One of the most important consequences of the asymmetry that exists between the buyer and the seller, but not the only one, is the inflationary principle that states that, in aggregate terms, the price of goods or services cannot go down and can only go up. A very important consequence of this principle is that in the case that the amount of money in the economy decreases, the amount of real production will decrease and not prices. Or, in other words, the destruction of money will create a production crisis (it will be with the destruction of bank money that we will explain economic crises).

About the Capital Markets

An essential feature of the monetary economy is the appearance of goods which produce rents, whose nature is completely different from the nature of consumer goods. Goods

which produce rents are called capital goods, and their differentiated existence explains that their price is fixed in a differentiated market, the Capital Market, and with a different mechanism from the one used in the Consumer Market to decide the price of consumer goods.

To explain how the price of capital goods is determined, the Madrid Theory uses three laws of capital: Robinson's First Law, Robinson's Second Law and Piketty's Law:

- Robinson's First Law: "The value of a capital good is equal to the income it produces, divided by the interest rate of money and by the uncertainty that the market assigns to each capital good:

$$k_i = \frac{r_i}{\aleph_j \cdot i} \qquad \textit{(Robinson's 1st Law)}$$

- Robinson's Second Law: "The aggregate value of capital goods is equal to the income they produce after taxes, divided by the interest rate of money and by the uncertainty factor:

$$K = \frac{\langle\alpha\rangle \cdot PIB}{\overline{\aleph} \cdot i} \qquad \textit{(Robinson's 2nd Law)}$$

- Piketty's Law: "In a stable economy, the uncertainty factor $\overline{\aleph}$ is "1", or in other words, the aggregate value of capital goods is equal to the after-tax income they produce, divided by the interest rate of money:

$$K = \frac{\langle\alpha\rangle \cdot PIB}{i} \qquad \textit{(Piketty's Law)}$$

The three laws of capital reflect the financial nature of capital, and uncover the most notable consequence of the use of money when we use it to organize production within a society:

> *"the aggregate value of capital goods does not depend on the amount of savings made, but on the amount of existing rents within the economy".*

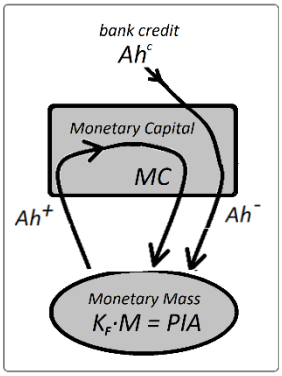
Piketty's Law tells us what is the concrete relation between the aggregate value of capital and the amount of rent, which is none other than the interest rate of money.

In short: It can be proved beyond any reasonable doubt that the nature of capital is financial and its valuation is equal to the valuation of rent it produces. Specifically, in a stable economy, the aggregate value of all capital goods is equal to the average rent they produce after taxes, divided by the interest rate of money: $K = \frac{\langle\alpha\rangle \cdot PIB}{i}$, an equation we have named Piketty's Law.

On economic growth

Explicitly, the Financial Theory of Growth we have developed within the Madrid Theory, identifies the growth of exchanges, or PIA, with the growth of the monetary mass with which the real economy functions, what we call the Consumption Market. Or, expressing it in terms of the productive surplus, which is almost equivalent, the theory identifies the growth of the *GDP* with the growth of the monetary mass M:

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = -[Ah^{+}(t) + Ah^{-}(t)] \qquad \textit{Growth Eq.}$$



Wherein Ah^{+} y Ah^{-} are the savings and dissaving flows that communicate the Consumption Market with the Capital Market. According to the expression, a monetary economy cannot grow in nominal terms, if the money supply does not increase, which means that the money that injects savings flow Ah^{-} in the Consumption Market must be greater than the money that extracts savings flow. Ah^{+}. The attached figure shows the monetary flows involved in the process.

It is also possible to express changes in the money supply in terms of changes in the amount of bank money created and the amount of money hoarded. To do this, we define the flow of credit Ah^{C} as the change in the quantity of bank money and we define the hoarding flow as the change in the quantity of bank money created and the quantity of money hoarded. Ah^{S} as the change in the amount of hoarded money held in the Capital Market. With these two variables related to bank money, the Growth Equation is:

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = Ah^{C}(t) - Ah^{S}(t) \qquad \textit{Growth Eq.}$$

Thus, the Financial Theory of Growth assumes that when the technological moment is propitious, new products and new projects will appear that will require for their production and development of financing through loans, so that an exogenous impulse will appear to increase investment and consumption on credit, increasing the amount of bank money, the flow of credit, and with it, according to the Growth Equation, the GDP of the economy. $Ah^{C}$and with it, according to the Growth Equation, the *GDP* of the economy.

The condition for the economy to grow is, according to the equation, that the annual increase in bank money, the flow, is greater than the annual increase in money held, the flow, is greater than the annual increase in bank money, the flow. $Ah^{C}$is greater than the annual increase of the money that is hoarded, the flow, which is always the case when bank money grows because very little money is hoarded. Ah^{S}This is usually the case whenever bank money grows because very little money is hoarded. As long as there is no important flight towards liquidity, which only happens when there is already a credit crisis,

the flow of hoarding is very small or almost null. Ah^S is very small or almost nil, and it is the changes in the quantity of bank money (the flow of bank credit Ah^C) that governs the business cycle:

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) \cong Ah^C(t) \qquad \textit{(Growth Eq.)}$$

Therefore, when the flow of credit grows, the economy grows smoothly. However, the Growth Equation has a negative reading, because when the flow of credit stops because credits are not renewed in aggregate terms, then its value becomes negative, indicating that bank money is being destroyed. When this happens, the economy goes into recession and the flow of hoarding can increase greatly, contributing greatly to the extraction of money from the money supply that the economy runs on.

The growth equation speaks of two opposing forces, the flow of credit and the flow of savings, which, in an environment of strong technological change, work together to achieve remarkable growth rates that can be higher than 10% of *GDP, with* hardly any inflation (for example, the Chinese economy has grown in the last decades of the twentieth century with rates of around 10% and an inflation rate that has rarely been above 3 or 4%). But, in an environment of weak technological growth, the two turn against each other and conspire together to produce a credit crunch.

The criterion tells us that, when the money from savings is not returned to the economy with savings, the economy inevitably enters into a recession which will be more or less serious to the extent that savings increase and the money in the monetary mass decreases.

An equivalent expression is obtained when credit and hoarding flows appear in the growth equation.

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = [Ah^C(t) - Ah^S(t)] \xrightarrow{\frac{d}{dt}PIB(t) < 0} \boxed{\begin{array}{c}\underline{Credit\ Crisis}\\ \downarrow \\ Ah^C(t) < Ah^S(t)\end{array}}$$

If we assume that there is hardly any hoarding, then the decrease in the flow of bank money creation, until it becomes negative, is what starts the credit crunch:

$$Ah^C(t) < 0 \quad \xrightarrow{Ah^C(t)\sim 0} \quad credit\ crisis$$

The credit criterion allows us to explain economic cycles without many problems, since it tells us that cycles are basically driven by the increase and decrease of the quantity of bank money, that is, by the flow of credit.

EXPANSION CYCLE. When the vegetative population increases, either through migration or internal growth, there is an endogenous impulse to increase spending and output, which is usually financed by borrowing. The increase in lending is met mainly by bank credit, which increases the amount of money in the economy and, with it, the disposable income that increases spending and production.

The same happens when there are expectations that technological change will increase productivity. There is then an exogenous impulse to increase output that must be fuelled by borrowing, which is almost always satisfied by increasing bank credit. Increased bank credit increases disposable income, which increases spending and output.

In both cases, the need for investment injects money into the money supply through bank credit, and enables growth.

RECESSION CYCLE. The problems appear when either the technological impulse declines and the need to invest decreases, or when the vegetative growth is small, or when there are structural imitations which prevent growth, because then savings start to find nothing to invest in and the flow of credit is insufficient to prevent monetary extraction. In such a situation, the creation of bank money can stop, and then even become negative when the credits which are returned are not replaced by new credits in aggregate terms. Everything seems to conspire to destroy the money created in the growth phase, because now the money of savings is hoarded without being returned to the economy with the purchase of new capital goods, or as deficit spending.

Once the destruction of bank money begins, the deflationary environment feeds back on itself and any reversal of the economic situation becomes very difficult. The destruction of production decreases income and with it, the income that capital goods produce, decreasing the value of capital goods. Now, the interest on debts is no longer paid out of income, and attempts are made to sell capital goods to pay off debts, when their price is plummeting and there is hardly any money in the economy. No one buys, and the debt goes unpaid. Everything is a disaster once the destruction of the money that is sustaining the exchanges in the real economy begins.

Of course, the problem has been caused by the exogenous decrease in credit, but it is the endogenous excess of savings that has triggered the crisis, because there comes a time when it is above the flow of credit. This is what we in the Financial Theory of Growth have called "the savings problem", because savings are increasingly difficult to find a place to invest.

In short: The Growth Equation allows us to explain very well the economic cycles to which monetary economies are subject:

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = -[Ah^+(t) + Ah^-(t)] \quad \begin{cases} Ah^+(t) > Ah^-(t) \rightarrow \ \Delta PIB(t) < 0 \\ Ah^+(t) < Ah^-(t) \rightarrow \ \Delta PIB(t) > 0 \end{cases}$$

In particular, it is possible to establish a criterion (*the credit criterion*) to know when an economy is in recession:

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = Ah^C(t) - Ah^S(t) \xrightarrow{\frac{d}{dt}PIB(t) < 0} \boxed{\begin{array}{c} \underline{Credit\ Crisis} \\ \downarrow \\ Ah^C(t) < Ah^S(t) \end{array}}$$

Or to put it in words, when the flow of credit is less than the flow of hoarding, money starts to be extracted from the money supply and the economy threatens to go into deflation, which turns into a recession when the flow of credit becomes negative and bank money starts to be destroyed. The time from when the criterion is met until *GDP* starts to notice the decline is about 6 months (the inverse of Fisher's constant).

On the crisis of change

One of the most glaring evidences in the world of economics over the last 50 years, and one that economists working for private universities in the US have managed to overlook, is the large number of credit crises that have been occurring all over the place. As is often the case in economics, anything that does not appear in textbooks and that does not appear in the most prestigious journals has never existed, and following this unappealable logic, a crisis that does not affect the US is not a crisis that deserves to be justified or explained in journals or in economics books, because it simply does not exist. It is not strange then that the period of time from 1980 to 2010 is referred to in economics textbooks as "the great moderation", because apparently, what happens to the rest of the world that does not happen to the US does not matter.

