

THEORY

of

WEALTH (*)

and

UNEMPLOYMENT

(Macroeconomics from microeconomics)

(*) Generation-destruction-distribution

CARLOS A. BONDONE

THEORY of WEALTH and UNEMPLOYMENT

(TWU)

CONTENTS

Abstract

Theoretical introduction

Research problem - Object
Theoretical framework

Theory of subjective value
Theory of economic calculus
Empirical economic calculus
Wealth and economic calculus in *TWU* and *SEE*

Justification of the research
Research questions
Methodology of the research
The structure of the text
Acknowledgements

Part I

MICROECONOMICS

Microeconomics
The fundamental economic causality in an individual (Gossen-Crusoe)

Need (demand)
Economic good (supply)
Fundamental Economic Causality (FEC)

The closed box
Conclusions of *Fundamental Economic Causality*

Behavior of the *Fundamental Economic Causality* in Robinson

- a) Decrease of demand (need) of a stock
- b) Decrease of supply of a stock

Supply and demand of a stock – Two sides of the same coin
The *closed box* of the stock and *E point* of stock generation
Synthesis of *point E*
Conclusion of microeconomics

Part II

MACROECONOMICS

Macroeconomics

THE QUANTITY - PRICE

Law of exchange –The fundamental economic causality in a society
The law of exchange and uncertainty
The *Quantity-Price* and *point E* of exchange
Quantities-Prices as a unit of measure
The *closed box of exchange* explains the *variation of quantities – prices*
Quantity-price and Pareto's Optimal
The benefit of demand

- a) Geometrical expression of the benefit of demand
- b) Arithmetical expression of the benefit of demand

Quantity-price, value, and the benefit of demand
Quantity-price theory

CURRENCY

The economic good currency in exchange
The *quantity-price* of the economic good currency
Variation of the *quantity-price* of the economic good currency
Quantities-prices relative to the *quantity-price* of the economic good currency, as a unit of calculus

ECONOMIC CALCULUS

WEALTH – Calculus and distribution

Stock and calculus of wealth

- Robinson's stock of wealth
- Stock of aggregate wealth of "*n*" owners
- Property of the stock of aggregate wealth of "*n*" owners
- Curve of stock and distribution of wealth of "*n*" owners

Conclusion

WEALTH – Generation and destruction

Curve of Generation of Wealth (by “*n*” owners)

Displacements of the Curve of Wealth Generation (by “*n*” owners)

Curve of Wealth Destruction (by “*n*” owners)

Displacements of the Curve of Wealth Destruction (by “*n*” owners)

ECONOMIC EVOLUTION OF OWNERS

POINT R of average velocity of net positive wealth generated, per capita of owners

Theoretical connotation of *point R* – Generation of wealth and economic calculus theorems

Behavior of the *R point*

Curve of the Economic Evolution of Owners (CEE-O)

Displacement of CEE-O from a spatio-temporal point

SOCIO-ECONOMIC EVOLUTION — Endogenous institutions and economic policies

Part III

PROPOSED MACROECONOMIC MODEL — APPLIED

Currency and fiscal policy

Socio-economic evolution in history

Quantities-Prices control, subsidies, and other policies

Appendix A – Charts 36 amplified

Appendix B – Epistemology

Concept of evolution

Continuity for explaining the discrete

Conclusion

Appendix C – Accounting practice for economic calculus without a currency veil

Notes

Charts

Tables

Bibliography

Epistemology
Economics
Accounting

ABSTRACT

The *Theory of Wealth and Unemployment (TWU)* postulates that generation, destruction, and distribution of wealth, and unemployment derive from combining the laws that govern homo economicus and homo sociologicus. Which implies understanding the laws and variables that govern the *market* and the laws and variables that govern (economic) *policies*.

The *model of Socio-Economic Evolution (SEE)* we present proves the validity of the postulate of *TWU*, insofar as it considers both the laws and variables that govern the *market*, and the laws and variables that govern (economic) *policy* as endogenous to it.

THEORETICAL INTRODUCTION

“My pencil is smarter than I” ⁽¹⁾

Albert Einstein

Since this introduction presents theoretical, empirical, and epistemological content, this introduction is part of the theoretical material to be studied, insofar as here you will find the basics of the *Theory of Wealth and Unemployment (TWU)* that we present, and of its *model of Socio Economic Evolution (SEE)*. Denomination that could alternatively be the *model of political-economic evolution*, but considering that social is a broader concept, we will retain the first. What is important is to begin by stating that the model explains the basics of *TWU*, based on considering them endogenous to the *market* and *politics*. Thus, with the laws that govern both scenarios, all variables involved are considered simultaneously—which we summarize in the concepts of physical marginal productivity and marginal subjective valuation.

RESEARCH PROBLEM - OBJECT

Since we are speaking of a new theoretical proposal, it is pertinent to introduce the theoretical framework in which it is developed.

THEORETICAL FRAMEWORK

It is pertinent to offer an introductory summary of the theoretical postulates on which the proposal is based that, though we say it is new, we must not forget to mention that while *TWU* can be considered an extension of the *Theory of Economic Time (TET)*—economic time and its price, interest, are expressed in changes in economic value, therefore, understanding the basics implies understanding those entities—⁽²⁾, and the *SEE model* operates as a demonstration of its hypothesis.

This section therefore anticipates the theoretical framework of the proposal, which we will do highlighting the central primitive terms.

Theory of subjective value

Considering the epistemological answer states that the macro is based on the micro sphere, we will show *how* all humans make the individual and “abstract” act of valuing subjectively “visible”. The hypothesis of this work is that humans manifest their subjective valuation through *quantities* of economic goods, be it the case of Robinson Crusoe—that values without prices—or that of a plurality of individuals that exchange in a society—they value with price-quantities derived from exchange, be it through barter or with currency.

The model shows that the *subjective value* (the value that humans assign “ordinally” to economic goods):

- Is implicit in the marginal laws of decreasing utility and increasing marginal effort (inverse of the law of decreasing yields) which will allow us to obtain an observational scientific range for subjective value, both at the time we appreciate the utility obtained by economic goods, and the effort necessary to obtain them given their scarcity.
- It is expressed or it manifests itself observationally through quantities of economic goods.
- It is measurable, which implies the feasibility of *economic calculus*, which leads to the following section. I.e., considering the fallibility typical of any measurement, humans measure in quantities of economic goods, which allow economic calculus in economics.

This abstract theoretical relation between subjective value and its “empirical” expression, in observable quantities of economic goods, would allow us to say that an alternative title to the *SEE model* could be *Quantitative model of subjective value*, a suggestion that is very enriching for economic theory, which in turn introduces us to *economic calculus*.

Theory of economic calculus

The act of valuing subjectively is behind all human economic calculus, calculus that guides economic actions. In turn, the fundamental economic calculus humans carry out is of the effort needed to obtain economic goods, and the use to which they will be put, all in a limited spatio-temporal period.

Understanding the way in which humans generate (effort) and dispose of (destruction) temporarily of economic goods, in a finite spatio-temporal field, is the priority for economics as a science. This whole work refers to those calculus (effort and satisfaction), including two spheres of human action: understanding the calculus by Robinson Crusoe (*calculus of quantities —of economic goods— without prices*) and the calculus by “First” Robinson and “Second” Robinson when they exchange economic goods (*calculus in quantities —of economic goods— with prices; in this case with or without currency*).

Thus, we call ***economic value*** the human valuation of *quantities* of economic goods, which also implies saying that *economic calculus works with quantities of economic goods*. In turn, we define as *currency value* —a concept we define based on Menger and Mises— the *economic value pondered by currency units*. All which has ***theoretical and empirical transcendence*** insofar as it allows us to *build a theory and model of an only real and currency world at the same time*, with no need to explain a real world *versus* a virtual currency world, that must be balanced. The two world dichotomy initiated by Böhm-Bawerk and Wicksell,⁽³⁾ that conditioned all the developments of the twentieth century — “Wicksell’s Real Effect” and “Wicksell’s Price Effect”, and Patinkin’s dichotomies.

Let us see then a very short summary of the aspects we must consider in reference to economic calculus, that also can be used to show that micro economic calculus (*calculus without prices*) underlies macro-economic calculus (*calculus with prices, that implies barter and currency value*), since in both, calculus is based on quantities of economic goods:

- *Temporality of economic calculus*: we should not proceed with *empirical economic calculus* without stressing that the same refers essentially to how to explain the *temporal*

relation between human beings —distribution and unemployment—, in a specific spatio-temporal setting. Temporal relations that include these aspects that need to be calculated:

- a) The *utility* of generating wealth: governed by the *temporal* law of decreasing marginal utility.
- b) The *effort* to generate wealth: governed by the *temporal* law of increasing marginal effort, in line with the well known law of decreasing marginal yields.
- c) The *destruction* of wealth generated with *effort* to produce *utility*: governed by the *temporal* law of increasing marginal destruction.

Three calculus governed by their respective laws that, being marginal, allow us to consider simultaneously the economic preference in time of: the wealth generated and destroyed, its distribution, and unemployment, all in terms of quantities of economic goods (*currency value* in a currency regime).

I.e., human decision is guided temporally by amounts of economic goods, available in specific spatio-temporal area, which will be destined for destruction in said period —satisfaction of needs in the referred period— and for saving for future destruction. Thus, the hypothesis is that humans demand present goods, both to satisfy present need and as *stock* for future needs.

- *Measurability of economic calculus*: The model will show that the use of *economic value* is not only necessary, but sufficient representation of subjective value, insofar as we will be able to explain using economic calculus by means of *quantities of economic goods* —which will have been previously categorized in their qualitative aspects, in terms of the need they satisfy.⁽⁴⁾ A situation that does present a different argument in the “micro” case of Robinson Crusoe, that calculates quantities of economic goods without prices, since there is no exchange, and the “macro” case of “First” and “Second” Robinsons, that calculate using prices derived from the exchange of economic goods among them —by means of barter or with currency. This is so, insofar as prices are nothing more than quantities of economic goods. Thus, in this case we do economic calculus —we obtain the economic value— by means of the use of quantities of other economic goods they are exchanged for, which is the essence of the concept of price.

- *Unit of measure for universal calculus*: finally, the specific case of the use of *quantities* of an economic good as the universal measure for all calculus —the *currency value*— still belongs to the **use of quantity** (of economic goods) to ponder and homogenize economic calculus. In other words, the *monetary value* homogenizes the *economic value*, derived from quantities of economic goods.

Concretely, humans in society calculate by quantities of an economic good used as universal unit of measure, which allows us to understand human economic action with no “currency veil”.

The fact that the economic unit of measure is not constant in time is solved by humans considering the error this implies does not prevent them from calculating, which is the reason for the existence of the universal unit of measure. Which in turn allows humans to see when and how the dimension of the error prevents calculus —extreme distortion of currency policies.

Empirical economic calculus

Having understood the *why* (of the decisions humans make in their temporal relation with economic goods, and the economic relations of humans among themselves), and the *how* (by the use of quantities of economic goods), from economic calculus we proceed to explaining the model proposed as the procedure for human economic calculus. A proposal that explains the use of quantities without price (Robinson Crusoe), quantities pondered by amounts of other economic goods with which there is barter, and finally the exchange for quantities of the economic good chosen as the universal unit of measure, in a society where there is exchange with currency.

Economic value – calculus without price (Robinson Crusoe that does not exchange)

The use of the laws of decreasing marginal utility (that guides demand) and of increased efforts (that guides supply) determines the temporal behavior of the satisfaction of needs provided to Robinson by the economic goods available to him, and the temporal behavior represented by the effort he will have to make to obtain them, all within the same spatio-temporal setting. Temporal behavior that will *quantify* –in specific amounts of economic goods– the *quality* of the economic good, and will explain the temporal relation between human needs and the economic good that satisfies them. Thus, this work will be able to show how what we call the *axiom of the fundamental economic causality*, ⁽⁵⁾ the ordered set *man (need) → economic goods*, that governs the *qualitative and quantitative* temporal relation of those two ordered elements, operates –an issue that is of general theoretical interest, though sometimes there is the pretense to limit it to the field of the study of currency.

In this manner, in the framework of considering the *needs satisfied by the economic goods* and the *efforts to obtain them* as *subordinate variables* —that we call *economic valuation variables*— of the *quantities of available economic goods in a period of time*, we determine the instant in which Robinson makes the temporal decision of generating a *stock* of economic goods, available in the present, for future needs. I.e., we will measure, in quantities of economic goods the valuation of the *satisfaction of needs* the economic goods temporally offer Robinson, and the *effort* to obtain them in that same period of time, establishing simultaneously the moment and the quantities that will generate the *stock* of present economic goods for the satisfaction of future needs.

Based on what has been said, the model will allow us to determine: *by means of quantities of economic goods available in a period of time*:

- The moment in which Robinson considers ending the satisfaction of present needs.
- The moment in which Robinson considers generating a *stock* of available present economic goods, to satisfy future needs.
- The *economic value (quantities of economic goods)* that Robinson assigns to needs, present and satisfied in the period.
- The *economic value* Robinson assigns to future needs, which he will be able to satisfy with present economic goods he sets aside for them.
- The “theoretical-scientific” (economic laws) basics which allow Robinson to perceive the economic values that are what allow him to relate *temporally* with his needs, and the obtainment of scarce goods to satisfy them.

All this will be shown with the help of geometrical graphs, with which we will be able to observe how, what we have defined as *economic value* is an empirical-observational sign of subjective value, that humans have of economic goods. All in *limited* spatial (quantities of available economic goods) and temporal (period of time) *setting*. I.e., once we get to know the laws that govern the human need for economic goods (law of decreasing marginal utility), and the human effort to obtain them (law of increasing marginal efforts), we will determine *the moment* and *quantities* of present and available economic goods in a period, that Robinson sets aside for the satisfaction of future needs —*stock*— no matter what type of present economic good it could be, not only capital goods.

We only point out that the graphic representation of this first study refers to quantities without prices, i.e., we represent the presence of the marginal laws without the use of prices, since we are referring to Robinson Crusoe that does not exchange interpersonally and does not generate prices.

Economic value –calculus with price– without currency (Robinsons that exchange economic goods through barter)

With a *procedure of conversion* of the *variables that value needs and efforts*, derived from Robinson's valuation without prices, we will obtain the origin of the formation of *stocks* of economic goods, that *First* and *Second* Robinson produce, in a setting in which they exchange their corresponding productions of economic goods by means of barter. Understanding by conversion procedure the expression of *value variables or of the value of needs and efforts*, which guide the “calculus without prices”, resorting to quantities of other economic goods for which they are exchanged. I.e., exchange will also allow us to express the *value variables of needs and efforts*, in *quantities* of “other” economic goods with “different” prices.

Based on the conversion of micro into macro behavior, we will determine in the same way the quantities-units of the independent variable *economic goods* available in a limited spatio-temporal scenario, used for present needs in said period and the *quantities* set aside as *stock* for future needs. In other words, being in a setting with two people, that exchange economic goods, we will determine *the moment* and *quantities* of present economic goods that “First” and “Second” Robinson use for exchange and the *stocks* of the economic goods they produce with their effort and that they assign to exchange.

In this way, based on understanding the behavior of the *subordinate value variables* (value of need and effort), by *ONE* human being of the *independent variable* (economic goods), we deduce and understand in the same manner the behavior of *n* human beings referred to those variables. I.e., we will show there is no composition fallacy when explaining the consequences of subjective valuation of the subordinate value variables need and effort, when extending it to a group of human beings. Thus, economic value is not only necessary but sufficient also to understand the temporal relation that *all* human beings have with *all* economic goods, those of their own production and of third parties alike. This being an aspect that will allow us to understand at the same time the economic relation between humans —distribution and unemployment.

Thus, based on the observational expression (*always* expressed in units of economic goods) of the “abstract” value variables of need and effort of the model, we can carry out and understand economic calculus. Economic calculus that is derived from the marginal laws of utility and

effort, both in the case of Robinson with no prices and First and Second Robinsons with prices derived from barter.

Monetary value – calculus with prices – with currency (Robinsons that exchange economic goods with currency)

We have come to the last phase of *economic value*, the *currency value*. As we already know this simply implies homogenizing economic value, by pondering it by the price of the unit of measure (currency), we simply detail the calculus formula we will use: $q_x [p_{x(m)}]$, where q_x represents the quantities of the economic good x , and $[p_{x(m)}]$ represents the price in currency units of the economic good x . Product that originates the accounting matrix of the asset present economic goods —with which we arrive at the empirical expression we were searching for to master economic calculus in a currency economy, *currency value*, which will be extremely useful, with no currency veil, a world that is real and monetary at the same time.

Wealth and economic calculus in *TWU* and *SEE*

With *currency value* as the tool of economic calculus that individuals carry out in a society that uses currency, we are prepared to establish the central theoretical-empirical elements, and the hypothesis that derive from *TWU*, and are corroborated with its *SEE model*, which we summarize:

Wealth or asset: for calculus we consider as such the *currency value of present economic goods*, equivalent to accounting assets composed of present economic goods. Wealth = currency value = $q_x [p_{x(m)}]$.

Wealth generation: wealth is generated according to the marginal law of decreasing yields.

Wealth destruction: wealth is destroyed according to the marginal law of increasing destruction.

Variables of economic valuation: considering as such economic human *needs*, and the *effort* to satisfy them.

Endogenous variables of the model: productive structure (physical marginal productivity); distributive structure (salaries and profits); population economic structure (those that generate and destroy wealth and those that only destroy it); fiscal structure (fiscal policy); and currency structure (currency policy).

Subordinate variables: the *generation* (g) and *destruction* (d) of wealth, and its *distribution* depend on the productive structure and the institutional framework and of economic policy that govern the relationship between the population that generates and destroys wealth (n_P), and the population that only destroys wealth (n_D).

Independent variables: the population of individuals (n_T), composed by those that generate and destroy wealth (n_P), and the individuals that only destroy wealth (n_D).

Functional relation between variables: variables are related temporally based on the law of decreasing marginal utility, the law of decreasing marginal yields, *the law of increasing effort*, and the *law of increasing marginal destruction* —that are incorporated. Laws that will allow us to understand both the generation and the destruction of wealth, and its distribution, in accordance with the productive and institutional economic framework, and unemployment.

The TWU hypothesis corroborated by its *SEE model* are the following:

- The *currency value* is sufficient to understand the generation, destruction and distribution of wealth and unemployment. Which is equivalent to saying currency value allows economic calculus, since it makes the effects of the marginal laws that govern the economy visible.
- The generation, destruction, and distribution of wealth, and unemployment, are explained based on the currency value of the marginal physical productivity of capital and labor, and the currency value of economic policies (fiscal and currency). Which in other words is equivalent to saying currency value allows us to explain the relation between markets and politics simultaneously —being endogenous variables.
- **Fiscal and currency policy** produces *regressive distribution effects of wealth* and an *increase of unemployment*, but they do so in different manners in terms of intensity and complementary.

JUSTIFICATION OF THE RESEARCH

Concluding the theoretical framework of the theory proposed, it is pertinent to determine if the same is a scientific advancement that justifies the research. In this sense, and in accordance with Karl Popper's epistemological proposal, we will now establish if *TWU* says more (which includes saying the same from a superior and more powerful epistemological category) and/or says the same in a simpler way (which implies discarding known material). Let us see:

TWU says more: ⁽⁶⁾

- Adds new laws.
- Adds new axioms, some of which give greater scientific rigor to imprecise concepts or that are considered laws.
- Adds new theorems (alternatively considered axioms).
- Postulates and corroborates new theories: of the relativity of economic time and its theory of interest, and the impossibility of collectivism.
- An epistemological achievement since it postulates, and the *SEE model* proves, that macroeconomics is based on microeconomics, i.e., there is no fallacy of composition.
- It makes previous concepts more precise (eg: *currency value* and *economic calculus* that Menger and Mises respectively introduced without defining them precisely).
- The *SEE model* presents accounting as a model for economic theory, based on *currency value* as a common factor of accounting and economics.

- *TWU stresses* the temporal function of *economic value* and *currency value* when explaining the relation of man with economic goods, and the economic relation between men (distribution and unemployment) —all this in a limited spatio temporal setting. In terms that are well known, it stresses the temporal function of the quantities of economic goods (prices) when explaining the temporal preferences of the same.
- *TWU* presents a more consistent explanation of the phenomenon of unemployment, based on *currency value*, not on the value of currency (Phillips curve), nor on the interest rate (Keynesian models). Which in terms of the axioms of equality and equivalence ⁽⁷⁾ implies saying that *TWU* and its *SEE model* explain unemployment by p_m , and not i_m .

TWU is simpler and/or more rigorous:

- It explains based on an only world that is at the same time real and currency, not two worlds that have to be balanced (Wicksell Real Effect and Wicksell Prices Effect). Which it does based on *economic value* in general, and *currency value* for societies with currency.
- It circumscribes and gives precision to Say's Law, making it at the same time dispensable, since it is what we have considered in the *exchange axiom*, and in the *stocks axiom*, including not only exchange economic goods —the limited sphere for Say— but also those not exchanged.
- It states that the idea of Gresham's Law is of universal validity.
- *Subjective value theory*: *TWU* produces an explanation without resorting to it theoretically insofar as it considers it implicit in the marginal laws of utility, effort, and yields, these being sufficient to explain *economic value*, which is what is needed for economic calculus. All which is proven by its *SEE model* resorting only to economic calculus with the use of quantities of economic goods, subject to marginal laws; quantities that allow us to calculate the generation, destruction and distribution of wealth, and unemployment —quantities that in a society are expressed by the currency value.
- *Price theory*, *TWU* theorizes directly based on the marginal laws with the use of quantities of economic goods, which are the basis for economic calculus. Then the exchange of those quantities among human beings originates prices. I.e., ***economic calculus (economic value) is considered a theoretical entity that comes before prices***, and that is the basis for subjective value theory, which we have left aside.
In reference to prices, we add that *TWU* does not theorize based on conceiving the theoretical possibility of absolute prices.
- *Currency value*: *TWU* proposes, and its *SEE model* proves, that the *value of currency suffices* for economic calculus in a currency economy. Which allows us to understand the temporal process relative to the satisfaction economic goods offer man, the implied effort for obtaining them, and the basics of the process of their destruction, along with their distribution, and unemployment.
- *Law of supply*: *TWU* does not use it in its theoretical development, since it is considered an observational technique of the law of increasing marginal effort and decreasing yields.
- *Law of demand*: *TWU* does not use it in its theoretical development, since it is considered an observational technique of the law of decreasing marginal utility.
- *Interest theory*: *TWU* does not use it since it is included in the marginal laws of economics, considering *marginal implies time*, therefore its incidence is explained by

them. All of which *TWU* derives from the *Theory of Economic Time* (TET), and proves with the *SEE model*. I.e., *TWU* and its *SEE model* explain the incidence of time in the economy, without resorting to the “phenomenon” of interest —see note 2.

- *Theory of capital*: insofar as *TWU* states, and the *SEE model* proves, that the *stock* of economic goods —the stock of capital goods is no exception— is explained by the use of the laws of decreasing marginal utility and increasing marginal effort, which humans identify in quantities of economic goods. I.e., with the *stock axiom*, *TWU* offers an explanation on the formation of all *stocks*, within which is included the formation the *stock of capital* —with no reference to the theory of interest.
- *Theory of equilibrium*: *TWU* develops its theory with no need of resorting to the balancing two worlds, the Wicksellian real and currency worlds.
- *Theory of economic cycles originated in currency*: it explains them based on the simple concept of price controls, specifically control of the price of currency.
- *Currency theory*: along with showing the inconsistency of the so called quantitative theory, it shows that currency needs no special theory to be understood, nor to apply to it the theory of subjective value —the fact that is an economic good exempts it from any theoretical development, which would not be the case if it is not considered an economic good.
- *Real Wicksell Effects and Prices*: in *TWU* and *SEE* the marginal laws explain more than what these concepts pretend to explain, and they do so based on an only world that is real and currency at the same time.
- *Indirect transmission mechanism*: since it is an incompatible and unnecessary theoretical development considering the axioms of currency equality and equivalence.
- *IS/LM and 45° Curves*: being models that do not need the use of interest, they do not explain with the consistency of the use of the *currency value* of the *SEE model*, they explain less, and they do not do so considering economic policies as endogenous.
- *Phillips Curve*: considering the three versions (negative, positive and vertical slope) explain in terms of the inflation rate and not the *currency value*, they explain less than the *SEE model*, and it does not do so considering economic policies as endogenous.
- *Accounting as an economic model*: since its use to explain the economy adds technical rigor.

We can summarize the justification of the research that led us to *TWU* and its *SEE model* as follows:

TWU could be considered the synthesis between objectivist marginalism of physical productivity and subjectivist marginalism of value, since it explains with the contribution of both marginalities that are present in the general economic value and the special currency value. Which is valid simultaneously for homo economicus and homo sociologicus.

RESEARCH QUESTIONS

We know that the question is what is most important for knowledge, since a well presented question increases the probability of success of the answer. That is why we include in this theoretical introduction a battery of questions focusing on another perspective than that of *TWU* and its *SEE model*:

- Is it feasible to improve economic theories to better guide citizens and their leaders, in avoiding and/or solving recurring crises?
- Is it possible to have an economic theory that makes objective and subjective marginalism —of physical productivity and value— compatible?
- Is it possible to have a unifying theory that explains based on the basics that guide the economy (markets) and the politics (economic policies)?
- Is it possible to have an economic theory that explains the generation, destruction, and distribution of wealth, and unemployment, directly based on a currency economy, with no reference to what would happen in a world without currency?
- Is it possible to build macroeconomics based on microeconomics?
- Is it possible to explain the problems economic science works on with the data derived from double entry currency accounting?
- Can *TWU* and its *SEE model* be considered a synthesis of economic knowledge of our times?

Additional questions that derive from this work and would be of huge theoretical and political importance, are:

- Why does the quantitative currency theory not have a scientific bases?
- Why is there no currency veil in economic calculus?
- Is collectivism possible?
- What would be a currency macro-economic theoretical proposal, *alternative to those we know*, that would allow us to anticipate the consequences of the “economic policies” we *vote for*?

METHODOLOGY OF THE RESEARCH

Continuing with the readers guide on the contents of this work, we dedicate this section to stress the basics of the methodology used. In this sense we will begin by saying that *TWU* and its *SEE model* are built with the use of the reasoning that implies *a priori* logical deductive

theoretical causality. A methodology that has its origin in the epistemology of Karl Popper and the Austrian School of Economics. Said logical-deductive causality can be summarized in the table below, where the arrow indicates the order of the explanation causality present in the work, in accordance with the theoretical framework we have mentioned.

With this table we pretend to schematically summarize the integration implied in the term *macro-economic theory*. In other words, we are saying that the method of the work was integrating the specific theories of each subject that is part of *TWU* in a body of macro-economic theory.

Causal Diagram of the proposed *TWU*

<i>Result</i>	Proposed macro-economic theory ^(d)	
<i>Economic calculus</i>	Wealth = currency value = $q_x [p_{x(m)}]$ ^(c)	
<i>Symbols</i> of the temporal relation	Prices ^(b)	
<i>Temporal relation</i> of the elements	Marginal laws ^(a)	
<i>Elements</i> of the economic causality	Man → economic goods	
<p>(a) That sustain the abstract value of economic goods, expressed in quantities of economic goods (q_x).</p> <p>(b) Relative to the Price (quantities) of the currency unit $p_{x(m)}$.</p> <p>(c) Economic calculus as a confluence of $q_x [p_{x(m)}]$.</p> <p>(d) In which the law of increasing marginal destruction is included.</p>		

The formal aspect of the methodology used responds to the use of geometrical graphs, of the type used to present models in the specialized literature —determination of the variables of the model; the origin of the curves that functionally explain the relations of the variables; displacements of the same due to changes in their fundamentals (based on which it is possible to study, with a simulation process, the qualitative and quantitative consequences of economic policies); meaning of the areas (integration), surrounded by the curves (differentiation), and the axis; etc.

Given all that has been said, we can state the research will be of an *exploratory, descriptive, correlation, and explanatory* nature.

THE STRUCTURE OF THE TEXT

We complete this introduction presenting the parts in which the text has been divided, and a brief description of the contents. Here we will be able to corroborate that *TWU* explains micro-economics to be able to explain macro-economics.

Part I: section dedicated to **Micro-economics**, where the fundamental economic causality is analyzed (*man* → *economic goods*) with one economic agent, represented by the legendary figure of Robinson Crusoe. That is supported by the same economic laws that govern decisions by an individual in society.

In this section we will show that marginal laws of decreasing utility and *increasing effort* contribute the necessary and sufficient fundamentals to explain economic calculus for subjective valuation by man.

Here we will prove the central hypothesis of the *Theory of Economic Time*, insofar as economic temporality is expressed through economic goods, considering that understanding the temporal aspect of its quantities allows us to understand the temporal economic aspects.

Part II: section dedicated to **Macro-economics**, where we extend the study of the fundamental economic causality from micro-economic sphere to a society where there is exchange. All this preserving the fundamentals developed in *Part I* dedicated to Micro-economics, i.e., aggregates are simple summations of individual agents, which implies adding these individuals and not disaggregating aggregates to explain the individual.

In this *Part II* we consider the different aspects relevant to an economic theory of exchange, from where derives *economic value* based on the amount of economic goods exchanged. This part concludes with the construction of the pretended model, which we call the *Socio Economic Evolution curve (SEE)*.

In this section we establish the basics that explain economic events in a world with a unit of measure for calculus. We unravel the singularity of economic calculus when humans adopt a unit of measure for calculating —the **currency value**—, which allows us to reveal the non-existence of what has been called the “currency veil”, that did not allow the observation of “reality” when calculating. All this with no need to present a non-monetary real world ((Real Wicksell Effect), *versus* a currency or virtual world (Wicksell Price Effect). Since what exists is an economic world that calculates (values) using a unit of measure provided by the economic good currency, which presents the particularity of not being constant in time, a circumstance that does not prevent calculus, except in the case of the destruction of the unit of measure.

Here we show that the **currency value is necessary and sufficient** to guide human economic conduct in society, i.e., instead of constituting a veil, it is precisely what guides economic calculus, and this explains the decisions humans make relative to economic goods and other human beings. Thus, it is based on currency economic calculus that we will be able to understand the consequences of the “economic policies” we vote.

In this *Part II* we will understand that there is no currency veil that prevents us from understanding economic calculus in a currency society. On the contrary, the analysis based on the existence of currency is what allows us to explain how a currency society works. We do not need to suppose a society with no currency (real or barter) and to compare it with a society with currency (virtual or not real). I.e., the productive and distributive structures, and the institutions

and economic policies are considered endogenous to the proposed model; therefore we need not draw back any veil, nor consider exogenous variables to explain.

Part III: dedicated to applied theory, where the *Socio Economic Evolution Curve (SEEC)* is used to explain the consequences of currency, fiscal, occupational, and financial policies, and intervention on credit, price controls, subsidies, etc. With one graph we will be able to observe the explanatory power of the *Socio economic evolution curve*, insofar as we represent there the economic evolution-involution of a society in time.

The applied *SEE model* proves “economic (currency, fiscal, occupational) policies” produce results that are totally opposite to the political and “theoretical” arguments they are justified with, discouraging the spirit of individual commitment and responsibility to strive to satisfy needs, making those policies the origin of social injustice, and effective obstruction of the evolution of the human species.

Here we will concretely see *how, why and how much* the consequences of different fiscal and currency policies differ, in terms of wealth (generation-destruction-distribution) and unemployment.

Appendixes: We include three appendixes specifically focused on: A) repeating the 36 (a) and 36 (b) graphs to give them a greater dimension, given the density of information; B) where we present aspects that have to do with epistemological tools used in the work, considering the doubts readers might have on this issue; and C) offering a simple model that, based on accounting information, will allow the immediate use of the *Socio Economic Evolution model* proposed here.

ACKNOWLEDGEMENTS

This work is a tribute to my intellectual mentors: Heraclitus, Gossen, Carl Menger, Karl Popper, Albert Einstein, Ludwig von Mises, Friedrich A. Hayek, and Israel Kirzner.

PART I

MICROECONOMICS

MICROECONOMICS

With the term microeconomics we refer to the economics of an economic unit, which traditionally has been known as the economy of legendary literary character Robinson Crusoe, which we make extensive to all economic units.

*From microeconomics we will produce
macroeconomics*

THE FUNDAMENTAL ECONOMIC CAUSALITY IN AN INDIVIDUAL (GOSSEN-CRUSOE)

We begin our development of theoretical logical deductive *a priori* causality, stating what we consider the *fundamental causality of the economy*, as is the origin of the "economic problem"—that meet needs from scarcity:

Need → *Economic good* ⁽⁸⁾

The fundamental causality of economics, that expresses in simple form that the impulse for human action is a state of need that has to be overcome, which in the economy is carried out by means of economic goods. I.e., causality goes from a need that mobilizes to the obtainment of an economic good ⁽⁹⁾ to satisfy it. Therefore we will now study needs and economic goods.

Need (demand)

We can say *Gossen's three laws* ⁽¹⁰⁾ clearly stressed that the origin of the fundamental causality in economics was *need*. But Gossen did not stop there, and he established the fundamentals of the relation between *need* and *economic good*, considering that the state of need was in a decreasing relation, as the use of the economic good that satisfied it increased, a situation derived from the principle or *law of diminishing marginal utility*, ⁽¹¹⁾ considering that each additional unit of the good added satisfies the need in a decreasing degree compared to the previous unit. I.e., the first apple to be eaten is more appreciated than the third apple.

Yes, Gossen allowed us to understand the human relation between needs and economic goods that satisfy them that TET summarizes as follows:

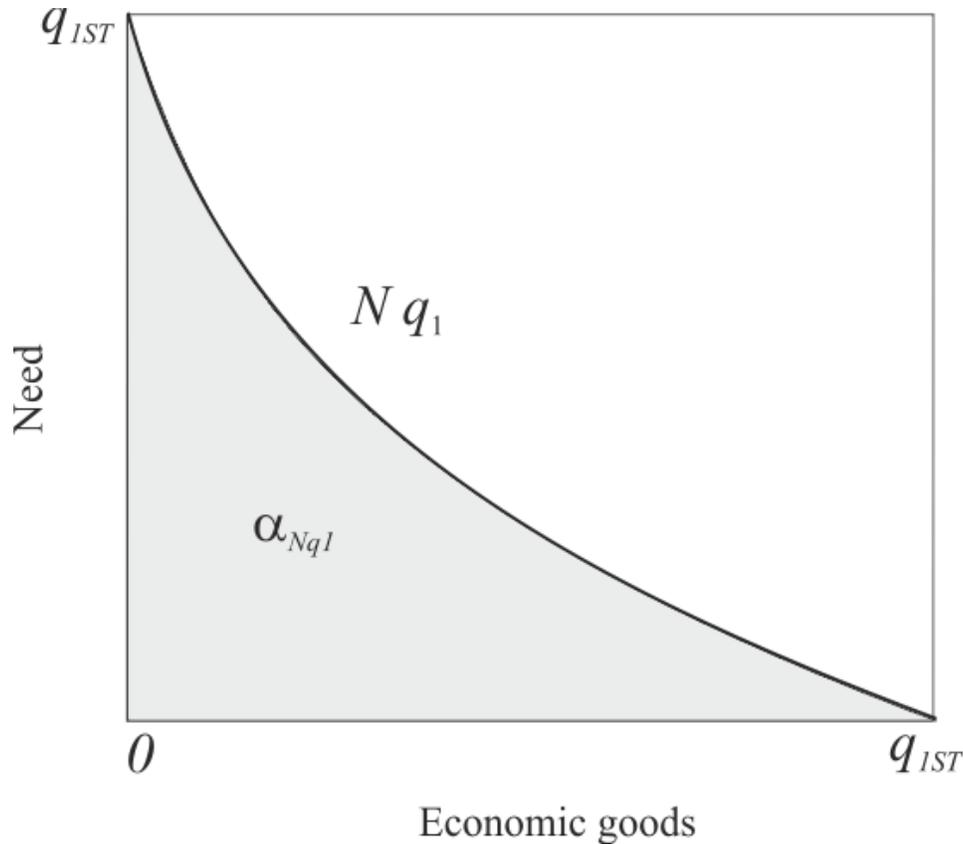
- Human beings have a spatio-temporal need of a specific quality ⁽¹²⁾
- That need is satisfied by the specific quality of an economic good.
- The quality is the *common factor* that allows the need and the economic good to be connected to each other, for example, the quality of an economic good of quenching thirst is what connects *thirst* with the good water that satisfies *thirst*.
- The relation between the need (quality and intensity) of the economic good (quality and quantity) to satisfy it, behaves according to the variation of the quantity of the economic good and the period of time in which the need is satisfied, which is defined by the *law of the diminishing marginal utility*.

Thus we go directly to the development of what we call the *Curve of need* or *Gossen's Curve*, that we show in chart 1.

Graph 1 allows us to represent Robinson Crusoe's behavior, and that of any economic unit, with respect to the fundamental causality of the economy, the relation *need* → *economic good*. Let's see:

Chart 1

Curve of need (Gossen) – Curve of demand



- 1) *Observable variables*: both the ordinate and the abscissa are expressed in quantities of the economic good q_1 available (supply) in the period of time in question. The existence aspect (stock of goods) adopted is essential so that the conceptual variables have an empirical correlation. I.e., the *variable need* (*variable economic valuation*) is analyzed relative to the *units offered in a period of time* of the economic good that satisfies it.
- 2) “*Box closed*” (to reality) ⁽¹³⁾ : both the abscissa and the ordinate go from zero in the origin to q_{IST} the point that establishes the end of the supply of goods (stock) destined to satisfy needs, where both components of the fundamental economic causality (need and supplied economic goods) are limited to a period of time. Thus we always obtain a graphic square, given that the needs that can be satisfied are those satisfied by the economic goods existent in that period of time. That is why we consider this type of representation as a “*closed box*”, because it is limited by the stock of goods supplied (by nature or produced by man), and time limited to a certain period.
The reader will see that the “closed box” —because it only refers to it— renders what is called “real economy” unnecessary, since both the ordinate and abscissa are expressed in

quantities of the economic good q_1 supplied in the period of time in question, to satisfy the needs that are satisfied by that good. This aspect is essential insofar as:

- a) There is a specific quality of a need linked to an economic good that has the specific quality to satisfy the need in question, not with another economic good that does not satisfy the quality of the need studied, which does not deny complementary, the fact that is replaceable, etc.
- b) Abstract theoretical variables have an observable empirical correlation —i.e. what is analyzed is the supply of the *units of the economic good in a period of time*, not those that were needed but do not exist, which imply the infinite that is impossible to control within the fallible dominion of man. ⁽¹⁴⁾
- 3) *The law of decreasing marginal utility: the curve of need (Gossen)* we have represented with Nq_1 has a descending slope since each new unit will satisfy Robinson decreasingly compared to the need satisfied by the preceding unit.
- 4) *Flow: the curve of need (Nq_1)* which decreases from its origin, represents the derivate or flow of the temporal rhythm with which the need is satisfied, according to the independent variable quantities of q_1 . The curve of need Nq_1 is the rhythm of temporal flow of the incremental satisfaction of the need, according to the independent variable q_1 , which in mathematical terms implies that Nq_1 is the derivate of the surface α_{Nq_1} . Remember Gossen's laws establish limits (fallibility) for both time and quantity.
- 5) *Quality: the temporal and quantitative elements come after defining the quality* —the common factor that man wants on the need and the economic good—, of the economic good, since there is no sense in referring to the quantities or the period of time if they are not referred to an economic good with the specific quality required by the need that must be satisfied. I.e., the common denominator of the need and the good, **the quality**, is already represented in the stock q_1 .
- 6) *Stock: we deduce then that α_{Nq_1} represents the surface of the needs satisfied by the stock of goods q_1 supplied in the specific period of time. In other words, the area α_{Nq_1} represents Gossen's profit or benefit, received because of the satisfaction produced by disposing of the economic good q_1 , a concept that will be extremely useful as we reach higher spheres in the chain of knowledge we are developing, of the economy of a society with exchange.*
- 7) *All the supply destined to satisfy the final use: in relation to the preceding point, it is important to stress that here we have considered the area α_{Nq_1} supposing the whole stock, supplied in the period, of the economic good (q_{1st}) is wholly destined to satisfy the need in the period considered.*

Economic good (effort - supply)

Having considered the behavior of the *need*, let us now see the other part of the fundamental economic causality, the *economic good*, whose behavior (as a flow and stock) we represent in the

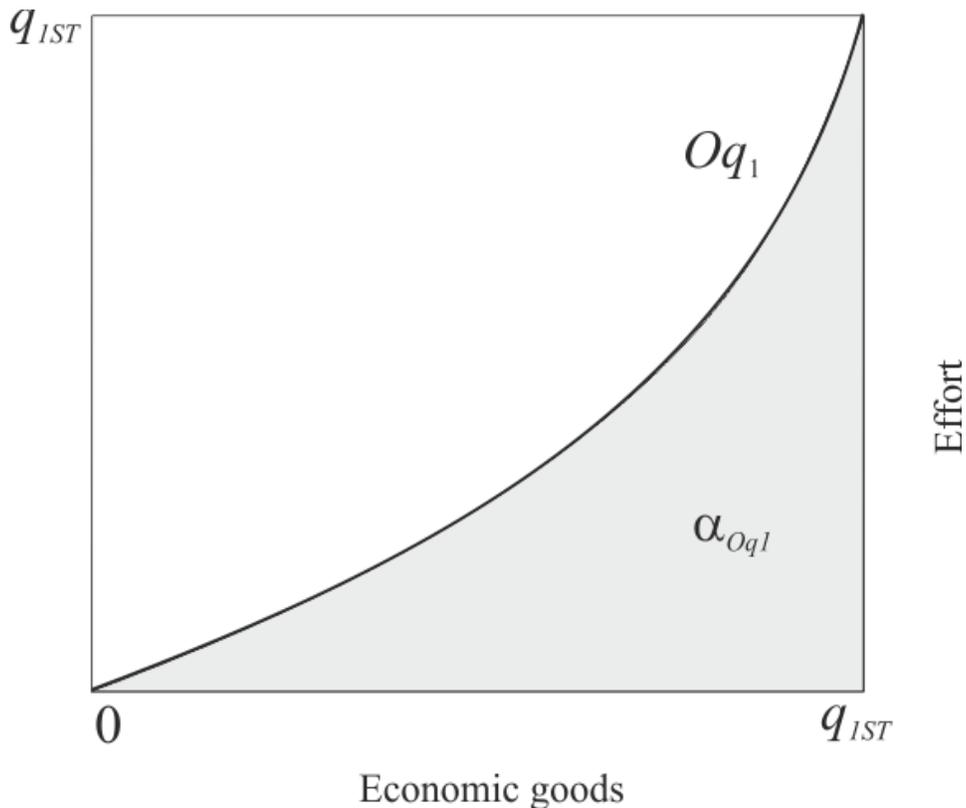
curve of supply of economic goods, and the area determined by it, and for this we continue with the same structure as the chart of *curve of need* (Gossen), so we have chart 2.

Again in Chart 2 we observe the model we call “*Closed box*”

- 1) *Observable variables*: both the ordinate and the abscissa are expressed in quantities of the economic good q_1 available (supply) in the period of time in question. The existential aspect (stock of goods) adopted is essential so that the conceptual variables have their empirical correlate. I.e., the *variable effort* (*variable economic valuation*) is analyzed relative to the *units offered in a period of time* of the economic good that satisfies it.

Chart 2

Curve of economic good – Curve of effort (supply)



- 2) “*Closed box*” (*closed to reality*): both the abscissa and the ordinate start from zero in the origin to q_{1st} , point where we find the end of the supply of goods (stock) destined to satisfy needs. Thus, in this case we will always obtain a square, since it is not possible to offer more goods than those that exist in the period of time; and for this reason we consider this kind of representation as a “*closed box*”, with the considerations previously expressed.

- 3) **Law of increasing marginal effort:** just as the curve of need was governed by the law of marginality (decreasing marginal utility), the *curve of supply of economic goods* we have represented with Oq_1 is governed by the **law of increasing marginal effort**. We suggest our goal of explaining the incremental effort for humans to obtain an additional unit of economic goods be considered as the inverse of the law of decreasing yields,⁽¹⁵⁾ since it expresses in terms of yields what our law does in terms of effort. This law is reflected in the common man, since he knows that satisfying needs by obtaining scarce goods (that is why they are *economic goods*) implies an effort, which is felt more as the hours of work go by (the eighth hour demands more effort than the first) to obtain one unit more of economic goods. The biblical saying that *you will earn your bread with the sweat of your brow* is perfected by the *law of increasing marginal effort* establishing that the sweat will increase. In turn, both the *law of increasing marginal effort*, and the law of decreasing yields, are expressed or measured by **physical marginal productivity**.
- 4) **Flow:** the *curve of effort (or curve of supply)*, represented by Oq_1 increases from its origin, which represents the increasing effort to produce one more unit of an economic good. The supply curve Oq_1 is the rhythm of the temporal flow of the effort to supply incremental economic goods, relative to the independent variable q_1 , which in mathematical terms implies that Oq_1 is the derivate of the area α_{Oq_1} .
- 5) **Quality:** all the temporal and quantitative elements come after having defined the quality—the common factor that man wants on the need and the economic good— of the economic good, since it makes no sense to speak of quantities or time and not refer to an economic good and its specific quality referring to the need that must be satisfied. I.e., the common denominator of the need and the good, **the quality**, is already represented in the stock q_1 .
- 6) **Stock:** we deduce then that α_{Oq_1} represents the area of the needs that can be satisfied with the stock of goods q_1 supplied in the period. An area that will have important meaning again when we develop the chain of economic causality of a society with exchange, since what we are seeing here will have the same meaning of what we saw previously, α_{Nq_1} .
- 7) **All the supply destined to satisfy the final use:** relative to the previous point, it is important to stress that here we have considered the area α_{Oq_1} supposing that the *whole* stock of the economic good (q_{1st}) supplied in the period, is destined to satisfy the need of the period being considered.

FUNDAMENTAL ECONOMIC CAUSALITY (FEC)

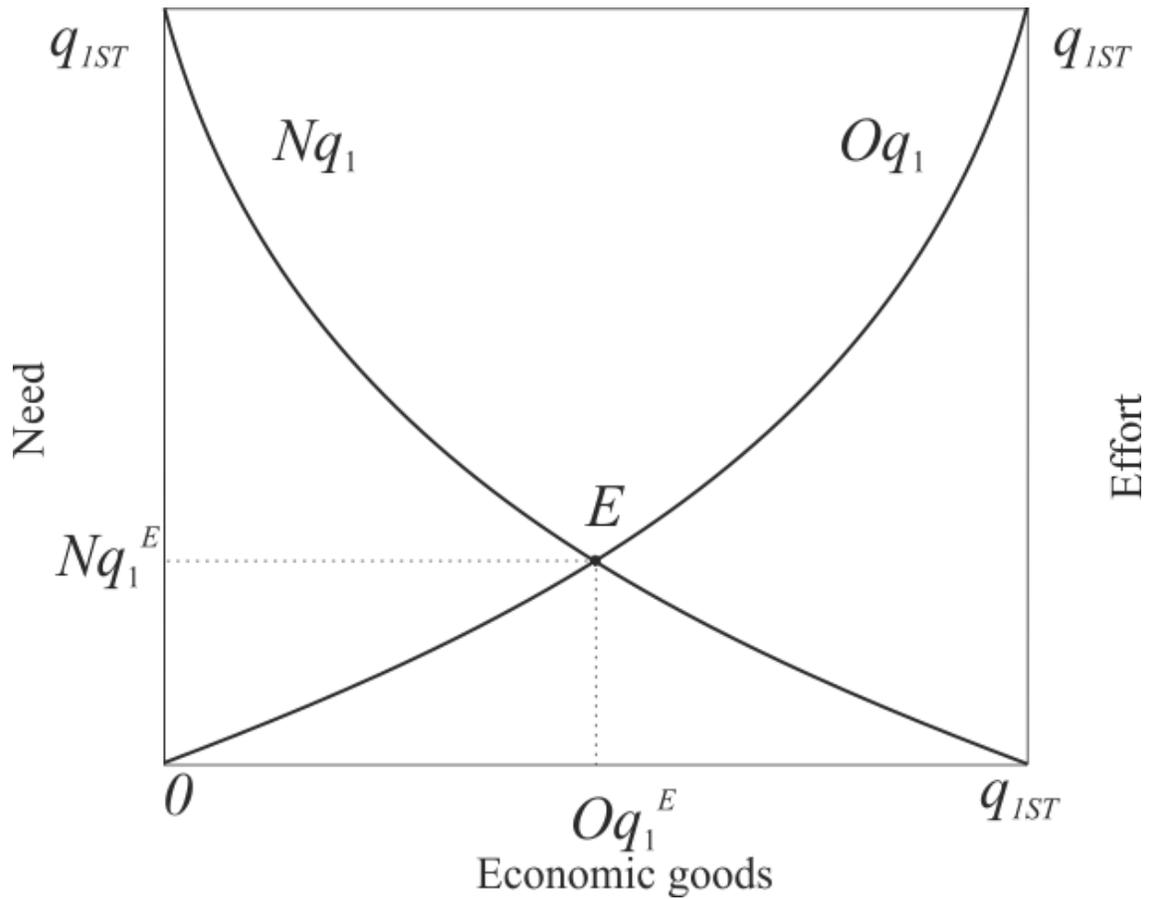
Since both curves represent the behavior of variables that are subordinate to the same independent valuation variables (economic goods) they can be combined or confronted (considering their opposite behavior relative to the independent variable, the stock).

Thus, considering the common denominator of the need and the good, **the quality**, is already represented in the stock q_1 , and the same is an independent variable that is common to both curves, which in turn are representative of the two elements of the fundamental economic

causality, we will proceed to oppose the two curves. Curves that represent the rhythm in *time* of the satisfaction (*need*) of a certain quality of economic goods, and of the rhythm in *time* of the *effort* to obtain them (supply), both expressed in quantities of the economic good, with which chart 3 *causality appears*, representing the explanation of the *Fundamental Economic Causality (FEC)*. Let us see how we oppose the need and the effort to satisfy it.

Chart 3

Curve of Fundamental Economic Causality (CFEC)



In the construction of chart 3 it is very important to highlight:

The closed box: since this chart is the superposition of charts 1 and 2. What is important to stress is that we are in the presence of a chart with four sides equal, they all have the extension q_{1st} .

We ratify that chart 3 shows the elements of the fundamental economic equation:

- 1) Man is the center of the scene, represented here by his *need* and the way he satisfies it by means of economic goods, that require an *effort* to obtain, since he is fallible. Thus, we have the man who subjectively values, both the need and the effort.
- 2) In the variable economic goods *quality* is implicit, operating as the common factor of the need and economic good that satisfies it. Quality that is manifest in considering the two curves as subordinate variables of the same independent variable, the economic goods, that imply a specific quality in relation to the need that must be satisfied.
- 3) Once the quality is established, it includes time (marginality) and quantity (stock).
- 4) The descending slope of marginal satisfaction of the need derives from the *law of diminishing marginal utility*.
- 5) The ascending slope of the effort curve, or supply curve, because it generates economic goods, derives from the *law of the increasing effort* as one works to obtain a marginal unit.
- 6) Thus, in the ordinate on the left we represent the *curve of need* or ***curve of demand***, that Robinson has of the economic good q_1 in a period of time, relative to the law of diminishing marginal utility that adds each unit of the economic good to the satisfaction; in the ordinate on the right we represent the ***curve of supply*** of the *economic good* q_1 , relative to the incremental effort of supplying more units. All this in a limited period of time, with also limited amounts of economic goods, both in the aspect of satisfying needs as of generating economic goods —i.e. the limits of quantity and time derived from Gossen's laws are considered. All within the chart of a “*square closed box*”, surrounded by the reality of the existing goods, that are measured in observable units, which possess qualities that are valued by human beings, both from the point of view of the need and the effort to satisfy it.

Conclusions of the fundamental economic causality

Now it is very adequate to refer to the conclusions that the theory must derive from chart 3. Said chart allows us to study Robinson's ***economic behavior*** in terms of his effort to satisfy needs —***sic economic goods***:

- 1) ***Box closed to finiteness***: he recognizes he is fallible, since he knows that to satisfy economic needs implies effort. I.e., fallibility limits, determines and stimulates his life, a situation that is studied by economics. A state of things that makes human beings fallible relative to the infinite (the needs that cannot be satisfied) but with the possibility of controlling finiteness in a circumstantial-spatio-temporal moment (represented by the stock of economic goods, that *exists*, in a period of time).
- 2) The limitations and stimulus of human fallibility are governed by the *law of diminishing marginal utility* to satisfy needs, that is opposed to the *law of increasing marginal effort*, that

implies the effort to obtain the goods that satisfy those needs. From the study of both these marginal laws we observe:

- a) *Hope*: the fact of confronting diminishing marginal needs indicates that human action to fulfill them is valid, or there would be no hope.
 - b) *Efficiency* ⁽¹⁶⁾ the fact of confronting the diminishing marginal effort indicates the need of man to be efficient.
- 3) In turn, the marginal laws in which human conduct is framed to mitigate the fallibility, allow us to determine precisely the best way to do it more efficiently:
- a) As long as the level of *marginal utility* to satisfy present needs (Nq_1) is higher than the level of *marginal returns* of the effort to generate present economic goods (Oq_1) to satisfy them, Robinson will use the present goods to satisfy present needs. A situation represented by $Nq_1 > Oq_1$, which appears on the left of q_1^E .
 - b) From the moment the level of *marginal utility* to satisfy the present needs (Nq_1) is lower than the level of *marginal returns* of the effort to generate goods (Oq_1), Robinson will not use the present economic goods for present needs, represented by $Nq_1 < Oq_1$, a situation that appears on the right of q_1^E . I.e. Even if he has need of them, because the marginal utility is still positive, it is not as much as the effort to generate that satisfaction.
 - c) Precisely, *point E* shows Robinson what is the amount and the time in which he must abstain from consuming present goods to reserve them for future needs. I.e., *point E* is the guide for Robinson to decide to preserve present goods (the “problem of abstention”) and dedicate them to satisfying future needs that, in turn, he knows will start with a marginal utility higher than *point E* (at the beginning of the curve of need), a situation in which this will again be higher than the curve of effort. It is very important to stress that in *point E* Robinson may not necessarily have satisfied all his need of q_1 , he only needs to recognize that it is preferable to save for a need that will repeat the experience of $Nq_1 > Oq_1$.
 - d) *Stock*: in short, we deduce that combining Gossen’s *curve of demand* or need (law of diminishing marginal utility) with the *curve of supply* or effort (law of diminishing returns), allows us not only to discover the flow of the use of economic goods, but also the flow of generation of stocks of economic goods.
 - e) *Only one curve*: it is very significant to see the *point E* is generated when $Nq_1^E = Oq_1^E$ occurs. A very fortunate situation for theory, since it allows us to work with only one curve considering the *point E*, that indicates the origin of the formation of stocks, is always observed in reality, and that both curves are subordinate variables of the same independent variable, economic goods (q_{1st}). This has an enormous theoretical potential that will be fully understood when we leave Robinson’s world and penetrate the macroeconomic world of exchanges in society.

This *a priori* logical deductive chain of causality allows us to say we are in the presence of a very superior tool to what is commonly known, since theory has concentrated on explaining the economic events relative to the flow of goods and not their stock —exchanged quantities—, which in turn implies the flow of its generation and destruction. Superior tool insofar as in time we study their flow based on the behavior of stocks, the stock being what is observable, which is not a minor issue for science —because efficient techniques are needed to do this— and this allows us to avoid techno-mania when there are no adequate techniques available.

Thus, we can deduce that the ***point of stock generation (E)*** is of transcendental importance in the economy and is determined by the following relation:

$$N_{q1(t0)} = O_{q1(t0)} < N_{q1(t1)} > O_{q1(t1)}$$

A condition that allows man to solve with precision the permanent indeterminate (because it is unknown) conflict of the uncertain future (*t1*), relative to his knowledge of the present (*t0*), by means of the moment in which the descending curve of present needs intersects the ascending curve of present efforts. In other words, man decides based on the finite he knows — including expectations — today and not the infinite he ignores about today and tomorrow. A reflection that puts us in contact with the *Theory of Decision Making* and the *Curve of Human Evolution* (and its *continuation*) derived from it, that we have developed based on TET.

“Point E indicates the moment in which the supply of present economic goods (initial stock and what is generated in the period) ends the function of satisfying present needs and begins the function of forming stocks of present economic goods to satisfy future needs”.

The theoretical finding of the *point of generation of stock E* is a great achievement, not only because of its theoretical importance but because of its very simple practical determination, since we do not need to draw the curves described here, because man's economy is always at *point E* —a fact perfectly reflected and captured by double entry accounting. And this is so insofar as the existence of any stock of economic goods implies the existence of *point E*, in the same way as the non-existence of a stock of economic goods implies that the amount to be destined to future needs was not generated.

Given the transcendence of *point E*, we now will analyze in depth its implications and its power to explain economic activities.

From all this analysis we derive that any technical innovation, discovery, etc., that expands supply in a given period of time will produce an increase in the amounts of goods used to satisfy present needs and *stock* at the same time, with the proportions determined by the slopes of the curves at the re-calculated *point E*.

BEHAVIOR OF THE *FUNDAMENTAL ECONOMIC CAUSALITY* IN ROBINSON

Now we will study the displacements that can appear in the curves that represent the fundamental economic causality and explain their behavior based on the displacements in the two curves that form it:

a) Decrease of demand (need) of a *stock*

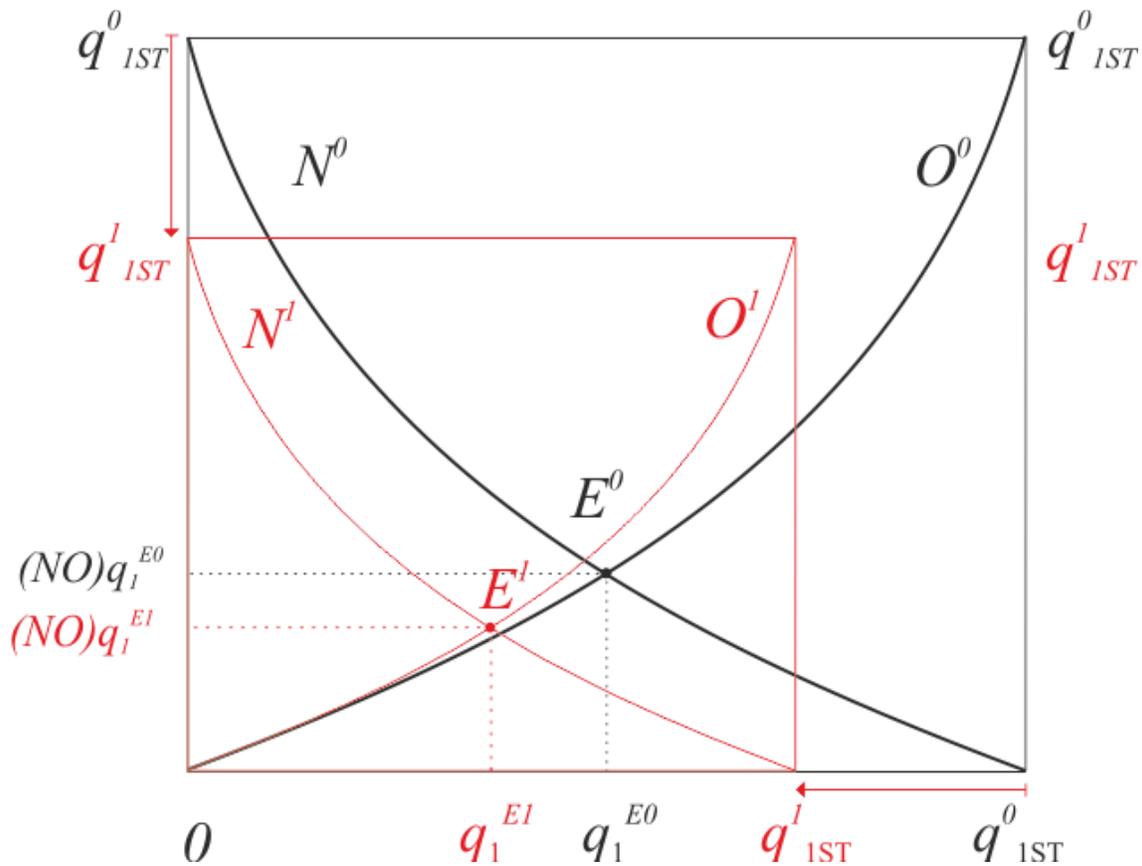
In graph 4 we present a downward displacement of the curve of need (N^0 to N^1), which means that the individual has a need for a lesser amount of the good q_I for each position of the amount of stock, which is represented by the red curve N^1 .

But given the closed box axiom, we must remember that we have to represent simultaneously a displacement of O^0 to O^1 . As a result we see a displacement from E^0 to E^1 , which presents $q_I^{E1} < q_I^{E0}$, and $(NO)q_I^{E1} < (NO)q_I^{E0}$. I.e., the new red square chart (sides q_{1st}^1) is smaller than the black one (sides q_{1st}^0), a situation observed with the left and downward orientation of the red arrows indicated outside the ordinates.

In short, the decrease in demand reduced the Surface of the square of the closed box (red box) and placed E^1 below the preceding E^0 (displacement $\leftarrow\downarrow$).

Chart 4

Decrease in stock demand



b) Decrease of supply of a stock

In chart 5 we present a decrease of supply, which means less quantities of economic goods are supplied in each point of demand, and this as a result of the new stock or supply being less than the preceding one, and thus we go from O^0 to O^1 . To the effect we will see, we suppose the

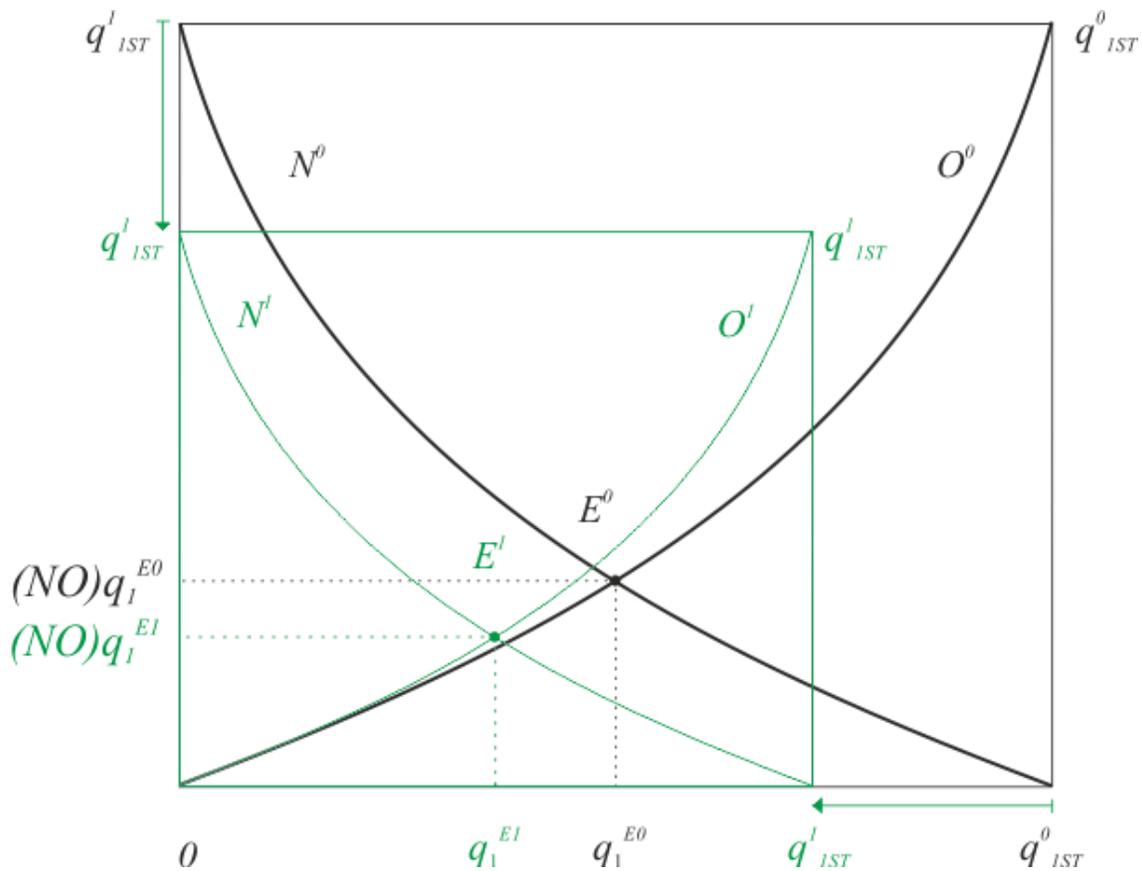
decrease in supply is of the same intensity as the decrease in demand shown in chart 4, which does not alter the analysis and will be very useful when comparing both displacements.

Again, given the closed box axiom, we must consider simultaneously a displacement from N^0 to N^1 . And as a result we see a displacement from E_0 to E_1 , which presents $q_1^{E1} < q_1^{E0}$, and $(NO)q_1^{E1} < (NO)q_1^{E0}$. I.e., the new green square chart (sides q_{1st}^1) is smaller than the black one (sides q_{1st}^0), a situation that is observed with the left and downward orientation of the green arrows outside the ordinates.

In short, the decrease in supply reduced the surface of the closed box square (green box) and places E^1 below the preceding E^0 (displacement $\leftarrow\downarrow$).

Chart 5

Decrease in stock supply



From all these analysis we derive that any technical progress, innovation, discovery, etc. that expands supply in a certain period of time, will present increases of the quantities of goods used to satisfy present needs and for *stock* at the same time, the proportions of which will be determined in terms of the slopes of the curves in the E points determined again.

SUPPLY AND DEMAND OF A STOCK – TWO SIDES OF THE SAME COIN

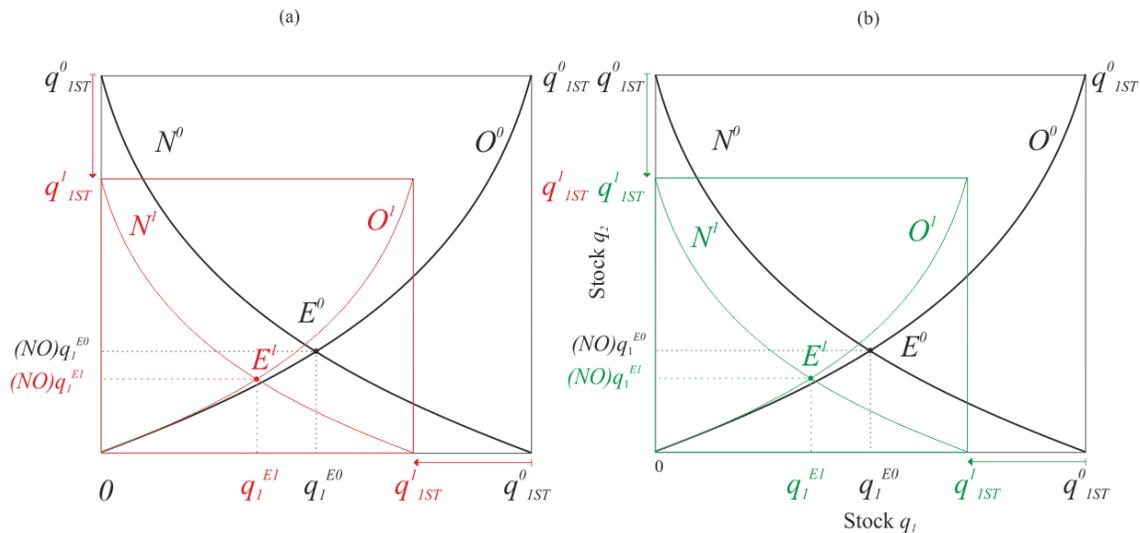
Now we present both charts together so as to conclude the analysis of the fundamental economic causality referred to stocks of observable economic goods.

Conclusions of the displacements of the curves of diminishing marginal utility (demand) and of diminishing returns (supply) of a stock of economic goods in a period of time, in this case with a decrease of both:

- 1) The two new surfaces are identical and inferior to the previous ones: closed box **red** = closed box **green** < closed box black.
- 2) The point of generation of stock E^l is similar in both cases ($E^l = E^l$), for presentational reasons.
- 3) The equality of the coordinates in *point E* is confirmed: $N^0 = O^0$; $N^l = O^l$; and $N^l = O^l$, and in the example the following curves are the same: $N^l = N^l$ y $O^l = O^l$.

Chart 6

Behavior of Robinson's fundamental Economic Causality



- 4) From which we deduce:

- a) When we refer to stocks of economic goods, always $Ost \equiv Dst$, where *st* means present stock, “real”. I.e., relative to the stocks of present economic goods it is not feasible to consider demand without its mirror supply, or vice versa. In other words, it is inconsistent to propose differences between supply and demand of stocks of present economic goods, it is not pertinent to speak of $Ost < Dst$, or $Ost > Dst$, and we only need to add that both supply and demand can increase or decrease simultaneously.

- b) It is pertinent to say that the supply of a stock of economic goods in a period of time and its corresponding demand of a stock of economic goods is composed of stocks of economic goods that satisfy present needs and/or will satisfy future needs (when q_I appears to the right of E).
- c) That is why we are not surprised to observe in chart 6 on the contrary, it is what we set out to prove— that the incidence of demand (need) and supply (effort) on the stock of economic goods indicates that:

$$\downarrow D_{st} \equiv \downarrow O_{st}$$

$$\uparrow D_{st} \equiv \uparrow O_{st}$$

This last identity can be seen producing the pertinent charts, which is equivalent to starting with the smaller closed box (red-green) that defines E^I , and moving to the bigger one (black) that defines E^0 .

These equations ratify the popular saying that the *solution to an economic need is to satisfy it or not want it*.

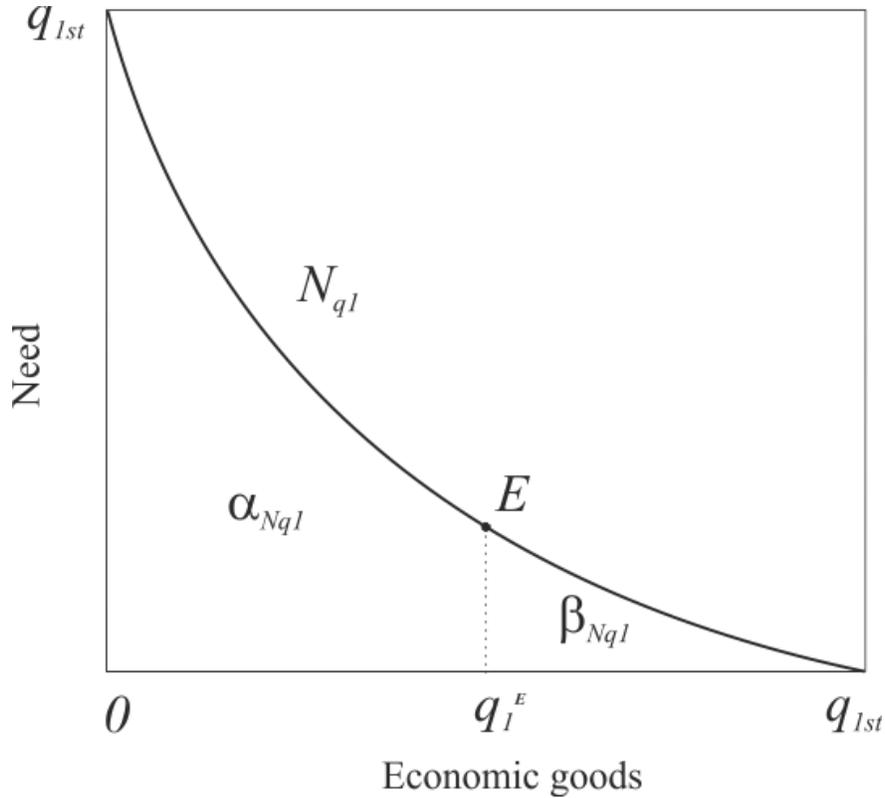
THE CLOSED BOX OF THE STOCK AND POINT E OF STOCK GENERATION

Since the *closed box* chart and *point E* allow us to work with only one curve of the fundamental economic causality, in chart 7 we only consider the marginal utility or needs (demand) curve, where we observe the area $\alpha_{NqI}(0, q_{Is}, N_{qI}, E, q_I^E)$ that represents the *satisfied present needs*, in the period of time (initial stock and production of the period). In the same way we observe the area $\beta_{NqI}(q_I^E, E, N_{qI}, q_{Is})$, that represents the *unsatisfied present needs*, due to the existence of present stock in the period. Both situations are defined by the precise moment in which the equality of the utility of marginalities (need or demand) and returns (effort or supply) is generated, moment that coincides with the intersection of both curves, where *point E* is determined. I.e., there are needs in the period that, though they could be satisfied by the stock supplied in the same period, are not satisfied. In other words, the relation $\beta_{NqI} / \alpha_{NqI}$ ⁽¹⁷⁾ shows us that the part of the need not covered by the economic goods available for the satisfaction of the present needs of the period that are postponed because of a higher valuation of future needs.

We observe that based on the fundamental economic causality we can not only explain the satisfaction produced by the economic goods, but also the temporality in which the needs that can be satisfied by the existence of economic goods are satisfied. On the other hand, the quantities of economic goods that have not satisfied present needs in the period, constitute the stocks to satisfy future needs. In this manner we have been able to prove that the existence of economic goods (stock) is deduced from the fundamental economic causality, ratifying it, here from the stock (area), different from the flow (curve) that we have developed above. In this way we have proven the origin of the *stocks* of economic goods, based on the fundamental marginal laws of economics.

Chart 7

Unsatisfied needs



In this manner we can conclude that the present amounts of q_l that derive from the difference $q_{1st} - q_l^E$, are the present units that remain in stock for *future needs*, not *present needs*. So we observe the total supply of an economic good in a certain period (initial stock plus what is generated in the period), is composed of two elements:

Total supply of a present economic good = Supply for present needs + Supply for future needs

Which we synthetically describe as:

$$O = O_p + O_f$$

Where O means the total supply of quantities of present economic goods in a period of time (initial stock plus generation); O_p the supply of quantities of present goods in a period of time (initial stock plus production) to satisfy present needs (p); and O_f is the supply of quantities of present goods in a period of time (initial stock plus production) to satisfy future needs (f). It is important to observe that we do not need the subscript st since supply is stock (origin of the “real” closed box). Thus, $O = O_{st}$, since all supply of economic goods is from a present stock of economic goods.

It is very important to observe that, intentionally, we have used the word supply instead of demand, while we are using the curve of demand, and this is so because it is allowed by the realism of the closed box, that only considers the study of needs that can be satisfied, ⁽²¹⁾ that are limited to the quantities of economic goods in stock. Therefore it is feasible to equate D and O in referring only to existing goods, which allows us to work with finite amounts and observable variables. In this manner, in economics it is only feasible to study stocks of economic goods, since it makes no sense to study the case in which $D > O$, because it is not possible to observe what does not exist. ⁽¹⁸⁾ For this reason it is pertinent to study the fundamental economic causality based on the real world of the *closed box* model, of available goods, which is the supply of existing stocks in a period of time, knowing that at the same time we are referring to the demand that can be satisfied. A situation we can summarize with this combination of equations of equality and inequality.

$$D^T > O = O_p + O_f$$

where D^T means total demand, i.e., demand that satisfies all needs, those that can and cannot be satisfied.

From the condition of fallible man we deduce that all his needs cannot be satisfied, from where derives the axiomatic idea that $D^T > O$. Which is exact when we refer man to the unattainable infinite, but not when referred to the finite *present* which can be mastered, as is the temporal satisfaction of a need, which can be observed and studied by means of stocks available in a period. A situation we understand as follows:

$$D^T_{tI} = O_{tI} + D^I_{tI}$$

With D^T_{tI} that means the total demand in the period tI ; O_{tI} that means the total supply of stock in that period (that is why we do not add the superscript T or the subscript st , since we know we do not include what does not exist and only refer to stocks), and D^I_{tI} represents the unsatisfied demand of the period (I).

Clearing terms we deduce:

$$O_{tI} = D^T_{tI} - D^I_{tI}$$

Then, if we must only refer to what man can satisfy, in any spatio-temporal present moment, it is evident that $D^I_{tI} = 0$, which leads us to the following: axiomatically in every spatio temporal present point for supply and demand of a present stock in a period of time this equation is valid:

$$O_{tI} = D^T_{tI}$$

Equality that defines precisely what from here on we will call the ***stock axiom: demand and supply of stocks of economic goods in the same period are equal***. Thus we can generalize saying supply and demand of the stock of a period of time implies that:

$$O_{st} = D_{st}$$

We now only need to express how supply is generated (O_{st}), which is defined by:

$$O_{tI} = ST_{t0} + G_{tI}$$

Where O_{tI} is the supply of period I , i.e., the present stock of period I ; ST_{t0} is the present stock of economic goods at the end of the previous period, which is the initial stock of period I ; G_{tI} is the generation or production of economic goods of period I . If we deducted from this the wealth destroyed during period I , we could have the final stock of period I , which would be the initial stock for period 2.

We conclude that just studying the behavior of the stocks of economic goods, we are studying the whole fundamental economic causality, since *point E* indicates the moment in which humans make the decision of abstaining from satisfying present needs, that can be satisfied with the present stock, to set it aside for future needs. Thus, *point E* is the economic clock, the administrator of economic time.

Thus, the ***indicator of time*** *point E* is materialized in economic goods, as TET indicates with its indirect materialization of economic time. And this is why we can scientifically limit the study to economic goods in stock, that are observable, and it allows us to study both supply and demand, knowing that by the *axiom of stocks* they are equal. In this manner, the sole presence of stocks of economic goods —***observable***— is indicating the presence of *point E*; the moment in time when we have the equal intersection of the marginal laws. Reasoning that helps us corroborate the *axiom of stocks*, insofar at each spatio-temporal moment is represented by *point E*, which derives from an equality that ratifies that the supply of stocks is equal to its demand; if this is not so, we are not speaking of economic goods, where the two marginal laws are not valid.

We can anticipate that the analysis of speculations between present and future needs, and present and future efforts (flow and stocks), will arise from the relation between the differences of $D_f - O_f$ versus $D_p - O_p$ an aspect that mobilizes the Kirznerian entrepreneurial alertness.

SYNTHESIS OF POINT E

Not all present economic goods, available to satisfy a need, satisfy said need at the same time, as we can detect in *point E*. A situation that can be observed from the two components of the *fundamental economic equation*, ***need*** (Nq_I^E), and the *economic good* (Oq_I^E), representing ***effort***.

It is very important to realize that the development of the curves of need-demand and effort-supply are *a priori* theoretical tools, derived from the marginal laws of diminishing utility and returns, with a strong capacity for explaining reality, a transcendental aspect since Robinson's economy is always at a *point E*. I.e., *point E* discovers Robinson's permanent reality. That is why the most relevant aspect of the demonstrations we have developed is that economic goods are always a stock, its flow implies the precise moment (present or future) in which it satisfies a need. I.e.:

We understand economic time through quantities of economic goods.^(a)

^(a) The essence of *Theory of Economic Time (TET)*

Thus we deduce that for man, conditioned by the needs of a fallible being, what is relevant is the *study of the generation and destruction of economic goods in time*. And this is so insofar as with both terms of the fundamental economic causality, needs and economic goods, and the intersection *point E* —of the generation of stock (*E*)— that both components determine, the quantity and temporality of both is defined, relative to the marginal intensities of the need and the effort to satisfy it.

We conclude that studying the *behavior of stocks of economic goods* in time, we are studying the whole economy, which is very appropriate since this guarantees observable results, as are the stocks of economic goods, different from studying the intensity and temporality of needs, of nonexistent economic goods (*D'*). And since we know the *behavior of stocks of economic goods* is governed by the two marginal laws, we complete the arsenal of necessary and sufficient tools to produce economic theory as we shall see.

CONCLUSION OF MICROECONOMICS

The great importance of having found an *a priori* logical-deductive chain of theoretical causality, which has deposited us in the real world of the observable explicative variables (as are economic goods) leads us to what can be studied: being *sufficient* along with *necessary* it avoids us having to confront the ghost of the unknown (*D'*).

We can conclude the microeconomic Robinsonian analysis saying:

- 1) Economics begins with the axiomatic chain provided by the *Fundamental Economic Causality*

Fallible man → need → economic good

- 2) Given that we can study the economic causality completely and consistently based on the stock of economic goods (the stock and its flows) science sees the study of economics facilitated since it is circumscribed to the study of economic goods, which reduces the chain of economic causality to one that is more workable

Fallible man → economic good

Chain that clearly indicates that need is implicit in fallible man's essence, and is implied also in the economic good, the observable epistemological unit. It is also pertinent to refer to it in terms we have used:

need → economic good

which is closer to the terms used in economics.

demand → supply

- 3) *Chain of operative economic causality* that allows us to apply TET'S axiom that says:

Owner ↔ economic good ⁽¹⁹⁾

Insofar as we have only replaced the term fallible man with the more precise economic term *owner*, which is the category that fallible man dons in the economy.

- 4) *Epistemological aspect*: the biunivocal relation $need \rightarrow economic\ good$ governed by **quality** defined by the need, **quality** that functions as the common factor with the economic good —quality that functions therefore as the intersection between both terms of the fundamental economic causality—, allows us to concentrate exclusively on the study of economic goods, specifically the laws that govern the generation and destruction of its **quantities** in **time**. Thus we consider the two essential components of economic causality: *need* (that is included in the economic good) and the *economic good* (that includes the need), in their *qualitative, quantitative and temporal* aspects, with which we solve the issue that has worried economics very much when explaining quality as opposed to quantity and time.

TET's proposal is ratified: 1) the first thing that must be identified is the **quality**, the common factor of the set $need \rightarrow economic\ good$, then the **quantity** and time are explained by the marginal laws of diminishing utility and increasing effort; and 2) the common factor **quality** allows us to approach the economic good knowing that with it is involved the need.

- 5) *Theory of interest and capital*: *point E* of generation of stocks of economic good and the end of exchanges, expresses the temporality of economic goods in general, no matter if they are capital goods or not, which validates TET, insofar as a theory of capital is not necessary to explain the incidence of time (interest). On the contrary, the existence of time and its price, interest — both expressed in quantities of economic goods ⁽²⁰⁾ — is what originates the existence of capital goods, but not only these, but the stock of all economic goods.
- 6) *Axiom of stocks*: the chain of economic causality of stocks of economic goods presents only one equation we need to study:

$$O = D_{pst} + D_{fst} = D$$

The present stock supply (O), is equal to the present demand of the present stock (D_{pst}), plus the future demand of the present stock (D_{fst}). Which allows us to reiterate the *axiom of stocks*: when speaking of stocks of economic goods, always $O = D$.

Synthesis of the axiom of stocks: the equation $O = D$, expresses that the laws of marginal increasing effort and marginal diminishing utility apply to the same and only stock of economic goods available in a period of time, the only supply that can be destined to the only demand that can be satisfied, which is composed of the satisfaction of present and future needs, by the present stock.

- 7) The equation $O = D$, the only one derived from the fundamental economic causality, makes the traditional equation system inconsistent and unnecessary -known as the circular model rent (income) *versus* expense (consumption):

$$Y = C + I$$

$$Y = C + S$$

Where Y is the so-called income; C consumption, I investment, and S the savings. Equation system completed with the equilibrium equation:

$$S = I$$

The system of equations presented is incompatible with what is developed in these pages. ⁽²¹⁾

- 8) *Say's Law*: since we can only consider the **Demand** included in the **Supply** (represented by O), because the rest is composed by $D^I = 0$, the permanent equality we have indicated is evident:

$$O = D = D_{pst} + D_{fst}$$

I.e., in exchange, **demand by one is part of the supply of another** and vice versa, and what remains is the demand of stock of the supplier. This tautology could be called the **"tautology of exchange"**, and it is what was at issue with the unfortunate attempt called Say's Law, that allowed as many interpretations as there were interested parties interpreting it.