It is easy to see that very few countries have escaped without being affected by some strong and traumatic devaluation which, in certain cases, has been repeated periodically, without ever finding any explanation, even though it is easy to see that exchange crises, which is what they call non-consensual devaluations, began to occur from the 1970s, when the Bretton Woods agreements were broken and the limitations to the free circulation of money were eliminated. In addition, it was also prevented from balancing the trade balance of countries with tariffs, which ended any possibility of local industrialization of the still deindustrialized countries. In the Madrid Theory we manage to explain the exchange crisis exactly with the same mechanism with which we explain the credit crisis in an isolated economy: by the destruction of bank money due to the liquidation of credits.

The development of the explanation of the exchange rate crisis leads to the confirmation of the old idea that it is not possible to keep the trade balance unbalanced for a long time, because it will be inevitable that an exchange rate crisis will occur most of the time. The more detailed analysis of the exchange rate crisis also leads us to conclude that, in general, even when the trade balance is balanced and there should be no cloud on the horizon, it is impossible to avoid an exchange rate crisis under the right circumstances. This is due to the coexistence of the local currency and the reserve currency with which international trade is conducted, and it is only possible to avoid crises when the free circulation of currency is prevented and trade is regulated with tariffs. Although nobody is unaware that, in such a case, what we would have are two countries isolated by tariffs and by limitations in the monetary flows.

Let us imagine an isolated country in which there is a fall in prices in the Capital Market that causes savers to flee to liquidity. In such a situation, the Central Bank must act by providing liquidity to the Capital Market, which can only be done by creating bank money and spending it in the purchase of assets of all kinds to avoid the fall of prices. But this operation of the Central Bank, which can be done without any problem in an isolated economy, must be done with more delicacy in an open economy where there is free circulation of money. It is not difficult to understand why: when the Central Bank creates money and buys assets to prevent their price from sinking, it puts in the hands of savers a quantity of local money which will sink the exchange rate, in case they want to exchange it for the reserve currency.

However, this prediction about the impossibility of exchanging local money for reserve money does not necessarily hold true when there is a credit crisis, since the monetary creation done by the local Central Bank is not only done to prevent the price of assets from sinking, but it is done, above all, to replace the money that is being destroyed by the cancellation of credits and loans (which is the cause of the fall of the price in the Capital Market). In this case, it is not clear that there is a significant amount of local money in the form of monetary capital that wants to be exchanged for the reserve currency (the desire will depend above all on the inflation of the local currency with respect to the reserve currency, which in the case of a credit crisis has to be very low).

We see that a credit crisis can turn into an exchange crisis when the economy is not isolated and there is a free circulation of money, but this is not the only way to produce an exchange crisis. The economy can also enter into an exchange crisis because of the private creation of bank money. We know that in a country where there is free circulation of money, any person can ask for a credit in local currency and exchange it for the reserve currency, something that will not happen as long as the interest rate of local money is higher than the income expected to be obtained with the purchase of foreign assets. But, along with the benefit that can be obtained from the difference in income between local assets and foreign assets, there is also the possibility that the local currency will devalue, which will

mean that less money will have to be paid back than was borrowed. This possibility, that of earning money with the devaluation, becomes a self-fulfilling prophecy that the Central Bank cannot prevent from happening, because the excess local money is being created by private banks without taking any risk in case the devaluation does not occur.

Let us note that, in both cases, the problem originates from the creation of local money. In the first case, it is manufactured by the Central Bank to avoid a credit crisis, while, in the second case, it is manufactured by private banks to make money with the devaluation. It is very evident that:

1) There can be no free circulation of money in a country that manufactures its own currency.
2) Private banks cannot lend without Central Bank control.

As we can see from the above analysis, the real cause of exchange crises is to be found in the existence of a reserve currency which cannot be manufactured by the Central Bank, which makes it useless and very dangerous to allow the free circulation of money when we have our own currency.

To sum up. Where the consequences of the existence of two differentiated markets, the Consumer Market and the Capital Market, are most clearly seen is when analyzing trade between different countries. Economists working for private universities in the US have propagated the absurd idea that a country with its own currency can achieve exchange rate stability, despite having free circulation of money, as long as it gives up fixing the exchange rate and lets the currency float. But this statement is nonsense when we understand that the exchange rate between currencies cannot be allowed to be fixed by the market, because this is what keeps the prices of commercial exchanges and companies stable. An analysis of the problem based on the existence of two markets, the Consumer Market and the Capital Market, obliges the authorities to prevent the free circulation of money, as long as they have their own currency and as long as they want to avoid the economy from entering an exchange crisis. The reason is a little complex to explain, but we must look for it in the impossibility of maintaining the liquidity of the Capital Market in the reserve currency, for the simple reason that the Central Bank of the country cannot produce it. Basically we can say that, when we try to avoid the collapse of prices in the Capital Market, which is known as the flight to liquidity, and the Central Bank creates money to buy assets of all kinds, nobody can avoid an exchange crisis because all the money that is being manufactured for one reason or another, cannot be exchanged for the reserve currency. Or in other words, when there is free circulation of capital, it is inevitable that a flight towards liquidity will end in an exchange crisis, as it has happened in countless countries during the last 50 years.

3. RECOMMENDATIONS DERIVED FROM THE MADRID THEORY

The previous brief summary of the most important conclusions reached in the exposition of the treatise, which we have named the Madrid Theory, clearly shows us a vision of economics that is very different from the paradigm propagated in their textbooks by economists working for private universities in the USA. We believe it is important to summarize separately some aspects that are also deduced from the Madrid Theory, but that are outside the conclusions that are strictly derived from the mathematical structure of the theory and that, therefore, enter the thorny field of political economy and the interpretation of facts.

Otherwise, we are going to list a set of recommendations that, although they are very clearly deduced from the context of the Madrid Theory, are recommendations that enter the field of political opinion and, therefore, are not necessarily true, nor does the subsequent verification of their falsity invalidate the mathematical basis of the theory, nor the conclusions that derive from it and that we have already exposed.

<u>On public spending</u>

If we understand that public expenditure is made because the citizens have decided that certain goods and services should be paid for jointly and provided in a public way, as is done with health, sewerage or roads, then it is difficult to understand why the amount of money that is collected through taxes does not cover the necessary expenses to satisfy the proposed public services, and has to be in deficit.

It is incredible to hear a good part of the economists working for private universities in the United States, specifically those who call themselves liberals, that the money collected through taxes should be reduced because they consider it excessive, at the same time that they reproach the government for providing public services in a deficient manner. They are economists who call for both the one and the other, that the public deficit should be reduced, at the same time as they call for less taxes to be collected, without ever saying which public services should no longer be provided because of a lack of resources.

You don't need to be an economist or have a PhD in economics to understand that you must first decide what services are publicly provided (in a common way) and then, logically, you must calculate what tax rate should be set to raise the money needed to pay for them.

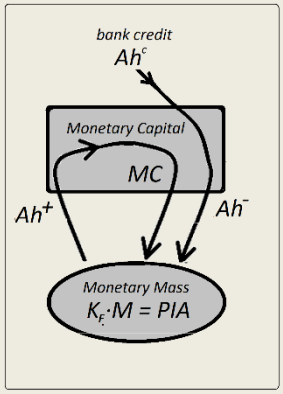
<u>WHO BENEFITS FROM THE PUBLIC DEFICIT?</u> It is not very difficult to find out. Let's take as an example a hypothetical society in which the following two statements are true:

a) Taxes are levied in proportion to the income of each citizen. Specifically, suppose that the total cost of providing public services forces a single tax equal to 50% of each person's income.

b) Society is divided into two parts, those who earn on average 200,000 euros per year (we **will call them the rich) and those who earn on average 20,000 euros per year (we will call** *them the poor).*

In such circumstances, and although we do not know the number of rich citizens or the number of poor citizens, we do know that in the case that public spending is financed in its entirety without resorting to deficit spending, the former pay 100,000 euros each in taxes and the latter 10,000 euros.

Suppose now that liberal economists convince citizens that it is in everyone's best interest to collect only half of what is needed to provide public services and borrow the rest. Specifically, suppose you go from the flat rate of 50% of revenue, to a flat rate of 25%, borrowing the rest, but from whom, within society, from whom can you borrow the money you need to meet public spending?



To find out, let's look once again at the attached figure where the flows of savings and dissaving between the Consumer Market and the Capital Market are shown.

It is easy to conclude that, when the government issues debt securities, it is financing the deficit with the money that comes from citizens' savings or that is created by the banks and (which we now discard in order not to complicate the analysis), so it is very clear that the government is borrowing from citizens the money that they have been able to save thanks to the tax cut.

In the economy of the example, rich citizens will be able to lend the government the 50,000 euros they save thanks to the tax cut, while poor citizens will only be able to lend the

government the 5,000 euros they save. If we stick to reality, it is easy to see that the poor save little because they have little income, while the rich have a large income and can save a lot. In general, it is the rich who save, not the poor.

The important thing to understand is that, in aggregate terms, rich citizens gain when public spending is covered by borrowing from citizens, rather than being covered by collecting taxes, since they are the citizens who save the most and pay the most taxes. In the example, the rich citizens are not only not paying the 50,000 euros a year that they are supposed to pay to maintain public services, but because the government is borrowing it from them, the government will henceforth be giving them interest on it. Or in other words, the government is not only paying them back the 50,000 that it would have to charge them in taxes, but it is also paying them interest for borrowing it. From the point of view of the rich it's a bargain, because not only does it not require them to pay back the 50,000 euros, but it also borrows it from them and pays them interest on it, at the expense of future tax revenues.

When we look at the amount of public debt reached by the different countries of the world, the nonsense acquires Dantesque dyes. In 2019, the public debt of the USA reaches 20MM dollars, the debt of the European Union is more than 10MM and the debt of Japan reaches 10MM euros. All that money, is money that the government should have raised and did not raise.

The direct consequence of increasing public debt is to create a very secure income for savers backed by public revenue which, unsurprisingly, is paid for with part of the current expenditure needed to maintain public services.

The public deficit is a truly derisory policy in aggregate terms, as citizens are being asked to borrow the money they save thanks to the tax cut. This can only benefit people with higher incomes, who see the money they would otherwise have had to pay to maintain public services as a saving, especially when you realise that taxes are progressive, and not just proportional as we have considered in the analysis.

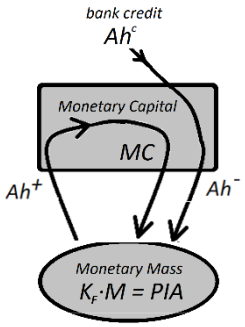
For example, the US has a public debt that is around 100% of *GDP*, which indicates that the federal government has forgiven taxes to its richest citizens approximately 20MM million dollars, which, updated, amounts to 35MM dollars, that is, 1.5 times the *GDP. But the most serious thing is not that, the most serious thing is that it pays interest on them, which is the last straw.* But the most serious thing is not that, the most serious thing is that it pays interest on them, which is the last straw. What can economists working for private universities in the U.S. claim to justify such nonsense? Worse still is the situation in Japan, whose government has an accumulated public debt that reaches 250% of its *GDP,* what can justify such a public debt?

When we understand that all that public debt is money that should have been raised through taxes and when we hear economists who call themselves Keynesians say that they are in favour of increasing the public deficit even more, then it is easy to understand the state of total madness in which the economy finds itself.

In summary: We think that it cannot be justified in any rational way that the necessary collection to finance the public expenditure that the citizens have decided to assume jointly is not covered by taxes. We think that what is desirable is that public spending is always done with the money collected from taxes. Therefore, any specific deficit that the government is obliged to assume must always be done with specific objectives and the specific way in which the deficit is repaid must be indicated. Therefore, the fact that it appears in the Constitution of Europe that national governments cannot have a deficit greater than 3% of GDP is always good news, but insufficient, since there is no reason for the deficit.

On Keynesian fiscal policy

In economics it is usually called "Keynesian fiscal policy", the public deficit that the government assumes with the intention of avoiding that the aggregate expenditure of the economy remains below the income, which has its logic. Let us note that, in aggregate terms, Keynesian policy achieves two very important objectives:



1) It returns private savings to the economy by borrowing and spending them.
2) It guarantees the growth of bank credit that the private sector has stopped making, by assuming part of its debt with the banks, in aggregate terms.

This is shown very clearly in the attached figure. There we see that the flow of savings can be returned to the economy if the government Ah^+ can be returned to the economy if the government issues debt securities and spends it in deficit. Not only that, in aggregate terms, the government deficit allows the private sector's debt to banks to be reduced by taking on part of the bank credit that is granted. When we assume that there is no hoarding and $Ah^S = 0$we have:

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = [Ah^C(t) + Ah^S(t)] = Ah^C > 0$$

The sum of deficit spending and private spending on credit helps to ensure that the flow of dissaving is greater than saving. Ah^{-} In this sense, Keynesian policy is ideal, since public deficit spending takes care of repaying the part of private saving that is not borrowed for investment by the private sector itself, as well as ensuring that bank credit increases sufficiently to guarantee the growth of the money supply.

But it is important to be very clear that the public deficit is unsustainable over time, at least as long as it grows faster than GDP, which is the source of tax revenue. This is what tends to happen nowadays (Japan already has a public debt close to 2.5 times GDP) because of what they call Keynesian policy. Not only that, in aggregate terms and because of the generalized decrease in the tax rate on the incomes of the wealthiest people, the savings problem is getting worse instead of easing, instead of decreasing over time.

In short: Keynesian fiscal policy is the policy that uses deficit spending to return money from private savings to the economy when private investment is insufficient. Which would be an excellent idea, were it not for the fact that the increase in public debt becomes unsustainable over time, and private saving, which is the reason for deficit spending, increases over time instead of decreasing, aggravating the problem. We think, and this is confirmed by the Financial Theory of Growth, that there is no reason to think that a tax reduction will activate the economy, since the only thing it activates is savings, aggravating the savings problem.

About the interest rate

As stated in the Financial Theory of Capital, the interest rate is the reference used by the Capital Market to determine the price of capital goods, so it would be highly desirable that its value remains unchanged, if possible above 3 percent.

However, nowadays, central banks use the interest rate as the basic variable to control the amount of money that is created in the economy and thus avoid both inflation and deflation. This is logical, since the interest rate makes it more expensive or cheaper to maintain bank credit, which is where all the money in the economy comes from. Therefore, the higher the interest rate, the greater the incentive to repay the bank credit and destroy the money that was created with the credit. The opposite will happen when the interest rate falls, it will be cheaper to keep the credit with which the bank money has been created and there will be less incentive to pay it back.

However, manipulating the interest rate to control the amount of bank money in the economy is not a good idea because the value of capital goods depends inversely on the

rate of interest, as stated in the three laws of capital. For example, according to Piketty's Law, the value to which aggregate capital tends within an economy is:

$$K = \frac{\langle \alpha \rangle \cdot PIB}{i} \qquad \textit{Piketty's Law}$$

It follows from the expression that when the interest rate is close to zero, the imprecision with which the price of capital goods is determined is very high. This can be easily checked by deriving Piketty's law with respect to rent:

$$\Delta K = \frac{\langle \alpha \rangle}{i} \Delta PIB \rightarrow \begin{cases} i = 5\% \ \rightarrow \ \Delta K = 20 \cdot \langle \alpha \rangle \cdot \Delta PIB \\ i = 1\% \ \rightarrow \ \Delta K = 100 \cdot \langle \alpha \rangle \cdot \Delta PIB \end{cases}$$

The expression tells us that, for a given interest rate, how much the added value of capital goods increases when the income they produce increases. It is very clear that when the interest rate is 1% the changes in the valuation of capital are 5 times greater than when the interest rate is 5%, at the same increase of income. That is, the lower the interest rate, the more uncertain the calculation of the value of capital knowing the income it produces, and the more unstable the Capital Market will be.

In short: The interest rate serves as a benchmark for valuing capital goods (goods that produce income) and should remain unchanged and above 3 percent. Therefore, its use for monetary policy should be avoided.

About taxes

Here we are going to distinguish between two types of taxes, those that are intended to pay for public services and those that are intended to develop fiscal policy.

TAXES TO PAY FOR PUBLIC SERVICES. The basic function of taxes is that citizens contribute, jointly and progressively according to their income, the money needed to pay for public services provided in common. We understand that the decision of what these public services are, is decided by the citizens themselves. Thus, universal and free education, universal and free medical care, universal and free access to justice, are an example of the many services that are financed through taxes, are managed in a public way and are services that citizens can access for free. For all these reasons, it seems a good idea that the tax rate on income should be progressive, so that those who obtain the most benefits from the economic system are also those who contribute most to maintaining it, as is stated in the articles of all constitutions. Just as there is no economic or political justification for the government to disobey the citizens and resort to indebtedness, because the collection that is made is insufficient to be able to provide them.

TAXES TO AVOID THE CREDIT CRUNCH. Although the purpose of collecting taxes is to finance public services, and no exemption to this rule should be allowed, the truth is that sometimes the government may have other reasons for collecting taxes. For example, to avoid excess savings. The growth equation states very clearly that savings must be returned as spending. Ah^+ has to be returned to the economy as expenditure $Ah^-$to the economy if the economy is to avoid going into recession:

$$\frac{1}{k_F}\frac{d}{dt}PIB(t) = -[Ah^+(t) + Ah^-(t)] \xrightarrow{\frac{d}{dt}PIB(t) < 0} \boxed{\begin{array}{c}\underline{Credit\ Crisis}\\ \downarrow \\ Ah^+(t) > Ah^-(t)\end{array}}$$

So a very obvious way to solve the problem that is created when people save is to penalize income, with the understanding that the less income people have the less saving can be done.

But it is important to understand that saving cannot be penalized directly, since it is impossible to distinguish it from investment. Both, saving and investment are two sides of the same coin and both are indistinguishable. Moreover, what creates the credit crunch is hoarding, which is nothing more than savings that are not invested. However, it is not possible to act on hoarding either, because the money which is hoarded is indistinguishable from the money which forms the money supply and which is used for exchanges. Therefore, the only thing that can be done is to penalize income in a very progressive way on the understanding that, in aggregate terms, the more people save, the higher their income is (Keynes' Law of Saving).

The question that may arise, when an extra tax is placed on income to avoid saving, is what is done with the money that is collected. It should certainly not be used to pay for public services as that was not the reason the money was collected. We think that the best thing to do is to return it to the economy as an investment, granting credits at a negative interest rate so that investments can be made in sectors of special social interest, such as, for example, for ecological reconversion.

In summary: It would be desirable to separate the need to finance public services from the need to limit savings by means of a very progressive extra tax on income, and thus avoid a credit crunch. We think that the "extra" money collected through fiscal policy should never be used to maintain or increase public spending, because that is not the reason for which the money is collected.

On the 2 percent inflation rule

One of the most important statements deduced from the Madrid Theory is that which refers to the existence within a monetary economy of two different types of goods, consumer

goods and capital goods, which are bought in different markets. Therefore, it is important to point out that when in economics we speak of inflation, we refer only to the generalized rise in the price of consumer goods, without taking into account the possible rise in the price of capital goods.

Although there is a lot of empirical evidence showing that inflation is an endogenous process, very rarely caused by an increase in the money supply, it is also true that any increase in the quantity of money which forms the money supply produces price inflation when it is not accompanied by a rise in output. This is the latter, which is very clearly deduced from the growth equation:

$$\frac{1}{k_F}\frac{dPIB}{dt} = Ah$$

The equation predicts that when a quantity of money is injected into the money supply through credit, the nominal consumption of the economy increases in proportion to Fisher's constant, part of the increase being a consequence of the real increase in production, and the other part of the increase being solely inflationary and a consequence of the rise in prices. Therefore, when you want to limit inflation, the usual monetary policy advises to limit the amount of money in the economy, which is achieved by increasing the interest rate of money.

But what is the level of inflation that should set off the alarm bells for the central bank to act?

It is not easy to set a specific level of inflation, but one idea that does not seem far-fetched is the one that the monetary authorities seem to be following at present, and they start to worry when the price level threatens not to rise by 2% or 3% a year. When this happens, the Central Bank lowers the money interest rate, on the understanding that the economy is heading towards deflation, because of insufficient money creation (or because the money that is being created is being hoarded). But here we are recommending not to change the interest rate at which money is lent and, on the contrary, what we are recommending is to limit saving, and therefore hoarding, by imposing a very progressive rate on income, and to spend the money collected by financing investment credits.

It is understandable then that when inflation threatens to fall below 3%, the Central Bank declares that aggregate savings in the economy are excessive, and the government puts an additional tax rate on income to remedy this, and the money raised is used to subsidize new credit.