In short, the exchange of economic goods is carried out by the owners of those economic goods, which implies the concomitant existence of owners and economic goods, which is no other than *TET's* axiom *economic good* \leftrightarrow *owner*. Thus, it is not possible to conceive economic exchange among owners without economic goods. What can be conceived is the exchange of credit-debt, which is the reason *TET* carefully differentiates types of exchanges: cash (present economic goods: barter and the exchange carried out with money), and credit (present economic goods for future economic goods).

- 9) *Theory of Economic Time (TET)* versus *Theory of Pure Temporal Preference*: the chain of economic causality, governed by the marginal laws of diminishing utilities and returns, leads us to *point E*, the spatio-temporal moment in which humans must choose between the present and the future and opt for the future. An important conclusion, since it means the end of the *Pure Temporal Preference Theory (PTPT)*. ⁽²²⁾
- 10) *The interplay of marginal laws*: the opposite and complementary role of marginal laws (it sounds like a contradiction, but is the law of fallible life), is the stimulus for efficient work, insofar as:

- a) *It is hope*, because of the stimulus that it is possible to improve on the state of need.

b) *It is useful effort*, because after it is carried out it is possible to effect the previous state of hope.

11) *The specialization and distribution of work* are implicit in the marginal laws, and explicit in the exchange law that derives from them, insofar as they are the basis for this human methodology to ameliorate fallibility. The specialization and distribution of work are the result or consequence of the law of diminishing returns. Not the opposite, insofar as they are efficient answers to the effort to obtain economic resources implied by the law of diminishing returns, what is commonly known as reduction of costs with an increase in productivity.

Precisely, specialization and division of labor is what introduces us to Macro-economics.

Thus, the *a priori* logical-deductive chain we have developed —with which we close the chapter on Robinson Crusoe’s microeconomics or a single economic unit— allows us to better specify fallible man and centre on economic man, the *owner* of economic goods. As we shall see, this simple conclusion is the basis underlying double entry accounting, which will be of enormous use for the macroeconomics we will develop, proof once again that it is the best economic model. All this will be possible because we have reduced economic research to the generation and destruction of economic goods (*wealth*), belonging to owners (*distribution*), which we summarize saying economics can be considered the study of the *generation and destruction of wealth* —value of economic goods stocks—, according to its *distribution* among its owners, and its variations or flows in time.

PART II

MACROECONOMICS

MACROECONOMICS

With macroeconomics we refer to the Economics of a plurality of economic individuals that exchange economic goods that are the product of specialization and distribution of labor.

From here on, continuing from *point E* to which we have arrived, we start to develop the *curve of economic evolution* of a *society*, which is based on:

- 1) The same method of the *a priori* logical-deductive chain of causality we have been developing. A chain that is corroborated insofar as the microeconomics attained up to now is the basis that connects with the macroeconomics we begin here.
- 2) Continuing with the same foundation of fundamental economic causality (*need* → *economic good*).
- 3) Continuing with the use of the two marginal laws that govern the “nature” of the economy. Laws discovered by man that allow him to battle the rigors of the economy: *the law of diminishing marginal utility, the law of creating effort, and the law of diminishing returns, and.*
- 4) Finally and essential for TET, we continue developing within the “real framework of stocks of existing economic goods, and the Robinson (s), also of real existence, that breathe and have DNA. I.e., we do not resort to virtual entities, ⁽²³⁾ but remain within the framework of the “*closed box*” (*reality*) of observational variables.

As we shall see, that we produce macroeconomics continuing and maintaining the basics used in microeconomics will ratify TET insofar as it rejects what have been called the “fallacies of composition”. We will judge all this at the end of our development. So let us begin.

THE QUANTITY - PRICE

LAW OF EXCHANGE — THE FUNDAMENTAL ECONOMIC CAUSALITY IN A SOCIETY

TET highlights as the *law of exchange* ⁽²⁴⁾ the human action that leads to exchanging economic goods between human beings, as a result of both parts benefiting from the same. This is in line with the Popperian-Austrian principle that motivates all human action, which is driven by the desire to better the state that motivates the action, because exchange is no more than an action in the same sense, with the same motivation. ⁽²⁵⁾

It is important to perceive the merely presentational nature of what we call the *law of exchange*, since it is included among the direct consequences of the marginal laws. In other words, it is not necessary to make it explicit, notwithstanding the academic importance it undoubtedly has.

We wish to explicit that exchange is an economic good, a factor of production, the same as including a machine in a productive process. Though we are not original in saying this, it is not superfluous to remember it, since forgetting it usually leads to *very* unfortunate theoretical developments. ⁽²⁶⁾

It is also important to stress that the advent of the theory of subjective value (TSV) not only solved the problem of the classical vicious circle *cost* ↔ *prices* (we will return to this when we refer to *value theory*), but also helped understand that exchange is for the benefit of all intervening parts, not as was believed in antiquity, that one part won what the other lost, or that neither parts wins or loses.

The concept of exchange implies that:

- 1) We no longer refer to an isolated Robinson Crusoe, but to individuals in society.
- 2) The existence of the society implies spontaneous *specialization and division of labor*. A method of action, discovered by man, as a consequence of the two fundamental marginal laws of economics.
- 3) Specialization implies producing a surplus beyond the needs of the specialist, of the specific goods he produces (q_x). Labor is divided in society from the perspective of that surplus.
- 4) The surplus of economic goods, that derive from specialization (q_1), generate the need ⁽²⁷⁾ to exchange them for economic goods that the specialist needs and are produced by other specialists (q_2).

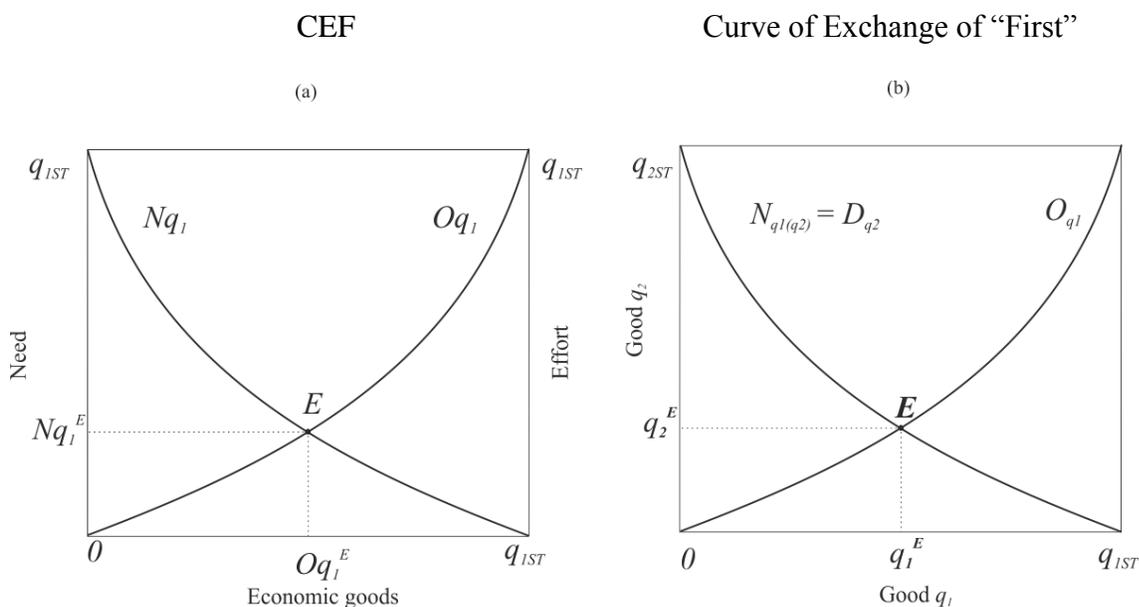
What is admirable of the progress we have made is that it allows us to continue with the *curve of demand* (Gossen's *need*), and the *curve of supply* (*the effort* to satisfy needs obtaining economic goods), not only to explain Robinson's economy, but of a society of "Robinsons". All of this knowing ***both curves refer to the same limited stock of present economic goods in the period of time, because of which we have proven that $S = D = D_p + D_f$*** . We need not alter at all what we have developed for Robinson Crusoe —based on the fundamental causality of

economics: *need* → *economic good*. Therefore the microeconomic developments we produced can be extended to a society of human beings that exchange economic goods obtained from the increased production due to specialization implied by the division of labor.

Another very useful way to appreciate this chain that connects micro and macro is to say that the basics we have developed with the study of microeconomics are the founding stone to understand macroeconomics. This is so insofar as we consider impossible to develop economic theory that does not begin by explaining the behavior of the individual. It would be as if in physics or chemistry we pretended to relate the elements without knowing their properties. Not knowing them implies an “explosive mix in the laboratory”.

Chart 8

The Box of Exchange of “First”



Given that exchange unfailingly implies exchanging economic goods that satisfy needs, here we simply replace the ordinate, that represented the need “First” Robinson had of economic goods q_1 when he “was on the island”, with the need the same “First” Robinson has of economic goods q_2 that belong to the “Second” Robinson *on the continent*.⁽²⁶⁾ And from “Second” Robinson’s side we have the same analysis. A process that implies the explanation of the underlying issues, with which we deal now.

This passage *micro* → *macro* is carried out with this “magical conversion” of the *Fundamental Economic Causality* that we represent with the model we have adopted from the *Closed Box (reality limited to what is finite)* of chart 3, to the *Closed Box of Exchange* of chart 8 (b) that, knowing it is closed because it is finite, we will simply call ***The Closed Box of Exchange of the “First”***.

The cart is composed of two figures, 8 (a) that is the reproduction of chart 3 where we express Robinson’s *Curve of the Fundamental Economic Causality*, and 8 (b) where we

introduce *Robinson's new Curve of the Fundamental Economic Causality* now referred to a world of exchanges. As a result we observe the following new elements in 8 (b):

- Since in the exchange the N_{q_1} , of Robinson on the island, now becomes $N_{q_1(q_2)}$, since the previous need of q_1 is now referred to **quantities** of the economic good q_2 i.e., the need for units of q_2 for which Robinson would exchange his **quantities** of q_1 . In other words, in the exchange the old N_{q_1} is replaced by the need or demand Robinson now has by q_2 : D_{q_2} . We summarize the terms as follows:

$$N_{q_1} = N_{q_1(q_2)} = D_{q_2}$$

We have highlighted D_{q_2} , because we pretend to add the concept of demand, knowing that it arises from its equivalence to Gossen's need seen from Robinson's point of view, which we call "First" Robinson, to differentiate him from the new members of his community.

- We have now called the abscissa specifically economic good q_1 , to differentiate it from the economic goods contributed to the exchange by the other participants. That is why in the ordinate we have placed q_2 , the economic good offered in the exchange by the new participant (which in another stroke of originality we have called "Second"), with a total supply of stock in this period of q_{2st} . It confirms that we keep talking about **quantities** of economic goods in time.
- The reader will understand we have designated the ordinates *Good q_1* and *Good q_2* only for expositive reasons, since the owners of those goods are the ones intervening. I.e., the ordinates must be interpreted as the supply-demand of the owners of those goods — axiom of *economic good* \leftrightarrow *owner*. The preceding paragraph should not make us forget that we explain economics in terms of **quantities** of economic goods in time.

Once Robinson's *fundamental economic causality* is adjusted to the *fundamental economic causality of exchange*, we begin its analysis, that we carry out within the framework of what we have called the **Closed Box of Exchange**, that transports the concept of Robinson's *closed box (real)* that we have seen, i.e., it all remains limited to the world of the existing stock of economic goods. Let us see the analysis from the points of view of the characters we have now, if not we would not be referring to exchange, i.e., from the position of "First" and "Second".

"First" Robinson

The transcendental change that First finds is nothing less than seeing his sphere of satisfaction of needs widened, since he not only will be able to satisfy his need of q_1 that he supplied, but he will have the possibility of satisfying the need for q_2 that Second is supplying him. This trivial commentary becomes the best corroboration of the benefits of exchange. Not understanding this or forgetting it has tragic consequences, as in the extreme situation of considering commercial activity as detrimental.

The benefit of exchange: “First” now is in a better situation with greater numbers of curves of the fundamental economic causality, which will increase in variety and quantity within each of them, as new participants are added to the exchange.

We must stress that *the more needs of others Robinson satisfies with the goods he supplies them, more of his own needs he will satisfy with the goods supplied by the others through exchange* — recalling once again that all this is temporary and subjectively valued *quantities* of economic goods.

“*Second*” Robinson.

He adds the same *benefit of exchange* we saw with First, and this is so insofar as the number of curves of fundamental economic causality previously limited to q_2 increases. A situation we can clearly observe if we represent his chart of fundamental economic causality separately and then in exchange as we did with First.

Based on chart 8 (c), *Box of Exchange of “Second”* (where the ordinates are inverted) we continue expanding the transcendental achievements obtained to economic theory.

In chart 8 (c) we have represented the *point E* of First and Second — arising from the intersection of specific *quantities* of economic goods represented on the abscissa —, which determine the end of exchanges for each one, and the beginning of the generation of stock for both, according to their subjective personal views. And those *quantities* arising from their valuations, are leading both to build relationships that —if they do not know it they learn quickly— they have to check against the “market”, a ghost word for many writers that represents the sacred space where First and Second sanctify the act that allows them to obtain the *benefits of exchange*, that we already saw both obtain from the action of exchanging their surpluses.

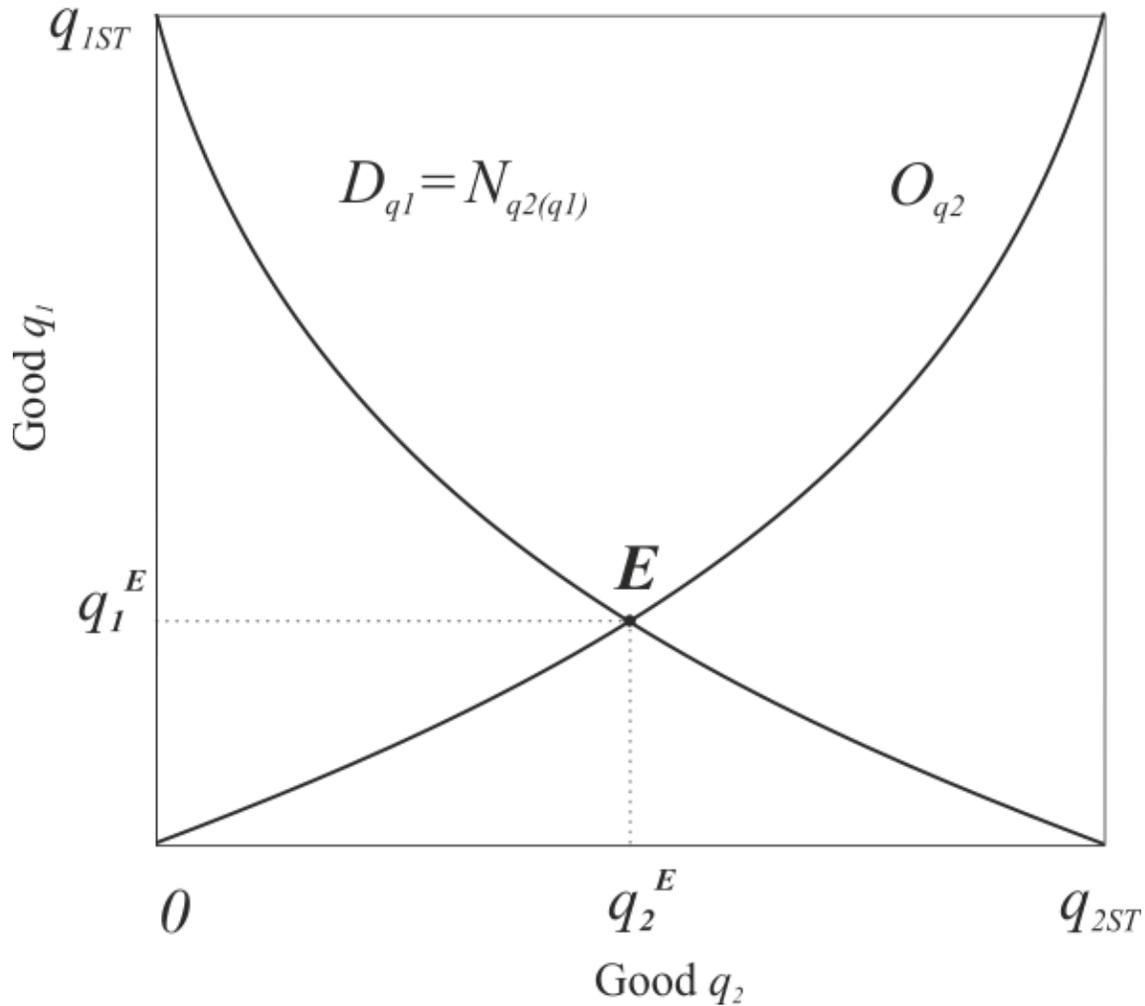
As a consequence of all this *a priori* logical deductive chain of causality we have been developing, based on the fundamental economic causality of each individual, we find we can apply what we have seen with First Robinson:

- *Axiom of stocks:* when referring to real stocks, the supply of economic goods existent in a period of time, we know $S = D$.
- *Point E:* that $S = D$ is of central relevance, since what we can observe is precisely the supply of stock of economic goods, since demand by itself cannot be measured.
- The combination of the *axiom of stocks* and *point E* explain how specialization and division of labor work, insofar as they establish precisely the quantities the specialist reserves for himself and what he will exchange of the economic goods that are the product of his specialty. I.e., the fundamental marginal laws also “explain” specialization and division of labor. In other words, since the marginal laws are what govern the functional relations of cause and effect of the components of the fundamental economic causality (*man* → *economic good*), they cannot be absent when explaining the causes of specialization and division of labor.

Chart 8 (c)

Curve of Exchange of “Second”

(c)



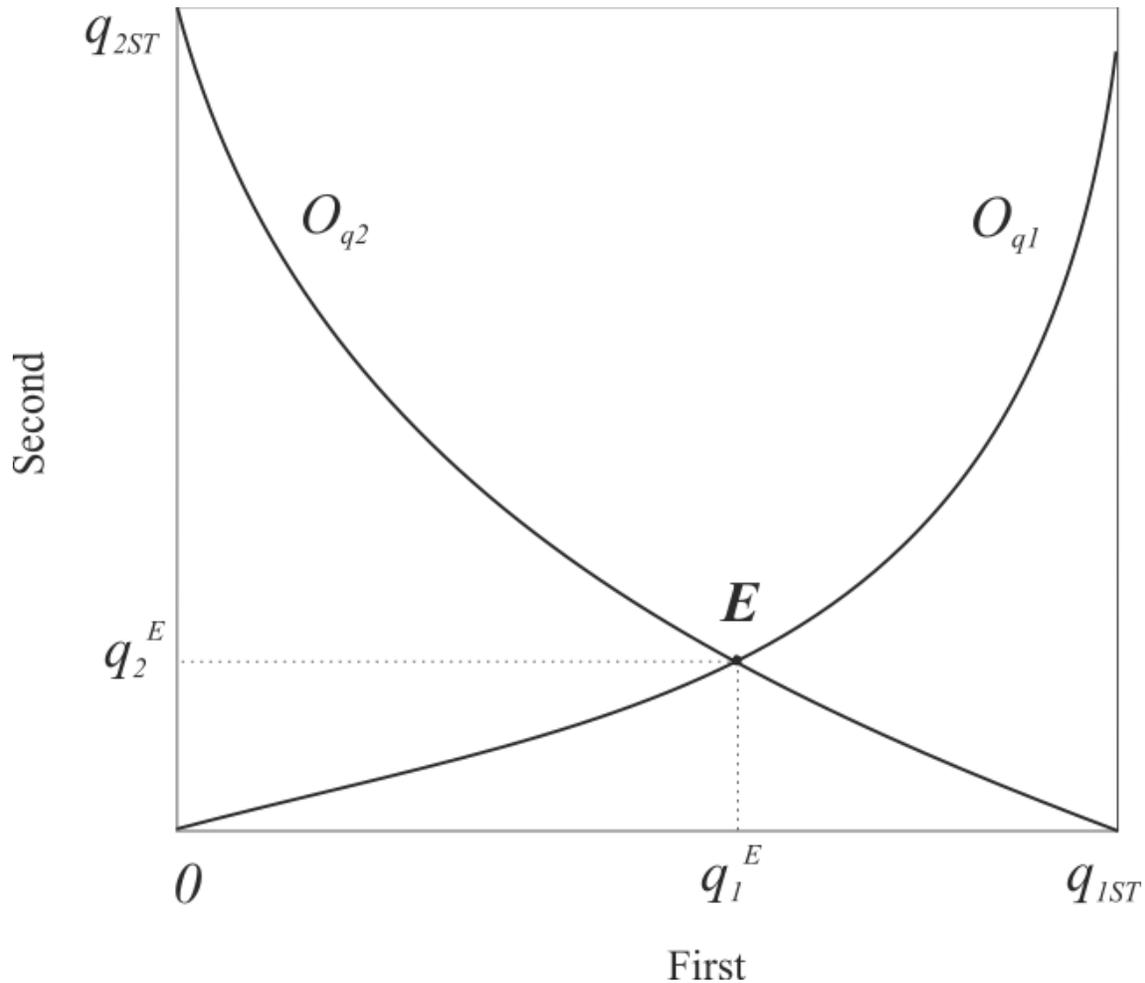
We conclude that we can study the fundamental economic causality of exchanges based on learn from the behavior of the *quantities* of economic goods of any of the participants. Yes, we only need to obtain his curve of supply—that he knows because he is the specialized producer—, and the curve of demand of the good he produces, knowing that this will be composed of what the other supplier demands with whom he will exchange in the market—subject to business alertness—, plus what he will keep as a stock. I.e., the success of his efforts to produce economic goods will depend on the needs he will satisfy of the other actor that is striving to produce economic goods, plus those represented by the stock he will retain. All which we can summarize saying that our own evaluation and that of third parties of the goods we produce with our effort is what governs the value we assign to economic goods.

All this we can see in graph 8-*E* that we now present to that effect.

Chart 8 (*E*)

POINT E

Box of exchange of “*First*” and “*Second*”



Components and analysis of chart 8 (*E*):

First Robinson adds to his need of q_1 the need of q_1 of *Second*:

- *Law of exchange*: the original need *First* had of the good q_1 he produces, as a consequence of the surplus production originated in his specialization, leads him to expand it because of the need of q_1 of *Second*, that is specialized in producing q_2 . In turn, and due to the fact that *First* needs q_2 , that *second* produces in specialized form, is how the exchange of surplus **quantities** originated in specialization and division of labor is

produced. I.e., the motive for producing surplus is to exchange it for other economic goods and to satisfy new needs, or to better respond to those previously existing.

We reiterate, neither First nor Second forget their own need, both exchange the surplus that they set out to obtain through their specialization, the rest is stock, and thus they complete the total demand of their productions (market).

In the modern world we observe economic units that are only produced to satisfy the needs of third parties, i.e., they are produced for exchange, which does not free them from having to manage very well the *point E* of stock generation.

- *Abscissa of the supply of First*: we have reiterated the abscissa (q_1) according to the chart of First, with its corresponding supply S_{q_1} , and named the abscissa First (as we said before), since it is the representation of the subjective valuation, which leads to Böhm-Bawerk's bargaining market — **quantities** again.
- *Ordinate of First's need*: we have drawn here the curve of the need Second has of q_1 . I.e. we have replaced the need First had of q_1 —called N_{q_1} in the original chart of the curve of need of isolated Robinson-Gossen—, because of the need of q_1 second has, relative to the **quantities** of q_2 he is offering. In this manner we call the original N_{q_1} of First because of its equivalent in exchange, S_{q_2} .
- In this manner, with the expressions obtained from the observable information —the offers First and Second would make for a mutual exchange of their surpluses, as a result of their valuations of their own needs of the good supplied by the other, S_{q_2} for q_1 , and S_{q_1} for q_2 —, allows us to work with the subjective valuations of the participants, while $N_{q_1(q_2)}$ is now the need Second has of q_1 considering his stock of q_2 , and vice versa, S_{q_1} is the need First has of q_2 considering his stock of q_1 . Both valuations are subjective and the participants establish them considering their own needs including the reality of the stock each one has and “estimating” the subjective valuation of the other participant.

It must be very respectfully observed that any curve of need, be it the original of First (N_{q_1}) or the need of Second [$N_{q_1(q_2)} = S_{q_2}$], are governed by the law of diminishing marginal utility. In other words, all demand is governed by the law of diminishing marginal utility, insofar as it is synonymous with need in search of something useful to satisfy it. A situation which allows us to carry out what we called a magic transition from the world of Robinson on the island to the world of Robinson on the continent: there is no magical transition, while always refer to observable quantities, ergo, there is also no fallacy of composition.

Finally, it is very important to observe that the method developed implies an objective scientific result, since who is collecting information to obtain S_1 y S_2 , can do strictly observational work of objectively collecting data —**quantities of economics goods**—, and does not need to analyze the determining factors of these supplies (demands); he can do it if he wishes, but it does not affect the conclusions derived from the “objective” knowledge we are developing.

Second Robinson adds First's need of q_2 to his need of q_2 .

We leave to the reader to draw the chart corresponding to Second, which is done with the same design, respecting the amounts and slopes of the marginal curves, and will come to the same results of *quantities* exchanged of each economic good in both charts, and will obtain the same *point E*. I.e., calculating based on one participant or the other, the conclusions of *quantities* exchanged will be the same, which is a tautology and corroborates the full validity of the *law of exchange* we saw in First, and the pertinence of working based on any of the participants, considering the information for one may be more trustworthy, which allows us to start with the first and estimate the second (a resource well known to accountants and statisticians).

Conclusion of the *law of exchange*

The act of spatio temporal exchange, unique and unrepeatably as TET teaches, that the parties carry out will be implemented according to the *quantities* determined at *point E*, composed of q_1^E in “First” y q_2^E in “Second”, determining also the *quantities* preserved as stock by each owner.

Closed Box rectangle versus Closed Box square: here it is of fundamental importance to distinguish between the *Curve of Fundamental Economic Causality* and the *Curve of Exchange*, and it is that we are no longer in the presence of a square chart but a *rectangular* chart. And this is so because it is very difficult for there to be an exchange of equal quantities of different economic goods. And if it is so, it is also explained by the development we made.

In short, we have deduced the *Curve of Exchange* of economic goods that is produced in a society, based on the *Curve of Fundamental Economic Causality* —derived from the laws of marginal utility and returns, both diminishing, and the *Law of exchange*—, which we can summarize saying:

The demand (need) of certain quantities of economic goods of a participant of the exchange, is satisfied with the quantities of other economic goods that the other participant of the exchange supplies, and vice versa. Thus, in the spatio temporal point E of the exchange, the demand of quantities of economic goods of one participant is satisfied with the supply of quantities of different economic goods by the other participant.

We can observe then the relevance of *point E*, since all the economic properties we have discovered in microeconomics (Robinson) appear in the macroeconomics of exchange. In this way, in *point E* the parties make the decision of keeping in stock the rest of the present economic goods they offer in the period of time and do not exchange.

Thus, in line with what we have seen on supply and demand of stocks of economic goods, everything we have said can be summarized mathematically as follows:

$$Dq_{1(2)} = Sq_{2(1)}$$

$$Dq_{2(1)} = Sq_{1(2)}$$

In this way two essential theoretical aspects presented:

- 1) The *law of diminishing marginal utility* is pertinent not only for Robinson's needs, but for everything implying a *demand*, insofar as *demand* is synonymous with *need, be it his own (stock) or of another*.
- 2) Present economic goods, that form the supplied stock of a period of time, will be for satisfying present or future needs.

With respect to *point E* determining the stocks of First and Second, it is evident it refers to all kinds of economic agents, even the current mega organization that have appeared directly in production for exchange.

Terminology: But the analysis does not end here. Let us continue our study of *a priori* logical deductive causality we have been developing. From now on we will only refer with *S* and *D* to the supplies and demands of stocks of present economic goods. Considering this, before we go to the next item, we believe it is convenient to replace the expression fundamental economic causality *need* → *economic good* with the better known expression:

Demand → *Supply*

This change of terminology is not only pertinent considering what we have seen: *all demand is synonymous of a need* —remember we have replaced the need of First of q_1 , with the need Second also had of q_1 , which we expressed with the supply he made of q_2 to satisfy that need of q_1 — and *all supply are quantities of economic goods (implying previous demand)*, and demand and supply not only refer to what is commonly known as consumer goods or destined to final satisfaction, a situation that would leave outside the reach of the fundamental causality the demand of goods that are not for consumers or destined to final use. An aspect that not having been adequately treated led to theoretical developments to understand these economic goods, as if they were not economic goods or if they required special treatment, which is what unfortunately happened: currency is the case TET denounces as the “*symbol*”, but the same happened with capital or investment goods, speculation, and others. Special treatment that we do not need here.

In reference to the terminological issue, it is very pertinent to express the *fundamental economic causality* of the exchange or social economy as follows

MARKET* → *ECONOMIC GOODS

Since we know “First” Robinson's need is now represented by the market.

The *economic causality of exchange* represented by *market* → *economic goods*, justifies reiterating a previous sentence:

We must stress that the more needs of others Robinson satisfies with the goods he supplies them, more of his own needs he will satisfy with the goods supplied by the others through exchange.

THE LAW OF EXCHANGE AND UNCERTAINTY

The *curve of fundamental economic causality of exchange* we have deduced, expressed in the curves of demand and supply —by **quantities** of economic goods—, clearly states that both participants in the market are acting guided by their subjective valuations, but it also adds another very important component, that each one acts knowing that a central part of his economic actions is his *imperfect knowledge* of the circumstances that surround both him and the other participant.

I.e., the *economic causality* of the exchange is:

- 1) Limited to the finite that is known.
- 2) Each participant is confronted by his own limited circumstantial knowledge of the space and time of the other participant, which is —nothing more and nothing less— the component of the demand of their surplus. A situation that is even more relevant in the current world, since all supply in practice is the surplus of the needs of the producer.
- 3) Thus, the only thing the participants can say they positively know is the information that derives from *point E*. Based on this *point E*, each participant can orient his decisions based on his knowledge of the end of the exchanges and the beginning of the stocks. *But this information is of the present, not the uncertain future*, i.e., what is known is the present *point E*, but not the future *points E*.

With what we have seen here, we are ready to continue, and refer to prices. For this we have a very solid launching platform — explain economy over time, depending on **quantities** of economic goods —for the continuation of the chain of causality we are producing, starting with Robinson that crossed over from the island to the continent.

THE QUANTITY-PRICE AND POINT E OF EXCHANGE

The example of exchange we have developed is the representation of what is called barter, and along with the exchange that is carried out with money they conform the cash exchanges, according to the taxonomy developed in TET —**quantities** of present economic goods. From this development economic theory has deduced an element that would become essential to analyze the behavior of the economy of a man living in society, *prices*. Let us study chart 9.

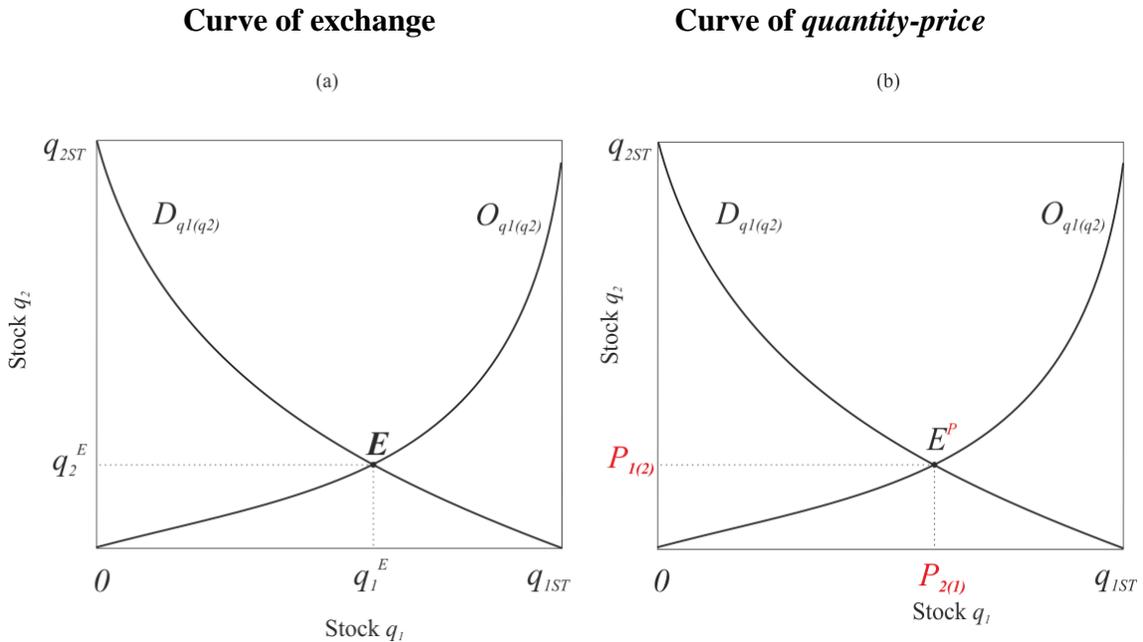
Thus we observe the exchange between the parties was produced in the spatio-temporal unique and unrepeatable *point E*, from where arises the *price* of q_1 expressed in **quantities** of q_2 : $P_{1(2)}$, that appears in the ordinate, in which we have represented the **quantities** of q_2 . In other

words, $P_{1(2)}$ is the price of q_1 expressed in *quantities* of q_2 , thus, the price of the economic good q_1 , whose stock is represented in the abscissa, is expressed in the ordinate that shows the *quantities* of economic good q_2 . And the same occurs with $P_{2(1)}$, it is the price of q_2 , that appears in the abscissa that presents the stock of q_1 in *quantities*.

The chain of fundamental economic causality, derived from the methodology of *a priori* logical deductive causality, explains why the definition of *quantity-price* ⁽²⁸⁾ expresses them as *quantities* of an economic good that are exchanged for *quantities* of another economic good. This clearly reflects that **the prices of an economic good are *quantities* relative to *quantities* of another economic good**. Which in other words means that we *express* the exchange of certain *quantities* of the good q_1 , using the quantities of the good q_2 for which the exchange was made.

Chart 9

The *Quantities-Prices*



Thus, E^p is the point that defines the *quantities-prices*, which in turn are defined by:

- 1) The time when the exchanges cease (the end of Böhm-Bawerk's bargaining). Which can also be interpreted as the point that represents the Pareto Optimal, to which we will refer specifically.
- 2) The time when the parties decide to form stocks of present goods for future needs.
- 3) The *quantity-stock* of these present good that will form the stocks for future needs. Situation that highlights the relevance of the key information of the *quantities-prices*, originated in exchange, for economic analysis. Generally what is highlighted in prices is the quantities exchanges and not the quantities that will form stocks.

Now we understand why the charts always present the quantities in the abscissa and the prices in the ordinate. There is an error in those charts when the prices expressed in the ordinate are considered absolute, and not relative to another economic good, they generally refer to prices in currency, a situation that we consider affected all economic thinking in the twentieth century.

Conclusion: TET, with the model of causality we have been developing, allows us to discover the relevance of the **quantities-prices**, not only as information of the quantities exchanged of the goods that are the object of the exchange, but also the stocks that are not exchanged. In other words, **quantities-prices** give us information to study the static (stock) and the flow (exchanges) of economic goods.

Thus, **quantities-prices** are the indicators of the quantity and time of the creation (and destruction) of wealth. It is impossible to give **quantities-prices** greater importance in the economic causality of exchange. From this derives the enormous destructive power of wealth implied in the alteration (control) of the causality that leads us to them, therefore:

Any interference in exchange implies altering quantities-prices, which is destroying wealth generated by labor divided according to specialization.

It is essential to see that *point E^p* is the result of the intersection of the curves that represent the marginal laws of decreasing utility, increasing effort and decreasing yields, a circumstance that is present in any **quantity-price**, important aspect when we refer to **quantities-prices** as units of measure, specially currency, which we will deal with specifically.

QUANTITIES-PRICES AS A UNIT OF MEASURE

We must consider a fundamental aspect of **quantities-prices**: they are units of measure of economic goods, generated by exchanges, expressed in quantities of other economic goods for which they are exchanged. Thus, in the cases we have seen q_2 is the unit of measure of q_1 y vice versa. That is why we indicate the Price as $P_{1(2)}$ and $P_{2(1)}$ respectively.

The preceding reflection indicates clearly that:

- 1) *Prices are quantities of economic goods.*

That is why we have established the concept of **quantities-prices**, since there is economic calculus in quantities that do not derive from exchanges.

- 2) *Prices are relative by definition*

In the closed box of exchange the relativity of **quantity-price** appears clearly, since $P_{1(2)}$ indicates that the **quantity-price** of q_1 is a function of q_2 , and vice versa, $P_{2(1)}$ is a function of q_1 .

3) *Economic unit of measure*

The unit of measure of an economic good is its *quantity-price*, which is in turn expressed in *quantities* of another economic good, which is subject to the contingencies of generation and destruction of all economic goods, and generates its *point E* in each exchange in which it participates. Thus we understand that the “economic meter” (the price of the good we use as a unit of measure) with which we measure any economic good, changes as the conditions that generate its *point E* change, which is the origin of the *quantities-prices* of exchange.

We conclude that in economics we do not have a rigid and unchanging unit of measure in time, as are the meter and the kilogram. And this is so since the unit of measure is the *price* of an economic good, not its physical reference, the economic good. I.e., the table of the scale of the “economic meter” (the price of the good currency, not the good currency, as we shall see) varies constantly, which only leaves us the alternative of selecting an economic good with specific qualities to serve as unit of measure, since its price will have constant variation. In short, *it is not gold that is the unit of measure, but the price it has in exchanges*, and this shows the qualities the economic good (gold) must have to be able to serve as currency. Again, first quality and then quantity.

4) *Valuation of economic goods*

Now that we have discovered a tool for measuring—which in economics means to calculate valuing—which is prices, we will give prices a use of incalculable importance derived from exchange. No matter if we are referring to the exchange of only two goods (barter) or to infinity of exchanges, with the presence of infinite economic goods. In this way, *prices are the necessary limit with which man makes subjective value discrete and observable.*

- 5) We can say *quantities-prices* are a fundamental tool when speaking of the economic quality, not physical, of economic goods. Thus, with quantities of economic goods (prices) generated in exchange, participants are “valuing the relative quality of economic good” which, *knowing quality is the first problem we need to solve*, tells us a lot when explaining the economy.

THE CLOSED BOX OF EXCHANGE EXPLAINS THE VARIATION OF QUANTITIES - PRICES

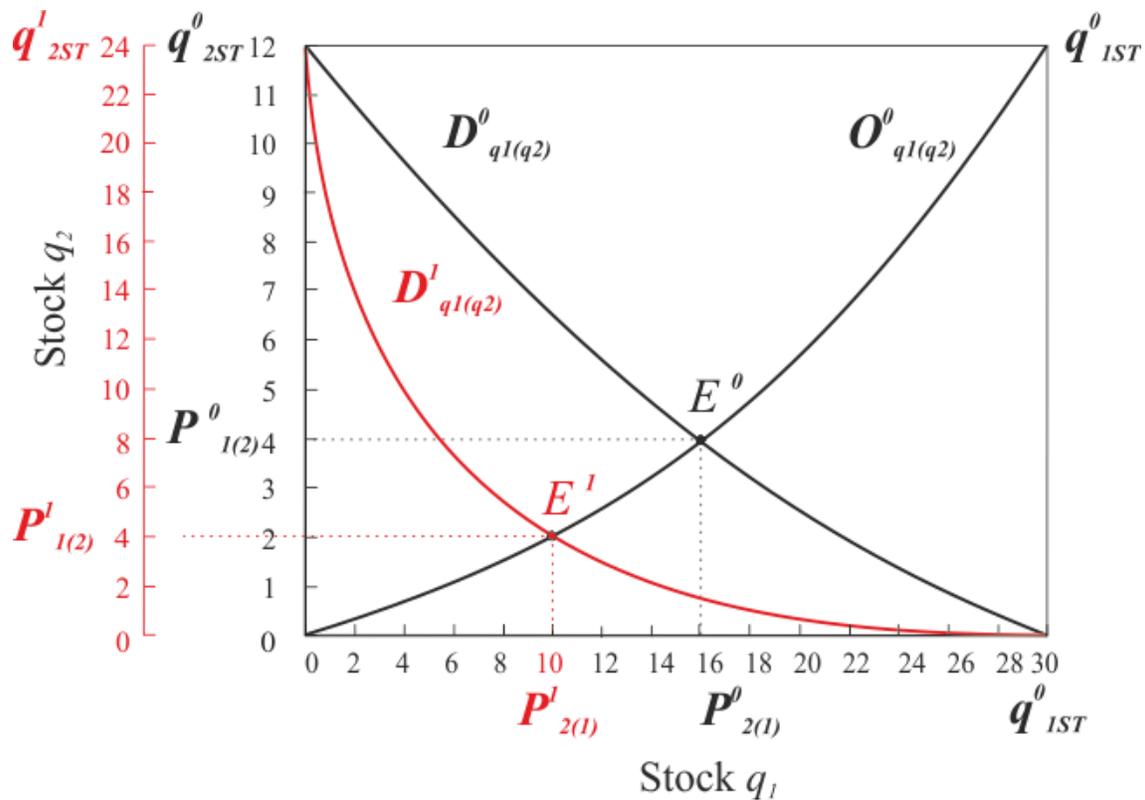
Continuing the previous section, now we concentrate on one of the essential aspects of economic theory, which is the inter-temporal variation of *quantities-prices*. To this effect we introduce an increase in the stock supplied in the period of one of the two goods we are considering, specifically we go from 12 to 24 units of q_2 . Let us see and study chart 10.

Components and analysis of chart 10:

- In black lines we represent the box of the preceding exchange, to which we have only added numerical scales.
- We add the new state of the stock of q_2 , which instead of 12 units is now 24 units.
- Because of this we add now a new ordinate to measure the new supply of q_2 , which is drawn to the left (red) of the preceding one, which will be useful for comparing and proving our point.

Chart 10

Variation of quantities-prices of one economic good



- Also because of the same we draw the new Supply curve of q_2 , we identify in red as $D^1_{q1(q2)}$, which modifies its slope relative to $D^0_{q1(q2)}$ since it is referred to the new closed box, with a scale determined by the new stock of q_2 and the old stock of q_1 .
- In this manner we obtain a new point E , represented by E^1 that identifies the new quantities-prices, since now 4 units of q_2 are exchanged for 10 units of q_1 , different from E^0 where 4 units of q_2 were exchanged for 16 units of q_1 . From which we deduce:

- a) The increase of the stock of a good, *ceteris paribus*, implies a decrease of its *quantity-price* relative to another, which implies an increase of the *quantity-price* price of the other relative to the first.
- b) The variations of the *quantities-prices* are not proportional to the increase in the quantities of the good. I.e., if we double the stock of q_2 it does not imply the *quantity-price* will decrease by half.
- c) The alteration of the quantity supplied because of the alteration of E^0 , implies the possibility of altering the quantities exchanged and/or the stocks of both goods, since the stock of q_2 is now of 4, the difference of $24 - 20 = 4$, *versus* the previous stock of 4, $12 - 8 = 4$, and the stock of q_1 is 10, because $30 - 20 = 10$, *versus* 16 because $30 - 14 = 16$, the previous stock.

Then on chart 10 on which we added an increase of supply of q_2 , we represent an increase in the supply of q_1 of 30 units to 45, with which we obtain chart 11.

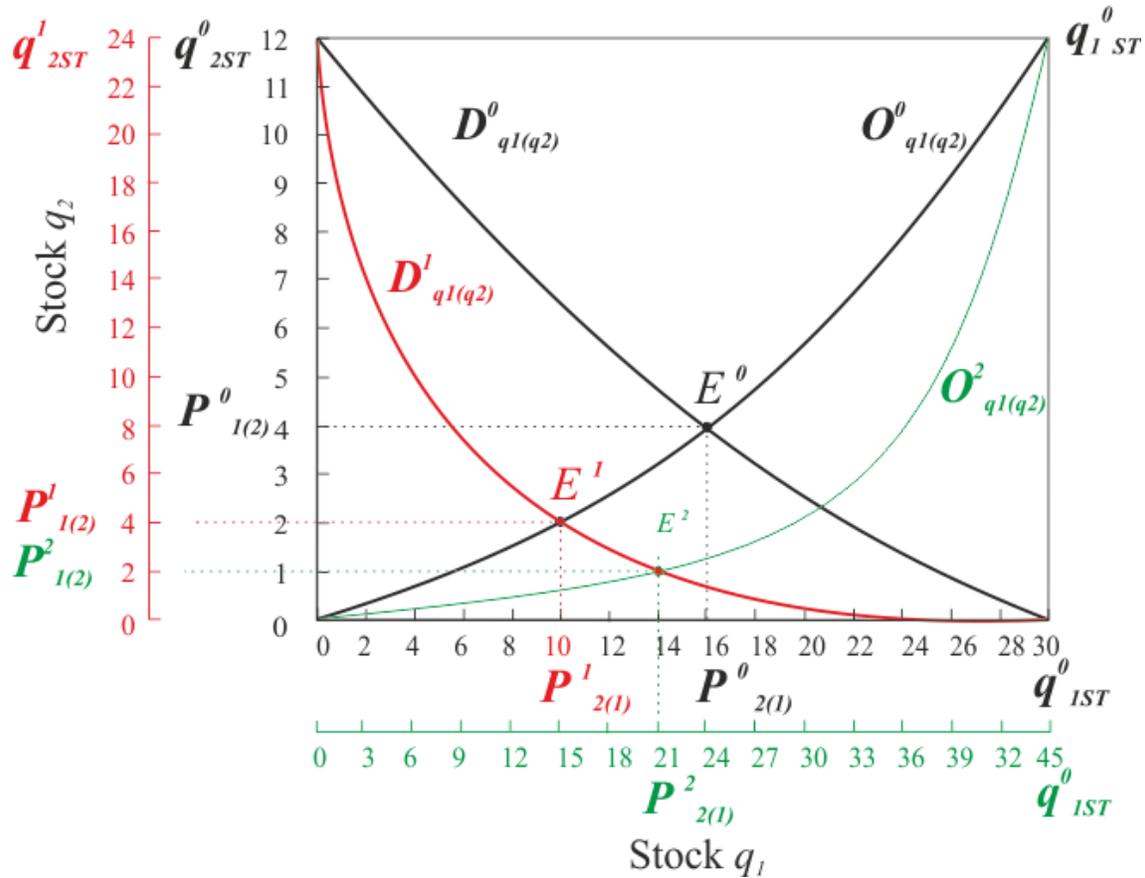
Components and analysis of chart 11:

- We copy the box of the exchange in chart 10, where we have already referred to the increase of the supply of q_2 .
- We include the new state of the stock of q_1 , that is now of 45 units instead of 30.
- Because of this we add now a new abscissa to measure the new supply of q_1 , which is drawn below (green) the preceding one, which will be very useful for comparison-demonstration.
- For the same reason we draw the new curve of supply of q_1 , that we identify with the color green as $O^2_{q_1(q_2)}$, and has the same slope as $O^0_{q_1(q_2)}$, only referred to the new closed box, with a scale determined by the new stock of q_2 and q_1 .
- In this manner we obtain a new *point E*, represented by E^2 that identifies the new *quantities-prices* since 2 units of q_2 are exchanged for 21 units of q_1 , different from E^0 where 4 units of q_2 are exchanged for 16 units of q_1 , and E^1 where 4 units of q_2 are exchanged for 10 units of q_1 . From where we deduce:
 - a) The increase of the stock of a good, *ceteris paribus*, implies a decrease in its *quantity-price* to another good, or an increase in the price of the other good relative to the first, which ratifies what we saw in E^1 , and the relativity of prices to each other.
 - b) The variations of the *quantities-prices* are not proportional to the increase in the quantity of the good. I.e., if we increase 50% the stock of q_1 it does not imply its *quantity-price* will decrease a third.

- c) The alteration of the quantity supplied, because we altered E^0 , implies the possibility of altering the quantities exchanged and/or the stocks of both goods, since the stock of q_2 is now the difference between $24 - 22 = 2$, versus 4 previous, and the stock of q_1 is $45 - 24 = 21$, versus 16 and 10 previous.

Chart 11

Variation of quantities-prices of two economic goods



Now we find ourselves at point E^2 to compare it with point E^0 , and we conclude:

- 1) An increase of the supplied quantities implies a decrease of quantities-prices originated in exchanges. Thus, the lower quantities-prices imply wellbeing, since there is a greater supply of economic goods to satisfy the same needs (this can be appreciated thanks to the *ceteris paribus* for explicative reasons in the exercise).
- 2) Since the exchange box derives from transferring Robinson's closed box, which had need in the ordinate and showed us point E , that is similar to point E^p in the exchange, we deduce that a decrease of needs produces similar effects to an increase in the quantities supplied, described in the preceding section.

And if we are referring to the analysis of wellbeing, we will now analyze it with the tools we have developed, which offer us an adequate methodology to approach this concept that is supposed to be abstract and not observable. But first we think it is appropriate to refer our conclusions to one of the developments with which current theories approached the issue, Pareto's Optimal.

QUANTITY-PRICE AND PARETO'S OPTIMAL

What we just said is closely related to what has been called Pareto's Optimal, considering as such the moment in which all exchanges cease because they would become detrimental to one of the parties. We will now try to clarify why this concept is unnecessary, since it is already included in the conclusions we have reached based on the two marginal laws, along with the exchange law derived from them. Let us see why we say this:

- 1) Pareto's Optimal is represented by our *point E* and *point E^P*, which tells us that all *quantities-prices* obtained in exchanges [$p_{1(2)}$ y $p_{2(1)}$] are representative of Pareto's Optimal, since each one is representative of an exchange that has been carried out, deriving from the *law of exchange*, and the cessation of exchanges is the origin of stocks. I.e., any position above or below, to the left or right, of *point E* or *point E^P* will imply the continuity of exchanges by dissatisfaction.
- 2) The fact that *quantities-prices* decrease inter-temporally does not imply that the owners of those goods have suffered because of the exchange that gave origin to the new, lower, prices. In other words, the decrease of prices is contemplated in the *law of exchange*, which always occurs to improve the situation of all participants.
- 3) The decrease of *quantities-prices* due to an increase in the quantities offered implies a more *efficient humanity*, a key tool to counteract the *marginal law of increasing effort*, and *diminishing returns* which underlies any supply or production of economic goods.
- 4) Finally, *point E* and *point E^P* indicate what is meant with the Pareto Optimal, since continuing exchanges after *point E*, or not to carry out those that would lead to *point E* —below or above, to the left or right of *point E^P*— would imply benefiting one at the expense of the other. Which can only be conceived if he is forced to exchange compulsively, a situation we have referred to and to what it means to alter exchange.

In this way we have corroborated that exchange is beneficial for all parties, since the wealth materialized in the stocks of economic goods is valued according to the product of “physical” quantities times the *quantities-prices* (which we will expand on in the section on *economic calculus*), these last being the tool for weighting the value of the physical quantities of economic goods, since the human action of valuing is what turns things into economic goods. This weighting, as will be seen, is of crucial interest to understand the economic evolution of man.

In short, there is no justification for a concept such as the Pareto Optimal, since the exchange is an expression of *point E*, the quantitative and temporal limit that makes the two fundamental marginal laws of economics and the “academic” law of exchange necessary and sufficient to

explain all we need to know about exchange. In other words, the Pareto Optimal can be useful if the *a priori* logical-deductive causality that explains the consequences of the validity of the marginal laws and the law of exchange is not understood.

We can summarize saying the marginal laws and the law of exchange (pure human action) would not allow an exchange where one of the parties is negatively affected compared to its situation previous to the exchange, considering that: it is impossible for all participants to have the same information and that the same data is interpreted differently by the subjects. It is important to observe that this is not refuted by the models that try to prove the opposite (such as the prisoners dilemma and others called game theory), based on the lack of knowledge of how the other interested party proceeds, or asymmetric information, which is all concrete information on reality, since there is no such thing as symmetrical, complete and perfect information. In other words, pretending to have symmetry of information or equal behavior with similar information is the same sphere of unreality as pretending to develop science based on an infallible man.

THE BENEFIT OF DEMAND

Benefit of the consumer: the benefit of the consumer is the differential generated, due to marginal diminishing utility, till the moment the exchange ends, when the market *quantity-price* is defined. Thus, the previous units acquired by the consumer satisfied more needs than the ones he acquired subsequently, even if they were obtained at a lower *quantity-price*. In other words, though the consumer may have paid the same *quantity-price* for all the units, he obtained greater utility with the first units than with the last unit with which the lowest *quantity-price* was defined, i.e., he would have paid the same price for all the units and obtained different benefits with each one. This utility is what is traditionally measured graphically as the benefit of the consumer, with the surface that is defined below the curve of demand, to the straight line below, defined by the ordinate at the level of the price, parallel to the abscissa.

Benefit of demand: we already know we refer to the benefit of demand —which we have called utility or *Gossen's benefit* with the area α_{Nq1} . This is composed not only by the demand destined for exchange, which is what is included in the previous term of the benefit of the consumer, but also of the demand of the supplier destined for stock (to satisfy his own or third parties future needs). In this way in the charts we have presented, we have measured the benefit of demand with the surface α , which is generated beneath the curve of demand, down to the coordinates' axis. I.e., we do not speak of benefit in terms of the *quantity-price* differential resulting from consuming many units at a lower *quantity-price* than the final one, instead we directly consider the total needs satisfied as the benefit of demand — expressed in *quantities* of economic goods —, bearing in mind that we not only need to consider demand for exchange but total demand, that includes demand for stock.

We will now offer two ways to evaluate the benefit of the demand —since it is what genuinely represents the concept of economic benefit—, with a geometrical chart and with a numerical representation. Comparing both we will have the possibility to clarify all doubts this presented in economic theory —not for the *theory of economic time*— which we can say was summed up in the (not very scientific to our humble understanding) concept of “currency veil”.

a) *Geometrical expression of the benefit of demand*

Now we will draw the charts 12(a) and 12(b) to represent the benefits of demand considering the increase of the supply of *quantities-stocks* of goods in a period of time.

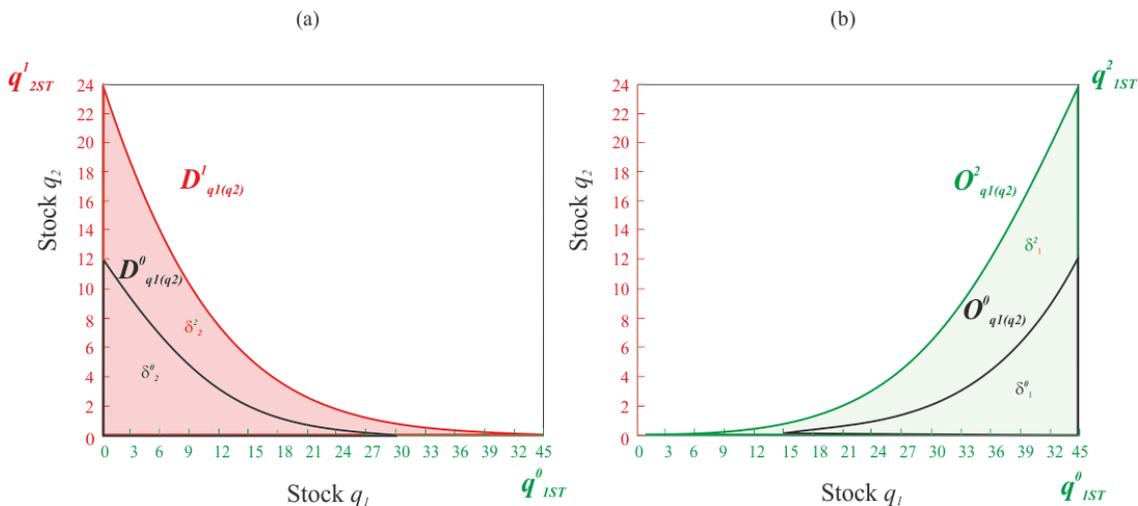
As we have shown, when we are referring to the exchange of stocks, the supply of one party is the demand of another, and we can represent the *benefit of demand* in the surface below both curves. As we saw, we consider the whole surface —to the abscissa, without the limit that is used in the representation of the benefit for the consumer—, since it is in line with the wider concept of satisfying needs, as we saw with Robinson (our α , that we will here call δ). This tool will be extremely useful to clarify doubts relative to decline of *quantities-prices* being or not beneficial, and how they come into play in each case.

Construction of the charts 12 (a) and 12 (b):

- Both charts were built based on the preceding ones, we only separated for greater clarity, the behavior of D^0 and D^1 in chart 12(a), and S^0 and S^2 in 12(b).
- We express both coordinates in the colors with which we have introduced the variations of the *quantities* supplied, red for q_2 and green for q_1 .
- We have represented in turn the original curves, before the exchanges, $D^0_{q1(q2)}$ in chart 12(a) and $S^0_{q1(q2)}$ in chart 12(b), both in black, and according to the units corresponding to the original case.
- We highlight the surfaces that represent the benefit for the demander represented in each chart, surfaces in colors for the new positions and framed in bold black for the original positions, with this detail:

Chart 12

Variation of *quantities-prices* of two economic goods – Consequences



δ^0_2 is the geometric area representing the benefit in the initial position of Second (q_2) from using *quantities* of First's goods (q_1). Area that is configured by the Surface below $D^0_{q_1(q_2)}$.

δ^0_1 is the geometric area representing the benefit in the initial position of First (q_1) from using *quantities* of Second's goods (q_2). Area that is configured by the Surface below $O^0_{q_1(q_2)}$.

δ^1_2 is the geometric area representing the benefit in the final position of Second (q_2) from using *quantities* of First's goods (q_1). Area that is configured by the surface shaded in red below $D^1_{q_1(q_2)}$.

δ^2_1 is the geometric area representing the benefit in the final position of First (q_1) from using *quantities* of Second's goods (q_2). Area that is configured by the surface shaded in green below $O^1_{q_1(q_2)}$.

Thus *the benefits of demand* due to the increase of *quantities* in the supplied stocks are represented in these inequalities, observed in the charts:

$$\delta^1_2 > \delta^0_2$$

$$\delta^2_1 > \delta^0_1$$

Conclusion of the geometrical expression of the benefit of demand:

- The increase of *quantities-stocks* of supplied economic goods, due to greater efficiency of supply, is the goal of human economic action, in Robinson's case on the island or in a society.
- We can observe the influence of the *marginal* concepts represented by the curves, and of the *totals* derived from them, represented by the surfaces. The behavior of the marginalities —present in the curves— is what determines the totalities —present in the surfaces.

We conclude that, *ceteris paribus*, the increase of the *quantities-stock* of economic goods implies a benefit for demand. We will see that this conclusion, that the logical causality we have developed presents dressed in triviality, merits an explanation when we introduce algebraic calculus, specifically when a unit of measure for calculating the value of wealth is adopted, and which becomes the value of the benefit of demand calculated with a unit of measure. The *somber panorama* we encounter notwithstanding, it has been extremely useful to produce this geometrical development, since it provides a very firm base which protects us against the presumed intrusion of an explanation “veil”, in case some event pretends to obscure the logical causality when explaining what is “observed”. Confusion that is present when there is no adequate prior theory to interpret what is observed, generally resulting when there is methodological “positivism” without a theory on which the observation can be based, which in

other words we express saying that the observation acts as a corroborator of theories, ergo, if the observation is made without a theory there is no corroboration whatsoever.

b) Arithmetical expression of the benefit of demand

Since in daily life, when we appreciate the benefit of demand we do not observe geometrical figures but we are instead confronted by numbers, it is urgent to study how they behave. Especially considering that the *quantity-price* of an economic good is adopted as a unit of measure to value all economic goods. All this knowing that all prices vary in time, and so does the *quantity-price* of the economic good used as a unit of measure.

To understand arithmetically the consequences of the variations (increase in this example) of the values of stocks of economic goods supplied in the period, it is essential not to lose sight of the relativity of *quantities-prices*, since they reflect the behavior of the marginalities, which will be decisive when calculating the totalities —expressed in *quantities*— we observe when we value. Let us see and study table 1.

In the first row we have placed the *quantities* supplied in each case we have developed. In the second row we have placed the *quantity-price*, expressed in *quantities* of the other economic good, indicated in each ordinate. In the third row we have presented the relative *quantities-prices*, with the corresponding division of the numbers indicated in row 2 ($0,25 = 4/16$).

We will now analyze the behavior of the magnitudes as we added the proposed changes in supply in sequential form: original situation, then Δq_2 , e $\Delta q_2 + \Delta q_1$.

Table 1

EXCHANGE MAGNITUDES

<i>Concept</i>	<i>Stock in units</i>					
	<i>q1</i>			<i>q2</i>		
	<i>Origen</i>	Δq_1	$\Delta q_2 + \Delta q_1$	<i>Origen</i>	Δq_2	$\Delta q_2 + \Delta q_1$
Units in stocks	30	30	45	12	24	24
<i>Point E^P</i>	4	4	2	16	10	21
<i>Quantity-Price</i>	0,25	0,40	0,10	4	2,50	10,50

The analysis will refer both to the variations of *quantities-prices* (marginality), and the valuations of the stocks (totalities composed of exchanged goods and kept in stock, in accordance to the *axiom of stocks*) at those *quantities-prices*, considering alternatively one or the other economic good as the unit of measure in the valuation.

a) *Increase of the stock of only one of the exchanged economic goods (Δq_2), and the prices:*

In the case where the *quantity-price* of q_1 [our $P_{q_1(q_2)}$], is adopted as the unit of measure, we can observe that when the supplied quantity of the other good q_2 , represented by the column Δq_2 , increases, its *quantity-price* also increases from 0,25 to 0,40. The inverse, decrease of $p_{q_2(q_1)}$, is observed in passing from 4 to 2,50. This clearly explains the meaning of the increase of the quantity of a supplied good, when the other is constant: a decrease in its relative *quantity-price* and vice versa in the *quantity-price* of the other economic good.

The same occurs if we analyze the increase of the stock supplied of q_1 relative to the increase of q_2 . Here we observe that $P_{q_1(q_2)}$ decreased relative to the previous *quantity-price*, from 0,40 to 0,10 as a consequence of the increase of the supply of q_1 , from 30 to 45. The inverse, an increase of $p_{q_2(q_1)}$ which is observed in passing from 2,50 to 10,50. This again clearly explains the previous case, the increase in the quantity of a supplied good when the other is constant, implies a decrease in its *quantity-price* price and an increase in the *quantity-price* of the other economic good.

b) *Increase of the stock of the two exchanged economic goods ($\Delta q_2 + \Delta q_1$), and the prices:*

Now we are going to analyze the case of the increase of supply of the two economic goods, and to that effect we relate the position of origin to the final one.

We observe a smaller change in relative *quantities-prices*, since both stocks increased. This is so since the effect of the increase of the quantities of each one in the other was partially neutralized, as opposed to considering only the increase of the stock of one good. But that is not what is important, we can simulate other situations. What is relevant is that the same *quantities-prices*, or different *quantities-prices*, are obtained with greater stocks available in the period, which means a greater benefit for demand. In this situation in the real world when calculating the value of the stock supplied in the period these questions arise immediately: The calculus of the valuations derived from the variations of *quantities-prices* will reflect that benefit with a higher number? Or will there be a “monetary veil” to refer all calculations on *quantities-prices-currency*? we shall see.

We have already learnt that the economic explanations — maybe all kinds of knowledge? — derive from understanding the behavior of the marginal magnitudes, and their influence on the total magnitudes. We continue with the pertinent analysis not forgetting that *essential causality to understand the numbers of the economy* and eliminate any “veil” that ad hoc theories could impose upon us, and starting from the fact that *in economics we refer to values, not quantities*, which are units of measurement to calculate

Marginal (quantities-prices) and total figures (valued quantities)

The exercise we have carried out clarifies the usefulness of marginal and total concepts. Let us see:

a) *Marginalism, quantity-price*: the marginal figures helped us explain the moment in which the parts decide to dedicate the stocks of present economic goods to future needs, and the amounts of stocks destined for exchange. In other words, and it could not be otherwise, the concept of marginality, present in the two fundamental laws of economics, helps us solve the temporal and quantitative aspect of economics. Remember *we have only needed the three marginal laws, that imply time, and we have done so through quantities of*

economic goods –which implies explaining economic time by means of quantities of economic goods.

- b) *Totalities, value:* if we weight the value of the total stock offered in the period of time by its *quantity-price*, i.e., expressed in the unites of another stock, we obtain the value of the supplied stock of q_1 in terms of its *quantity-price* expressed relative to q_2 , and we can say we have valued in terms of the formula $q_1 * P_{1(2)}$. Thus we can designate that product as the total value of the stock of q_1 supplied in the period, valued at the *quantity-price* of q_1 relative to q_2 :

$$V^{1(2)}_{q1st} = q_1 * P_{1(2)}$$

- c) *Marginalism (quantity-price) and totalities (valued quantities):* the value of the stock obtained [$V^{x(y)}_{qxst}$], weighted by the *marginal values provided by the relative prices* in terms of the quantities supplied of the stock of the other product, is a powerful tool for the economic calculus of *total* stocks in a period of time, which implies making the marginalism underlying our analysis visible. In other words, the *quantities-prices* are the observable expression of the consequences of the marginal laws, an expression that allows us to calculate through the mechanism of valuing the physical quantities of the economic goods, and giving quantitative content to the concept of value.

We will now analyze how the marginalities and totals determined with them come into play, as we use the different types of units of measure we can adopt.

- 1) *Valuation using quantities-prices, with no temporal value measure.*

To that effect we built table 2:

Table 2

Calculus with “pure” relative prices: with $p_{1(2)}$ and $p_{2(1)}$

<i>Case</i>	<i>q₁</i>			<i>q₂</i>			<i>Value of Stocks</i> [$V^{1(2)} + V^{2(1)}$]
	<i>Stock</i>	<i>P₁₍₂₎</i>	<i>V¹⁽²⁾</i>	<i>Stock</i>	<i>P₂₍₁₎</i>	<i>V²⁽¹⁾</i>	
Origin	30	0.25	7.50	12	4	48	55,50
Δq_2	30	0.40	12	24	2.50	60	72,00
$\Delta q_2 + \Delta q_1$	45	0.10	4.50	24	10.50	252	256,50

This table was built considering the relative *quantities-prices* we used in the exercise we developed, i.e., we have weighted the valuation of the units of stocks, for each sequence of increase of stocks presented, as we have indicated in the ordinate of the charts.

An analysis of the last column allows us to conclude:

- a) **Increase of the total value with the use of relative prices (with no universal unit of measure for the calculus)**: we see that in all the cases of increase of quantities of stocks supplied, ***using quantities-prices to value, with no units of measure, ALWAYS*** a higher value was obtained as the quantities increased, even if there was a decrease of relative prices, which is expressed in the last column with the values framed in yellow: $55.50 < 72.00 < 256.50$.

We underscored this situation because we are always going to obtain a higher value of the total stock, *when we use quantities-prices in the weighted valuation, not using one as a unit of measure*. This is so insofar as an increase in the quantities of the stocks will always give us a higher weighted value, valued at *quantities-prices* with no universal unit of measure in time. A situation we observe both in going from 55.50 to 72.00 (when we had increased q_2) and in going from 72.00 to 256.50 (when we had increased q_1).

We observe that this arithmetic case, that we will call the case of “*pure quantities-prices*”, is in accordance with the geometric case. And this is so because it is the pure application of the concept of *quantity-price*, with no alteration due to the use of a universal unit of measure for calculus.

But we will see that with the use of the *quantity-price* of one of the economic goods as a unit of measure we will not necessarily obtain figures with greater valued totals. Which does not imply there is a “veil” that does not allow us to explain.

- b) That though the absolute quantities of stocks, not weighted by *quantity-price*, increased from 42 (30 + 12) to 69 (45 + 24), which represents an increase of 64%, the total value of the wealth, from 55.50 to 256.50, which represents an increase of 256%. We present this as proof how the information supplied by the marginal calculus and the total calculus complement each other. This is the way economics captures the real concrete world of seeing and adding stocks (totalities), with the concrete real world of observing how *quantities-prices* are formed in exchange (marginalism). On the other hand it is clear proof that the variations of quantities have nothing to do with homogeneity or linearity on variations of relative prices or with the value of totalities.
- c) Finally it is important to stress that in economics it is pertinent to refer to the *economic value*, not things. And that value is weighted in terms of *quantities-prices*, which configure the observable aspect of value.

In daily life *pure quantities-prices* are not used, since they refer to barter, and instead the *quantity-price* of an economic good is used as the unit of value of stocks of economic goods, so we will continue with the study of this case.

Therefore we will study what happens when we adopt as universal measuring unit for calculating the *economic value*, better said, when we adopt the *quantity-price* of an economic good as a unit of measure to value the stocks of all economic goods. A situation we will now analyze.

- 2) *Valuation using the quantity-price of an economic good as the unit of measure in time.*

To do this we will present two more tables with numeric calculus, which we can produce with the information we have obtained with the simple exchange in exercise. We will value the

stock of economic goods available in the period, using the *quantity-price* of q_1 first and then the *quantity-price* of q_2 as a unit of measure. Let us see:

Table 3

Calculus with $p_{1(2)}$ as the unit of measure

Case	q_1			q_2			Value of Stocks [$V^{1(2)} + V^{2(1)}$]
	Stock	$P_{1(2)-1}$	$V^{1(2)}$	Stock	$P_{2(1)-1}$	$V^{2(1)}$	
Origin	30	1	30	12	0,25	3	33,00
Δq_2	30	1	30	24	0,40	9,60	39,60
$\Delta q_2 + \Delta q_1$	45	1	45	24	0,10	2,40	47,40

The column of *quantities-prices* is referenced in the *quantity-price* of the two economic goods relative to the *quantity-price* of q_1 , which is expressed adding -1 ($P_{1(2)-1}$, $P_{2(1)-1}$). As a result of which the *quantity-price* of q_1 is 1 for all cases (column 3).

On the other hand the *quantity-price* of q_2 , relative to the *quantity-price* of q_1 , is the same as we had before in table 1, in the row of the relative price of q_1 : $P_{2(1)}$. This is understood seeing we need 0,25 (0,40 and 0,10) of q_2 to buy a unit of q_1 .

We will now show the case in which we use the price obtained in the exchange for q_2 as the unit of measure to calculate the value of the stock. With the same procedure indicated in the previous case, we obtain the following table:

Table 4

Calculus with $p_{2(1)}$ as the unit of measure

Case	q_1			q_2			Value of Stocks [$V^{1(2)} + V^{2(1)}$]
	Stock	$P_{1(2)-2}$	$V^{1(2)}$	Stock	$P_{2(1)-2}$	$V^{2(1)}$	
Origin	30	4	120	12	1	12	132,00
Δq_2	30	2,50	75	24	1	24	99,00
$\Delta q_2 + \Delta q_1$	45	10,50	472,50	24	1	24	496,50

Analysis of the alternative valuations of the stock:

We will now highlight the aspects we consider relevant, apart from those that will interest the reader, from the information we have obtained:

- To obtain information from the proposed analysis, we have supposed an increase in the stock of both economic goods, exchanged in the represented barter. In other words, the

inverse explains the case of simultaneous decreases, and a decrease of q_1 can substitute the increase, to add to the increase we supposed first for q_2 . The analysis of decreases of quantities supplied, instead of the increases proposed here, can be analyzed also following the inverse path based on the same information we have presented. Mixed combinations of increases and decreases of quantities will shed the same light.

- We can see that, according to the price we use as a unit of measure, or of absolute relative “pure” prices, the final figure reflected by the value of the stock is completely different, let us see:

$$496.50 \neq 256.50 \neq 47.40 \quad 99 \neq 72 \neq 39.60 \quad 132 \neq 55.50 \neq 33$$

Which indicates that the figures are not only different, but they are also greater if we use smaller relative unit *quantities-prices* (that is why we have included the composed symbol \neq) and vice versa.

We must bear in mind that here we have compared values of each of the three situations according to each method chosen for the valuation, not of the values of each of the three situations “within” each method of valuation, a case that we will analyze below.

- It is very important to highlight what happens in the case of the value 99 of table 4, in reference to the fact that: the increase in quantities does not necessarily imply an increase in the value of the stocks in all cases.

$$256.60 \text{ (for } 45 + 24 = 69) > 72 \text{ (for } 30 + 24 = 54) > 55.50 \text{ (for } 30 + 12 = 42)$$

$$47.40 \text{ (for } 45 + 24 = 69) > 39.60 \text{ (for } 30 + 24 = 54) > 33 \text{ (for } 30 + 12 = 42)$$

$$496.50 \text{ (for } 45 + 24 = 69) > 99 \text{ (for } 30 + 24 = 54) < 132 \text{ (for } 30 + 12 = 42)$$

THE EXCEPTION: this “exception” expresses the case in which the decrease of the *quantity-price* of the good used as unit of measure, due to the increase of its stock, was relatively larger than the increase produced in the quantities of the stocks. Here the *quantity-price* of the economic good chosen as the unit of measure fell 37.50% (2.50 now, added to 4 before), *versus* an increase in the quantity of units of the stock of 29% (54 units now, added to 42 before). Then, the increase of the weight valued between *quantities-prices* and “physical” quantities, resulted in that the increase in the “physical” quantities did not compensate for the decrease in the *quantity-price* used for weighting. This “exception” confirms TET, since neither the *quantities-prices* —Price Wicksell Effect? — nor the “physical” quantities —Real Wicksell Effect?— by themselves can explain the *economic value* —*explained to consider complementary*. A situation we will have the opportunity to corroborate further on, as the decrease in the *quantity-price* of the unit of calculus will reflect the decrease of the calculated value of wealth. Which would “imply contradicting” that, *ceteris paribus*, an increase in the stocks of economic goods benefits demand.

A fall of the quantity-price of the unit of economic measure leads to a fall of the figure of the calculated value of wealth.

This situation produced great confusion in the theoretical developments of the twentieth century, very well represented by the debates between Hayek and Keynes ⁽²⁹⁾ about what rises and falls of prices meant for the economy. Keynes maintained that price rises were what gave the impulse for the profit companies needed to do business, and Hayek rejected this. Here we will show if one of them was right and why.

The figures we have obtained in this case only show that an increase in the quantities of the economic good used as a unit of measure —which implies a decrease of its *quantity-price*— can imply a lower valuation of total wealth. This situation will be seen in its full dimension when we study generation and destruction of wealth, and it will corroborate the exercise we have presented.

We must bear in mind here we have compared values from each case in relation to a system of stock valuation, one with *quantities-prices* and no unit of measure, and two with relative prices with a unit of measure. This is the method used in everyday life, and that is why the “exception” case is important.

- *Value*: it is important to bear in mind we have used the expression of greater or smaller value in the sense of a greater or smaller number. This is so insofar as we can use one or another price to value both economic goods.

Let us see another very important conclusion resulting from the exercise on the issue of value. To this effect we analyze the final result of the three proposed options, and concentrate on the percentage variations of the value of the stock for the period, according to each type of valuation, knowing the quantities of goods have varied equally for the three methods. Let us see table 5.

This table was built considering:

- The first two columns represent the percentage variations of the proposed increases of the stocks, in the stocks of each economic good.
- The other three columns, expressed in values obtained for each one of the three cases, according to the unit of measure adopted, for the first pair of columns that expressed in *pure quantities-prices* with no unit of measure, expressing in its first column the value calculated for each situation, and in the second the percentage variation compared with the previous one. The two following pairs of columns were built with the same criterion, one considering the *quantity-price* of q_1 as the unit of measure, and the other the price of q_2 .

We can observe the complete lack of harmony between the percentage variations of quantities, and the percentage variations of values. And there is a negative percentage variation in the case of 99.

This table is presented to reiterate, once again, that it is essential to say what unit of measure is being used for valuation in economics, since as we can see we obtain completely different figures with one or another. Nevertheless, we reiterate also that we do not find here the difference with the units of measure of physics (you also get different figures if you measure with meters or yards), instead it is in the variation you find in economics due to the use of one unit of measure, the price of one economic good —i.e., in economics the yard and the meter vary, a circumstance that must be taken into consideration to be able to calculate.

Table 5

Different values for the same stock

% Δ Stocks		Stock value with unit of measure:					
		$P_{1(2)}$ y $P_{2(1)}$		$P_{1(2)}$		$P_{2(1)}$	
q_1	q_2	$V^{1(2)} + V^{2(1)}$	% $\Delta V^{(a)}$	$V^{1(2)} + V^{2(1)}$	% $\Delta V^{(a)}$	$V^{1(2)} + V^{2(1)}$	% $\Delta V^{(a)}$
33	100	256,50	256	47,40	20	496,50	401,00
	100	72,00	30	39,60	20	99,00	-25,00
		55,50		33,00		132,00	

^(a) Represents the percentage variation compared to the previous state: Δ 256 % is the percentage increase of 256.50 over 72.

So we see:

- *General variations:* it is important to stress that when we observe the final result of the exercise we see that not only the exchanged amounts change but also the final stocks.
- *Economic calculus:* from all this we deduce that it would be very useful to be able to define an economic good as a unit of measure for all exchanges, because it is clear that:
 - a) If we can use three forms of valuating the exchanges, for each pair, it is easy to conclude that in a community with millions of exchanges of millions of economic goods, it is impossible to generate useful information. This complexity led mankind to use a common unit of measure to value all economic goods, as we shall see.

- b) We can understand then why human beings discovered spontaneously the economic good of common use for exchanges, so that its *quantity-price* would serve as the generalized unit of measure for valuations or economic calculus.
 - c) We can also understand the preoccupation with respect to a “fall” of the price of the economic good used as the unit of measure, considering what it implies for the valuation of the stocks of economic goods. A situation that is not considered in currency policies to which we will refer.
 - d) We can understand that an increase of the value of the unit of measure is not a problem, on the contrary, since it avoids the “currency veil”. I.e., the reference to the “barbaric relic” in reference to money currency was very unfortunate (we are referring to Keynes comment on gold as currency).
- The ***effect of the closed box***: Its use allowed us to understand that the variations of the *quantity-price* of goods does not alter in proportional or homogeneous form the value of economic goods; that is in fact impossible based on the laws of marginal diminishing utility and returns underlying the law of exchange.⁽³⁰⁾
 - In *accordance* with the measurements of the other sciences, the use of different units of measure produces different “figures” with the same objects; by simple effect of multiplication the figures are greater according to the unit of measure used being greater, and vice versa.

To this effect it is sufficient to observe that if in a period of time we value Argentine wealth considering its peso as the unit of measure, as time goes by the figures will be greater here than what we obtain if we use the American dollar or the euro as the unit of measure, and this is so considering the quantity of Argentine pesos supplied was exponential compared to these currencies. A situation that is referred to with the concept of “currency devaluation” or “variations of the exchange rate”.

What is *distinctive* in economics is that the valuation will be smaller the greater the amount of the economic good used as the unit of measure, given that the greater the amount of the economic good chosen as the unit of measure, *ceteris paribus*, the smaller the price after the increase. And vice versa.

IMPORTANT: as the stock of units of the economic good used as the unit of measure increases in time (*ceteris paribus*) its price decreases along with the valuation of the stocks, and vice versa. IT IS NOT THAT THE *QUANTITIES-PRICES* OF OTHER GOODS RISE, an unfortunate use of language under the title of “general level of prices”.

Conclusion on the arithmetic calculus of the benefit of demand.

It is not appropriate to express figures of value without indicating what economic good the units in stock refer to, and to what unit of measure the valuation calculus refers to. In the same sense that we do not simply say 5 if we wish to refer to bread and 5 kilos. It is only with this qualitative data (bread), the unit of measure kilo and the quantity 5, that we know we are talking of 5 kilos of bread. In the same manner we say those 5 kilos of bread “are worth” 50 monetary

units (\$). We need to refer first to the quality; for economics here it is 5 kilos of bread are worth \$ 50, interpreting “worth” in the sense that 5 kilos of bread are exchanged for 50 currency units.

Based on the example of barter, we see the need to continue developing the economic causality chain to be able to explain further. But we do this fully confident, since we know we must not abandon the *a priori* logical deductive chain of causality. On the contrary, it shows us man must find a solution to calculus with the adoption of a unit of measure, knowing what this will imply. Even so, TET’s posture is ratified in the sense that economic calculus is feasible where *quantities-prices* are generated, even if they are not in *quantities-prices-currency*, since barter also generates them, a theoretical observation on Mises we made based on TET.

What we have developed up to this point will be of extreme importance to explain the economy as we shall see. We expressly ask that the reader concentrate on understanding the score of the symphony presented by the *a priori* logical deductive causality chain we saw up to here, since it is the same symphony we will continue to observe.

Yes, we have seen economics up to here, but sharing the same basics as the double entry accounting techniques. The truth is that economics and accounting share the same basic fundamentals of causality, the fundamental causality of economics —*need* → *economic goods*—. That is why for Mises and for us it is very easy to say that accounting is the model for economics, complying with the necessary and sufficient conditions to explain the economy.

We cannot leave this part of the development, since it is foundational for what follows, without reiterating that the conclusions we have reached up to here are based on applying the marginal laws of utility and returns, both diminishing. A situation which on the one hand is guarantying fidelity to the method of the *a priori* logical deductive chain of causality, uncontaminated with other developments that could alter the clean use of these foundational laws of economics, since they are primitive terms that substantiate the fundamental economic causality *demand* → *supply*.

When comparing the conclusions obtained geometrically and arithmetically we can conclude, *ceteris paribus*, that the increase in the quantities of stocks of economic goods supplied implies a benefit for demand, though the case of the 99 value could induce us to think we are in the presence of a *non benefit*.

The reflection in the preceding paragraph is what has interested the economists of the twentieth century, and they based their theories on this issue to explain the consequences of the variations of *quantities-prices* of the universal unit of measure (*quantity-price-currency*), and its consequences for wealth distribution and unemployment of labor and available resources in general. This work ends with an explicative model which will allow us to corroborate the enormous importance of classifying the types of currencies a community can choose WHEN CALCULATING—in both this *quantity-price* is the universal measure unit—, since the use of one or the other has opposite effects and can lead to devastating consequences — *the laws that govern quantities-prices of money in time are different from the laws that govern the quantities-prices of credit*.

QUANTITY-PRICE, VALUE, AND THE BENEFIT OF DEMAND

Therefore, when measuring the economic benefit of demand, it is of great importance to understand the relevance and consequences of the necessary use of a variable unit of measure in time. Thus, the calculus of the total value of wealth is determined based on weighting the

physical units of each economic good by the marginality they contribute to the price, which is relative to the good for which it is exchanged.

It is important to consider how we have treated the specific case of the exchange of an economic good for another, which allowed us to produce the economic calculus of the value of wealth in the primary phase of barter, an achievement of enormous magnitude, no matter how trivial it might seem. In other words, we have adopted the alternative of going from the simple to the complex, instead of the traditional method of explaining based on currency, and supposing that without currency we cannot calculate. We have proven that without currency it is possible to calculate, considering as such the process of valuing based on *quantities-prices* that derive from exchange, if we are in the presence of barter.

It is also known that man discovered the way to go beyond the primitive phase of barter, using currency. The very good news is that to study the phase of currency we need not alter what we have developed in the least, since we only need to value all economic goods considering their *quantities-prices* relative to the *quantity-price* of currency. Thus we can compare the values of all economic goods given the common factor included when using a unit of measure of universal use. Which we will logically do.