$\pi \geq 2$ *monetary target*

A BAD EXAMPLE. Let's look at the Spanish economy during 2019.

$$\left.\begin{array}{l} PIB\ en\ 2019 \ldots\ldots\ldots\ldots\ldots\ldots 1.244.757\ M.€ \\ nominal\ growth\ 3\% \ldots\ldots\ldots\ldots\ldots 37.342\ M.€ \\ real\ growth\ 2\% \ldots\ldots\ldots\ldots\ldots\ldots 24.895\ M.€ \\ public\ deficit\ 3\% \ldots\ldots\ldots\ldots\ldots\ldots 37.342\ M.€ \end{array}\right\}$$

It is very clear that this is a near deflationary economy, where inflation has remained below growth, indicating that not enough money is being pumped into the economy.

The situation in Spain that year, 2019, is still very complicated. On the one hand, Spain was obliged to limit the public deficit to 3% of GDP by the Stability Treaty of the EEC, and, on the other hand, the request for private credit seems to be still low and the amount of money is not increasing, probably because of the accumulation of debt that still drags the private sector since 2008. If we now look at the balance of payments, we see that Spain has a surplus, which confirms that money must be leaving Spain in the form of capital flight, or being destroyed by the liquidation of bank credit. There is no other way, the money that is being injected into the Spanish economy is insufficient to cover the growth needs of the Spanish economy, precisely because it can be seen that there is significant growth with hardly any inflation.

It makes little sense to prevent monetary growth in a country with hardly any inflation and a youth unemployment rate of almost 30 per cent. It is necessary to increase taxes and dedicate them, not to public spending, but to subsidizing credits, which will increase the money supply.

In short: One of the central bank's primary functions of monetary policy is to ensure that it is creating the amount of money needed to sustain economic growth. To do this, a good policy is to watch the value of the inflation rate, acting when it threatens to fall below 3% a year. If one had to give a blind rule to follow, one that cannot hurt the economy as long as economic growth is not too great (<4%), it would be the following:

$$\pi \geq 3\% \qquad\qquad Monetary\ Target$$

In other words, *"the central bank must ensure that enough money is injected into the economy to keep the inflation rate above 3% per year. π rate stays above 3% a year. What is proposed here is to impose a special income tax aimed at reducing aggregate savings, and to use the proceeds to subsidize investment credits. This is the fiscal policy deduced from Growth Theory and is based on acting on savings and not on credit.*

On the problem of Capital Market liquidity.

The Capital Market is very different from the Consumer Market. While the flow of exchanges within the Consumer Market is very stable and needs a specific amount of money to function, the flow of money within the Capital Market is very variable because it functions as a barter market where money is just another asset. In this sense, the arbitrage within the Capital Market makes money equivalent to a debt security or any other asset in the market, so the amount of money that is kept hoarded depends only on the desire of savers to have more or less money, without that amount having any relation with the volume of assets that exist or with the concrete flow of exchanges that are made within the market. Therefore, any liquidity problem that arises within the Capital Market has its origin only in the desire to keep a part of the savings in the form of money.

When we look at the US and the year of 2019, the distribution of savings among the different capital assets, we can realize that the liquidity needs in the Capital Market can become immense:

$$capital goods \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 120\ MM$$
$$aggregate\ debt \begin{cases} bonds \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 40\ MM \\ monetary\ mass\ international \dots\dots 10\ MM \\ monetary\ mass \dots\dots\dots\dots\dots\dots\dots\dots\dots 10\ MM \end{cases}$$

However, the amount of money they keep hoarded is very small. IF, in a panic, all savers decided not to roll over debt securities and keep their savings liquid, there would not be nearly enough money in the economy to satisfy the $40 MM+ owed in bonds of all kinds. Worse, since all capital goods are equivalent, savers may also wish to make the rest of the capital goods liquid, and then the more than $120MM held by Americans should be able to be exchanged for money, which would be impossible to do, unless the Central Bank acts by creating enough money.

Unfortunately, "flight to liquidity", which is the name given to the situation that arises when savers wish to keep their wealth liquid, is a "self-fulfilling prophecy" when all savers sell their assets at the same time because they believe that their price will fall in the near future, for no other reason than the widespread belief that such an event will occur. In fact, it is a phenomenon that has happened countless times, in every country in the world and in every era, and it is inevitable that it will happen again, unless it is remedied.

Regardless of whether the stock market panic is more or less justified by the economic situation, the only certainty is that the collapse in prices that causes a flight to liquidity can only be stopped if the Central Bank acts as buyer of last resort, in a very energetic way and while the panic lasts. Only by agreeing to buy all the securities that savers have put up for sale can the collapse in the price of capital goods be prevented and drag down the consumer market.

<u>THE CENTRAL BANK HAS TO ACT</u>. Very recently, in March 2020, the problem of liquidity in the Capital Market has again become very clear when in just one week, the IBEX35 fell nearly 40% without the European Central Bank doing anything to stop it.

Does it make sense for a country's economy to collapse because the European Central Bank does nothing? Why hasn't the Central Bank acted in Europe, as the Federal Reserve has done in the US? Does it make sense for people's savings to be vaporised because of a clear panic situation, which is no different from the banking panics that ravaged economies throughout the 19th century?

We think that liquidity within the Capital Market is, perhaps, the aspect to which more attention must be paid within the monetary economy because, unfortunately, it can ruin a country much more quickly and violently than a conventional war or a few atomic bombs. If Europeans want Europe to persist over time, the European Central Bank must intervene forcefully and provide liquidity to all the countries of Europe; with clear rules for action, but without exceptions.

All this leads us to ask ourselves why the Central Bank is not in charge of providing liquidity to the Capital Market, not only in exceptional situations, when it is very clear that it has to act because nobody else can do it, but also in normal situations when it is the commercial and investment banks that are in charge of providing liquidity to the market by granting credit.

Here we are going to propose the procedure to be followed by the Central Bank to provide liquidity to the capital market all the time, preventing it from sinking and speculating with it.

<u>The "guaranteed purchase" of assets</u>

The Central Bank has to provide liquidity to the Capital Market, and the only way to do this is through "guaranteed purchase of securities". The basic idea is that any holder of a listed asset can sell it to the Central Bank at a price related to the price at the time of sale. Specifically, and as an example, the rule to be followed by the Central Bank could be the following:

> *"The central bank is committed to buying any amount of publicly traded securities at 1% below the price the securities were trading at a week ago."*

Or, in other words, the Central Bank intervenes and buys any asset that falls more than 1% per week. It is easy to see that, with this rule, it is impossible for asset prices to fall below 1% of what they were a week ago, because in that case they would obviously be sold to

the central bank. This simple rule will forever prevent any stock market panic, just as the guarantee of bank deposits eradicated bank panics many decades ago, and will give stability to the Capital Market just as it gives stability to the banking system. We must bear in mind that, in the eyes of a saver, the savings conserved in the purchase of an asset are no different from the savings deposited in a current account, and if the government guarantees one, it does not seem unreasonable that it should also guarantee the other. The rule is completed with another rule that guides the sale of securities by the Central Bank:

> *"The Central Bank shall put up for sale any security it holds when its price is 2% higher than the price at which it was purchased."*

In this way, giving stability to the Capital Market becomes a business for the Central Bank and it will profit from it, since buying the securities when their price goes down and selling them when their price goes up, with a 2% margin, is a good business. In fact, this is what Investment Banks do when they give loans for their clients to leverage when the price of assets is low, in the expectation of selling them when the price rises. It must be understood that this is a legitimate business that gives legitimate profits to the investment banks, but it does not give price stability in the Capital Market because it is the instability of the market that they make their profits from. The reason is not hard to understand, the investment bank waits for asset prices to sink before funding leverage. It is just the opposite of what we propose the Central Bank does.

Let us observe that the Central Bank has losses with those securities that never recover the price at which they were bought plus 2%, because it never sells them, so if there is a generalized collapse of prices, the Central Bank can lose a lot of money when it resells them, but that is exactly what it is trying to avoid happening: that the price of capital goods collapses and that this ends up sinking the real economy as well. If such a situation were to arise, the Central Bank would have two options: one, to sell the securities at a loss, or two, to keep the securities. With neither of the two options, money would be lost, because the money that the Central Bank has used is money made from nothing, and the most important thing: it has managed to avoid the collapse of the economy.

The advantages of the existence of the "guaranteed purchase" are very clear:

1) Financial panic is avoided immediately, since the sale of securities for fear that their price will fall at a rate of more than 1% per week cannot occur. It is the same thing that happens when the Central Bank guarantees the money in the bank deposits of savers, that the banking panic ceases to occur because savers can withdraw the deposited money without losses, regardless of the situation of the bank.

2) There is no danger of moral hazard because no specific assets are chosen, only those whose price is falling too fast and which meet minimum requirements of transparency in their management, and which the Central Bank regulates.

Note that the only danger the Central Bank faces is that it encourages the creation of a bubble when it underwrites securities above their real price, so the Central Bank must find a rule to make sure this is not happening.

The rule, in aggregate terms, exists and is easy to verify, since it is the statement of the Second Law of Capital, or Robinson's Second Law: *the market price of all capital goods is directly proportional to the income they produce and inversely proportional to the interest rate of money*, which can be applied to a sufficiently large subset of capital goods. Specifically, the second law can be applied to the subset of assets that are under the umbrella of the Central Bank's guaranteed purchase:

$$k_j = \frac{\langle r_j \rangle}{\aleph_j \cdot i} \qquad \rightarrow \begin{cases} \langle r_j \rangle \rightarrow income_{capital} \\ \aleph_j \rightarrow Uncertainty \\ i \rightarrow interest\ rate \\ k_j \rightarrow priceo_{capital} \end{cases} \qquad (1)$$

Where $\langle r_j \rangle$ is now the aggregate after-tax income of all the assets whose purchase is guaranteed by the Central Bank, and k_j its notional value. The uncertainty factor is the parameter to be determined, and it is chosen to be greater than "1" to prevent the guaranteed purchase of securities from feeding a bubble. The rule on the guaranteed purchase of assets is modified in such a way that the Central Bank does not buy any asset for a price higher than the one obtained by applying the first law (equation 1), being the theoretical uncertainty of the asset $\aleph_j$is the same for all assets, and is decided by the Central Bank.

The basic idea behind the guaranteed purchase of securities is that, although the real value of a security is not known (that is why the market exists), it is accepted that the sharp fall in its price will most likely be attributable to the lack of liquidity in the market and not to a real change in its uncertainty, so that the generalized purchase of capital goods by the Central Bank will be correct as long as it is done on a diverse set of assets. This is so, because according to Piketty's Law the Uncertainty Factor is worth "1" in aggregate terms, and it will also be true for a diverse set of capital goods.