The reader that has encountered the external theoretical struggle considering if a rise or fall of prices is beneficial,⁽³¹⁾ can now find a concrete answer, since we now understand how marginal magnitudes (relative and temporal, as everything marginal) and total magnitudes come into play. On the other hand, he will have been able to see what effect the use of different systems of valuation has, and the enormous importance of the rise or fall of the *quantity-price* of the economic good used as the unit of measure, being the method adopted by advanced communities that have gone beyond the phase of barter.

Given that the increase of quantities (*ceteris paribus*) implies efficiency has produced results—appearing as the underlying motivation the need to cover the shortages that explain human economic action—since there is a greater *benefit of demand*, we can conclude we are in the presence of more benign consequence of the *law of diminishing returns*, due to the *efficiency* attained thanks to its incidence. In other words, efficiency (derived from capital, technology, knowledge, discovery, productivity, etc.) must be the prow of all societies. Institutions opposed to efficiency—*bureaucracy*—harm humanity, which makes us think it should be considered a crime against humanity, since it causes harm to life itself.

In the continuity of the causality chain we have been developing, important for what is to follow, it will be useful to retain these conclusions:

- 1) *Unit of measure for valuing wealth*: the calculus of the value of economic goods is based on the relative *quantity-price* of the economic good chosen as the unit of measure.
- 2) *Unit of measure variable in time*: being the unit of measure of economic calculus *a price*, we immediately deduce the impossibility of it being constant in time. Especially considering it is the reference *quantity-price* for all other *quantities-prices* (except its own). A trivial circumstance in our development, but it has been and still is one of the “so many inconsistent” problems of economic theory and practice. I.e., it is not prudent to equate the function of the unit of measure in economics, with the units used in physics, apart from the fact that in that case there is also no constant unit of measure (it is considered constant disregarding small differences).

- 3) *Currency veil – Consequences of calculus with a variable unit of measure*: precisely the variation of the price of the economic good used as a unit of measure is of transcendental importance in calculus, since it is the multiplying factor with which humanity values wealth and makes all economic decisions. To that effect we only need to bear in mind the case of 99, which presents lower figure of value of wealth (*ceteris paribus*) with the same or greater quantities of stocks of economic goods (wealth). In short, calculus with the variable unit of measure explains that case 99 is no exception, but a consequence with an explainable causality, here duly explained and clarified, that allows us to eliminate the so called “currency veil”, that would be a veil if we could not explain it.
- 4) *Selection of the unit of measure*: in terms of what it means to choose an economic good to be used as the unit of measure (currency), a complete and precise currency taxonomy is of transcendental importance.

Given what we have seen, we can discover the transcendental importance of the taxonomy proposed by TET when classifying currency: it is very different for the economic good currency to be part of the equation $A_n = PN_n$, composed of stocks of present economic goods (with no risk for what is pending for the future), from currency belonging to the equation $Cr_n = D_n$, representing exchanged economic time, which is subject in turn to the relativity of other economic goods. Let us see the classification of currency we adopt, according to the *Theory of Economic Time*:

- **Money currency**: subject to the relativity of *quantity-price*.
- **Regular-credit currency**: subject to the relativity of *quantity-price* + the relativity of indirect materialization (being credit).⁽³²⁾
- **Irregular-credit currency**: subject to the relativity of *quantity-price* + the relativity of indirect materialization (being credit) + the uncertainty of not specifying the indirect materialization.

We reiterate that it is of transcendental importance to see if currency is money or credit, if the credit is regular or irregular, given that the *quantities-prices* each one forms in exchanges obey completely different laws. Of extreme importance, derived from the fact that it is the universal economic unit of measure.

- 5) *Generating or destroying the value of wealth*: another central aspect when classifying the different types of currencies is linked to the function of preserving value. TET firmly states it is not an exclusive property of currency, since all economic goods exist because of the value assigned to them, or they would not be economic goods —more proof that currency does not merit a special theory. Nevertheless, it is curious to appreciate that the value of currency is a property that should be recognized even more in currency, considering it is assigned the function of acting as a unit of measure, and we know it guides the calculus of value in wealth in economics, i.e., the alteration of its *quantity-price* implies altering all other calculus. In other words, the rise in *quantity-price* of currency implies greater value of the wealth calculated, and the opposite implies less value. All which tells us that the alterations in the quantities of currency imply generating

or destroying the value of the wealth calculated. As the reader can observe, the more we progress with our work, so much more unfortunate the expression “barbaric relic” appears to be.

It is very important for the reader to remember this section, since it will be very important for the following developments:

Economic value is calculated with a variable unit of measure

We end this section saying the circumstance of using the price of an economic good as a unit of measure for calculations of the value of wealth does not authorize us to forget that the *quantity-price* of the economic good used as a unit of measure is still a *quantity-price*, generated in exchanges where the good in question participates, just like any other economic good. I.e., we cannot consider an absolute *quantity-price* or a *quantity-price* that is not relative, because of the fact that it is used as a unit of measure to calculate the value of wealth.

Forgetting what is in the preceding paragraph is the reason why theory did not understand what happened in the event presented with “case 99”. That error led to think that “case 99” implied the destruction of wealth as a stock of economic goods, when it expresses the value of wealth using as a unit of measure the decreased *quantity-price* of an economic good. But if we compare it with the two other possibilities of valuation —relative prices without a unit of measure or the *quantity-price* of another economic good as the unit of measure— that circumstance did not occur. As a consequence, with the fall of the price that is the unit of measure, what we have is a destruction or fall of the value of the wealth calculated with that unit —a situation that does not occur with the use of the other two methods—, of which we will analyze the consequences.

QUANTITY-PRICE THEORY

Evidently what we have developed allows us to shed much light on price theory. To that end we present a brief summary of its evolution, and how our chain of logical deductive causality beginning with *Gossen's three laws* can be presented as a synthesis.

- *Classics (Theory of objective value)*: they said prices were determined by costs, and so these end up determining prices, and at the same time they accepted that supply and demand determined prices. It is what is known as the classical vicious circle —that we represent: $cost \leftrightarrow price$ —, based on it classical theory could not explain the “price phenomenon”. It is important to recognize the influence of David Ricardo in this, above all with his analysis on diminishing returns.
The classics’ argument was that prices “derive from things”, i.e., they were objectified in economic good. The extreme case was Marxist dialectic materialism.
- *Marginalists (Theory of subjective value)*: with the advent of the theory of subjective value at the end of the nineteenth century the classical vice was solved, since prices arise

from the subjective valuation of the participants in the market, not the costs, aspect that has its explanation in imputation theory, discovered by Menger and explained by Hayek.

- *Theory of Economic Time*: it proves the laws of supply and demand are unnecessary to explain the formation of prices, our E^P since they are explained by the joint incidence of the laws of diminishing marginal utility and the law of diminishing returns. In other words, the curve of demand is the representation of the behavior or functioning of the law of diminishing marginal utility (the curve of need or Gossen's curve), and the curve of supply is the representation of the behavior or functioning of the law of increasing effort (diminishing returns).

The *Theory of Economic Time (TET)* clearly states that the well known laws of supply and demand —foundations of the current theories— are in truth the *observed consequences* of the “natural” laws of diminishing marginal utility and diminishing returns. This is very important, since legislating on *quantities-prices* is intervening in the functioning of these laws, it is like legislating on the law of gravity and its consequence are usually catastrophic, within the sphere of crimes against humanity. A situation that can be avoided legislating only one sentence saying: *it is forbidden to alter the free functioning of the laws of marginal diminishing utility and returns.*

In reference to the link of the theory of *Quantities-prices* to the theories of value and the functions of the same, let us remember emphatically the central role we have given the *temporal function of quantities-prices* here, insofar as they define the *moment in time* of the end of exchanges and the beginning of stocks, overshadowing the traditional approach of focusing on the explanation based on exchange ⁽³³⁾ – we suggest studying, not just reading, note 33.

CURRENCY

Before continuing with the study of the *quantity-price* of the unit of measure currency, it is very important to reflect on the consequences what we have seen and concluded up to this point has for the theory of *quantity-price*.

THE ECONOMIC GOOD CURRENCY IN EXCHANGE

The appearance of exchange showed the presence of a need, overcoming the routine, costly, and bothersome phase of barter. Once again human action was mobilized to overcome a state of dissatisfaction, which originated the discovery of currency. We can ratify currency was an efficient answer to a need that showed a very high marginal effort level (level of the curve of supply).

The *Theory of Currency* in TET, defines currency as the *economic good that satisfies the need for liquidity*,⁽³⁴⁾ —without excluding other functions— illiquidity being what is characteristic of the phase of barter. From this definition derive the qualities that an economic good must have to reach the status of currency, and the functions it will have in the economy.⁽³⁵⁾

Once it is understood that ***currency is an economic good*** (that satisfies the *need* for liquidity), we can include it in the *a priori* logical-deductive causality reasoning we have been developing and show how the *quantity-price* of currency is determined in an exchange, and in turn how economic goods exchanged for it define their *quantity-price* compared to the *quantity-price* of currency. In other words, the study of currency does not need special developments to apply to it the theory of subjective value.

THE QUANTITY-PRICE OF THE ECONOMIC GOOD CURRENCY

Given the nature of the economic good currency, we can analyze it within the development we have been producing.⁽³⁶⁾ Thus we present chart 13.

In the ordinate we have represented the stock of an economic good that is not currency (q), and in the abscissa we have represented the stock of the economic good currency (m). We have represented the curves of supply-demand of both goods that seen from the “*producer*” of currency are $D_{m(q)}$ y $O_{m(q)}$ respectively, and its prices expressed in quantities of another good: the price of the economic good currency expressed in the economic good q appears as $P_{m(q)}$, and the price of the economic good q expressed in the economic good currency $P_{q(m)}$. We reiterate that:

$$O_{m(q)} = D_{q(m)}$$

$$D_{m(q)} = O_{q(m)}$$

Where:

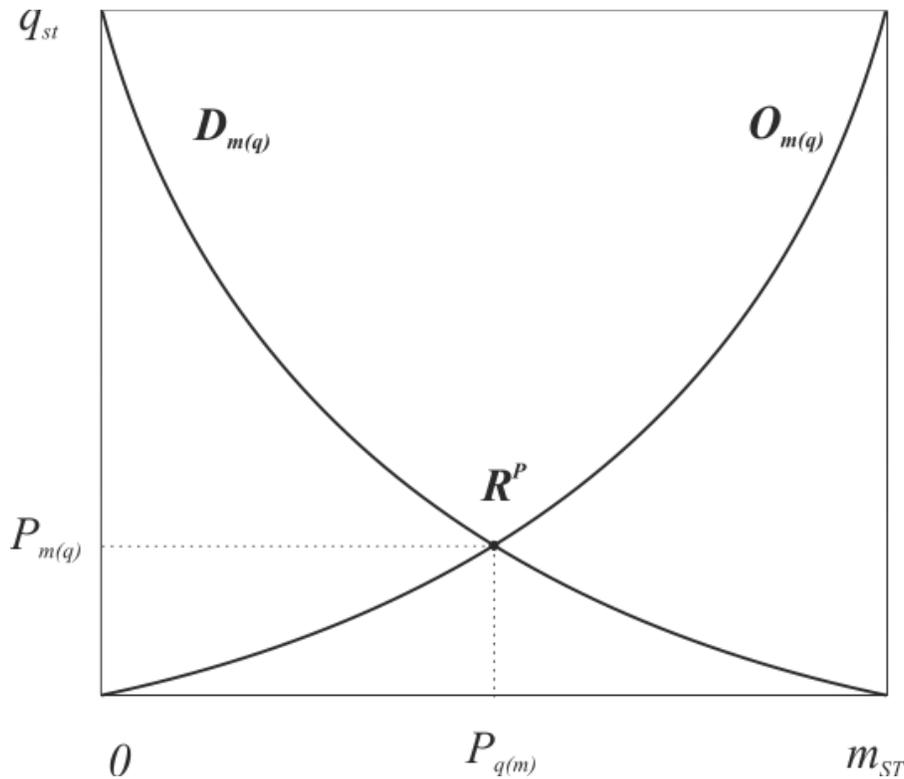
- $O_{m(q)}$ is the *supply* of m for the *demand*er of q
- $D_{q(m)}$ is the *demand* of q for the *supplier* of m
- $D_{m(q)}$ is the *demand* of m for the *supplier* of q
- $O_{q(m)}$ is the *supply* of q for the *demand*er of m

This important conclusion is what allows us to work in the real world of *quantities-prices* observed in the market, which indicate —of all *quantities* that make up the stock— the end of exchange and the beginning of stocks.

Chart 13

The *quantity-price* of currency

13



We should remember we find here a rectangular closed box, whose sides have the length of the quantity of the economic good currency (m_{st}) in the case of the abscissa, and the quantity of the other economic good (q_{st}) in the ordinate.

For expositive reasons, from now on we will refer to the ***quantity-price-currency*** $P_{m(q)}$ simply as p_m , knowing it is expressed in the quantities of other economic goods with which the economic good currency is exchanged. In the same manner we could represent $P_{q(m)}$ simply as p_q , as the price of the other relative economic goods expressed in terms of the price of currency, whose *quantities-prices* are also relative.

We deduce then that when we express that a unit of the economic good q_1 has a *quantity-price* of $5 p_m$, or \$ 5, we are saying that 5 units of the economic good currency (m) were supplied to buy a unit of q_1 . Which, seen from the side of the *quantity-price* of the economic good currency tells us the *quantity-price of a unit of the economic good currency* (m) is 0,20 of a unit

of q_I (0,20 is the *quantity-price* of q_I in terms of the currency). Table 6 shows us the analysis we have carried out:

Table 6

Table of (relative) quantities-prices

Economic good	Relative economic good	Relative unit price
q	m	$5 m$
m	q	$0,20 q$

Mathematically it is explained by

$$1q = 5m$$

$$1m = 1/5q = 0,20q$$

As you will see, it is not necessary to be a PHD in mathematics to understand the price of the economic good currency expressed in currency [$P_{m(m)}$]. Specifically, the price of a unit of the economic good currency ($1m$) expressed in currency is expressed by $P_{m(m)} = 1m = m$.

VARIATION OF THE QUANTITY-PRICE OF THE ECONOMIC GOOD CURRENCY

We will now study the consequences of a variation in the quantity of currency, more specifically the increase in the quantity of currency supplied in a period of time, since that is the most common event we can observe in our times of credit-currency, different from money-currency. In turn the opposite process —a fall in the stock of present currency supplied in a period of time— only requires to be read in the opposite sense to the one presented here, i.e., instead of determining *point E^I* based on the original position of *point E^0* , we must consider the path from *point E^I* to *point E^0* .

Let us see chart 14, where we suppose an increase in the supply of currency in the period, from the original 30 to 45, which is shown in the passage of the supply drawn on the abscissa with a black scale, to the abscissa with the scale drawn in green. All this derived from our being in the presence of the closed box of exchange (where supply of q is kept at 12 units).

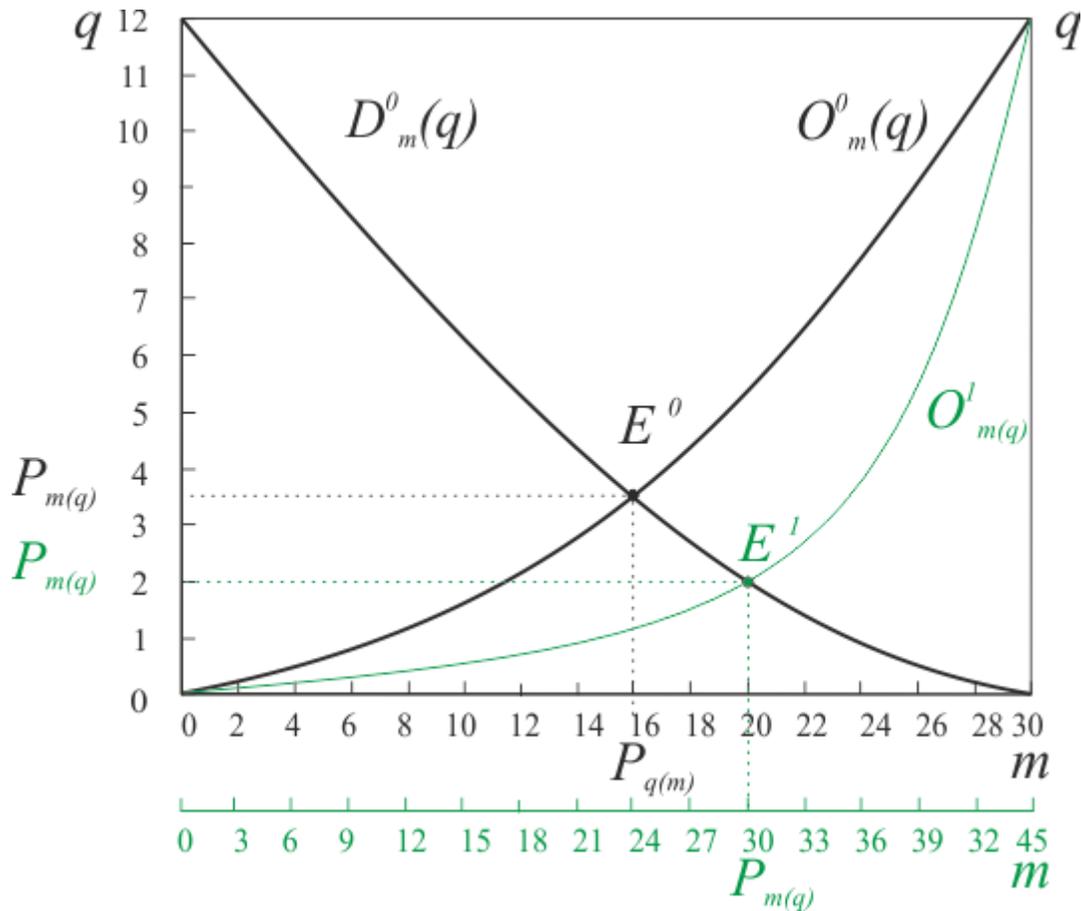
Components and analysis of chart 14:

- With black lines we represent the original box of exchange of economic goods, the currency (m) in the abscissa and q in the ordinate, representing the economic goods that are not currency. The stocks are determined by the scale in black, 30 and 12 unites respectively.
- We add the new state of stock of m , that now, instead of 30 units, is 45, 50% more units.

- Due to the preceding, we now add a new scale of the abscissa where we present the new stock of currency, which is drawn in green.
- Also due to the same reason we draw the new curve of *Offer* (supply) of m , we identify in green $O^1_{m(q)}$, maintaining the curve of *Demand* $D^0_{m(q)}$, since the stock of q , supplied in the period, has not varied.

Chart 14

Variation of the quantity-price of currency



- In this manner we obtain a new *point E*, represented by E^1 that identifies the new *quantities-prices*, now two units of q are exchanged for 30 units of m , different from E^0 where 3,50 units of q are exchanged for 16 units of m . From where we deduce:
 - a) The increase of the stock of a good, *ceteris paribus*, implies a decrease of its *quantity-price* relative to the other, which implies an increase of the price of the other relative to the first.

- b) The variations of *quantities-prices* are not proportional to the increase in the quantity of the good. I.e., if we increase 50% the stock of m it does not imply its price will fall a third. Once again the closed box of exchange proves the non-existence of a homogeneous or linear behavior.
- c) The alteration of the quantity supplied, reflected in the passage from E^0 to E^1 , implies altering the quantities exchanged and in stock of all goods. Which indicates that the increase of supplied quantities in this case of a good, *ceteris paribus*, implies variations in the quantities exchanged and/or in the stocks of both products, but one at a higher *quantity-price* than before and the other at a lower *quantity-price* than before.
- d) *Additional conclusion:* the preceding allows us to infer that with the perspective of the economic good currency losing value, human beings will not want to keep it, making it circulate in exchanges, opting for economic goods that they consider will not lose relative price. The reader can decide to call this behavior Gresham's Law, we simply say that the law of exchange implies selling an economic good with a higher *quantity-price* if we can carry out the same exchange for one with a lower *quantity-price*, with which we are referring not only to the economic good currency, but to all economic goods that are exchanged. Thus, Gresham's Law does not add or subtract from the more general law of exchange (it implies the marginal laws) that governs all economic goods –once again we corroborate apparently that currency does not justify a special theory.

If you observe in the study of the variations of the *quantity-price* of currency here presented a similitude with the conclusions we have obtained when analyzing the variations of the relative *quantities-prices* of any good (preceding charts) you will be right.

If you are wondering why we have included this section to study the variations of the *quantity-price* of currency, since it is a replica of what we have seen in previous charts, you will be right.

Conclusion: what is known as the quantitative theory of currency implies referring to an economic order where the marginal laws of diminishing utility and returns, and the law of exchange derived from them, are not valid, since the observation of these laws produces opposite results to what that theory postulates. But if an economic theory does not derive from the validity of the marginal laws of utility and returns and the law of exchange derived from them, we hope we do not offend anyone if we say it does not belong to the economic sphere.

QUANTITIES-PRICES RELATIVE TO THE QUANTITY-PRICE OF THE ECONOMIC GOOD CURRENCY, AS A UNIT OF CALCULUS

We saw that *quantities-prices* are units of measure referenced in another economic good, which leads us directly to the enormous advantages for exchange and all the economic calculus man has to produce, to be able to have an economic good as a general reference, having *point E^P* as the “agent” of the main information. We need not continue, and can say this economic good is currency, which is the reason why the prices of all other economic goods are relative to the price of the economic good currency, representing the *currency quantities-prices* of economic goods.

We already saw the huge *power of quantities-prices* for calculating, which in economics implies:

- 1) The moment when exchanges cease.
- 2) The moment when stocks are generated.
- 3) Quantitative information making the subjective value underlying its formation visible.
- 4) The process of valuation of wealth, calculation performed with a variable unit of measure.

Thus, it is understandable that we would be much better situated to carry out economic calculus, that allows us to value, if we use the *quantity-price* of a good of generalized use, which would allow it to be a universal reference since it is known by all, and in that manner we could compare all the calculus we have made.

Things being what they are, it is no chance that we have formally introduced this section—as simple and elementary as man can perceive it in his economic life—in the a *priori* logical deductive chain of causality we have been developing. Yes, currency as the unit of measure of generalized use in *economic calculus* will become a relevant link in the explanation of the social economic evolution we are forging.

ECONOMIC CALCULUS

Since we have already referred to the importance of economic calculus, which in economics consists of valuating wealth multiplying the “physical” quantities of an economic good by its *quantity- price* —relative or expressed in quantities of the economic good by which its *quantity- price* was determined in exchange—, and added to the importance of referring the valuation of all economic goods to the *quantity- price* of the economic good of common use, the currency, we directly initiate the economic calculus of goods expressed in the *quantity- price* of the economic good currency.

It was Ludwig von Mises, in this aspect continuing the legacy of Carl Menger, who stressed the importance of prices, since they allow economic calculus. More precisely, Mises stressed the relevance of prices of economic goods expressed in the economic good currency, our $p_{q(m)}$, of which we have highlighted *with great emphasis* its particularity in economics of not being a unit of measure that is constant in time. That is why the only thing constant we can obtain with an economic unit of measure is the specific quality of the economic good chosen as currency, an aspect that makes its fungibility ⁽³⁷⁾ — first and fatal flaw of paper money— relevant in economics as an essential property of an economic good that will acquire the status of currency. In reference to Mises posture, we believe it prudent to stress what to our understanding he pretended to say, or what we interpret as the central aspects of economic calculus, which we understand he would positively accept; let us see:

- The theory of subjective value is what explains the fundamentals of the human action of exchange, insofar as the value which each human being gives economic goods is what leads him to better his situation previous to the exchange.
- ***Quantities-prices are the factual sign of subjective value.*** *Prices are the tools that allow us to limit the theoretical concept of subjective value and make it observable.* It is in this manner that *quantities- prices* formed by the market allow the concept of value to be included in wealth —generated by effort of labor, specialization and distributed under law of exchange—, which man does weighting the *physical* units of the economic goods by the *quantities-prices* observed in exchange, since these are the visible expressions in fact of the subjective values that drive the human action of exchange. It would be more correct to say that value is wealth itself, since we cannot conceive an economic good (wealth) with no economic value, by the *axiom of the positivity of prices of TET* ($p > 0$): *prices are always positive by definition of quantity-price.*
- Economic calculus only values wealth, knowing that *wealth is the value of economic goods*, which for calculus are weighted by the relative *quantities-prices* of other economic goods.
- Calculating (valuing) allows us to compare, both the stock and the variation of wealth, be it of one agent in time, or different agents at the same time.
- Economic calculus allows us to value both the creation and the destruction of wealth, and its inseparable distribution, as we shall see.

- The *benefit of demand* (profit) is to add value, which derives from weighting quantities and prices.

Having produced this very important conceptual summary of the basics of economic calculus, we continue with the development of our chain of thought.

Of all the *quantities-prices* formed in exchanges, those of all the goods expressed in the economic good currency [$(p_{q(m)})$] are essential, since it is the *relative* reference of all *quantities-prices*. In other words, of all exchanges, that which is constantly carried out “for” the economic good currency is what is taken as reference for all economic calculus, as is shown in table 7.

Table 7

Quantities-prices of the economic goods expressed in currency

<i>Quantities-prices expressed and relative to the economic good currency (m)</i>					
<i>1q₁</i>	<i>1q₂</i>	<i>1q₃</i>	<i>1q₁₅</i>	<i>1m</i>	<i>1q_x</i>
<i>5m</i>	<i>0.2m</i>	<i>8m</i>	<i>10m</i>	<i>1m</i>	<i>40m</i>

Table 7 represents the information obtained from the exchanges carried out in certain spatio-temporal points. In turn, here we have simplified the information, since we have expressed everything in units of each economic good, even though exchanges are not carried out in that manner.

It is important to observe that the *quantity-price* of *1m* expressed in *m*—the $P_{m(m)}$ we have presented before— has not derived from an exchange, instead it is presented for a didactical symbolic reason.

In this manner we arrive at the fact that the *quantity-price of a unit of the economic good currency* is what humans adopt as the unit of measure for their economic calculus.⁽³⁷⁾ Having reached this point we can now approach with scientific rigor the *a priori* logical deductive causality that governs economic calculus.

WEALTH

— CALCULUS AND DISTRIBUTION —

We are now ready to calculate wealth, both in its *generation* (Adam Smith) and its *distribution* (David Ricardo).

STOCK AND CALCULUS OF WEALTH

Based on the concept of wealth as the totality of economic goods of an *owner* at a certain spatio-temporal moment, we proceed to integrate the determinants that generate wealth, which we know what they are and how they interact:

Elements of the fundamental economic chain of causality

- Man.
- Economic goods (stock of wealth)

Laws that govern the connections between the elements in the fundamental chain of economic causality

- Law of diminishing marginal utility
- Law of increasing marginal effort
- Law of diminishing returns

As we have expressed before, to obtain theoretical conclusions that we can represent with visible variables, we will use the idea expressed in the area α of the stock of wealth developed above, since it is feasible to produce an inventory of the quantities of existing economic goods (q_x) at a certain time, to which we assign *a number for economic calculus* multiplying it by the price informed by exchanges. ⁽³⁸⁾ And as we saw, for *economic numbers* to be understood by everyone, it is adequate to use in the multiplication, of all the prices of each economic good that form wealth, the *quantity-price-currency* that is relative to the economic good currency.

Robinson's stock of wealth

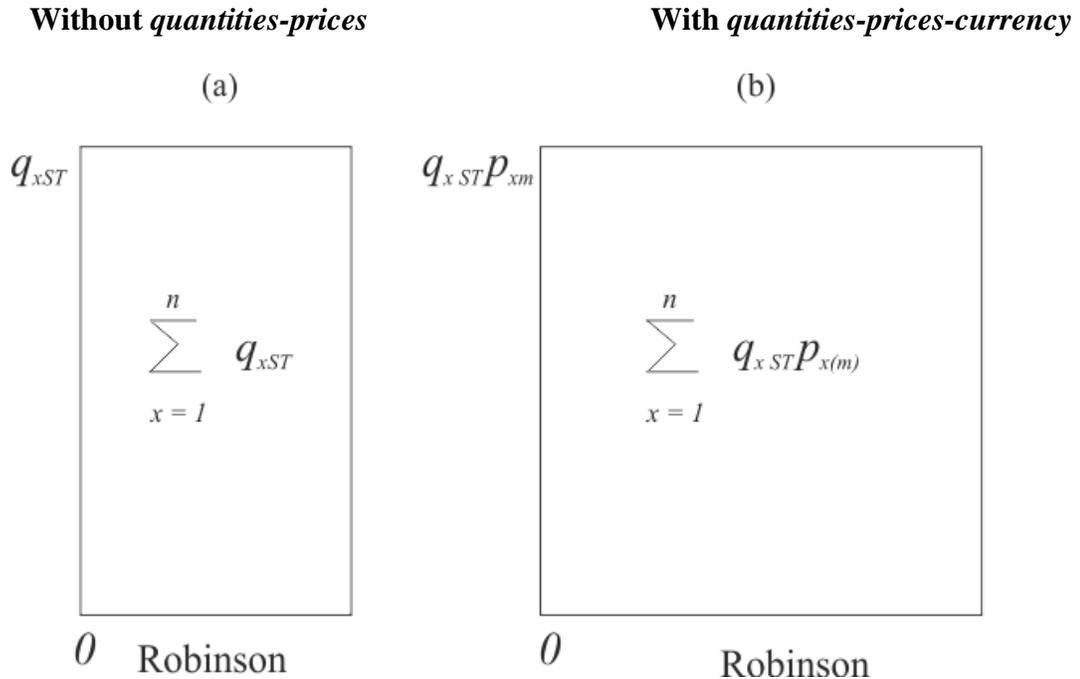
We present charts 15 (a) and 15 (b) of Robinson's stock of wealth.

In chart 15 (a) we have represented Robinson Crusoe's wealth in the solitude of the island, without *quantities-prices*, I.e. while there is no exchange that generates, therefore we only have *quantities*. In this manner the sum is inadequate since we are adding pears and apples and the total of units does not tell us anything useful for economic calculus.

In chart 15 (b) we suppose Robinson integrated in a society of individuals that exchange, and that originates *quantities-prices* of goods, *quantities-prices* that are relative or expressed in units of the economic good currency, since this community uses it and has gone beyond primitive barter.

Chart 15

Stock of Robinson's wealth



We obtain the stock of wealth in both cases, expressed in the following summations:

Robinson with *quantity*

$$\sum q_{xst} \quad (\text{x from 1 to z})$$

Robinson with *quantities-prices*

$$\sum q_{xst} p_{x(m)} \quad (\text{x from 1 to z})$$

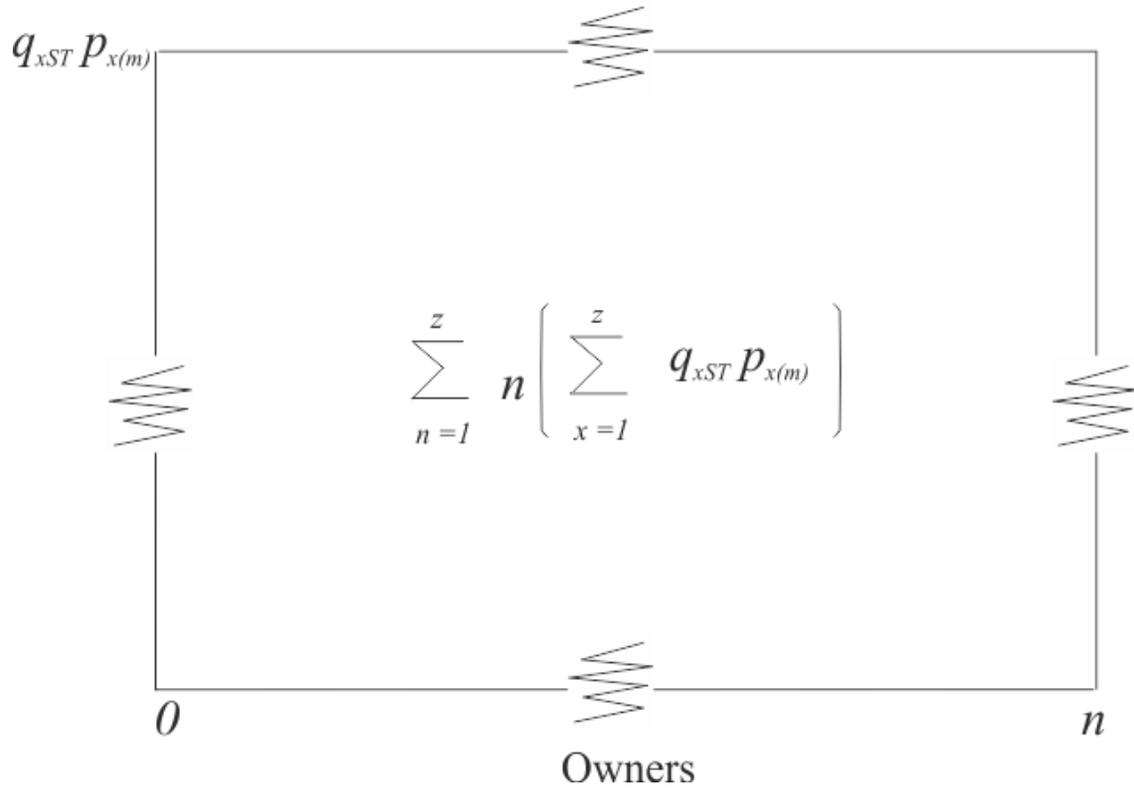
It is very important to remember that the surface that determines the charts of stock of economic goods, represent Robinson's total wealth in a specific spatio-temporal moment, i.e., they can be measured —stock inventory with *quantities-prices-currency*, and the exchanges of a period can be measured in the same way. In other words, the quality of the representation of Robinson's wealth depends on the quality of the data obtained by the observer.

Stock of wealth of "n" owners

We now present the chart of stock of wealth (α) of n owners that make-up the economic society, calculated in prices relative to the economic good currency. Let us see chart 16:

Chart 16

Stock of wealth of “n” owners



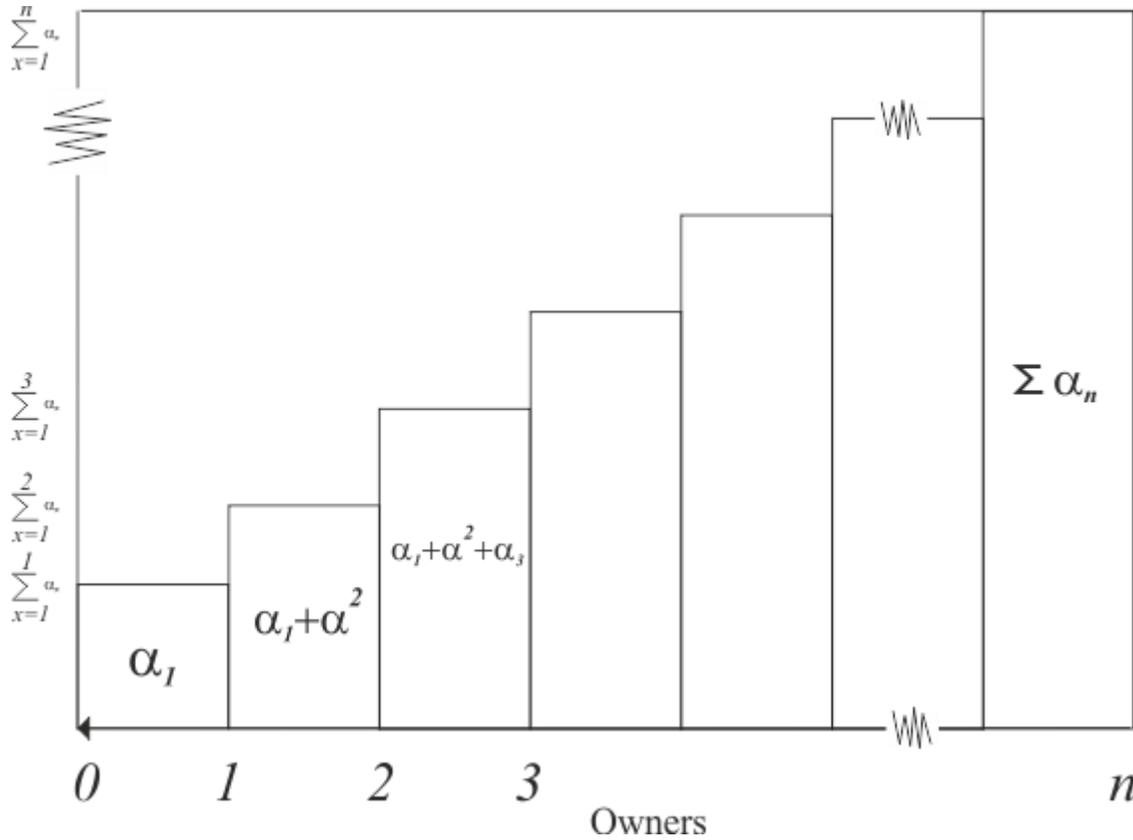
We have represented the stock of wealth of an individual and of a group at a precise spatio-temporal moment, based on the fundamental economic equation $man (n) \rightarrow economic\ good [q_{xst}p_{x(m)}]$. Starting from the stock of wealth we have obtained based on the fundamental axiomatic economic causality: $owners \leftrightarrow economic\ goods$ (expressed in relative-unit prices of the economic good currency). Now we are going to determine how that wealth is generated and distributed, limiting the analysis to the economic laws of marginality we have seen.

Stock of aggregate wealth of “n” owners

Chart 17 shows how the stock of wealth grows as we add-aggregate the wealth of the individuals that are the owners. Let us see:

Chart 17

Stock of aggregate wealth of “n” owners



Starting from the origin we add to the right of the abscissa (owners) the stock of wealth (α_n) of each owner, expressed in *quantities-prices-currency*. So we have:

$$\alpha_n = \sum q_{xstm} \cdot p_{x(m)} \quad (\text{with } n \text{ from } 1 \text{ to } n, \text{ and } x \text{ from } 1 \text{ to } z)$$

where *stm* is the stock of economic goods (q_x) of the n individuals.

Thus, the first rectangle (α_1) is the summation of wealth of the individual 1, the summation of the two first rectangles ($\alpha_1 + \alpha_2$) gives us the joint wealth of individuals a 1 and 2, and so on to the last owner, understanding as such the owner of that wealth. Thus we incorporate in the sum the wealth (α_n) belonging to individual n , obtaining the stock of wealth belonging to all owners, with *quantities-prices-currency* relative to the unit used for calculus, the economic good currency, that allows us to homogenize and make sense of the aggregate.

In algebraic terms we can express the wealth generated by n and owners:

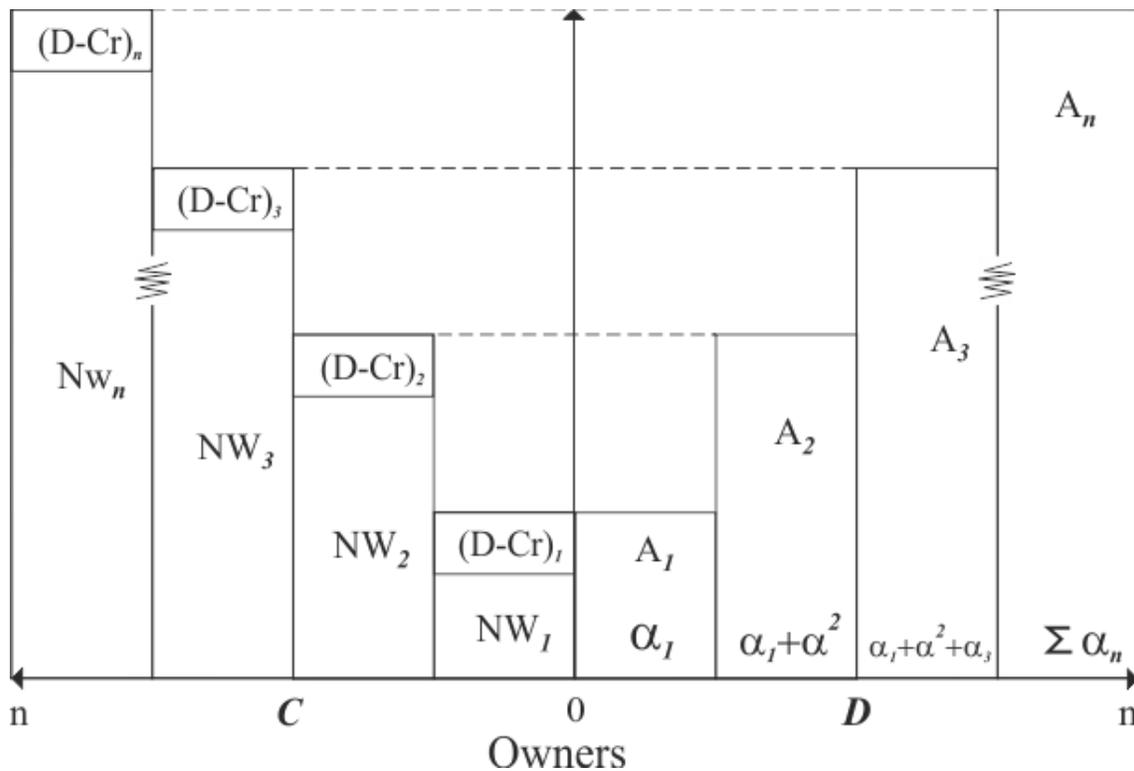
$$\sum f(x_i) \Delta x_i \quad (i = 1 \text{ to } n)$$

Property of the stock of aggregate wealth of “n” owners

According to the axiom of the biunivocal relation of *TET* (accounting expression of the fundamental law of economic causality) *owner* → *economic good*, that in short means *there is no economic good without an owner nor an owner without economic goods*, we can complete the chart of the generation of wealth with the adjoining and complementary concept of wealth, and so we have chart 18.

Chart 18

Property of the stock of wealth of “n” owners



In chart 18 we observe that what is indicated to the left of the ordinate is a mirror image of what can be observed on the right. Since we know what is on the right is the representation of the “currency” wealth of n owners, we only need to ask what the left side of the figure means, and it is no more and no less than the indication of who the individuals owners of the wealth are. That is why we have placed the letter D in the abscissa, to the right of the origin (accounting Debit that shows the assets) and C to the left (the accounting Credit representing the property of the assets).⁽³⁹⁾

Completing the explanation, we observe each rectangle on the left is separated in two components, the top part indicated with a D corresponds to *net debt* of the individual owner of the wealth, and the bottom his Net Worth (NW). If you have detected that this is the use of double entry accounting, you are right, and all this, given the axiom of *TET*’s biunivocal relation

economic good ↔ *owner*, which is the basis for the technique of double entry accounting in accordance with the fundamental economic equation (*man* → *economic good*).

For a precise understanding of the net debt we have referred to in the previous paragraph, we present charts 19 (a) and 19 (b).

Chart 19

Property of assets-wealth of present economic goods

(a)	(b)								
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 5px; width: 50%; text-align: center;">D (4)</td> <td style="border: 1px solid black; padding: 5px; width: 50%; text-align: center;">Cr (3)</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px; text-align: center;">PN (6)</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">A (7)</td> </tr> </table>	D (4)	Cr (3)	PN (6)	A (7)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 5px; width: 50%; text-align: center;">D - Cr (1)</td> <td style="border: 1px solid black; padding: 5px; width: 50%;"></td> </tr> <tr> <td style="border: 1px solid black; padding: 5px; text-align: center;">PN (6)</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">A (7)</td> </tr> </table>	D - Cr (1)		PN (6)	A (7)
D (4)	Cr (3)								
PN (6)	A (7)								
D - Cr (1)									
PN (6)	A (7)								

In chart 19 (a) we have represented on the right the traditional assets of a company, composed of what we have defined here as stocks of present economic goods ($A = 7$), to which we add the credits ($Cr = 3$) making up the total of the accounting Credit with 10 monetary units, i.e., quantities of stock of economic goods multiplied by their *quantities-prices* referred to the currency. On the left we have represented the same 10 units, expressed in what corresponds to net worth ($NW = 6$) and debt ($D = 4$), i.e., the accounting Credit.

We are working with the graphic representation of chart 19 (b), since we are considering the stocks of present economic goods ($A = 7$), which is equal to the net worth ($NW = 6$) plus the net of debts and credits ($D - Cr = 4 - 3 = 1$).

We only need to reiterate that balance consolidation determines that in the final analysis we always have $A = NW$, given that debts and credits are compensated, being always equal (in the whole). But it is very important not to forget the incidence credit-debt has in economic affairs, to which we will refer when we speak of the generation and destruction of wealth by society. We have been able to show the stock of wealth of a group of individuals, in a homogeneous manner with the use of a common denominator multiplier $—_{(m)}$ in the multiples $[p_{qx(m)}]$ — we have used to multiply by the quantities of economic goods that compose wealth.

Present goods versus future goods

Though we have already expressed it, it is important to reiterate a concept that has produced many consultations when referring to present economic goods, or better said, when trying to interpret credits, insofar as they are not present economic goods. The accounting consolidation of credits and debts shows us precisely that not doing so would increase the quantity of economic

goods (to 10) without the correlative existence (since the *stock* of the exercise is 7, we would be missing precisely the 3 that represent the credit = debt).

In the exposition we are developing it is clearly visible that the assets considered by TET are those corresponding to present economic goods, insofar as credits have their future counterpart in commitments by another agent, that is why in the consolidation they are not considered and we refer to the equation $A = NW$. Nevertheless, we indicate the part of future economic goods, that we represent with the dotted line $D = Cr$.⁽⁴⁰⁾

In short, the credits (Cr) = debt (D) do not constitute present economic goods in our analytical taxonomy.⁽⁴¹⁾ Thus, the way to be able to identify the non present economic goods is as accounting does: being future commitments equivalent in their amounts, their joint consolidation is pertinent for economics also. We stress that their consolidation does not imply omitting them in the analysis.

Thus, credit-debt is an important factor for generating wealth, but it must not be considered a present economic good, rather as a part of the analysis of the properties of economic goods, insofar as the owner of a company uses the property of others to strengthen (leverage) his companies' development. We will have the opportunity to appreciate in its full magnitude the beneficial effects of the expansion of credit-debt, and how pernicious its destruction is.

Curve of Stock and distribution of wealth of “ n ” owners

We can represent all this with curves, which we do in chart 20 in this section.

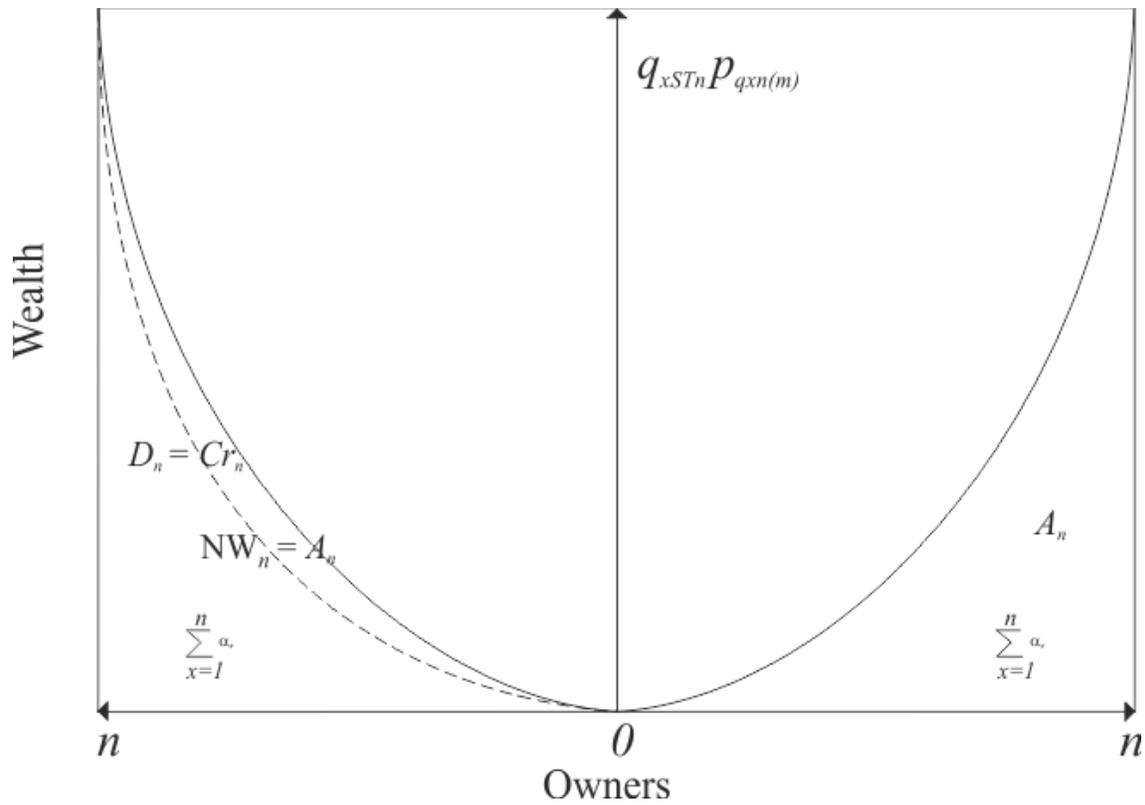
In chart 20 we present in continuous curve form the conclusions we have arrived at here. To the right of the origin we observe the aggregate stock of wealth of the n owners at a certain time and expressed in currency units (area A_n), and on the left its distribution according to its owners, where we show the proportion of the same generated by debt ($D_n = Cr_n$), of the consolidated total where $NW_n = A_n$. The reader can imagine the curves as if they were connecting the middle points, or vertices, from the origin of the surfaces α of the preceding charts.

The curve of debt is represented by a dotted line, since it is only there to show that its presence contributes to generating wealth. However we work with consolidated figures of the whole ($A_n = NW_n$). This is very relevant, it is not possible to generate debt-credit without the presence of a present economic good that originates it. The process of accounting consolidation is solid proof of it. That is the reason for the dotted line, expressing its relative participation in the present wealth but it does not add to “ $A_n = NW_n$ ”, that is only composed of present economic goods.

The curves are symmetrical and opposed, the mirror image, which represents a parabola cut off at the center, a geometrical expression of accounting double entry. In other words, the curve of wealth generation is the parabolic representation of the evolution of wealth of a set of owners, that since they can be represented by the accounting technique of double entry becomes a powerful tool for economic observation.

Chart 20

Stock and distribution of wealth curve of “n” owners



Another important aspect of the parabolic expression obtained is that it ratifies the axiom of economics postulated by TET, *economic good* \leftrightarrow *owner*, which is in turn the basis for accounting double entry. On the other hand the parabola also ratifies that it is inconsistent to separate—in time or space— wealth from its distribution to owners, no matter if we are referring to the stock or flow, its generation or destruction, aspects we will refer to now.

Conclusion

We cannot end this section we have called WEALTH, without presenting a more precise definition or concept of this term, since it always refers to wealth as the stock of economic goods, which is not wrong, because it points to economic goods (that have economic value). But possibly it would be more precise to define wealth as:

Whealt is the value that te man assigned to the economic goods.

Humans calculate economic value in quantities of economic goods:

Quantities: Robinson phase without exchange.

Quantities-prices: Robinson phase of barter exchange

Quantities-prices-currency: Robinson phase of exchange with currency

This concept, and *taxonomy of economic calculation*, clearly states that in economics it makes no sense to refer to entities with no value for man and *yes* that it refers to things with value (economic goods). With which we include the two components of the fundamental economic causality.

In turn this definition of wealth opens the door to the exceptional concept used in the business world, “creating value is the businessman’s goal”. In other words, all the economic world refers to value, entity which has at all stages of the human being (Robinson, barter and currency).

Finally, this definition or concept of wealth is in line with the theory of subjective value, since there are things that have no value and therefore are not economic goods. This will be very useful when we present the practical model of economic calculus (appendix C), insofar as a thing can have existed as an economic good at a certain moment t_1 , and continue to exist as a thing but no longer as an economic good in the moment t_2 . When calculating the observable value (weighted by its *quantity-price-currency*) of said economic good, it is evident that in the moment t_1 it will be multiplied by a *quantity-price-currency* that is greater than zero, while in the second moment, when there is no *quantity-price-currency* (because it is not an economic good), multiplying it by zero will automatically exclude it from consideration. Therefore, by definition of wealth it does not belong to the sphere of economic wealth. All this is in turn a ratification of the axiom of the permanent positivity of *quantities-prices* we postulate from TET ($p > 0$).

WEALTH

— GENERATION AND DESTRUCTION —

With the *fundamental economic causality* —equivalent to the axiom *economic good* ↔ *owner*—, the marginal laws of diminishing utility and returns —and the law of exchange derived from them—, to which we can add the double entry accounting technique, we have developed the *a priori* logical-deductive chain of causality that has allowed us to prove that the generation of wealth and its distribution are complementary variables, two sides of wealth, one that shows its configuration —production structure and value— and the other its ownership, which indicates that both components appear, persist and disappear concomitantly and simultaneously.

CURVE OF GENERATION OF WEALTH (by “n” owners)

With the necessary theoretical, technical and observational tools presented up to this point, we will see they are sufficient to show how wealth is generated in a set of n owners. Chart 21 in this section will allow us to appreciate this.

Chart 21 has been generated based on the following parameters ⁽⁴²⁾:

- 1) In the abscissa we represent the owner (n) of the wealth.
- 2) In the ordinate we represent the available present wealth, generated in a period of time. Said wealth is expressed by the value of the economic goods, which derives from the quantities of economic goods (q_{xst}) pondered by the *quantities-prices-currency* [$P_{qx(m)}$]. I.e., the wealth expressed in the ordinate appears through an accumulative addition of individual wealth of the owners $\Sigma q_{xst} p_{x(m)}$.
- 3) The accumulation of wealth represented includes that belonging to the individuals that generate greatest wealth up to that belonging to those generating the least wealth, all in the period of time considered.⁽⁴³⁾ This way we represent the ***wealth generation curve*** (g) decreasing relative to the quantity of owners that form an economic society.⁽⁴⁴⁾ The *wealth generation curve* g , is the curve that represents the generation of present wealth available in a period of time (not the initial *stock* of wealth). In this manner, the stock of wealth available at any spatio-temporal moment is the summation of the wealth existing at the beginning of the period, and that generated in the period, which is what we refer to here and in graph 21. It is understood that with this methodology we continue the chain of reasoning we have been developing since we started with Robinson, since the curve g , and the area A_n that it generates, refer to the value of the *stock* of present economic goods, that concomitantly produce and belong to a set of “ n ” owners, generated in a period of time, not the pre-existent wealth —which will be relevant when we study the destruction of wealth.

It is important to see the wealth generation curve is conditioned by or includes not only the productive structure but the institutional and political economic framework, all expressed in its currency value.

6) *Accounting as an economic model*: from the accounting point of view we can represent g as the profit of the chart of results which in time derives in the A of assets, and so we can express generation of wealth and its distribution in double entry accounting terms: $A_n = NW_n$. Which opens the door to the mathematical derivation of the curves represented here, based on the stock of wealth and its distribution, starting from the accounting balance of one owner and aggregating n owners. All which is pertinent adjusting the measurement of GDP from this new perspective. Analysis that appears when we include the participation of $D_n = Cr_n$. It all comes down to understanding accounting from the **double perspective with which you can analyze things based on “double entry accounting”**.

- a) *Income statement*: that determines how wealth is generated, equivalent to our g curve.
- b) *Balance sheet* (assets = liabilities + net worth): that determines the origin and destination of that result, in its two aspects: a) qualitative and quantitative composition of wealth; quantities of each economic good that configure wealth, weighted by its price expressed in the unit of economic calculus; b) the composition of the ownership of that wealth, the proportion of those present assets that belong to the owner or are borrowed. All which is expressed in the α area of our model.

The symphony of double entry accounting, exceptional and exclusive model of economics, is expressed in its categorically simple structure. Which implies both the instantaneous flow of generation and destruction of wealth (income statement), and the instantaneous composition of the stock that generates that flow, and the ownership composition of the same (balance sheet). All of which we can express in economic terms, the balance sheet represents the productive structure and its ownership and the income statement its productivity.

We humbly say that whoever has not understood the harmony between the flow of the river that represents the income statement and its overflow into the dam that represents the balance sheet, that explains not only the liquid contained in it but also identifies the owners of the stock, cannot presume to have understood accounting. And since this is more common than one would think, this is why we stress its virtues, as Goette and Mises did. We are demanding respect when producing financial statements, altering them is also a crime against humanity, because there is a falsification of the analysis of the socio-economic body, which is equivalent to falsifying a **blood** analysis, here represented by **value**, human value here.

7) The **closed box of accounting**: finally, it is evident that accounting is the typical expanding closed box model, as we have shown here from an economic point of view. I.e., the closed box expands like the universe and accounting is an excellent method to study and measure that “contained” expansion, in an accounting-Popperian demarcatory limit. It is not easy to find a model that will allow this. Physics experts know this. We

economists have been blessed by the discovery of double entry accounting (Goette-Mises-Bondone).

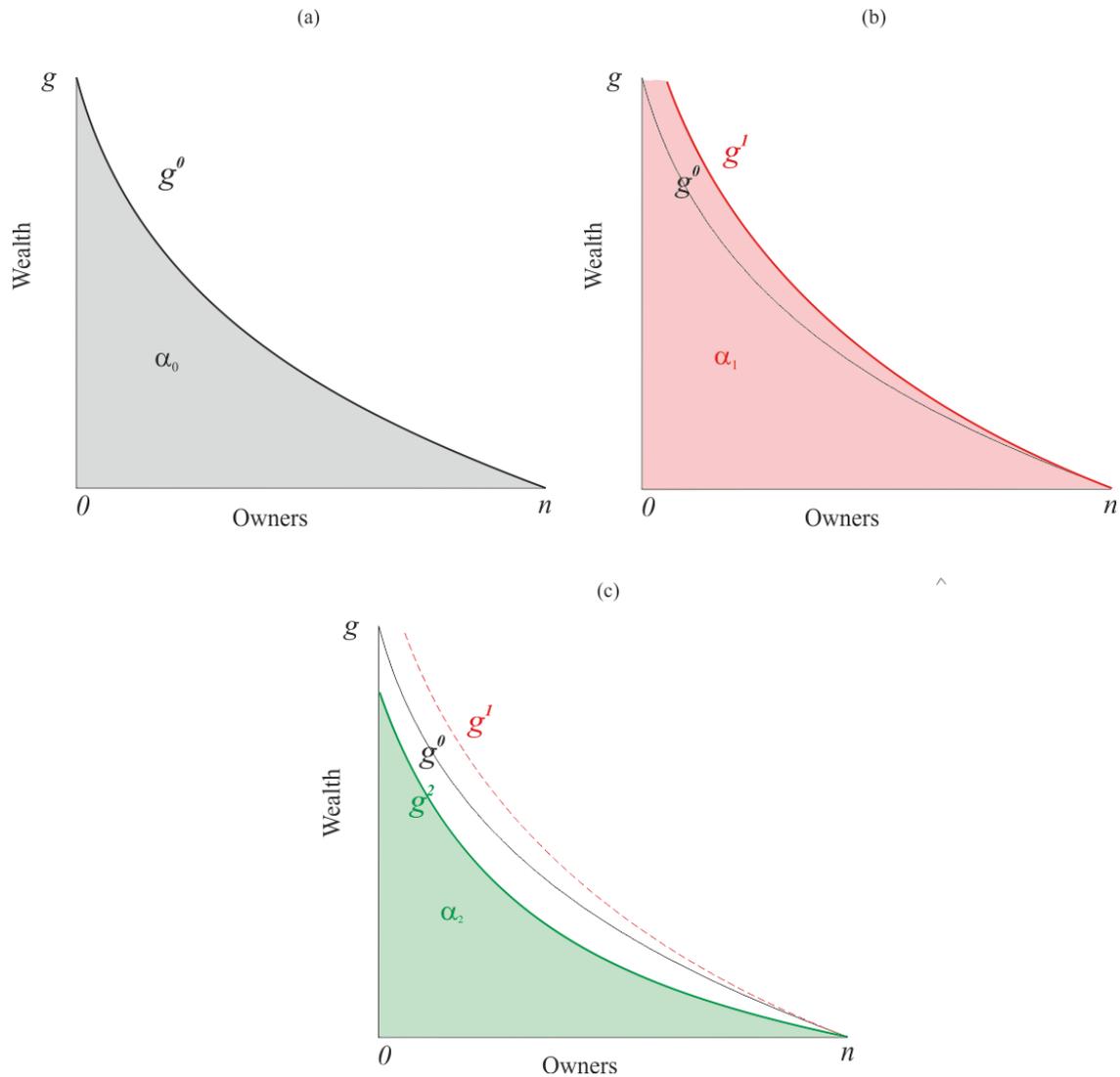
- 8) The graph is still impregnated with economics and accounting, since it is the model that best represents the fundamental economic equation. The form of graphs with curves that we will be presenting must not make us lose sight of the accounting model underlying these graphic representations. In other words, here we will have an excellent opportunity to see accounting with an economist spirit; I suggest you practice it, we have enjoyed it for decades, being one of the many beautiful aspects of life. Thus, we say to accountants they should see the economic potential of accounting, and to economists that they should see the potential of accounting for the explanation economics.
- 9) With the graphic representation of g we continue with the basic postulates established in our previous development: a) we consider physical units of economic goods; b) we ponder these physical units by the “observable” *quantity-price-currency* obtained in currency exchanges, and so we obtain wealth; c) both variables are within the Popperian demarcatory limit for an observable real world; d) considering the observable wealth generation based on the owners implies that the distribution of wealth is also present as an observable data, which is in line with the axiom *economic good* \leftrightarrow *owner*; and e) the proposed structure is the same as in double entry accounting.⁽⁴⁵⁾
- 10) **Distribution of wealth:** It is important to see that the methodology for building the graph implies that the same underlies the productive and institutional-economic social reality. I.e., together with the known productive economic structure it contemplates the institutional economic framework of society, and its “economic policies”. I.e., the g curve was built in terms of considering in the abscissa the n owners that generate wealth based on the law of decreasing yields, which implies increasing productive marginal efforts. This shows the way the laws of increasing marginal effort and of the decreasing marginal yields “operate” as the institutional basis of the social productive structures that explain, in turn, the way in which societies distribute the productive forces that generate wealth. An important aspect in the history of economic theories, since there is a debate as to if what is first determined is the profit rate or the interest rate; if capital formation depends on distribution of wealth between wages and capital, or if distribution of wealth determines the profit rate; if the *stock* of capital establishes the interest rate or if the interest rate determines the stock of capital; if the profit rate, wages and interest must be in equilibrium, etc.... etc. All these aspects will be considered simultaneously by our *TWU* and its *SEE model*, since all those entities are endogenous to it. All this will acquire more relevance when we analyze the curve of destruction for a society including the non-owners.
- 11) It is also necessary to see that the graph derives from the structure of *quantities-prices-currency* (monetary expression), which eliminates the possibility of the model not being qualitative or being only quantitative (non-relative prices). I.e., the model will allow the study of the “economic cycles” free from quantitative or absolute errors, and will eliminate the need to develop a theory that balances a world without currency (ζ “real”?) and a world with currency.

Displacements of the Curve of Wealth Generation (by “ n ” owners)

Now we will graphically represent the displacements the curve of wealth generation by n owners can present. Let us see charts 22 (a)-(b)-(c):

Chart 22

Displacement of the curve of wealth generation (by “ n ” owners)



In chart 22 (a) the curve of wealth generation (g_0) represents the original state of diminishing accumulation of wealth relative to the quantity of owners (abscissa n).

Following the *a priori* logical-deductive causality we have developed, this chart should be seen in its two essential aspects, of the curve generated by the g_0 function that by definition is a *behavior variable*, and of the surface that is generated below it from the origin of the coordinates, which constitutes the *stock* of wealth that is accumulated as the number of individuals that generate wealth increases, stock that we call (α_0). In other words, g_0 is the *derivate* that explains the incrementally decreasing way in which the stock of wealth (α_0) is generated. We could call g the *curve of human productivity of a society with “n” owners*.

Chart 22 (b) shows us an upward displacement (due to changes in the basics) (g_1) in the curve of wealth generation, which means a higher level of efficiency ($g_1 > g_0$) in the generation of wealth at the same level of n , a situation that explains that the same number of owners generates a greater stock of wealth ($\alpha_1 > \alpha_0$).

Chart 22 (c) shows the opposite situation, when there is less productivity for generating wealth, as is the case of g_2 , and we observe that $g_2 < g_0 < g_1$ and $\alpha_2 < \alpha_0 < \alpha_1$.

It is relevant to say that these charts allow us to compare the rate of comparative wealth generation of different societies in the same period of time, and compare the evolution of the same society in time, and appreciate that these charts can be drawn both with absolute numbers and percentages. In any of these forms we can clearly see that as we move from underdeveloped to developed communities, we will be moving in an upward sense of g , and vice versa.

Having established the available stock of wealth, that can satisfy human needs, and the way it is generated, now we must study the greater or lesser destruction of this wealth by the set of n owners.

CURVE OF WEALTH DESTRUCTION (by “n” owners)

It is very appropriate to present the *curve of wealth destruction*, insofar as wealth is composed of economic goods to satisfy needs, the moment in which there is destruction, apart from other reasons.

With the same arguments deriving from the summation: *fundamental economic causality (market \rightarrow economic good) + marginal laws of diminishing utility and returns (and the derived law of exchange-prices) + the axiom economic good \leftrightarrow owner*, to which we add the double entry accounting model, we deduce the way in which a set of individuals destroys wealth, understanding as such the *value* of the stock of present economic goods —initial stock of wealth and generated in the period, while both are destroyed — in a period of time and that does not remain at the end of that period. Precisely following this summation of primitive terms, deduced *a priori* with logical-deductive causality, we can represent chart 23.

In chart 23 we have represented the same curves as when referring to the generation of wealth, in the opposite sense, since we refer to the destruction of wealth. Curves that we have denominated d , NW_d and D_d and A_d , with the addition of d to indicate we are referring to the *d*estruction of wealth.

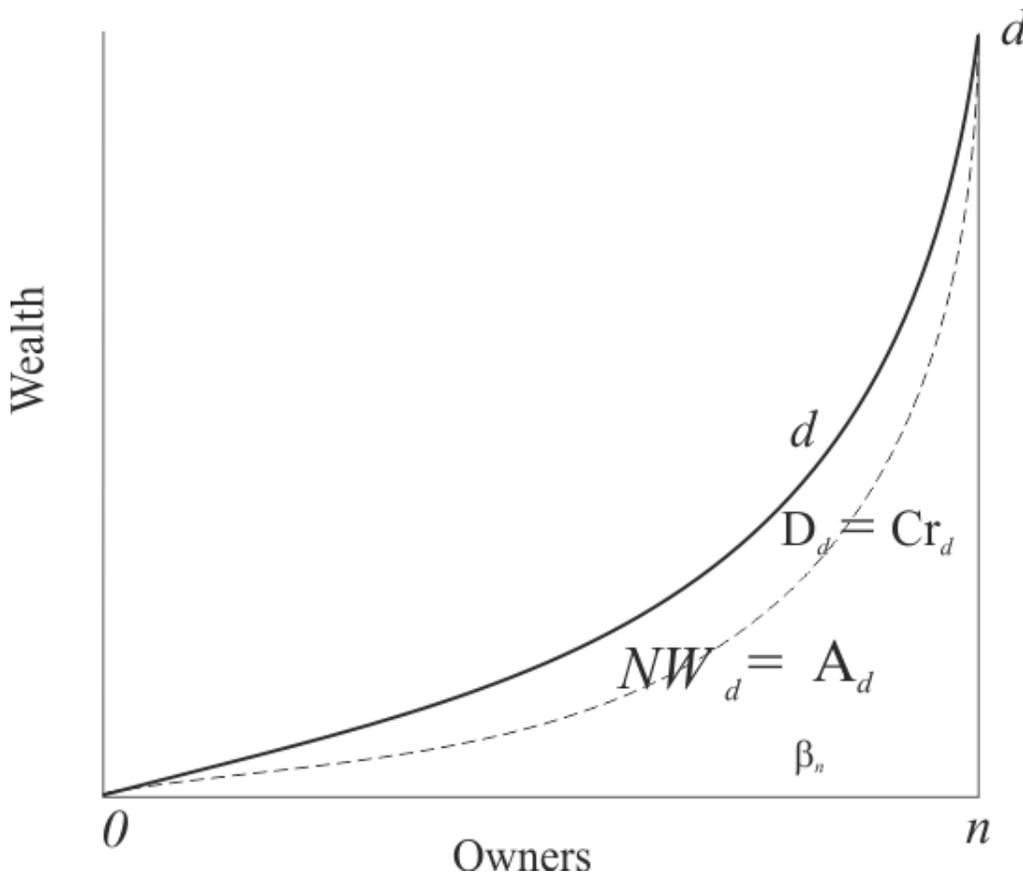
It is very important to see that, just as “curve g” of wealth generation considered the productive and institutional economic structure of the social aggregate, “curve d” does the same, since we have presented it according to the economic institutions and policies of the society we are studying. We have only inverted the relation of the analysis of wealth, since in “curve g” we included from the owner that generates greater wealth to the one that generates less, here we start from the owner that destroys less wealth going towards the one that destroys more wealth. This is done so to highlight that wealth generation responds to an aspect governed

by economic laws (crudely referred to as the laws of the market), while the destruction of wealth is dominated by political issues –here we have the endogenous treatment of economic institutions and policies. This will have its full relevance when we refer to the economic behavior of a real society, composed also by human beings that destroy wealth but do not generate it, an aspect that gives rise to economic institutions and policies where, precisely, we will see the enormous relevance of orienting “curve d” based on “policies” and not the economy, which is the reason why the model fully includes the same as endogenous variables.

Chart 23

Curve of destruction of wealth by “n” owners

23



These curves of wealth destruction are ascending and increasing from their origin, and it seems it could not be otherwise, since they are the inverse of the curve of wealth generation (g). Anyway we are going to include elements that allow us to sustain that representation. In other

words, as the number of individuals increases, the destruction of wealth grows. Let us see some of the arguments:

- 1) *The law of increasing marginal destruction of wealth*, the origin of the ascending curve *d* expresses that: human *n* destroys wealth in greater proportion than human *n-1*. Law that is based on:
 - a) The *Curve of ignorance*, derived from the *Theory of decision making*, allows us to see how ignorance produced by the *spatio-temporal-intellectual-moral “distance”* between those that generate and those that only destroy, is sufficient argument to prove the ascending slope of the use of *available knowledge*. Which allows us to say: destruction is directly proportional to the distance between those that generate and destroy, that man can reduce with economic education, specifically respecting its laws. Because in economics, *available knowledge* \equiv *wealth*.
 - b) Increasing distance between the motivation of those that generate wealth and those that destroy it. I.e., the destruction of wealth is based on motivations from those of who generates it, proof of which are the economic political institutions that promote –based on *ad hoc* theories- the “tragedy of the commons”. Tragedy of the commons that we define as: the destruction of wealth that is in inverse relation to the degree of proximity with the motivation that sustains the effort to generate it, i.e., those who do not understand the effort, do not understand the expense.
 - c) A lesser level of economic education (in truth ethical and moral education) implies a greater level of destruction of wealth.⁽⁴⁶⁾
 - d) *Failed economic theories* that promote destruction of wealth in favor of “*their*” growth and distribution. If the base of those that destroy is widened, aggravating the problem of the tragedy of commons, this leads us to conclude: that prior to establishing economic institutions and policies for “redistribution”, the recipient must be educated, if not the problem that you are trying to solve will be made worse. In this manner the teaching of economics –its laws- will allow that those that destroy wealth be considered more proximate by those that generate wealth.
 - e) Once more, moral and ethics have a scientific explanation, which explains the devastating danger represented by political power in the hands of economic ignorants, since here we find the basis for “*populism*”: it is based on economic ignorance, that is why it obtains its electoral support and makes it worse once in power, assuring cognitive involution – increased destruction of wealth. Ergo, totalitarianism finds its “legitimacy” in scientifically “illegitimate” theories –since they are not derived from the *laws* of economics.
- 2) That distribution of wealth is already considered in the model, and this cannot be otherwise, since it derives from the three marginal laws (*market*) to which “re-distribution” will be added, implying the inclusion of non-owners, since they respond to questions of social politics (*economic policies*).

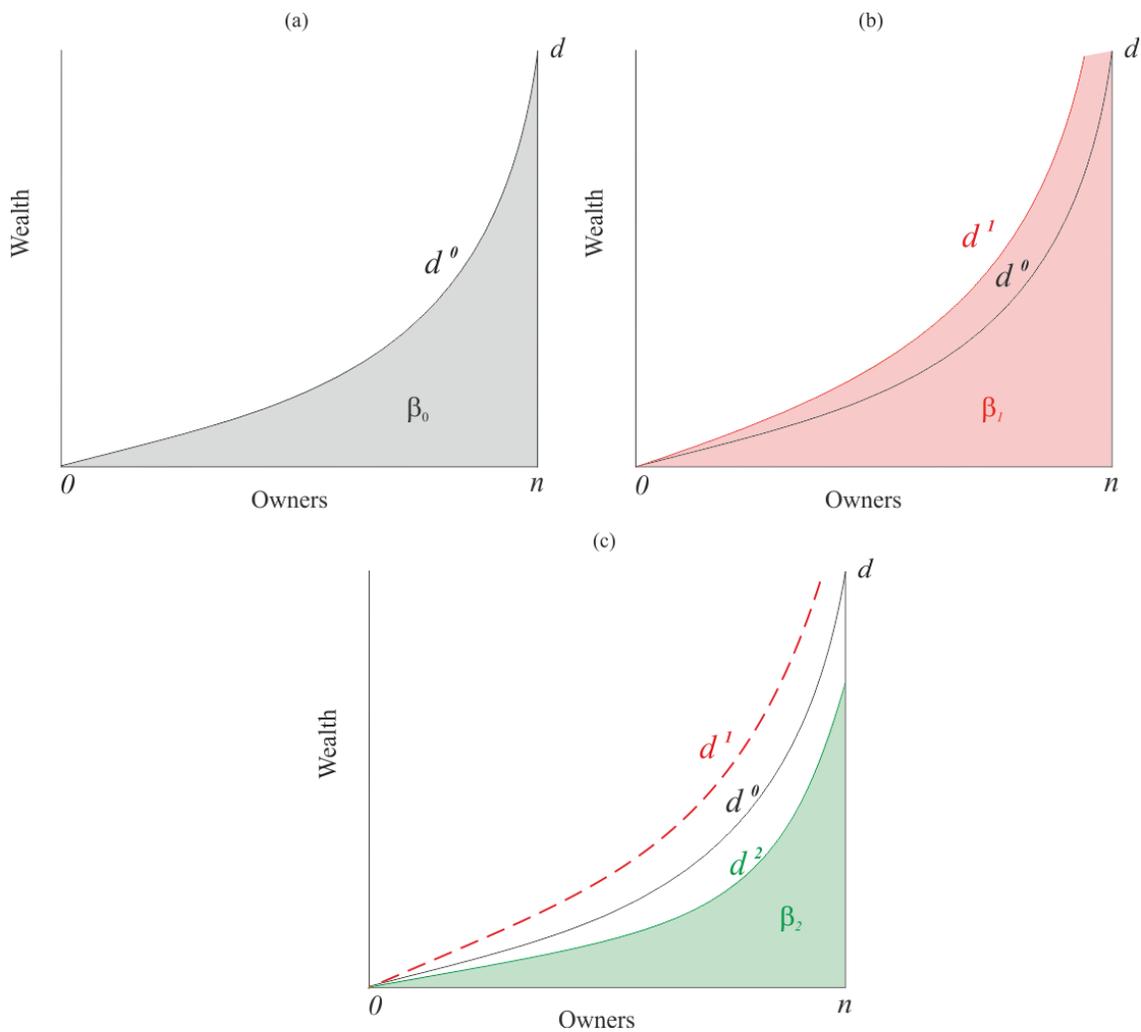
It is very important to see that the model does not distinguish business owners from workers, nor those that live on “rent” from those that live on their work, since both generate wealth, be it based on the efforts of muscle or intellect (which is in truth capital, accumulated effort, all those that generate wealth are workers with the intervention of capital goods, i.e., we all participate and enjoy the “rent” produced by accumulated work, called capital).

Displacements of the Curve of Wealth Destruction (by “n” owners)

Now we graphically represent the displacements that the curve of destruction of wealth (d) by n owners can present. Let us see charts 24 (a)-(b)-(c).

Chart 24

Displacement of the curve of destruction of wealth (by “n” owners)



In chart 24 (a), the curve of destruction of wealth we propose (d_0), presents an increase as the number of owners that compose the society increases, as we have seen in chart 23. As we go to

the right the number of owners and the destruction of wealth increase at the same time, i.e., we will have more owners that destroy a greater stock of available wealth.

Figure 24 (b) shows us an upward displacement (changes in the fundamentals) of the wealth destruction function, which indicates that $d_1 > d_0$ with the same level of n , which expresses a greater destruction of wealth with the same quantity of owners.

Figure 24 (c) shows the opposite situation, a downward displacement of d to d_2 , indicating that $d_2 < d_0 < d_1$ at the same level of n , which expresses a lesser destruction of wealth with the same number of owners.

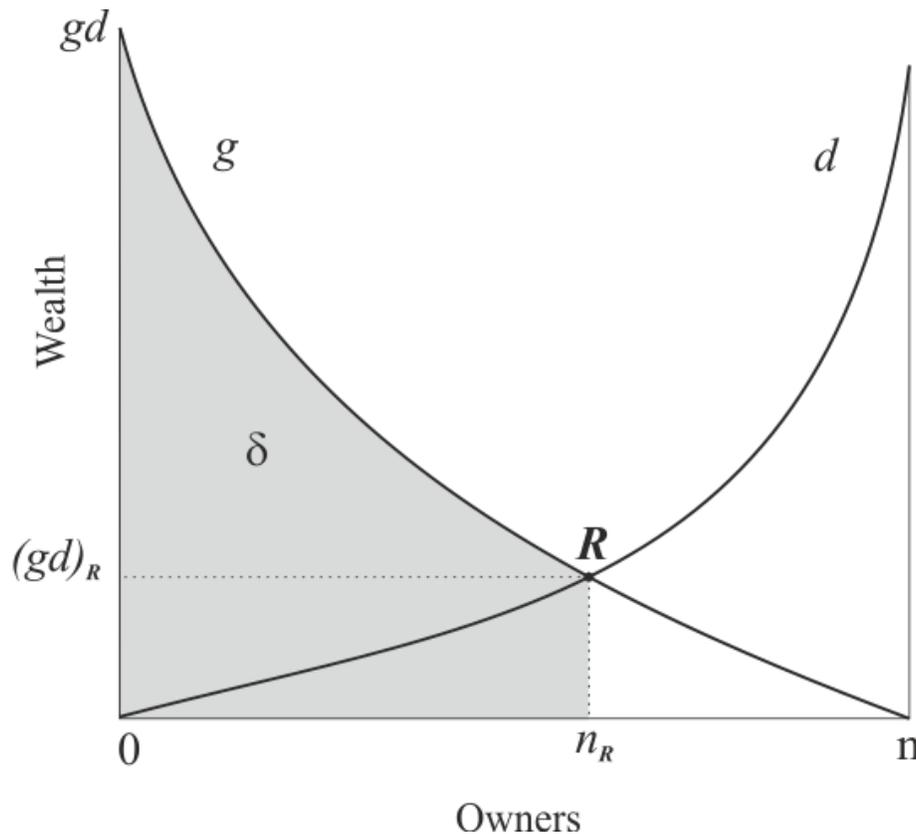
ECONOMIC EVOLUTION OF OWNERS

Since the two curves obtained represent the behavior of subordinate variables (value of wealth) of the same independent variable (the n owners), it is possible to combine or confront them, the same way we did with chart 3, when we obtained the important *point E*, which would then become *price point E^P*.

Chart 25

Point R of stock

25



If we “confront” the *Curve of Wealth Generation* (g) with the *Curve of Destruction of Wealth* (d) we can obtain an interesting chart and take advantage of the mathematical rigor we can add to

economics, and its consequences for explaining-analyzing human economic evolution. Let us see chart 25.

POINT R OF AVERAGE VELOCITY OF NET POSITIVE WEALTH GENERATED, PER CAPITA of OWNERS

In graph 25 we observe the enormous relevance of *point R*, which appears as the intersection of the *curve of wealth generation (g)* and the *curve of destruction of wealth (d)*. Said point, that we call *point of average speed of positive net wealth generated per capita of owners (R)*—where net means generation minus destruction, the Result in the model of double entry accounting,⁽⁴⁶⁾ that is why *R* allows us to:

- 1) Express the moment, measured in terms of owners, in which the speed of generation of wealth (slope of g) is equal to the speed of destruction of wealth (slope of d).
- 2) Express that: to the left of R (more specifically to the left of n_R) the speed of the generation of wealth is greater than the speed of destruction ($g > d$), and to the right it is the opposite ($g < d$).
- 3) Express the value of wealth accumulated by society at the time when the situation is that the level of average velocity of destruction of wealth is higher than for the generation of wealth ($g < d$).
- 4) Express the relation between the wealth generated by each owner and the average of all owners, since *point R* indicates that while there are owners that generate wealth at a higher level than R (where $g = d$), there are others that do so at a lower level. I.e., in the community of owners, there are those that produce wealth at a level that, for society in average, it implies it is a situation where their activity destroys more wealth than what it generates.
It is important to see the huge importance of this conclusion, above all referred to the *accepted* criteria that economic activity—specifically the study of economic cycles—is measured on the basis of comparing the expected results with the market interest rate, which would be akin to a “benchmark” *point R*, which would be inconsistent with our reasoning.
- 5) Express, in reference to all the preceding, the following relations that can be studied based on the figures that arise from *point R*, since it allows us to relate:
 - a) The value of the *positive* net wealth generated by n_R in terms of those that generate wealth at the level where the average velocity of positive net generation of wealth is higher than the average of destruction ($g > d$).
 - b) The value of the *negative* net wealth produced by the $n_D (= n - n_R)$ in terms of those that generate wealth at the level where the average velocity of the generation of positive net wealth is lower than that of destruction ($g < d$).
 - c) The average wealth generated per capita by owners at the time when the slopes of g and d are equated, which appears as the quotient of the value of the grey area, over $n_R \cdot \delta / n_R$.
 - d) With the development of the algebraic model—system of equations and unknown variables—pertinent for this graphic model, it is feasible to quantify the qualitative aspects we highlight in this work.
 - e) In turn, through procedures of derivation and integration (total and partial) of the general algebraic model, pertinent for the graph developed here, we can ratify the qualitative consideration expressed in this work.

And other relations that are relevant at the time of judging economic policies (fiscal and monetary), as we will have the opportunity to see.

It is worth remembering that the concepts expressed here constitute observational variables, insofar as:

- a) All the values of wealth (q^*p) are expressed in the economic unit of measure, the price of economic goods in terms of the economic good currency [$p_{q(m)}$].
- b) All the concepts of wealth are considered in terms of the current institutional and technical structure in a community of n owners. I.e., *stock* and distribution are “data” of reality, insofar as we are referring to *stocks* of economic goods multiplied by the currency prices generated in exchanges (market) and the distribution of their property. I.e., *wealth and its distribution are economic entities that are ontologically complementary, with their pertinent observable variables.*

Finally we stress that we could observe the model with a graph that showed directly the curve g with the destruction of wealth deducted and represented by curve d , in such a way that the new *curve of generation of net wealth* (g_N) would be equal to the difference $g - d$. In this way we would have an only net curve of the generation of wealth (g_N) —that would cross the ordinate axis at the *point R*, since from there it would become negative— based on the curve of generation of wealth (g) and the curve of the destruction of wealth (d):

$$g_N = g - d$$

The importance of handling this equation when producing algebraic developments is evident, but to the effect of visualizing the consequences in graphic form we will continue with the scheme of the figure of graph 25. This will be relevant when explaining the economic evolution of a society, since the parameters for wealth generation are different for those related to its destruction (¿with the hedonism of politicians intervening?) when speaking of society, as we shall see.