Piketty's Law also gives us a rule to follow so that the Central Bank does not end up involuntarily participating in a real estate bubble or any other asset class. When the uncertainty factor $\overline{\aleph}$ is less than "1", the Central Bank has to stop buying assets, in fact, the Central Bank should stop buying assets before the uncertainty is "1".

In short: The Central Bank must be the one who is in charge of providing liquidity to the Capital Market in a transparent way and declaring when, how and where it will intervene by buying securities. Except in very exceptional situations, the amount of money held as money (monetary capital) is very small, so that the liquidity of the Capital Market can only be satisfied if the Central Bank is willing to act as a buyer of last resort, especially in panic situations. Here we propose that the Central Bank should permanently use a concrete mechanism, "the guaranteed purchase of securities", to provide liquidity to the Capital Market and prevent any rapid collapse of the stock market.

(We have not analyzed it, but in order to carry out the guaranteed purchase of securities, it is necessary to prevent the free circulation of capital, because the local money created by the Central Bank to buy the securities, will most probably want to be exchanged for the reserve currency).

On the creation of bank money

When you look at the immense profits that investment banks make by providing liquidity to the Capital Market, it becomes very difficult to justify the privilege of creating bank money that has been granted to them by the Central Bank. One can justify the bank interest charged by commercial banks when they give credit because of the liability and risk of non-repayment that is always involved in finding borrowers, but it is very difficult to justify the same in the case of investment banks. The latter create large amounts of money to lend to large investors who use it to speculate on the lack of liquidity in the market, which is the opposite of what investment banks should be doing. The investment bank waits for the capital market to collapse and then lends money to those who are going to buy them at very low prices.

As we have already said, when there are problems, the liquidity of the Capital Market can only be satisfied by the Central Bank, and when there are no problems, there are no problems. In both cases, the guaranteed purchase of assets by the Central Bank can perfectly fulfill the purpose of providing liquidity to the market, so the role of investment banks in all this is not very well understood, when it can be seen, moreover, that they are the first to go bankrupt when a credit crisis appears.

As if this were not enough, it is clear to no one that commercial and investment banks are the ones that are directing newly created money to specific sectors of the economy, and not to others, so their existence implies a high "moral hazard" or conflict of interest, when they decide who gets loans and who does not, which is very difficult to justify. There is also a high "moral hazard" in the ability of banks to lend for leverage in certain assets and not in others.

Nobody doubts that, when a credit is granted, and even more when money is created from nothing, whoever receives the money and spends it, has to assume a cost that is charged through the interest rate of money. If this were not so, there would be no reason to refrain from borrowing and spending money, this is logical. But to think of credit as if it were only a service that has to be paid for is a major mistake that forgets the important role of money creation in today's monetary economies, for it is credit that drives growth and decides which sectors grow and which sectors do not grow. Credit is like water in a desert region, and the one who decides how it is distributed is the one who really runs the economy of the region, since it is he who decides which lands have economic value and which do not, depending on whether they receive water or not. This makes it necessary to separate the banking activity from the activity which implies the creation of money, as both activities have in general different interests, and nobody is to be reproached for this.

Specifically, what we propose here is that the Banking System should limit the total amount of bank money it can create through lending to 25% of the value of *GDP*, which is approximately half of the money the economy needs to function, leaving the Central Bank responsible for finding borrowers for the other half of the money needed to maintain the Consumer Market. The idea is not only to prevent the banking sector from creating bubbles, but also to ensure that a substantial part of the loans are granted according to political, social and environmental criteria.

In short: It would be desirable to separate the "management" of money from the "creation" of money, which is currently done by commercial and investment banks without it being possible to separate one function from the other. We propose to prevent investment banks from continuing to lend money, and to replace them with guaranteed asset purchases. In addition, we propose to limit the amount of credit that can be granted by the commercial banking system to no more than 25% of *GDP*, which is about half the amount of money needed for the Consumer Market to function, and let the rest of the credit be granted by the Central Bank on a policy basis.

We think the above collection of statements on specific aspects of the economy, are a fairly coherent summary of the consequences derived from the financial theory of capital and the set of basic equations with which the monetary economy is described, and which we have called the Madrid Theory. We think they reflect quite accurately the problems and contradictions created by savings and credit within an economy, even though we have not constructed a theory of trade as such and, therefore, even though we have left out of the analysis the most important aspect of today's economy: globalization.

4. INCOME TAX AS A SOLUTION TO THE SAVINGS PROBLEM

In recent years, the fiscal policy used by almost all countries in the world to avoid credit crises has been to use monetary injection from deficit public spending, which is often referred to as "Keynesian policy". This policy, which, as has been analysed here, is very coherent, is accompanied at the same time by a tax cut that reduces progressivity and the amount of income tax, which makes no sense at all because it aggravates the problem created by savings. This policy, which seeks to activate the economy by leaving more money in the hands of the private sector at the cost of maintaining deficit public spending, is called "supply-side fiscal policy", although it has never been clear to anyone exactly what the phrase means. What has become very clear to everyone, after more than 50 years, is the result of carrying out such a policy, which has been none other than to make the public deficit chronic in most countries of the world, which are now unable to raise enough money to maintain minimum public services.

In addition, the loss of progressivity of the income tax has left more money for the top earners. As a result, they have been able to increase their savings more and more, increasing their wealth more and more and driving inequality to levels not seen since the 19th century. All of which is supported by the theories of fiscal policy propagated by economists working for private universities in the US.

Of course, it is true that maintaining deficit public spending avoids recession because it manages to return to the economy the money that the private sector extracts when it saves, but it has the serious disadvantage that it increases without limit the accumulated public debt and, with it, the cost of debt service, making it more and more difficult to maintain deficit public spending (Japan has been using this fiscal policy for more than two decades and its public debt is already more than two and a half times the value of its *GDP*).

Moreover, Keynesian fiscal policy is usually insufficient to return savings to the economy, and it is usually accompanied by a persistent lowering of the interest rate to prevent bank money from being destroyed. We have already shown that the bank money with which the economy works is created with credit, and this depends on the technological moment and the money that is necessary to invest to increase production. Therefore, lowering the interest rate alleviates the payment of interest on the public debt, making the public deficit more bearable, but above all it alleviates the interest paid for maintaining bank credit, which is the debt that needs to grow because it is what creates the money supply of the economy. But lowering the interest rate of money does not increase the need for investment, which is exogenous and depends on the technological moment. For example, the nominal interest rate of the dollar has been falling since 1980, almost 50 years ago, and the amount of bank credit assumed by the private sector is decreasing, which creates the deflationary environment that has caused inflation to fall to very worrying levels. At present, the interbank rate is zero or negative in almost all industrialized countries, and

the real interest paid on bank loans by citizens and small businesses is very low in the US and industrialized countries, perhaps not much more than 2%.

The problem arises when we see that, like deficit public spending, monetary policy is also exhausted when the interest rate reaches zero and private credit does not increase despite the low cost of maintaining it. So it seems that there is nothing that can be done to prevent the economy from entering a credit crunch, except to inject money directly into the economy, which aggravates the savings problem. It is then that the Central Bank resorts to monetary creation to buy public debt and other debt securities, with the intention of injecting directly into the economy the money that is destroyed by the liquidation of credits. The mechanism or policy is known as "quantitative easing" or "quantitative easing".
or "quantitative *easing*", or as QE (*quantitative easing*), and although it manages to avoid deflation and with it the credit crisis, it cannot prevent private savings from continuing to hoard an increasing amount of money.

It is very important to understand the economic situation around us a decade after the credit crisis of 2008 if we are to understand what the problem is and where to look for the solution:

1) The money that the economy uses to function is created by the banks when they grant credit and destroyed when the borrower repays the credit, so the decision of citizens to no longer want to maintain bank credit leaves the economy without money and leads to a recession.
2) The creation of bank money can be stimulated by lowering the interest rate of credits, since it alleviates the price of maintaining a bank credit, but it must be understood that the decision to maintain a credit does not depend on the interest rate, but on the benefit that is expected to be obtained when the credit is assumed. If such a benefit does not exist, the credit will not be taken on, no matter what the interest rate is (*"You can lead a horse to the river, but you cannot force it to drink" ... Keynes*).
3) The solution to which the Central Bank finally resorts, is to inject money directly into the economy, and it does so by buying assets of all kinds with bank money created for this purpose, so that it replaces the money which has been destroyed by the liquidation of private credits.

Let us note that the Central Bank has finally managed to avoid the credit crunch. For example, the Federal Reserve has replaced bank money from private credit with bank money backed by itself. The result is clear to anyone who wants to see it. A good part of the amount of bank money circulating in the economy, either as money supply or hoarded as monetary capital, has been created and spent directly by the Fed, while the amount of private bank credit has been substantially reduced. How much? We do not know, because

the Federal Reserve (and the rest of the monetary authorities) do not know how much money is being made by commercial and investment banks, but we suspect that currently more than half of the bank money that exists is being backed by the Federal Reserve and not by the private sector.

We will look a little more closely at the overall economic situation later, but let's note that despite all the problems that the economy seems to have, everything can be fine as long as the Central Bank injects the amount of money that the economy needs to function. There is no reason why the economy should have to function with money coming from private credit instead of money coming from the Central Bank's monetary injection. Both are the same money, and both are indistinguishable from each other. When the private sector does not want to take on credit, the Central Bank can create money and spend it on buying assets, or spend it directly as a public deficit, keeping the amount of money that moves the economy unchanged. There is no problem with this.

But let us note that, with such a policy, the problem created by aggregate savings is not solved. Aggregate savings, when it is greater than the growth of capital within the economy, will be hoarded without remedy, which extracts money from the money supply that must be replenished by someone. When the Central Bank buys private assets and retains them, it is decreasing the amount of capital in which aggregate savings can be invested, aggravating the problem and forcing savings to hoard (the amount of capital in an economy is fixed and determined by Piketty's Law), and failing to return the money from savings to the money supply. This implies that, in order to absorb the savings, the public deficit will have to be maintained and the Central Bank will have to create more money and spend it on buying government debt securities. For aggregate purposes, the result is that the money extracted by savings is hoarded, at the same time as it is replaced by the money manufactured by the central bank.

This is not a serious problem when the environment is not inflationary. In such a situation, savers may not mind keeping their wealth in money, even though they get no benefit from it. But it is certain that they would not do the same in an inflationary environment. In an inflationary environment, savers will try to buy assets, but there are not enough assets for that much savings and their value will end up being higher than Piketty's Law predicts and financial instability will set in, making a flight to liquidity more likely.

The situation is clear.

If we want to maintain a minimal inflationary environment, then savers will not want to keep their wealth hoarded in money because it depreciates appreciably and the previous Central Bank policy of buying public debt becomes impossible. Now, savers will need the public debt securities, and the government has to absorb the excess savings by increasing its debt with the private sector indefinitely, without resorting to monetary creation and paying at least the interest that avoids the devaluation of the securities due to inflation.

But this is unsustainable for the public accounts when the annual saving to be absorbed is higher than the nominal growth of the economy, because, in nominal terms, the flow of interest to be paid will grow indefinitely. There is therefore no way out. If you want to maintain an environment with minimum inflation where it is not possible to hoard money, then someone has to absorb the savings and pay for it, at least, an income equal to inflation.

Obviously, the only possible solution is to prevent savings. The fiscal policy we propose here to avoid the credit crunch is to put a progressive tax on income in order to limit saving. The idea is that since we cannot prevent credit spending from stopping, nor can we create a deflationary environment for savings to hoard, nor can we absorb savings with the public deficit in an inflationary environment, it will be necessary to eliminate it. What we are proposing here is that the Central Bank, based on analysis of the economic situation, signal to the government the extra amount of money that needs to be raised, separately from other taxes, to reduce the excess savings that threaten to sink the economy.

Specifically, when we assume that saving is progressive with respect to income (Keynes' Law of Saving), the tax rate to limit saving must also be progressive with income. There is, therefore, no reason why it should be different from the rate already used to finance public spending, and what we propose, in fact, is that it should be the same.

The attached table sets out the proposal:

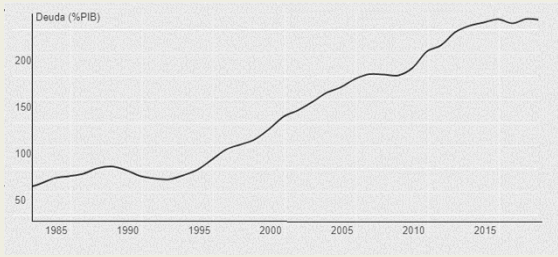
Capital tax		**Income tax**		**Savings tax**	
Multiple of the average equity	Annual property tax	Multiple of median income	Effective tax rate	Median income multiplier	Effective tax rate*
0,5	0%	0,5	10%	0,5	ε·10%
2	0%	2	40%	2	ε·40%
5	2%	5	50%	5	ε·50%
10	2%	10	60%	10	ε·60%
100	2%	100	70%	100	ε·70%
1.000	2%	1.000	80%	1.000	ε·80%
10.000	2%	10.000	90%	10.000	ε·90%

* The parameter ε is a positive number that the Central Bank decides

The table on the left proposes a tax on the amount of capital that seeks to replace the tax on inheritance or on donations and to avoid dynasties, but which has nothing to do with the subject that concerns us now. The second table shows the usual rate imposed on income to finance public expenditures, which does not distinguish whether it comes from work or income. It is the same rate proposed by Thomas Piketty, and it is copied from the proposal he makes. The third table shows the tax that we propose to reduce savings. It is a tax that is just as progressive as the income tax, but it depends on a parameter ε which must be determined by the Central Bank well in advance and which must change according to changes in the general economic situation.

It only remains to add that we think that the money collected with this last tax should never be used to finance public spending, as that is not the reason for which it is collected. It is understood that it must be separated in a very clear way, the tax that is used to finance public spending from the other tax that is used to carry out the anti-saving tax policy. We think that public spending should be financed only with the money that is collected from the income tax, without having to resort to the public deficit and without using the money that is collected to limit savings. We think that the sensible thing to do is to use the money that is collected to solve the savings problem to provide subsidised loans for investment by people who do not have sufficient equity to back up the loans.

<u>THE FUTURE TO COME</u>. Japan's economy passes very well for being a completely insulated economy. There, the interest rate has been close to zero for decades, and it is deficit public spending that is returning to the economy the savings made by the private sector, preventing savings from being hoarded. In 2020 Japanese public debt reached 250% of GDP, surely the highest in the world, and it will be unsustainable, even for Japan, as soon as the interest rate on bonds rises a little. The problem, as we have already pointed out many times, is that an interest rate close to zero will push asset prices to stratospheric heights, producing instability in the Capital Market's valuation and causing frequent flight to liquidity.



Let us note that it is entirely possible that the Japanese would hoard in yen, 2.5 times Japan's GDP in a low inflationary environment, even though they give up an income for their savings, but that alternative would have been incompatible with an inflationary environment or with the belief that at any moment the dreaded inflation may appear, when any savings in yen would have devalued over time. Perhaps this is why Japan opted for a Keynesian fiscal policy equivalent in aggregate terms to the previous one, which made public spending hostage to the savings needs of the private sector, and allowed the private sector to save 2.5 times GDP in government debt securities.

The accompanying figure shows the almost constant increase in Japanese public debt from the 1990s onwards, demonstrating very conclusively that private saving was proportional to GDP for almost 30 years and very stable. If we assume that all public debt comes from Japanese savings and very little of it is a consequence of money creation because GDP has barely grown, then:

$$public\ debt = \int_0^t Ah(s) \cdot ds \xrightarrow{Ah=\tau_s \cdot PIB} = \tau_s \cdot \int_0^t PIB \cdot ds \xrightarrow{PIB(t)\sim constante}$$

$$\approx \tau_s \cdot PIB \cdot t \quad \rightarrow \quad \frac{public\ debt(t)}{PIB(t)} = \tau_s \cdot t$$

That responds very well to the straight line shown in the graph, suggesting that it is true that saving has remained proportional to GDP, as we have assumed. This makes it easy to calculate what the annual savings rate of the Japanese has been, since it is equal to the slope of the public debt line shown in the graph:

$$\frac{saving}{PIB} = \tau_s \sim 10\%$$

The graph also allows us to see that Japan's evolution is very well approximated by an isolated economy that is not creating money because it is growing very slowly and where the sum of public debt and private savings is zero in aggregate terms. It is very clear that Japan's situation is absurd because it is unsustainable. Japan's public spending has been absorbing the private savings of the Japanese for 30 years and returning them to the economy, avoiding deflation, but it is very clear that it will not be able to do so for much longer.

The net result of the process has been a public debt of 2.5 times GDP, without it being at all clear what the deficit spending has been used for and whether it has benefited lower income people, which is highly doubtful it has. Bear in mind that it is quite possible that the government of Japan had no need to maintain deficit spending, nor did it have any obvious place to spend the 10+ billion euros it has borrowed over the last 30 years.

EPILOGUE

How can we finish a treatise of almost 300 pages pretending to summarize everything that is told in it in just a couple of paragraphs? Perhaps it is pretentious on our part, but in this case, it is not as difficult to achieve as it seems if in the first paragraph we formulate a question and dedicate the second paragraph to answer it.

Where does the money from our savings go?

A very simple question, which has a very short answer: "nowhere". In aggregate terms, money is hardly hoarded in a minimally inflationary environment, and people save by buying something whose value increases over time or, at least, does not devalue over time. Rich people do not save by hoarding money, although there is always some money hoarded for contingencies, but what is for sale in a monetary economy that has a price that does not decline over time? Obviously, capital goods, because their value depends on the income they produce, and this income grows and does not devaluate when there is inflation. Therefore, if we want to save, we have no alternative but to buy capital goods.

So, we've answered the question and we know where our savings money is going?

We are afraid not. If you have followed the line of reasoning behind the Financial Theory of Growth, you will have understood that saving, in itself, does not create any new capital good, so saving will not cause any problem or will cause many problems, depending on whether or not you find capital goods to buy. Who sells a capital good, does it almost always because he wants to dissave, spending the money of the sale in consumer goods, but, so that saving is balanced with dissaving it is necessary that the aggregate saving of the economy is negative, or at least null. In such a case, there is net growth of the quantity of money and net growth of capital, and those who wish to save can come to equilibrium with those who wish to dissave, some buying the capital goods sold by others. The problem arises when the economy does not grow sufficiently and the desire to save exceeds the amount of capital goods for sale, either because not enough capital is created or not enough capital is offered for sale. Bear in mind that in today's economies private savings easily reach 10% of GDP, a very large monetary flow that it is far from clear that the growth of the economy can absorb.

We have already shown, and repeated ad nauseam, that the nature of capital goods is financial, and that the word "capital" is the word used by economists working for private universities in the USA to hide the fact that capitalism is an economic system based on rent

creation. Specifically, Robinson's 2nd Law tells us that in an economy the growth of capital goods depends on the increase in the share of GDP devoted to paying rent:

$$\Delta K = \frac{\langle \alpha \rangle}{\bar{\aleph} \cdot i} \ \Delta PIB$$

According to the most important equation of the economy, as long as GDP does not increase, wealth will not increase. That is, in an economy with no growth or very slow growth, wealth will increase slowly and will be insufficient to absorb savings.

Do you see where the problem with savings is now?

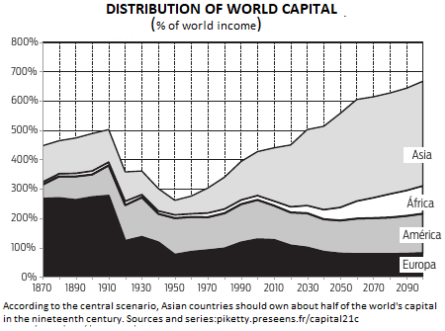
The problem is that we are not heading for a slow-growth economy in which it will not be possible to save in aggregate terms, because there will be no growth in capital goods. Such an economy has happened in the past and most of the population will find it undesirable to return to it in the near future.

Let's try to imagine the society we are heading for. A society with hardly any growth and with capital goods distributed very unequally. A society where 1% of the population owns 50% of the capital goods, and where it is very difficult to prosper because there is hardly any economic growth. A society where the incomes of the poorest 50%, would shrink until they stop saving, because they will no longer have any capital to use to back up debts.

It is very clear to the authors that the current instability shown by the economies is transitory, and only a consequence of the excess savings made by the richest, but that will change. When the economy is balanced, and the richest realize that they have assured income from their wealth, they will stop saving and spend their income, without fear that the future may change things. Then society will inevitably move towards an economy with little change in the distribution of income and wealth, much like the one predicted by Thomas Piketty in Capital in the 21st Century and much like the society divided between rich and poor that has existed for the last three hundred years. The twentieth century and progressive income taxation was the exception, not the rule, of a society divided between rich and poor, as predicted by Thomas Piketty.