THEORETICAL CONNOTATION OF POINT R – *Generation of wealth and economic calculus theorems*

We cannot continue without considering the theoretical importance of *point R*, since it indicates that:

- Reiterating the preceding, *there always* exist economic activities generating net negative wealth, based on measuring them according to the parameters of all the generators of wealth. This fully ratifies that all economic activities are governed by the subjective value of the agent in consideration, therefore the parameters that appear by simple aggregation of numbers must be considered with adequate scientific rigor, insofar as an activity can be initiated even it does not respond to “social” parameters. The demonstration is self-explanatory since all the wealth generated by the generators, at the right of point n_R were and are produced in those conditions.
- The statement in the previous paragraph anticipates different consequences on the number of individual owners generating wealth, which acquire and lose this condition with changes in curves g and d , resulting from the changing conditions of their reality

(productive structure, economic policies, catastrophes, etc.). Consequences the quality and quantity of which will depend on the slopes of the curves g and d .

- If we consider the level of *point R* as the parameter based on which we will decide the suspension of any new project of wealth generation, evidently none should be undertaken beyond *point R*. But this would lead us to a *point R* to the left of the original, which is establishing a new “Average” *point R* of all the owners, leading us to a similar situation, and so on indefinitely — a typical vicious circle. This allows us to express the following:
- **Theorem of wealth generation:** all communities of human beings have producers-activities that generate *negative wealth*, according to the level of average velocity of net generation of wealth. Considering *negative wealth* to be that which produces less positive net wealth than what corresponds to *point R*.

Though this is the law that relates all average figures with the marginal (and total) figures, it is no less true that it has very relevant economical and political connotations when referred to *point R*, since it allows us to analyze the individual based on the collective, though we alert on the danger implied by the methodology based on “aggregates”:

- 1) Demystifying in this case the repeated concept of “urban legend” that humans only act in terms of what “*society*” considers wealth. I.e., the theorem ratifies the theory of subjective value.
- 2) There is no fallacy of composition between individual conduct and that of the whole. This would only be explained if we forget the mathematical relation between marginal, total and average figures. I.e., the fallacy would be of a mathematical nature.
- 3) It demystifies the possibility of developing theories based on the perfect functioning of markets, since it would imply perfectly identical supernatural humans that, when acting would know with total precision how it would alter the level of average velocity of net positive wealth generation (in truth, zero, because at *point R*: $g - d = 0$) of the community as a whole, and at each instant. Not forgetting in turn the theoretical and factual impossibility, because of the vicious circle of the generation at *point R*, that results as an average.
- 4) It disqualifies all authoritarianism that could pretend to govern the destinies of individuals, different by nature when valuing, in terms of valuing, based on parameters generated by averages derived from aggregates. Evidently in our case we are referring to currency and financial policies, since according to the axioms of equality ($im = pm$) and equivalence ($im \equiv pm$)⁽⁴⁸⁾ pretending to establish and/or control the rate of interest, implies doing so based on the price of the unit of calculus. I.e., we do not consider in our work the entity interest, which considering the axioms of equality and equivalence (currency-financial) implies that any action to control what is known as currency interest, is equivalent to currency policy, with the consequences we shall see.

We can say we have proven the correctness of the Hayekian statement referred to the *fatal arrogance*.

5) *Market currency interest rate (i_m):* the wealth generation theorem implies said rate is *referential information* for the investor, since it tells him (ceteris paribus) not to pay more than what the ***resource economic time*** is worth in the market —we consider interest a the price of economic time. I.e. Said rate only operates as a cost of opportunity (very important certainly) but it does not imply you reject an investment if it can only be carried out with a higher financial cost than i_m , as long as the level of net wealth generation of the project is higher. This reflection is not unimportant, since all generators of wealth to the left of n_R would be in that situation. On the other hand, as we have stressed, you could not justify the existence of wealth generators to the right of *point* n_R .

I.e., i_m does not operate as an exclusive benchmark justifying the generation of wealth. Proof of this is the wealth ***always*** generated below the levels of average net wealth generation velocity. We have personally promoted successful projects that had a financial cost higher than i_m , and helped maintain projects that “circumstantially” operated below i_m .

Evidently the theorem of wealth generation solves the theoretical question of the *theory of interest and capital productivity* clarifying that *wealth is generated in each economic activity*, as long as its level of generation of wealth (its own g) is higher than the level of destruction of wealth (its own d). An aspect that once again shows us that accounting is the best model, insofar as this reflects that the company generates positive results (operates in an area where: own $g >$ own d , that is the same as: own $g -$ own $d > 0$, which is more than profit in accounting terms), considering in its costs the “price of economic time”, interest, but the interest it pays, not the market average. *I.e., including in costs (destruction of wealth) the price of economic time (interest) does not respond to a different condition from including any input, nobody would pay more than the buying price in the market. Which ratifies the theory of interest of TET, not meriting different treatment, since it is always represented by economic goods.* ⁽⁴⁹⁾

6) *Laffer Curve: point R* can be considered in the analysis of this curve, referred to when an increase of fiscal rates results in a reduction of tax collection. Nevertheless, our *point R* is much broader, since it also includes currency policy.

7) *The blessed profit:* finally *point R* shows that any attempt to reduce, confiscate or attack company profits or increase the destruction of wealth which is what is promoted with the so called “welfare policies” must be reviewed, since the result is the opposite of what their good intentions pretend.

- *Impossibility of calculus in collectivism:* ⁽⁵⁰⁾ if all human beings were economically equal in every spatiotemporal instant we value, the generation and destruction of wealth would present a uniform behavior —*measured from the aggregate of wealth (a sphere in which it is feasible to compare the individual and society) that they generate, which implies the feasibility of occurrence.* This would not only present parallel and horizontal g and d curves but, what is worse, it would determine which is above or below or if they are at the same level.

Evidently only with the model of curves g and d we are developing we can corroborate the impossibility of calculus in collectivism, what Mises imprecisely referred to when he said economic calculus could not be implemented in collectivism because there are no prices. Here we have shown it is not so, but that the impossibility of economic calculus

would be in the only case of human beings being (economically) equal —*measured from the aggregate of wealth (a sphere in which it is possible to compare the individual and society) that they generate, which makes difficult the factual possibility of its occurrence* — and since this is impossible both theoretically and factually, *it is impossible for economic calculus not to exist*. I.e. what does exist is the intent to alter human nature, collectivism is theoretically and factually impossible, if as such we consider that possibility of equality in the valuation of individuals —two people can buy at the same price but the reason are different always.

Therefore what we have proven is the ***theoretical and factual impossibility of collectivism***.

Theorem of economic calculus: given that an only individual calculates economically and the theoretical impossibility of the existence of a community of individuals that value economically in the same way (generate and destroy wealth at the same level all the time) we can enunciate the following calculus theorem:

Human existence implies economic calculus

Denying economic calculus would imply denying human economic fallibility (scarcity of goods) and the marginal laws of decreasing utility and yields, and increasing effort. Negations in which are based the developments that necessarily must be based on the premise of the equality of individuals.

So the theory of the model presented here allows us to conclude:

- The feasibility of economic calculus does not depend on the existence of computers, instead computers appeared and are useful for economic calculus. In other words the *g* and *d* curves of the model show how inconsistent it is to defend the idea that communism would have survived if computers had existed before, on the contrary, computers appeared because of the possibility of economic calculus, without which the human species would not have progressed (and from that progress came computers).
- The indeterminacy of the subjective value, in value observable through quantities of economic goods, is only pertinent in an imaginary world of “all equal”. On the contrary, the human condition of “all different” is what guarantees the existence of economic calculus.
- We can theoretically deduce that institutional intervention that imply “leveling” the *g* and/or *d* curves, imply in turn an obstacle to economic calculus. With progress in this work we will show practically what economic institutions and policies imply not only for the *g* and/or *d* curves, but also for *point R* and its implications for n_R .

Having completed this *necessary* detour, of theoretical importance that does not end here, we come back to our analysis —also theoretical— of the connotations derived from the analysis of *point R*.

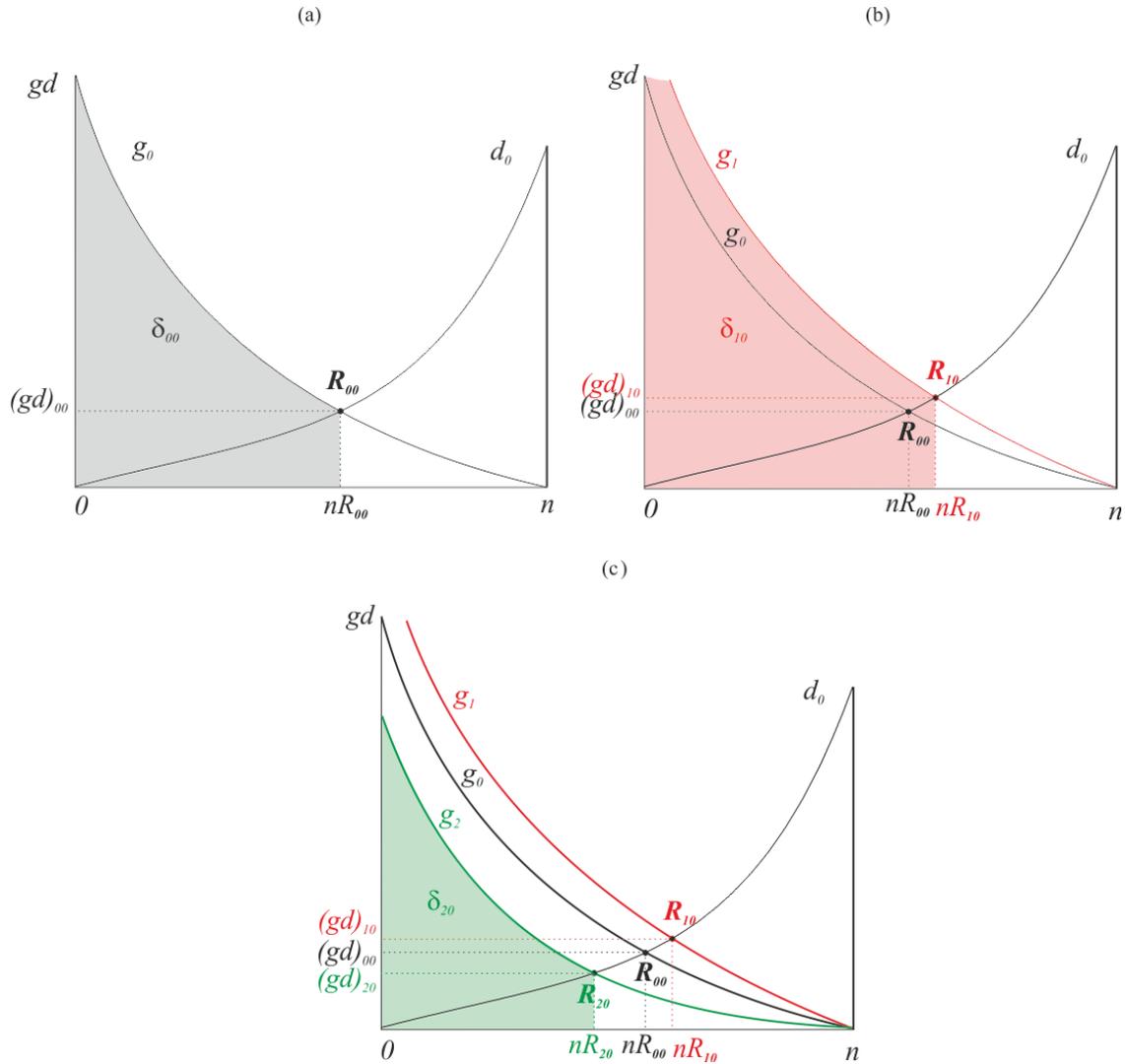
BEHAVIOR OF THE R POINT

Now we will study the behavior of the displacement of *point R* (the result of the behavior of the generation and destruction of wealth). Let us see and study charts 26 (a)-(b)-(c).

In chart 26 (b) we have begun the study of the behavior of *point R*, supposing the displacement of *g* with *d* and *n* constant. Let us see the conclusions:

Chart 26

Displacement of *g* with *d* and *n* constant



1) In chart 26 (b) we suppose an upward displacement of *g* from *g₀* to *g₁*, with $g_1 > g_0$ for any *n*. I.e., we are in the presence of $\uparrow g$ with *d* and *n* constant, which implies:

- a) An increase of δ , given that $\delta_{10} > \delta_{00}$. We observe that $\uparrow \delta = \delta_{10} - \delta_{00}$
- b) An increase of *R*, given that $R_{10} > R_{00}$. We observe that $\uparrow R = R_{10} - R_{00}$.

- c) An increase of the owners that conform the per capita wealth $\uparrow n_R$, given that $n_{R10} > n_{R00}$.
- d) In this case we conclude the resulting increase of $\uparrow \delta = \delta_{10} - \delta_{00}$, indicated in 1-a, can be synthesized as: $\uparrow \delta = \uparrow g \uparrow n$.

All which is reflected in this table:

Table 8

With d_0 constant and displacement $\uparrow g_1$

g	R	n	$g = d$	δ	Arrow R
$\uparrow g_1$	$R_{00} \rightarrow R_{10}$	$n_{R10} > n_{R00}$	$(gd)_{10} > (gd)_{00}$	$\delta_{10} > \delta_{00}$	$\rightarrow \uparrow$

- 2) In chart 26 (c) we suppose a downward displacement of g from g_0 to g_2 , with $g_2 < g_0$ for any n . I.e., we are in the presence of $\downarrow g$, with d and n constant, which implies:
- a) A decrease of δ , given $\delta_{20} < \delta_{00}$. We observe that $\downarrow \delta = \delta_{20} - \delta_{00}$.
- b) A decrease of R , given $R_{20} < R_{00}$. We observe that $\downarrow R = R_{20} - R_{00}$.
- c) A decrease of owners conforming per capita wealth $\downarrow n_R$, since que $n_{R20} < n_{R00}$.
- d) In this case we conclude the resulting decrease of $\downarrow \delta = \delta_{20} - \delta_{00}$, indicated in 2-a, can be synthesized as: $\uparrow \delta = \downarrow g \downarrow n$.

All which is reflected in this table:

Table 9

With d_0 constant and displacement $\downarrow g_2$

g	R	n	$g = d$	Δ	Arrow R
$\downarrow g_2$	$R_{00} \rightarrow R_{20}$	$n_{R20} < n_{R00}$	$(gd)_{20} < (gd)_{00}$	$\delta_{20} < \delta_{00}$	$\leftarrow \downarrow$

Let us proceed now to charts 27 (a)-(b)-(c):

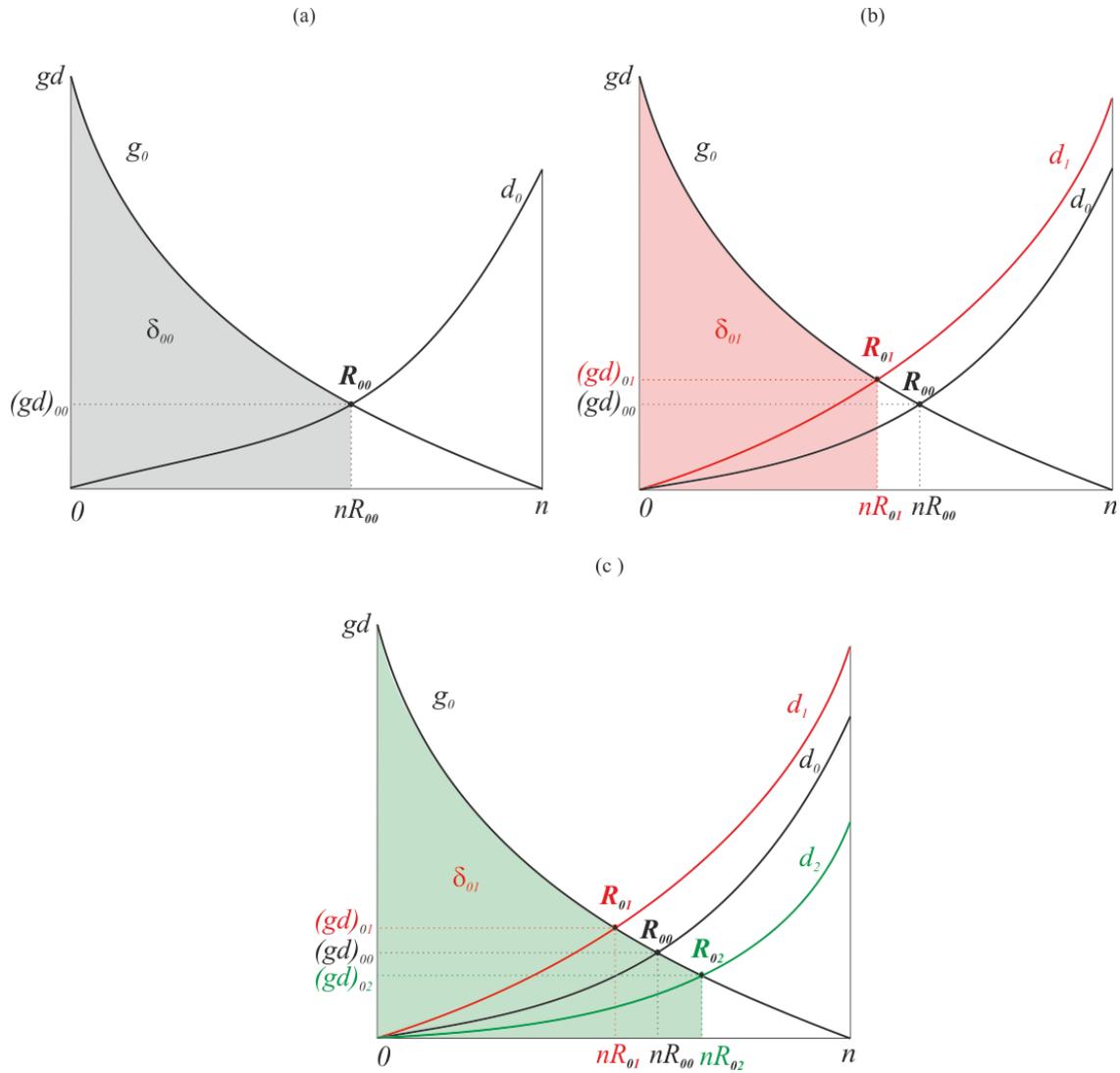
In chart 27 (b) we continue the study of the behavior of R supposing the displacement of d with g and n constant. Let us see the conclusions:

- 3) In chart 27 (b) we suppose an upward displacement of d from d_0 to d_1 , with $d_1 > d_0$ for any n . I.e., we are in the presence of $\uparrow d$, with g and n constant, which implies:
- a) A decrease of δ , since $\delta_{01} < \delta_{00}$. We observe that $\downarrow \delta = \delta_{01} - \delta_{00}$

- b) An increase of R , since $R_{01} > R_{00}$. We observe that $\Delta R = R_{01} - R_{00}$.
- c) A decrease of owners conforming per capita wealth $\downarrow n_R$, since $n_{R01} < n_{R00}$.
- d) In this case we conclude the resulting decrease of $\downarrow \delta = \delta_{01} - \delta_{00}$, indicated in 3-a, can be synthesized as: $\downarrow \delta = \uparrow d \downarrow n$.

Chart 27

Displacement of d with g and n constant



All which is reflected in the following table:

Table 10

With g_0 constant and displacement $\uparrow d_1$

d	R	n	$g = d$	Δ	Arrow R
$\uparrow d_1$	$R_{00} \rightarrow R_{01}$	$n_{R01} < n_{R00}$	$(gd)_{01} < (gd)_{00}$	$\delta_{01} < \delta_{00}$	$\leftarrow \uparrow$

4) In chart 27 (c) we suppose a downward displacement of d from d_0 to d_2 , with $d_2 < d_0$ for any n . I.e., we are in the presence of $\downarrow d$, with g and n constant, which implies:

- An increase of δ , since $\delta_{02} > \delta_{00}$. We observe that $\uparrow \delta = \delta_{02} - \delta_{00}$.
- A decrease of R , since $R_{02} < R_{00}$. We observe that $\downarrow R = R_{02} - R_{00}$.
- An increase of the owners that conform per capita wealth $\uparrow n_R$, since $n_{R02} > n_{R00}$.
- In this case we conclude that the resulting increase of $\uparrow \delta = \delta_{02} - \delta_{00}$, indicated in 4-a, can be synthesized as: $\uparrow \delta = \downarrow d \uparrow n$.

All which is reflected in the following table:

Table 11

With g_0 constant and displacement $\downarrow d_2$

d	R	n	$g = d$	δ	Flecha R
$\downarrow d_2$	$R_{00} \rightarrow R_{02}$	$n_{R02} > n_{R00}$	$(gd)_{02} < (gd)_{00}$	$\delta_{02} > \delta_{00}$	$\rightarrow \uparrow$

CURVE OF THE ECONOMIC EVOLUTION OF OWNERS (CEE-O)

We are ready to study the behavior of the economic evolution of n owners, which we will do with chart 28 that we analyze now.

In chart 28 we show the extreme cases presented previously, upward and downward displacement of the curves of *Generation* (g) and *Destruction* (d) of wealth by n owners. So we concentrate on the R points resulting from the intersections g and d : R_{00} of the intersection $g_0 \leftrightarrow d_0$; R_{11} of the intersection $g_1 \leftrightarrow d_1$; R_{21} of the intersection $g_2 \leftrightarrow d_1$; R_{22} of the intersection $g_2 \leftrightarrow d_2$, y R_{12} of the intersection $g_1 \leftrightarrow d_2$. In turn, each one with the related coordinate point $g = d$, y n_{xx} .

The study is carried out drawing the *curve of economic evolution* (CEE), which will consist of linking the points R_{xx} , from the point of origin R_{00} to the arrival point, and in the same order the relation of the coordinates that determine each one of them ($g_{xx} = d_{xx}$ y n_{xx}).

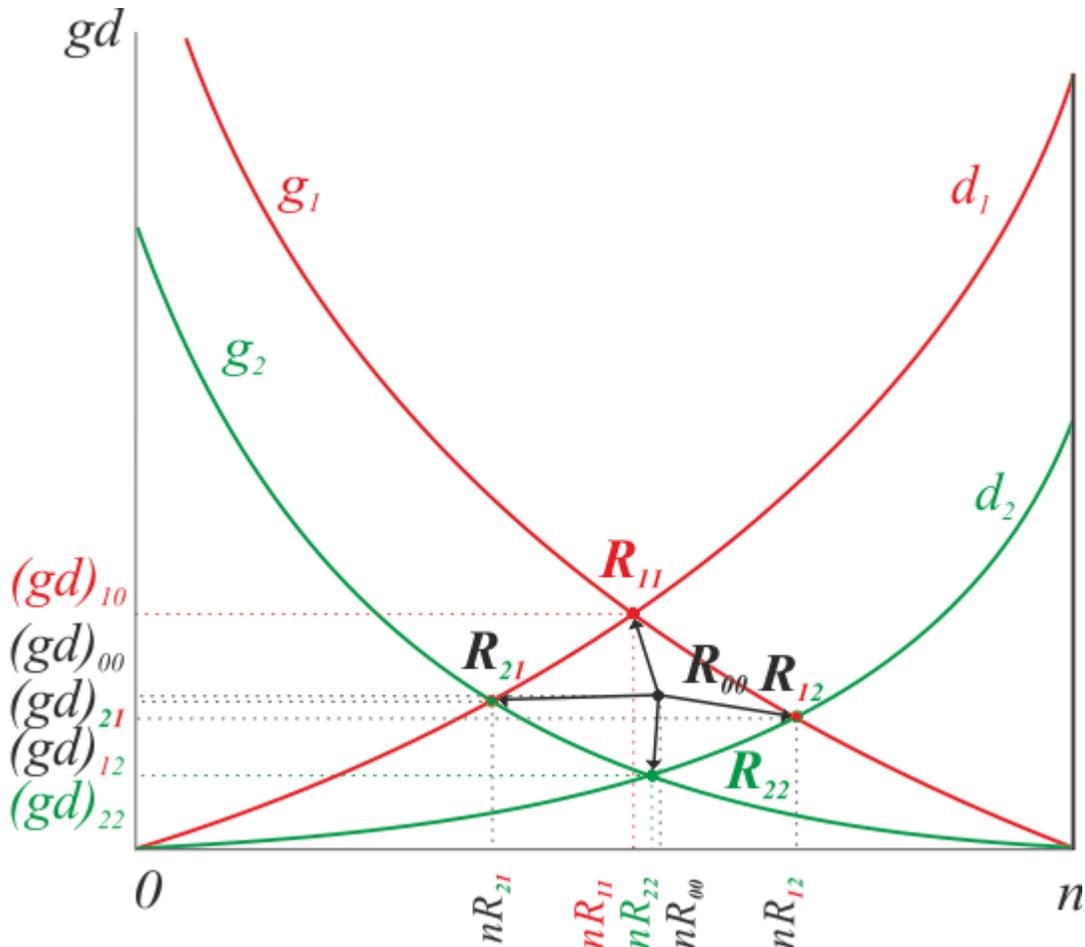
Now we will analyze the consequences of the *displacements* of the curves of *Generation* (g) and *Destruction* (d) of wealth that can occur —according to the implicit cases in the figures used here—, and their consequences in the movement of the *curve of economic evolution of the owners* we will present. The reader can do the pertinent analysis of movements within the curves, combined with displacements. On the other hand, it is possible to study the inverse

behavior to those shown here, supposing simply the final positions are the origins and the origins are the final positions.

We analyze first the behavior of R_{xx} referred to its incidence on the equation $g_{xx} = d_{xx}$, with the displacements of the curves.

Chart 28

Curve of Economic Evolution of “n” owners



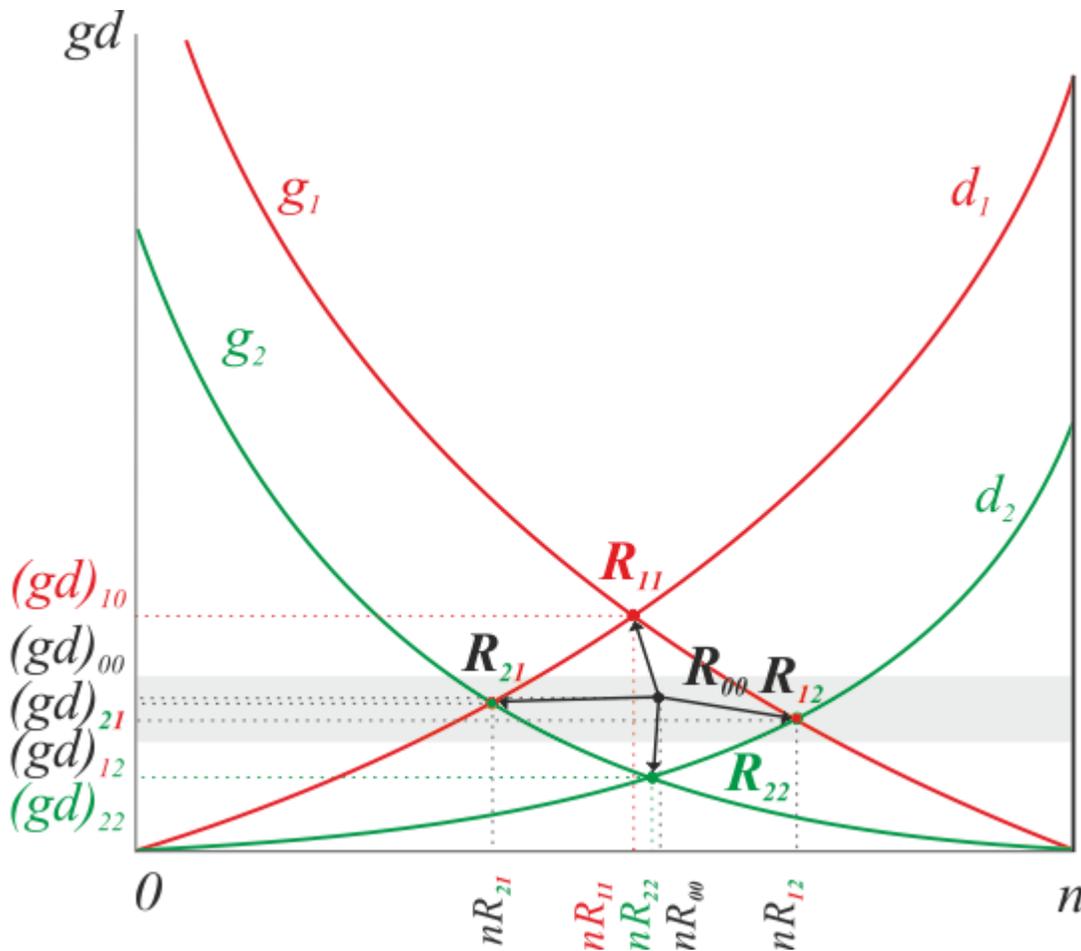
Based on chart 29 we analyze the three cases we wish to distinguish, using the horizontal shaded band surrounding the level of R_{00} , to visualize the consequences of the displacements of g and d on the level of R , let us see:

- a) Rise of the level of R above the shaded band, where we only observe R_{11} , produced by the *upward* displacement of the curve of generation of wealth ($\uparrow g_1$) and the *upward* displacement of the curve of wealth destruction ($\uparrow d_1$): $R_{00} \rightarrow R_{11}$.

- b) *Fall* of the level of R , below the shaded band, where we only observe R_{22} , produced by the *downward* displacement of the wealth generation curve ($\downarrow g_2$), and the downward displacement of the curve of wealth destruction ($\downarrow d_2$): $R_{00} \rightarrow R_{22}$.
- c) *Approximate similarity* of the level of R , above the shaded band, where we observe R_{12} and R_{21} , because the effects of an *upward* displacement of the wealth generation curve ($\uparrow g_1$) are neutralized by a *downward* displacement of the curve of wealth destruction ($\downarrow d_2$): $R_{00} \rightarrow R_{12}$; and a *downward* displacement of the wealth generation curve ($\downarrow g_2$) with an *upward* displacement of the curve of wealth destruction ($\uparrow d_1$): $R_{00} \rightarrow R_{21}$.

Chart 29

Behavior of R with displacements of the curves g and d

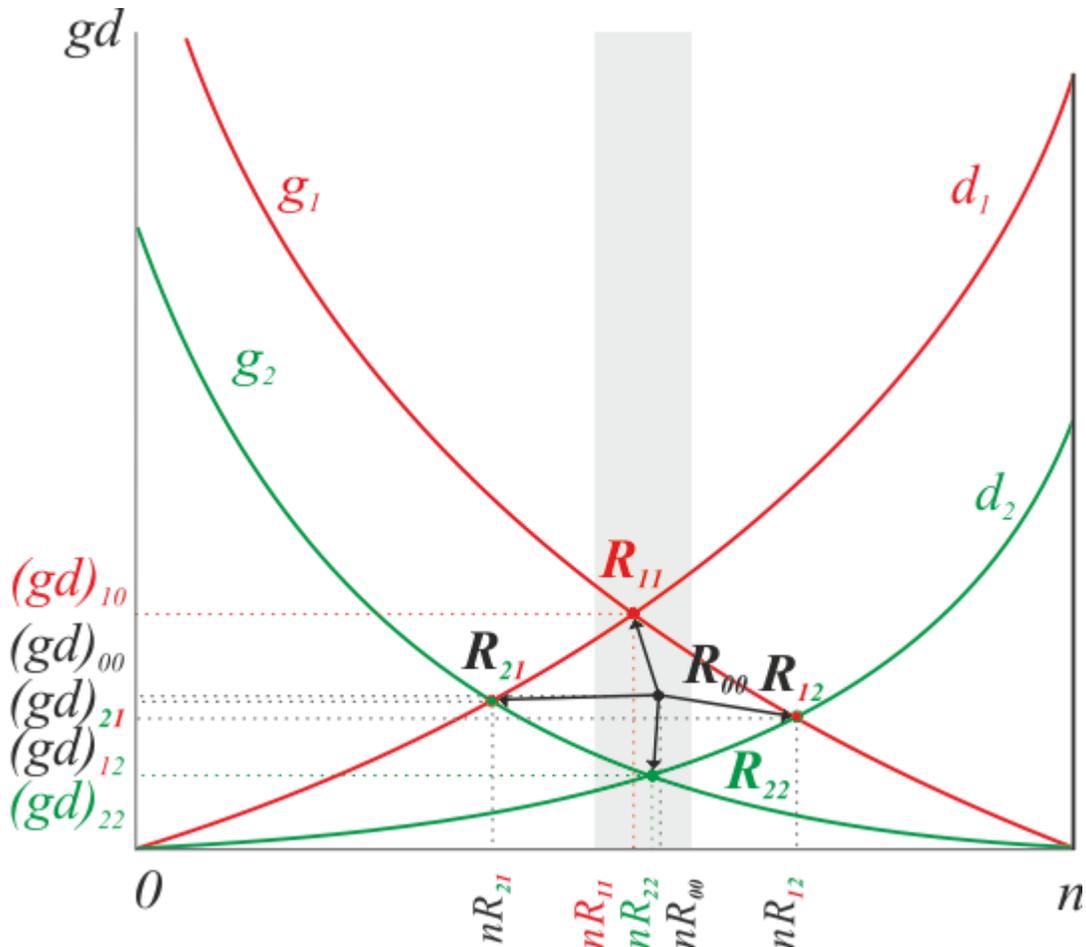


We stress that similar displacements of g and d that do not neutralize each other, they present more profound variations in the behavior of R . This is different from the opposing movements of g and d , where the upward displacement of one is “compensated” with the downward movement of the other, producing smaller oscillations in the behavior of R .

Now we will analyze the behavior of the number of owners participating in the formation of average per capita wealth (n_{xx}), i.e., what the behavior of the distribution of wealth indicates with displacements of the curves of generation and destruction of wealth. Let us see and analyze chart 30.

Chart 30

Behavior of n_{xx} with displacements of curves g and d



Based on chart 30 we analyze the three cases we wish to differentiate, using to this effect the shaded vertical band surrounding the level of R_{00} , to visualize the consequences that the displacements of g and d have for n_{Rxx} .

- a) Rise of the level of owners n_R , to the right of the shaded band, where we only observe n_{R12} , due to an *upward* displacement of the wealth generation curve ($\uparrow g_1$), with a *downward* displacement of the curve of wealth destruction ($\downarrow d_2$): $R_{00} \rightarrow R_{12}$.

- b) *Fall* of the level of owners n_R , to the left of the shaded band, where we only observe n_{R21} , due to a *downward* displacement of the curve of wealth generation ($\downarrow g_2$), with an *upward* displacement of the wealth destruction curve ($\uparrow d_1$): $R_{00} \rightarrow R_{21}$.
- c) *Approximate similarity* of the level of owners n_R , included in the shaded band, where we observe n_{R11} (beside n_{R00}), originated in the *upward* displacement of the wealth generation curve ($\uparrow g_1$) with an *upward* displacement of the wealth destruction curve ($\uparrow d_1$): $R_{00} \rightarrow R_{11}$; and R_{22} , originated in the *downward* displacement of the wealth generation curve ($\downarrow g_2$), with a *downward* displacement of the wealth destruction curve ($\downarrow d_2$): $R_{00} \rightarrow R_{22}$.

We observe a behavior that is different from R , since here there are larger oscillations in n following a different behavior of g and d .

It is evident that the completely different consequences in the behavior of R and n , with the same combined behavior of g and d , will be very useful for economic analysis. Analysis we will now develop and that surely will not exhaust the analytical field open here.

Now we eliminated the shaded area and concentrate on the combined effects on R and n of the proposed displacements of g and d . Let us see the following chart 31.

In chart 31 we observe that:

- a) *A higher level of per capita wealth*, concentrated in a *similar number of owners*: R_{11} y n_{R11} , originated by the *upward* displacement of the curve of wealth generation ($\uparrow g_1$), with an *upward* displacement of the wealth destruction curve ($\uparrow d_1$).
- b) *Lower level of per capita wealth*, concentrated in a *similar number of owners*: R_{22} and n_{R22} , originated by the *downward* displacement of the curve of wealth generation ($\downarrow g_2$), with a *downward* displacement of the wealth destruction curve ($\downarrow d_2$).
- c) *Similar level of per capita wealth*, concentrated in a *smaller number of owners* R_{21} and n_{R21} , due to a *downward* displacement of the wealth generation curve ($\downarrow g_2$), with an *upward* displacement of the wealth destruction curve ($\uparrow d_1$).
- d) *Similar level of per capita wealth*, concentrated in a *greater number of owners*: R_{12} and n_{R12} , due to an *upward* displacement of the wealth generation curve ($\uparrow g_1$), with a *downward* displacement of the curve of wealth destruction ($\downarrow d_2$).

Finally, in chart 31 we clearly observe the difference between the areas that represent the net wealth generated between the two extreme cases limited by R_{21} (with black frame) and R_{12} (shaded).

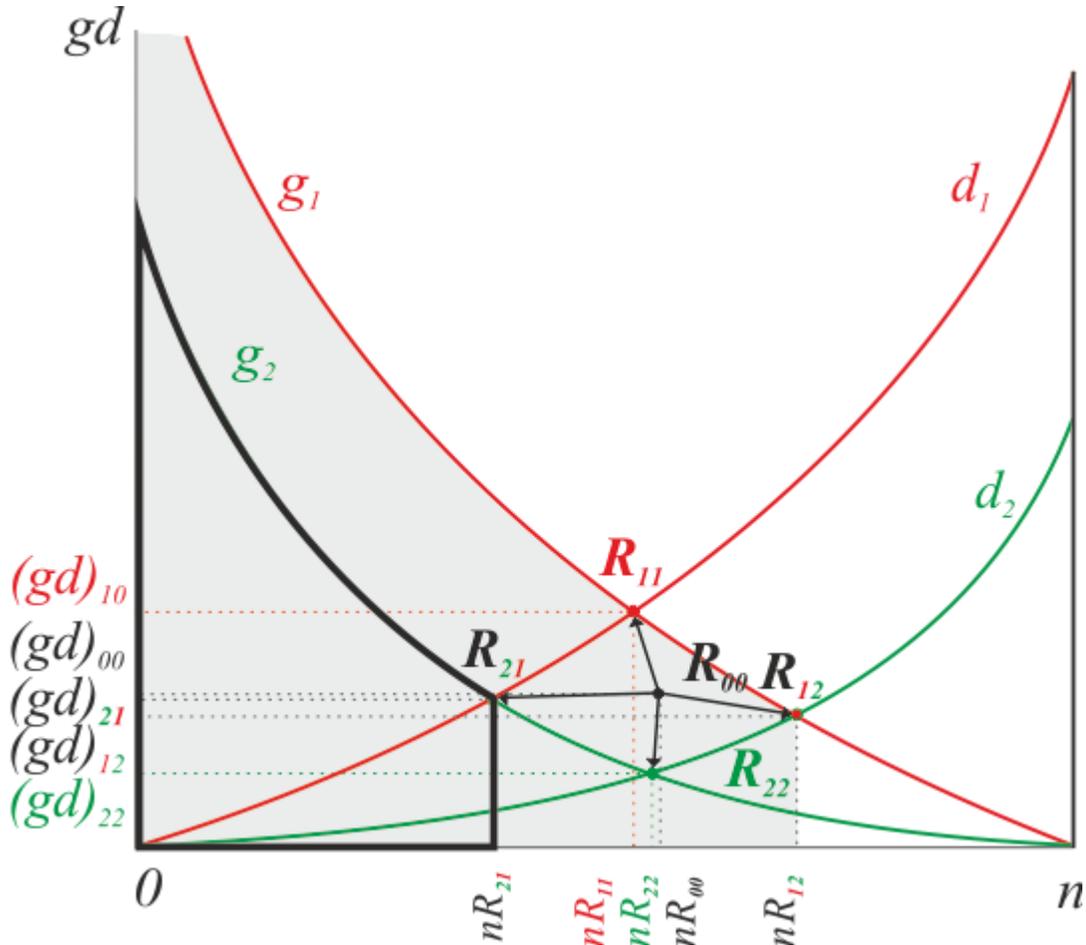
Now we simplify the data and present chart 32 in which we only highlight the R points generated at the ends of the displace curves (R_{21} y R_{12}).

We should not forget that the analysis of this section refers to comparing the new extreme positions (R_{21} y R_{12}). Derived from the also extreme curves of wealth generation and destruction (g_2d_1 y g_1d_2), *relative to an original position* R_{00} , derived from g_0d_0 from where we start the comparative analysis.

Now let us see what analysis we have when we compare directly two positions we are interested in analyzing, i.e., we do without the original position (R_{00}) —that we use as a mediation for expositive reasons and to show a non linear process— and directly compare two positions that will be necessarily different.