The future that Piketty draws, based on the future value of the parameter β the ratio of the value of capital goods to GDP (income), is the same future we predict here, even though the nature Piketty attributes to capital is not physical, but financial. Even though Piketty's prediction of a value of β close to 7 for the end of the 21st century, we think it is wrong, however, the consequences he draws based on that value are correct and very similar to the future we have just described based on the impossibility of saving because of slow growth. The curious thing is that the recommendations Piketty makes to avoid this undesirable future, returning to the progressive tax rates that brought the US out of recession, is also what we recommend. In fact, the table we have set out here, in which the

progressive rate on capital appears, is taken from Piketty's book and his recommendations. The only difference is that we recommend not to tax the inheritance of capital and, on the contrary, to tax the possession of capital with an equivalent annual rate that avoids the formation of dynasties.



It is not the intention of the authors to scare anyone, but to show the future that awaits us and that the economic theories taught by economists working for private universities in the USA are trying to hide. We have done our job by showing the Wizard of Sickles hiding behind the curtain, but to avoid the future that those who finance private universities in the USA want to take us to, is not our job, but yours.

Clara Rojas García, Julia Rojas García, Pedro Rojas Sola
March 04 of the year 2021

ANNEX 1

WE ACCUSE STEVE KEEN OF PLAGIARISM

Pedro Rojas Sola
June 1, 2021

The explanation of Steve Keen's crisis

In April 2017, Steve Keen published his latest book to date, "*Can We Avoid Another Financial Crisis? (The Future of Capitalism)*", where he announces for the end of 2019, the arrival of an economic crisis in a number of countries because of the high level of private debt they maintain. From the reading of this book we can conclude that Steve Keen was still explaining the economic crises in 2017 with the same argument he used in 2010, when he based his explanation of the cause of the economic crises on the changes in the amount of private debt.

Specifically, in an article published in 2010, with the title "*The problem is private debt and the future of the US is deleveraging*", Steve Keen defines aggregate demand... "*as the sum of GDP plus the change in debt (where that demand is spread across goods, services and asset markets).*" In other words:

Aggregate demand = GDP+ change in debt

Based on the expression, he deduces that any change in private debt will affect aggregate demand. Thus, Steve Keen reasons that any decrease in the amount of private debt will cause a reduction in aggregate demand that will eventually affect GDP and cause a recession, although his reasoning is rather obscure and hard to follow.

We see that the basis of Steve Keen's explanation of economic crises is therefore quite simple and has remained unchanged throughout the second decade of this century. In it, he attributes the origin of the decline in GDP to high private debt, although the reason why

the high amount of private debt has to decline at some point in the future and cause a decline in demand is never made clear in Steve Keen's explanation of the economic crisis.

However, it escapes no one that Steve Keen's reasoning in his 2010 article, and which he repeats in the book he published in 2017, leaves much to be desired regarding the explanatory capacity of economic crises, since, from his definition of aggregate demand, it does not necessarily follow that the economy's GDP has to decrease when the change in private debt becomes negative (GDP has to decrease for an economy to enter recession). Let's note that from Steve Keen's 2010 definition of aggregate demand:

Aggregate demand = GDP+ change in debt

... the causal line between the variables that Steve Keen uses to justify the economic crisis, and that goes from the change in debt to the economy's GDP, does not emerge. In fact, and according to the expression, a negative change in the amount of private debt forces GDP to increase when aggregate demand does not change, which is just the opposite of what Steve Keen concludes to justify the crisis. Why this cannot happen? Why can't the change in debt be negative at the same time that the economy's GDP increases?

Let's note that, from the definition of aggregate demand, it is not concluded what is the causal relationship that exists between the three variables that appear in it and, therefore, all the argumentation that Steve Keen makes about the effect that the change in debt has on the economy's GDP, is left floating in the air. Not only that. Steve Keen doesn't know it, but the causal line implicit in his definition of aggregate demand is the opposite of the one he uses in his reasoning:

Aggregate demand = GDP + d/dt (private debt)

According to the expression, it is the difference between aggregate demand and GDP that drives the change in private debt, not the other way around (only those who have studied physics know this).

We can see, when we analyze in depth the basis of Steve Keen's explanation, that it is not possible to construct a coherent explanation of economic crises using only the definition of aggregate demand he makes in 2010. For this reason, Steve Keen is forced to make several *had oc* arguments about the specific causal linearity that exists between the variables that, moreover, turns out to be the opposite of the one implicit in the expression he uses as a basis to explain the economic crises. Perhaps for this reason, and not for anything else, is why nobody takes Steve Keen seriously when he says that he did see the 2008 crisis coming, and he did so after observing the high levels of private debt held by many countries in those years.

We see that, in order to explain economic crises, Steve Keen needs to make several *had oc* reasonings on the concrete causal linearity that exists between the variables, which is the opposite of that implicit in the expression he uses as a basis to explain the crises.

The article in the magazine Braveneweuropa with the title "Money Matter" in 2020

However, at the end of 2020, Steve Keen's interpretation of the economic crisis changed radically after we sent him the Madrid Theory at the end of 2019 through Michel Robert, an English Marxist economist who offered to evaluate the equations that appear in the Madrid Theory.

In December 2020, Steve Keen published in the magazine Braveneweuropa, under the title "Money Matter", the draft of the second chapter of a new book that he will publish at the end of 2021. The book will be entitled *The New Economics: A Manifesto*, and we fear that Steve Keen will present in his new book as his own, many of the ideas that we began to develop in 2015, more than 5 years ago, and that we sent him at the end of 2019 through Michel Robert. In other words, Steve Keen is going to plagiarize all our work.

Although it does not make much sense for someone to bring forward a chapter of his next book by a few months, in the case of Steve Keen we can find a good reason to do so. In the second chapter of the book Steve Keen formulates a very precise criterion for detecting economic crises, which had never been formulated before, neither by him nor by any other economist that we know of (although this is always difficult to know), and whose discovery Steve Keen attributes to himself when he states that he had already discovered it in 2010:

> *The correct Bank Originated Money and Debt model shows that crises are caused by credit turning negative (Vague 2019)*
>
> *Steve Keen, 2021*

It is very clear that Steve Keen has never claimed such a thing in any of the many articles he has published before 2021. Furthermore, and perhaps most important of all, in the second chapter of his forthcoming book, Steve Keen shows a graph of the three major economic crises suffered by the US in the last 300 years. The graph fully confirms the Credit Criterion that we formulated in the Madrid Theory, which attributes the cause of economic crises to the decline in bank credit:

> *<u>Credit Criterion</u>: The economy will go into recession when the difference between the flow of credit and the flow of hoarding becomes negative.*

Nor had Steve Keen presented this graph and the corresponding explanation in any article published prior to 2021. One wonders, therefore, why Steve Keen does not state in the draft of the second chapter that we are facing a new discovery, when he attributes the economic crisis to the decrease in the quantity of credit money.

Indeed, in the graph shown by Steve Keen there is a very clear correlation between the flow of negative credit and the three great economic recessions in the US, but such correlation is not new and even Karl Marx had already pointed out this fact.

Keep in mind that the explanation economists have been giving to the correlation observed between the GDP and the change in the amount of bank credit is exactly the opposite of what the Credit Criterion states: "the fall of the GDP causes the retraction in the granting of bank credits, because the banks fear they cannot collect them and because the users fear they cannot pay them back". That is, economists assume that, as a result of the collapse of the economy, people liquidate their credits and banks stop granting them, which aggravates the liquidity problem, but they never assume that the fall of credit is the cause of the crisis, but its consequence. You only have to read Milton Friedman to see that this view of bank credit is the one that underlies all his reasoning about the 1929 crisis, but you can also read it in the writings of Irving Fisher or in the writings of Karl Marx. It can be seen that all of them basically affirm the same thing, despite the fact that they live in epochs very far apart in time.

Steve Keen's view on bank credit has never been different from that of other economists. His position on bank credit only changes when he receives the document we send him, in which he derives the expression that relates changes in GDP to the flow of bank credit and that we name here as the Growth Equation:

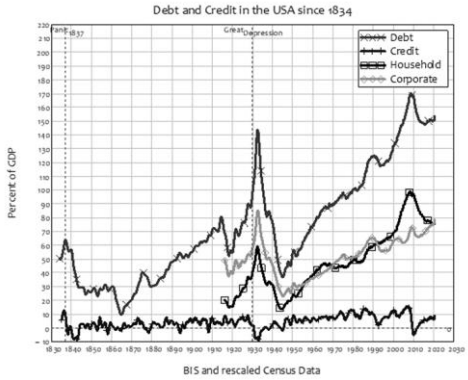
$$\frac{1}{k_F}\frac{dPIB}{dt} = (Ah^C - Ah^S)$$

Analyzing the consequences of the expression, we can formulate without difficulty the "Credit Criterion", that states that the economy will go into recession when the difference between the credit flow and the accumulation flow becomes negative. The Growth Equation also contains explicitly, without possible discussion, the causal line between the variables: the change of GDP depends on the difference between the flow of credit and the flow of hoarding. (Keep in mind that the flow of a variable is equal to the annual amount that grows or decreases the variable).

Steve Keen's plagiarism is clearly shown when we remove from the second chapter everything that is genuinely Steve Keen's, and leave only what is new and original. What remains, then, is a small piece of text extracted from the section ***Negative credit, economic crises, and economic policy,*** where Steve Keen verbally formulates the Growth Equation:

"Similarly, the "unpredictability" of crises like the Great Recession is a product of the Neoclassical **paradigm's** *false Loanable Funds model of money. The correct Bank Originated Money and Debt model shows that crises are caused by credit turning negative (Vague 2019) , and that most recessions are caused by credit declining, but not quite going negative. This causal relationship between credit (which is identical in magnitude to the annual change in private debt) and economic performance endows capitalist economies with a tendency to accumulate higher and higher levels of private debt. This phenomenon is most evident in that most capitalist of economies, the United States of America-see Figure 6.*

Figure 6: Private Debt and Credit in the USA since 1834



This chart identifies America's three great economic crises: the Great Recession, the Great Depression, and the "Panic of 1837". What, you haven't heard of the "Panic of 1837"? Neither had I, until I produced this chart (Census 1949, Census 1975), but after doing so, I found it was described at the time as "an economic crisis so extreme as to erase all memories of previous financial disorders" (Roberts 2012, p. 24). In each of these crises, credit plunged from a historically high level, turned negative, and remained negative for a substantial period-see Table 4.

Table 4: Magnitude of Credit and duration of negative credit in the USA's major economic crises

	Credit			
	% GDP			Years
Crisis	Maximum	Minimum	Change	Negative Duration[18]
Panic of 1837	12.2	-8.9	21.1	6.2
Great Depression	9.1	-9.1	18.2	8.2
Great Recession	15.4	-5.3	20.7	2.6

Each crisis turned around only when the decline of credit stopped. But the renewed growth engendered by rising credit came at the expense of a rising private debt to GDP ratio, with

this rise terminated either by another crisis, or by wars that drove the private debt ratio down dramatically because of the "War Economy" boost to GDP: nominal GDP growth reached 32% p.a. during the US Civil War in (1861-65), 29% during WWI (1914-1918), and 29% again during WWII (1939-45), far exceeding the maximum growth rate of credit during those periods (0.2% of GDP p.a., 8.6% and 4.5% respectively).

This is no way to run an economy, but it is what we are stuck with while economic policy is dominated by a theory of economics that ignores banks, private debt, money, and credit. However, with a new, monetary paradigm, several things become evident: we should stop the level of private debt from getting too high, and credit-based demand should not be allowed to become too large a component of aggregate demand. But how could we do that?

It's time to take a monetary look at the other type of debt: government debt.

Steve Keen, 2019

In the rest of the second chapter, Steve Keen adds nothing new to what he has been saying since 2010, but it is very clear that the piece we have reproduced here is completely new, even if Steve Keen doesn't want to acknowledge it. In the text, Steve Keen no longer makes a vague statement along the lines of, *"The smoking gun: credit".* Now we have the explicit formulation of a causal relationship between GDP and the flow of bank credit, which Steve Keen uses as the basis for his new explanation of the economic crisis:

> *The correct Bank Originated Money and Debt model shows that crises are caused by credit turning negative (Vague 2019), and that most recessions are caused by credit declining, but not quite going negative. This causal relationship between credit (which is identical in magnitude to the annual change in private debt) and economic performance endows capitalist economies with a tendency to accumulate higher and higher levels of private debt.*

Let's observe that, in such a short text, Steve Keen repeats up to six times the causal dependence that exists between changes in GDP and the change in the amount of bank credit, and that formulates the Growth Equation:

First: "*The correct Bank Originated Money and Debt model shows that crises are caused by credit turning negative".*

Second: "*and that* most *recessions are caused by credit declining, but not quite going negative".*

Third: *"This causal relationship between credit (which is identical in magnitude to the annual change in private debt) and* economic *performance endows capitalist economies with a tendency to accumulate higher and higher levels of private debt".*

Fourth: "*Neither had I, until I produced this chart (Census 1949, Census 1975), but after doing so, I found it was* described *at the time as "an economic crisis so extreme as to erase all memories of previous financial disorders" (Roberts 2012, p. 24). In each of these crises, credit plunged from a historically high level, turned negative, and remained negative for a substantial period-see Table 4."*

Fifth: *"Each crisis* turned *around only when the decline of credit stopped".*

Sixth: *"nominal GDP growth reached 32% p.a. during the US Civil War in (1861-65), 29% during WWI (1914-1918), and 29% again during WWII (1939-45), far exceeding the maximum growth rate of credit during those periods (0.2% of GDP p.a., 8.6% and 4.5% respectively)".*

How can Steve Keen justify the drastic change of opinion on the cause of the economic crises? Prior to this draft written in 2021, he attributed the decline in the amount of private debt as the cause of the economic crisis, however, in this article written in 2021 he attributes the annual change in the amount of credit as the cause of the crisis.

It's not just that. Steve Keen needs to lie to make the reader believe that he has not changed his explanation about the cause of the crisis, and he lies when he claims that "the change in aggregate debt is the same as the "change in the amount of credit" (banking, right?), because it is very clear that both things are not the same. The reason for the lie is because only if both things are the same (or have the same value), will Steve Keen be able to argue that already in the distant year of 2010 he had discovered the causal dependence that the change in GDP has with the annual change in the amount of credit (dependence that allowed him to predict the 2008 crisis).

The Spanish prologue to "*Can we avoid another financial crisis? (ESSAY)"*

We have already commented that it does not make much sense to advance the chapter of a book that is to be published only a few months later, but it makes even less sense to publish the Spanish edition of a book that was published in 2017 and that the pandemic of 2020 has made completely obsolete. Unless, of course, the reason for publishing it has

nothing to do with what the published work says, and has to do with the change of opinion that you want to add in the book.

In April 2021, just a few months before the forthcoming publication of "The *New Economics: A Manifesto"*, Keen publishes the Spanish edition of his book, "*Can We Avoid Another Financial Crisis? (ESSAYO)"* in whose prologue you can read very well how Steve Keen has changed the way he explains the economic crisis. We do not know what the English version that was published at the end of 2017 says, because we have not read it, but we have no problem in showing the paradigm shift that Steve Keen's thinking undergoes in 2021, extracting some quotes from the prologue of the Spanish edition (and that it is certain that it does not appear in the prologue of the English edition written in the year of 2017):

1) *...As I explain in this book, private debt drives economic unemployment, because the change in private debt - which I call credit, following accounting terminology - is a significant, and by far the most volatile, source of aggregate demand.....*

The quote is from the prologue to the Spanish edition of Steve Keen's book, and it shows very well the change that his old definition of aggregate demand undergoes when he states that *"the change in private debt"* is the same as *"credit"*. Clearly, Steve Keen's claim is absurd and the change in debt is not the same as the change in the amount of bank credit in any accounting terminology, nor is even their value the same. Only debt is equal to bank credit when debt is acquired by the granting of bank credit, but then Steve Keen's clarification would be a no-brainer and in the 2010 definition he would have mentioned bank credit and not debt. Debt and credit are different things, as everyone knows, and what Steve Keen claims is a lie that he needs to pass off as truth if he wants to attribute to himself the discovery that it is the decline in bank credit that causes economic crises.

It is very clear that there is an intentionality in Steve Keen's lie, that he does not want to admit that he has completely changed his explanation about the cause of the economic crises in order not to have to give any explanation about the reason for his change of mind, well into 2021. There is a lot of pettiness in this.

2) *...This triggered a credit-based aggregate demand boom....*

   ...but the real culprit of the Spanish boom was the growth of credit, from zero in 1995 to 10% of GDP in 2008...

   ...the crisis began when credit began to fall - a pattern that would be repeated all over the world, but which was extremely obvious in the case of Spain....

All quotations are taken from the prologue of the Spanish edition. In fact, the prologue of the Spanish edition is the description of a credit bubble followed by a very sharp decline in bank lending which, as explained in the Madrid Theory, causes the economic crisis. His

description of the Spanish economic crisis, which he generalizes to the rest of the world's economies, has nothing to do with Steve Keen's pre-2020 interpretation. It is remarkable to note that Steve Keen says textually: ... "*the crisis began when credit began to fall" ...* explicitly discarding the inverse causality that attributes the decline in bank credit to the decline in GDP, i.e. Steve Keen is quoting the Growth Equation and making it his own.

What Steve Keen is formulating in the foreword is the Growth Equation and the Credit Criterion that follows from it. The Credit Criterion states verbatim: recession begins when the difference between the flow of credit and the flow of hoarding becomes negative.

> 3) *...My working hypothesis was that aggregate spending in the economy was roughly the sum of GDP and credit, and that this sum generated both income (through purchases of goods and services) and capital gains (through net purchases of assets - predominantly property and stocks). Since credit was much more volatile than GDP and could potentially turn negative and reduce demand, the crisis would begin when the rate of growth of private debt slowed.*

Here it is very clear that Steve Keen reiterates his deception, by referring to the definition of aggregate demand that he formulated in 2010. He insists on claiming that *"the change in private debt"* is the same as *"the change in bank credit"*, something that any economist knows to be false.

As we have already mentioned, the working hypothesis referred to by Steve Keen appears in an article published in 2010, entitled *"The problem is private debt and the future of the US is deleveraging*". There you can read:

> *"... This becomes obvious when you view aggregate demand according to my definition: as the sum of GDP plus the change in debt (where that demand is diffused by goods, services and asset markets)..."*
>
> *Steve Keen, 2010*

From the comparison of both quotes, it is very obvious that Steve Keen does not want to acknowledge that he has changed his interpretation of the economic crisis, and lies to the reader to make him believe that already in 2010, he defended that "the variation of GDP depends on the flow of credit" (in reality, the variation of GDP is proportional to the difference between the flow of credit and the flow of hoarding"), something that is completely false.

The Madrid theory

The Madrid Theory is a very complete scientific theory which deduces the physical laws which govern a monetary economy and studies its most immediate consequences. For example:

- We enunciate the Principle of Asymmetry (microeconomic binding) and analyze the macroeconomic consequences that derive from it.
- We deduce an alternative meaning to the "standard commodity" introduced by the Italian economist, Piero Sraffa in "Production of Commodities by other Commodities".
- We formulate the first two laws of capital according to their financial nature and name them Robinson's First Law and Robinson's Second Law.
- We formulated the third law of capital, and named it Piketty's Law. With it we demonstrate the financial nature of capital, beyond any reasonable doubt.
- We derive the Growth Equation that relates changes in GDP to the difference between the annual flow of credit and the annual flow of hoarding.
- We formulated the Credit Criterion that allows us to predict the credit crisis.

We authors are very proud of all the equations and principles we have formulated. From the Growth Equation, through the Credit Criterion, the Inflationary Principle, the Closure Principle, the three laws of capital, to the most important equation of all monetary economics:

$$K = \frac{\langle \alpha \rangle \cdot k_F}{i} \cdot M$$

All these equations and all these very important principles, and they had never been formulated before. In particular, the previous equation, which we consider the most important equation in economics, is equivalent to $E=MC^2$and we think that in the course of time it will be as famous as it is. Therefore, because of the importance of the equations and principles we have formulated in Madrid Theory, we are fully convinced that, in a more blatant or less blatant way, they will appear as our own discoveries in the new book that Steve Keen will publish at the end of 2021.

That's why we don't like it when someone with more prestige and more media coverage tries to take them over, either in part or in whole.

The accusation I make about Steve Keen's inappropriate behavior is very serious. The floor is now Steve Keen's to say what he has to say. We are done.

01 June 2021
Pedro Rojas Sola