Chart 31

Combined consequences for R and n of displacements in g and d



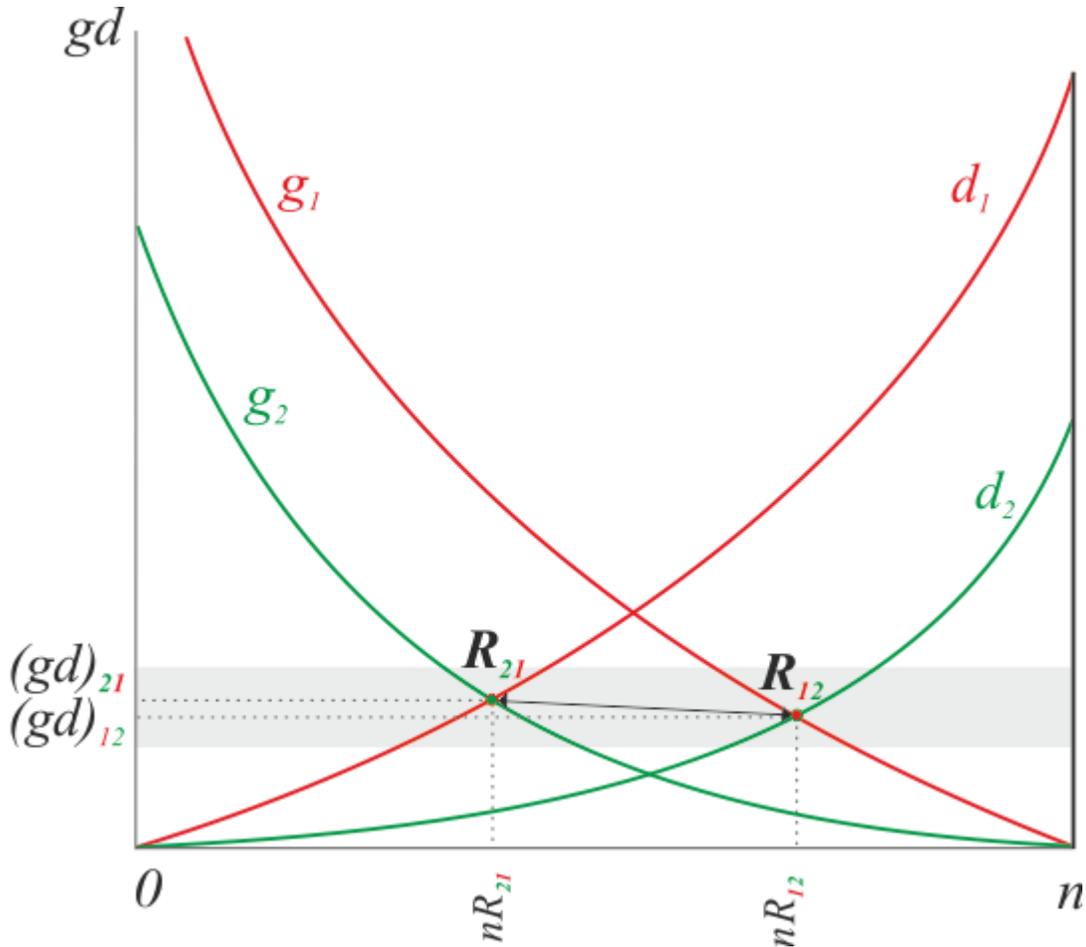
To this end we present chart 32 where we directly show the “movement” between $R_{21} \leftrightarrow R_{12}$, representative of the real cases that we can compare in a world in constant change, i.e., where none of the curves remain constant and we analyze specific data taken from reality. Let us see:

We could say the *curve of economic evolution of “n” owners* (CEE-O), represented by the line with an arrow at both ends is the behavior of the economic evolution of a community, since we have represented the extreme wealth generation and destruction curves, with the clear goal of making a synthesis of the trend a CEE-O should present. We observe that:

- $R_{21} \rightarrow R_{12}$: as the number of owners increases ($n_{R21} \rightarrow n_{R12}$), in a situation where wealth increases ($g_2 \rightarrow g_1$), and its destruction decreases ($d_1 \rightarrow d_2$), there is a considerable increase in the distribution of wealth, with distribution among *many more owners*, with a moderately higher at a level of average speed of positive net wealth (R_{21} y R_{12} were in the shaded band).

Chart 32

Curve of Economic Evolution of Owners (CEE-O)



- $R_{21} \leftarrow R_{12}$: as the number of owners decreases ($n_{R12} \rightarrow n_{R21}$), in a situation where wealth decreases ($g_2 \leftarrow g_1$), and its destruction increases ($d_1 \leftarrow d_2$), there is a considerable decrease in the distribution of wealth, with distribution among *much fewer owners*, with a moderately lower at a level of average speed of positive net wealth (R_{12} y R_{21} were in the shaded band).

- In turn, the synthesis of the human correlation of quality and quantity is reflected in the CEE-O with the relation $R_{21} \leftrightarrow R_{12}$, while we observe that $R_{21} > R_{12}$ shows us:
 - 1) The presence of the *law of diminishing returns*: since as the number of owners expands, the level of velocity of net generation of wealth decreases: to $n_{R12} > n_{R21}$ corresponds $R_{12} < R_{21}$, and vice versa: to $n_{R21} < n_{R12}$ corresponds $R_{21} > R_{12}$. Which is indicating that the expansion of wealth happens at the expense of a lesser level of individual intensity of wealth (as in physics, chemistry, economics, etc.). This is what we observe in the business world: they are born in a niche with few users at a high price, then they go through the process of differentiation with middle quantities and prices and through competition end up with low prices for a great number of users.
 - 2) The relationship ($R_{21} \leftrightarrow R_{12}$), synthesis of the inter-play of the behavior of the slopes of the curves of wealth generation and destruction, would validate the ideas of many scientists, especially in the field of physics, that the more we know the more ignorance we see. I.e., as humans increase their wealth, they discover the infinite that can be generated is wider and more complex —both in the micro and the macro— a situation that the previous state of relative poverty did not allow us to appreciate. The business world works in the same way, insofar as competition tends permanently toward greater wealth, except when institutions discourage this, in which case there is an involution to previous states of poverty.
 - 3) If we consider the downward slope of the wealth generation curve relative to the passing of time, we can conclude that all stock of wealth (value) can be considered “non renewable”, since we know that as time passes it presents “different forms”. This categorical conclusion determines that non-renewable natural resources should not be considered a special or strange case, since the same will be true for all wealth.
 - 4) These reflections ratify that the fallibility of human beings implies the condition of maximizer by nature. I.e., it would not be conceivable to analyze man outside this condition of maximizer, insofar as this is determined by the nature present in human action (Popper and Mises) and the marginal laws. Humans try to maximize the stock of wealth, knowing they will never reach the maximum possible.

We can summarize the behavior of the *curve of economic evolution*, saying that any expansion of wealth among individuals (increase of n) implies supposing that is achieved with a lower level of R . A situation than can only change if the progress in g overcompensates the increase in the concomitant destruction presented by the progress of d . The most favorable answer will always be in *economic education*, leading to institutions that do not alter the free functioning of the marginal laws and allow —it is not necessary to promote— the maximization of individual and collective efficiency.

Finally, it is important to stress that the process of the economic evolution of “ n ” owners does not present a linear relation as we have seen in chart 32, instead it is more appropriate to think of it as a “spider-web” figure, with the help of the theoretical understanding derived from chart 32, and of reference point R_{00} .

DISPLACEMENT OF CEE-O FROM A SPATIO-TEMPORAL POINT

We must stress that the conclusions we have reached derive from the institutional framework existing in society that determine the levels of the slopes of the curves of wealth generation and destruction and their displacements. All of which allows us to conclude in chart 33, and thus summarize the model and present the economic evolution of “*n*” owners as a non linear whirlwind that moves towards one of the quadrants we can consider once we have established the center of the axis of coordinates in a *point R*₀₀. Which would be the equivalent of analyzing the behavior of the *Curve of Economic Evolution of Owners* starting from a certain spatio-temporal point.

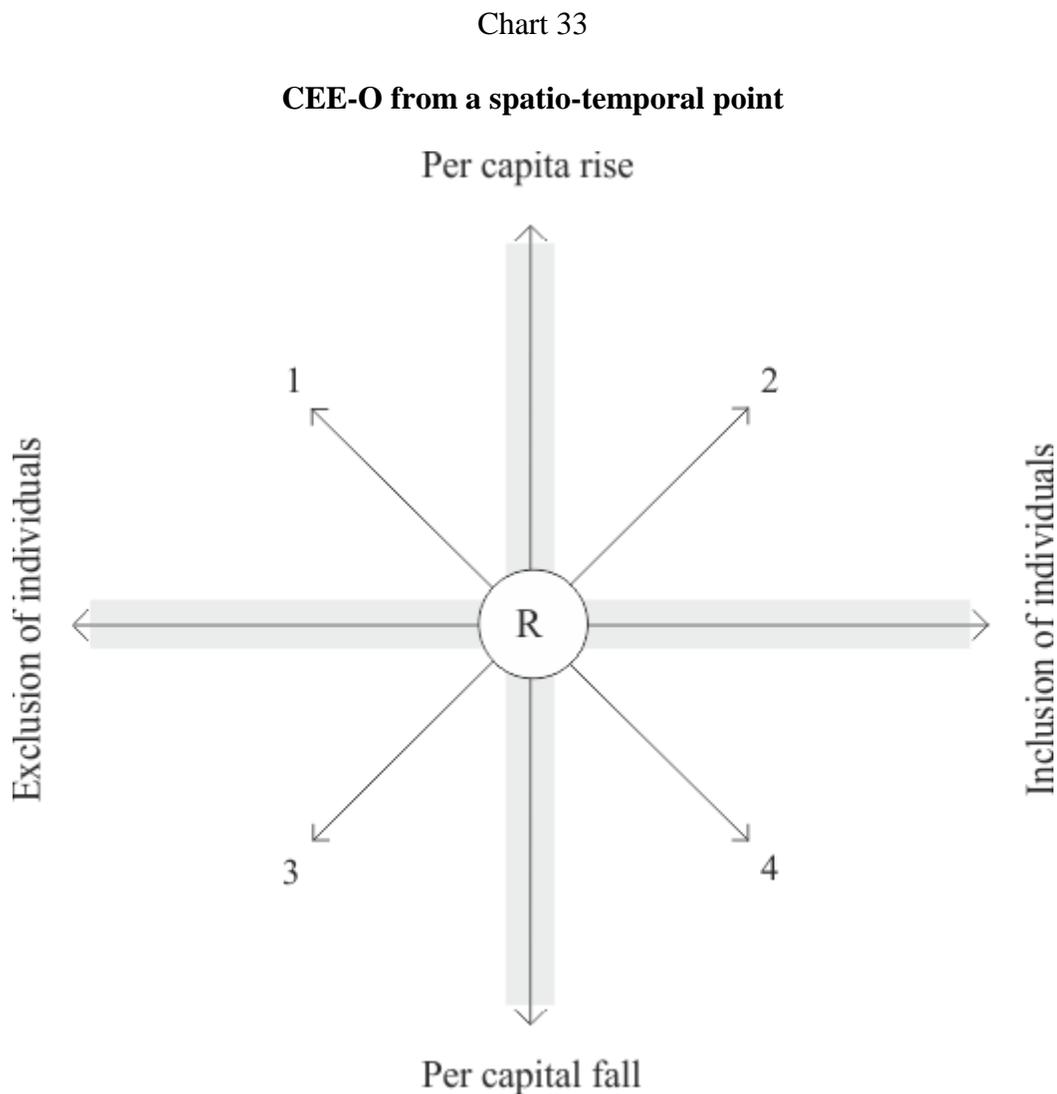


Chart 33 (cross) —the fact that this coincides with the number 33, the age of Christ on the cross, is pure chance— must be interpreted with the fundamentals of the CEE-O, only we have

placed the center of coordinates at a *point* R_{00} . An exercise that allows us to study the possible derivations of the CEE-O of each concrete case, as long as there is the adoption of policies for changing the institutional structures underlying the behavior of the curves of generation (g) and destruction (d) of wealth, with corresponding framework of distribution among owners of the same. In other words, it would be like drawing on the charts we have presented an infinity of temporary CEE-O starting from an initial spatio-temporal point. From another perspective, any CEE-O is a synthesis of infinitesimal and continuous curves derived from the immediately preceding spatio-temporal point, where the crossing of the original ordinates would be the beginning of the economic evolution of the owners under study.

Chart 33 shows us:

- Two horizontal sections: the one corresponding to the behavior of the level of generation of net wealth (R) showing an increase ($\uparrow R_{xx}$) above the abscissa, and a decrease ($\downarrow R_{xx}$) below it.
- Two vertical sections: indicating the *exclusion* of individuals ($\downarrow n$) that participate in the generation of net wealth, to the left of the ordinate, and *inclusion* ($\uparrow n$) to the right.

With the help of chart 33 we can predict synthetically the possible scenarios of economic evolution, starting from a spatio-temporal point of diagnosis (R_{00}) and evaluate the path with highest probability, which will be circumscribed to one of the referred quadrants.

Quadrant 1: *Increase* of the level of net wealth generation **with** *exclusion* of owners.

Quadrant 2: *Increase* of the level of net wealth generation **with** *inclusion* of owners.

Quadrant 3: *Decrease* of the level of net wealth generation **with** *exclusion* of owners.

Quadrant 4: *Decrease* of the level of net wealth generation **with** *inclusion* of owners.

The possibility of the occurrence of any of the four phenomenon puts us in a terrain where we cannot speak of a virtuous path of economic growth of owners with an axiomatic spirit. I.e., there is no dogma that stipulates a positive correlation between the economic evolution of the owner and the society to which he belongs, but there is a specific way to reach one or the other goal, which refers to allowing the free functioning of the marginal laws.

Chart 33 clearly indicates that the evolution of the individual and society are not always positively correlated, and that it is prudent to choose *rationally* the best method according to the goal of society, based on a point of diagnosis. Even so, it is clear there is only one way to reach the economic goal, the benefit of demand, and that is allowing the full functioning of the marginal laws.

Conclusion: we can ratify that all societies have much to say when explaining their poverty or wealth, a situation that becomes exponential as we follow the *a priori* logical-deductive causality of economics, and include in the analysis the individuals of the community that are not

owners, do not participate in the generation of wealth but do intervene in this destruction, with which we will have completed the study of **Socio-Economic Evolution**.

We must also remember the consequences we studied when analyzing chart 32, where we compared the consequences derived from the extreme positions of the curves of generation (g) and destruction (d) of wealth. There we concluded that the consequences of the displacements of the curves were more devastating off the distribution of wealth than for the average level of wealth, corroborated by post crisis statistics. Which should be an alert when establishing “economic policies”.

To confirm all this what follows will be necessary and sufficient proof reflecting which policies that have been applied (fiscal, currency-financial, employment, etc.) have originated displacements towards one or the other quadrant of the curve of socio-economic evolution starting from a specific spatio-temporal point.

SOCIO-ECONOMIC EVOLUTION

Endogenous institutions and economic policies

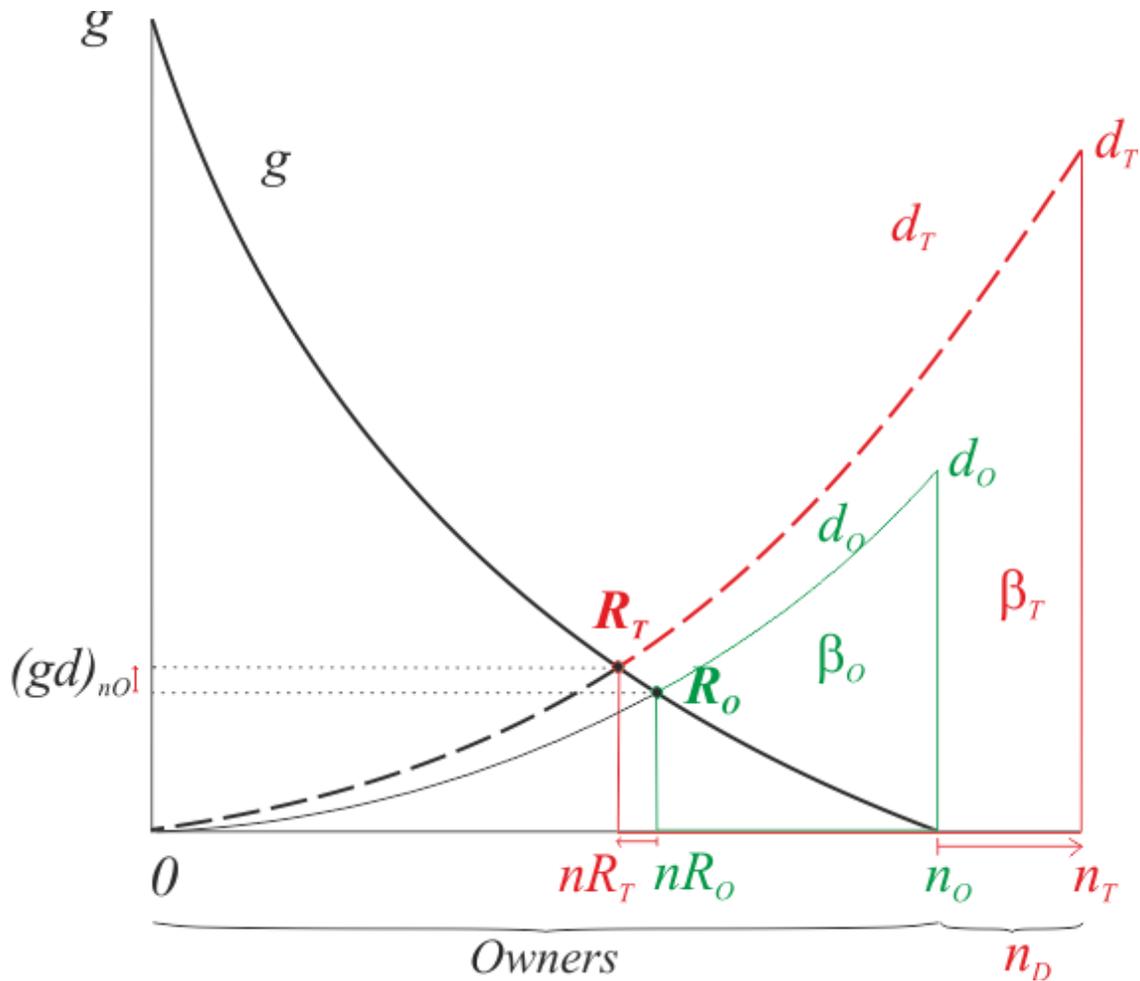
In this section we add to the *a priori* logical-deductive causality of economic evolution another component of the reality of a society, the economic support of individuals that are not economically active —only destroy wealth—, which we will designate as n_D .

It is of great importance to see this inclusion implies considering economic policy (currency and fiscal) as an endogenous variable of the model we are developing —a theoretical framework suggested by Milton Friedman for future developments, recognizing the lack thereof up to that moment.

To do this it is very useful to resort again to the CEE-O we have developed and so we obtain chart 34.

Chart 34

Curve of Socio-Economic Evolution (CSEE)



In chart 34 we have added more individuals to the n set that represented the labor force (which from now on we will designate as n_O , where the subscript O denotes the condition of owner). Thus we extend the abscissa to represent the total population (n_T), from where we deduce that the part of the population that is not part of the labor force (n_D) is the difference between the two others:

$$n_D = n_T - n_O$$

In chart 34 we highlight the consequences of including n_D insofar as they do not generate wealth but do destroy it:

- We extend the abscissa to the effect of adding the individuals that are not part of the labor force (n_D) that compose society. In this manner we have the quantity of owners from the origin (0) to n_O , and from n_O to n_T the individuals that are not owners or are not part of the labor force n_D , since they do not generate wealth.

We have already stressed the fact of considering humans that generate wealth in the abscissa (n_p) that, being ordered based on the law of decreasing yields, implies considering the distribution of wealth according to the owners that generate it. Now we include the humans that participate in the destruction of wealth generated by them that do so based on the institutional political order with which they are introduced to the economic world. I.e., here we complete the framework of wealth distribution, since we add those that are benefited with participating in the destruction of wealth that they do not generate.

We reiterate a previous statement:

...the generation of wealth obeys an aspect governed by economic laws (crudely mentioned as market laws), while the destruction of wealth is governed by political factors —here is the endogenous treatment of economic institutions and policies.

- We start from g , since it is the curve of wealth that generates n_O .
- We start from d_O , since it is the curve of destruction of wealth by n_O .
- We start from R_O , since it is point R for the described curves that present the equation $g = d_O$, for n_O .
- The curve of total wealth destruction, that adds n_D , is represented by d_T .
- The new point R_T appears as the intersection of $g = d_T$.
- The surface of wealth destruction β_T (framed in red) appears representing the stock of wealth destroyed with n_T . For comparison we frame β_O in green, representative of the destruction of wealth for n_O , before including n_D .
- The surface δ_{nT} is formed, representing the surface of net wealth generated by g and d_T , not represented in this chart, which is defined by 0 ; g ; g ; R_T ; n_{RT} . For comparison we highlight δ_{nO} , that represents the surface of net wealth generated by g and d_O also not represented in this chart, defined by 0 , g , g , R_O , n_{RO} .

- The red arrows, by the coordinates, show the behavior of the variables represented in them: increase of n_D individuals in the abscissa ($n_O \rightarrow n_T$), decrease of owners participating of the minor net wealth in the abscissa ($n_{RT} \leftarrow n_{RO}$), and increase of new point R , indicated in the ordinate ($gd_O \uparrow gd_T$).
- **Endogenous economic policies:** here we reiterate the enormous importance of having confronted the g curve of generation of wealth —decreasing from its origin (according to market terms)— with the d curve of wealth destruction increasing from its origin, according to political terms. I.e. we can clearly see the huge importance of presenting the d curve that ascends with the increase in the number of individuals, as we stressed in its first construction, in which we only referred to the wealth destroyed by the owners.
- We end this section refreshing an aspect that is essential to understanding how the g and d curves relate: while curve g represents the wealth generated in a period of time, the d curve represents the wealth destroyed in that same period of time, “**but**” includes also the pre-existing wealth that is destroyed in the period. In other words, while in a period only “new” wealth can be generated (represented by the g curve), the d curve refers to the destruction of wealth in the period, which implies the possibility of destroying “new” and pre-existent wealth.

Let us see the consequences of including human beings that only destroy wealth:

Table 12

Behavior of Socio-Economic Evolution (CSEE)

d_T	R	n	$g = d$	δ	Arrow R
$\uparrow d_T$	$R_O < R_T$	$n_{RT} < n_{RO}$	$(gd)_T > (gd)_O$	$\delta_T < \delta_O$	$\leftarrow \uparrow$

It is not strange that we are in the presence of the same consequences as when we studied the increase in destruction of wealth (table 10). A cursory examination will show:

Table 13

With g constant and displacement $\uparrow d_I$

d	R	n	$g = d$	δ	Arrow
$\uparrow d_I$	$R_O < R_T$	$n_{RT} < n_{RO}$	$(gd)_T < (gd)_O$	$\delta_T < \delta_O$	$\leftarrow \uparrow$

Then all the conclusions we reached when studying the consequences of bigger curve of wealth destruction are valid for the transition from n_O to n_T , due to the inclusion of n_D .

Finally we stress the new forms of the areas deriving from chart 34 (not drawn):

$$\delta_T < \delta_O$$

Which also allows us to say that with the difference $\delta_T - \delta_O$ we can evaluate the effort of a community to sustain n_D , from the analysis of the net wealth generated, in terms of economic goods, weighted by their prices relative to the currency.

From another point of view:

$$\beta_T > \beta_O$$

It allows us to say that with the difference $\beta_T - \beta_O$ we can evaluate the effort of a community to sustain n_D , based on the analysis of destruction of wealth, in terms of economic goods weighted by their prices relative to the currency.

Thus we can deduce:

$$\delta_T - \delta_O = \beta_T - \beta_O$$

It is the same if we take δ or β , it is clear that the marginal laws of diminishing utility and returns establish that anything that implies promoting destruction of wealth, that is, promoting consumption, is negative for social economic evolution. In this way productive efficiency once again becomes man's best ally. Among the manifestations of efficiency we highlight simplicity (one of the requisites of Popper to prove a theory is superior to another) which in economics implies "no bureaucracy" in the Misian sense.

PART III

PROPOSED

MACROECONOMIC

MODEL

— APPLIED —

CURRENCY AND FISCAL POLICY

We will now consider what is called:

- 1) *Fiscal policy*: considering as such imposing on the owners (n_O) covering the cost of the destruction of wealth by non-owners (n_D).
- 2) *Currency policy*: considering as such the control of bank currency and credit, with which there is the pretense of controlling alternatively the general level of prices (which for us is the price of currency) and/or the currency interest rate (not considering the validity of the equivalence axiom presented by TET: $i_m \equiv p_m$). All this with the intention of controlling what they call the “general” level of prices (inflation) and the level of unemployment, which they try to explain with the IS/LM models, the Phillips curve and its different interpretations, etc. Within the framework of the axioms of equality ($p_m = i_m$) and equivalence ($p_m \equiv i_m$) of TET, it is evident that currency and financial policies are mutually implied.

What we have considered as fiscal policy is represented by our socio economic evolution curve, since we have already added the incidence of the passage from n_O to n_T , adding the non-economic members of a society, n_D . We must reiterate that n_D includes the members of society that are non-economic, non-owners, that do not generate wealth and are not supported by direct family or solidarity ties with an owner. In other words, the members of a family are included in n_O and anyone that receives subsidies belongs to n_D .⁽⁵¹⁾

To this effect we now draw and analyze chart 35.

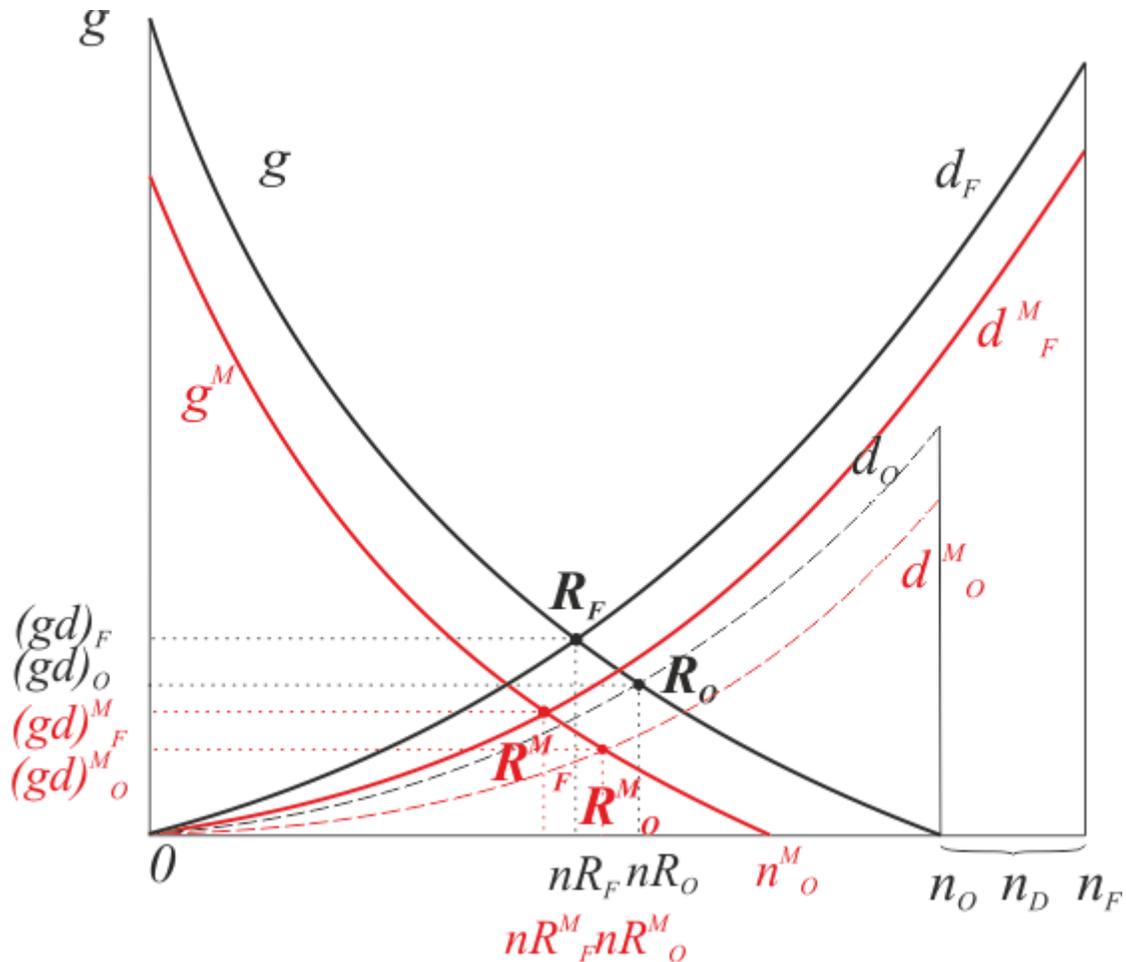
In chart 35 we highlight the consequences of including simultaneously fiscal and currency policies. Let us see the components:

- Compared with previous charts, we have only replaced the subscript $_T$ (Total) with the subscript $_F$ (Fiscal), representative of the concept that those that generate wealth must now support the whole population with taxes (fiscal policy).
- Fiscal policy is represented by the inclusion of n_D , expressing the distance between n_O and n_F , which we have already seen, which generates the curves d_F and d_O we already know, determining the points R_F and R_O , we also know.
- On the chart of the three curves representative of socio economic evolution that we already had (g , d_O , $d_{T=F}$) we have drawn in red the three new curves that appear with a currency expansion ($\uparrow M$) that causes a fall of the price of currency, unit of measure with which we weight when valuing the generation and destruction of wealth.
- We start from g , that is the curve of wealth generated by n_O .
- We start from d_{PO} , that is the curve of wealth destruction by n_O .
- We start from d_F , that is the curve of wealth destruction by n_F .
- We start from R_F , that is point R for the curves g and d_F .
- We start from R_{PO} , that is point R for the curves g and d_O .
- *Ceteris paribus*: $\uparrow M$ implies $\downarrow P_{m(q)}$, $\downarrow P_m$, $\circ \downarrow p_m$.
- We build g^M , that is the curve of wealth generated by n^M_P with $\downarrow p_m$ for $\uparrow M$.

- We build d_{PO}^M , that is the curve of destruction of wealth generated by n_O with $\downarrow p_m$ for $\uparrow M$.
- We build d_{F}^M , that is the curve of destruction of wealth generated by n_F with $\downarrow p_m$ for $\uparrow M$.

Chart 35

Curve of fiscal and currency policy combined



- We build R_F^M , that is point R for the curves g^M and d_F^M with $\downarrow p_m$ for $\uparrow M$.
- We build R_O^M , that is point R for the curves g^M and d_O^M with $\downarrow p_m$ for $\uparrow M$.

Let us see the consequences of fiscal (F) and currency (M) policy separately and together:

Since we have already studied fiscal policy when we analyzed n_D —the inclusion of the support of non-owner individuals by owners (the reason for their being taxes), a situation that existed before currency (there is fiscal policy without currency policy) — now we concentrate on

the analysis of adding currency policy to a state with a pre-existent fiscal policy. So let us analyze the consequences of a currency policy added to a previous fiscal policy:

Table 14

Analysis of fiscal and currency policy

Policy	g	d	R	n	δ	β	Arrow R
F		$d_F > d_O$	$R_F > R_O$	$n_F > n_O$	$\delta_F < \delta_O$	$\beta_F > \beta_O$	$\leftarrow \uparrow$
FM	$g^M < g$	$d^M_F < d_F$	$R^M_F < R_F$	$n^M_P < n_O$	$\delta^M_F < \delta_F$	$\beta^M_F > \beta_F$	$\leftarrow \downarrow$

- *Generation* of wealth (g): the fall of the price of currency produces a decrease of the value of wealth with the same currency used for calculus. The inexistence of any currency “veil” is ratified, insofar as our human action is guided by the *quantity-price-currency*, which is always “real” in a world with currency.
- *Destruction* of wealth (d): the fall of the price of currency produces a decrease of the value of the destruction of wealth with the same currency used for calculus. Again the inexistence of any currency “veil” is ratified.
- *Unemployment* ($\leftarrow n_O$): reflected in a lower level of owners indicated by $n^M_O < n_O$, which does not surprise us in the CEE since we are in the presence of net wealth destruction, which is generated with the fall of n_O : less wealth is produced by less owners (*ceteris paribus*). The same situation of distributive involution is presented by $n_{DM} > n_D$.
- *Result* (R): the fall of the price of currency results in:
 - 1) The velocity of *per capita* average net wealth generated is valued less: ($R^M_F < R_F$) o ($\downarrow R$). The inexistence of any currency “veil” is ratified.
 - 2) The deterioration of the wealth distribution, i.e., once again the reduction of wealth implies worse distribution of the same ($\leftarrow n$).
 - 3) The deterioration of the effort of n owners supporting the fiscal policy as long as the quantity of individuals (n_F) is not altered, but the number of owners is reduced (which is observed with $n^M_O < n_O$ and $n_{DM} > n_D$), which in turn will lead these to elude fiscal policies, generating a vicious circle.

Before we go on to a graphic representation, which will allow us a simpler understanding of the consequences of the implementation of fiscal and currency policies, it is necessary to reiterate that: while the first produces a displacement of *point R* within the same g curve —*regressive distribution of wealth*: $R_F > R_O$ and $R^M_F > R^M_O$ —, the second produces a displacement of the g curve (and the d curve) —*generalized regression of wealth, generation and*

destruction: $g^M < g$ y $d^M < d$)—, where the new *R points* are established. Which demystifies the belief that currency policy has the same consequences as fiscal policy; both have an effect, but in different ways.

The advanced reader of economic theory will see some theoretical consequences of enormous importance compared to developments of the twentieth century destined to explain what we explain here. The reader will see the difference with the known models, in the variables used for the analysis of the consequences of fiscal and currency policies, which will inevitably lead to different explanations.

Model with reduced graph

Now we will show another graph in which the conclusions regarding the consequences of fiscal and currency policies in the economy of a society can be observed from a different explanatory perspective that we believe to be more concise and simpler. To that effect we will present graphs that are partial reproduction of graph 35, i.e., the parts presented are a “graphic” copy (dimensions of the figures) of said graph, with explanatory geometrical additions.

In general terms, these graphs will allow us to see with greater clarity how the *g* curve slope (and the *d* curve, implicit in the *R points*) plays in fiscal and currency policies. This graph allows us to compare the model proposed here with known developments when studying the generation, destruction, and distribution of wealth, and unemployment.

Before starting, we wish to point out we have introduced some changes in the terminology, this is done to include the idea that the total population (n_T) is equivalent to the “Fiscal” population (n_F) we have seen and equalize the subscripts in the ordinate, abscissa, and *points R*.

Fiscal policy

First we present graph 35 F, in which we refer exclusively to the analysis of the consequences of Fiscal policy.

As we observe in the ordinate, the “transcendental” change we have introduced is considering that the total original population n_T is now in the position occupied before by n_P —the point of insertion of the *g* curve in the abscissa—, and that is why: 1) we exclude from our analysis the dotted part of the abscissa, which goes to the previous n_T (surrounded by dotted red), and 2) we call the new point n^F_T , with which we mean to say it is the point in which we have the number of individuals (*n*) included in the Fiscal policy, equivalent to the Total population.

Nevertheless, the simplest way to include the new graphs is considering the same were drawn starting from the range of the ordinate, i.e., the *g* curve (and the implicit *d* curve, from where the *R points* appear) was built with the new structure: the *g* curve includes the n_D , and we would have two *d* curves, that also include the n_D , and all of them would conclude in that new point on the abscissa n^F_T .

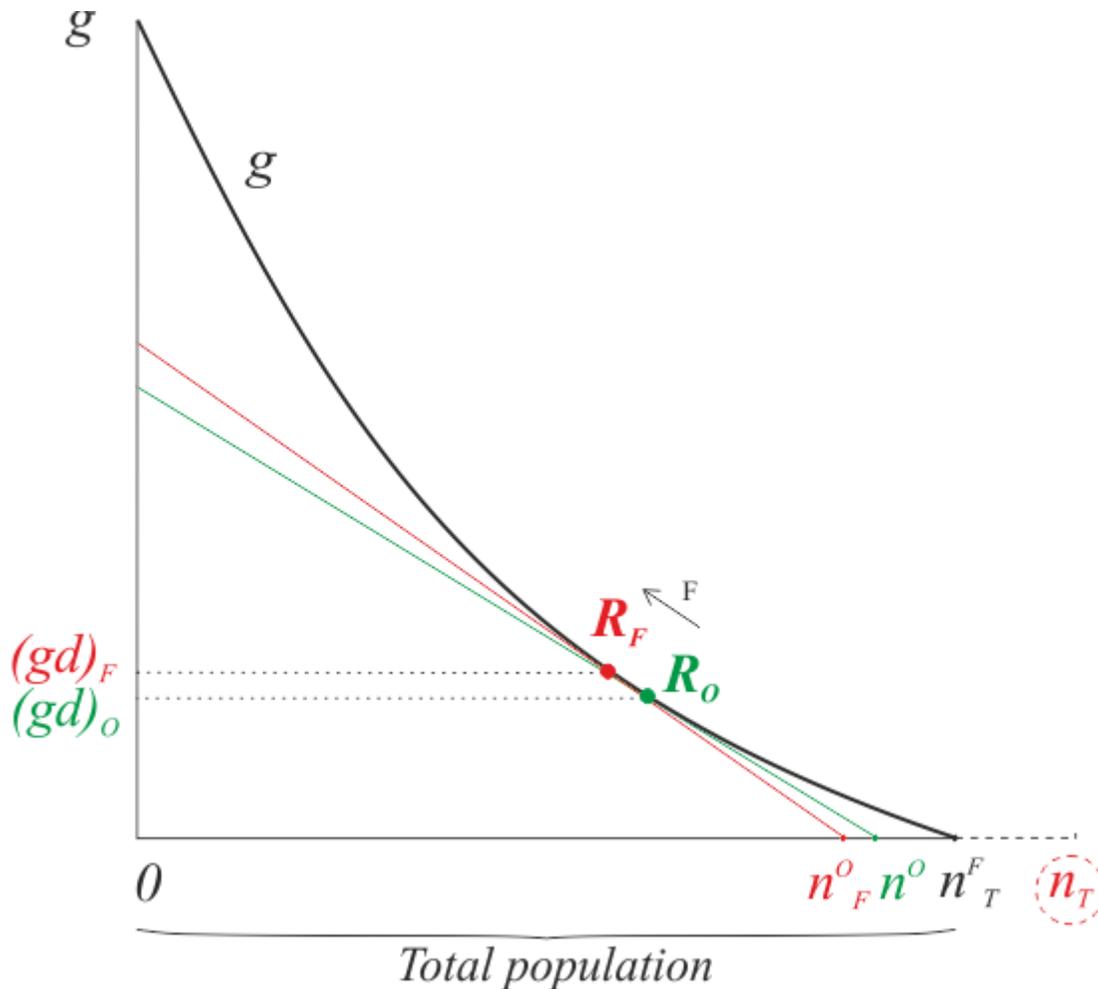
We begin from curve *g* where we represented the consequences of fiscal policy, with no presence of currency policy.

If we draw the tangent (green) to curve *g*, at the point R_o , where there was no fiscal (or currency) policy, the curve allows us to determine on the abscissa the number of owners that generate (and destroy) wealth, which places us at point n^o that allows us to determine the quantity of $n_D = n^F_T - n^o$, which is equivalent to n_D in graph 35. This is so insofar as the tangent to the “new” curve *g*, at the “new” point R_o (a consequence also of the “new” Curve *d*, not

drawn), shows us the same quantity of n_O , n_D and n_T of the previous graph. I.e., in graph 35 we do not need the tangent to determine the distribution of total inhabitants between n_O and n_D , but now we do need it, since those values are “diluted” in the construction of the “new” curves.

Chart 35 F

Consequences of Fiscal policy



If we draw the tangent (red) to the *curve g*, at point R_F , where there is fiscal policy (but no currency policy), the same allows us to determine on the abscissa the new number of owners that generate (and destroy) wealth, which places us at point n_F^O , which indicates that $n_F^O < n^O$, which determines a quantity $n_D = n_T^F - n_F^O$, which is equal to n_D in graph 35 –because of the criterion for building the “new” curves we have already mentioned.

So the graph clearly shows that fiscal policy implies a **displacement in curve g** (ascending arrow F to the left on the same g curve), and a regressive displacement in the quantity of owners, which will be added to the n_D that originated the fiscal policy, i.e., they will increase unemployment according to the difference $n^O - n_F^O$.

It is easy to see an inverse movement of fiscal policy, a decrease of destruction by the n_D , implying an inverse displacement from *point R* within the same g curve, and on the abscissa indicating unemployment.

Currency policy

Now we will show graph 35 M, where we include currency policy, which we represent in red, different from the exclusively fiscal policy of the previous graph, that we here reproduce in black.

So the graph adds the curve g^M of the original graph 35, which was the representation of the inclusion of currency policy on curves g and d , not drawn here since we are interested in the analysis of *point R* and the consequences for n .

First we stress we have developed the same procedure as in the preceding graph, which can be seen observing the dotted part in red of the abscissa that would explain the function of curve g (and curves d not drawn, but present through points R) drawn relative to the total population. In other words, n^M_T represents the total population in this drawing of curve g^M with currency policy.

We already know the main consequence of currency policy, a displacement of curves g and d (a displacement that we know to be downward).

If we draw the tangent to the curve g^M at point R_{OM} , representing the level for the curve g^M , where we only have currency policy—it is its equivalent to *point R_O* of curve g without fiscal or currency policy—, we determine on the abscissa the number of owners that generate wealth at point n^O_M . Point that shows the consequences of currency policy without fiscal policy, on unemployment: $n^O_M < n^M_T < n^O_F < n^O < n^F_T$.

But it is very important also to see that the descending displacement of curve g , to curve g^M , originates $R_{OM} < R_O$.

Now we add fiscal policy to currency policy, which takes us to the following analysis: if we draw curve g^M at point R_{FM} , representing the level of the curve g^M , where currency fiscal policy are present—its equivalent to point R_F of curve g with fiscal policy and without currency policy—, we determine on the abscissa the new number of owners that generate wealth at point n^O_{FM} . Point that shows the consequences of currency policy combined with fiscal policy on unemployment, which is included on the succession of previous unevenness: $n^O_{FM} < n^O_M < n^M_T < n^O_F < n^O < n^F_T$.

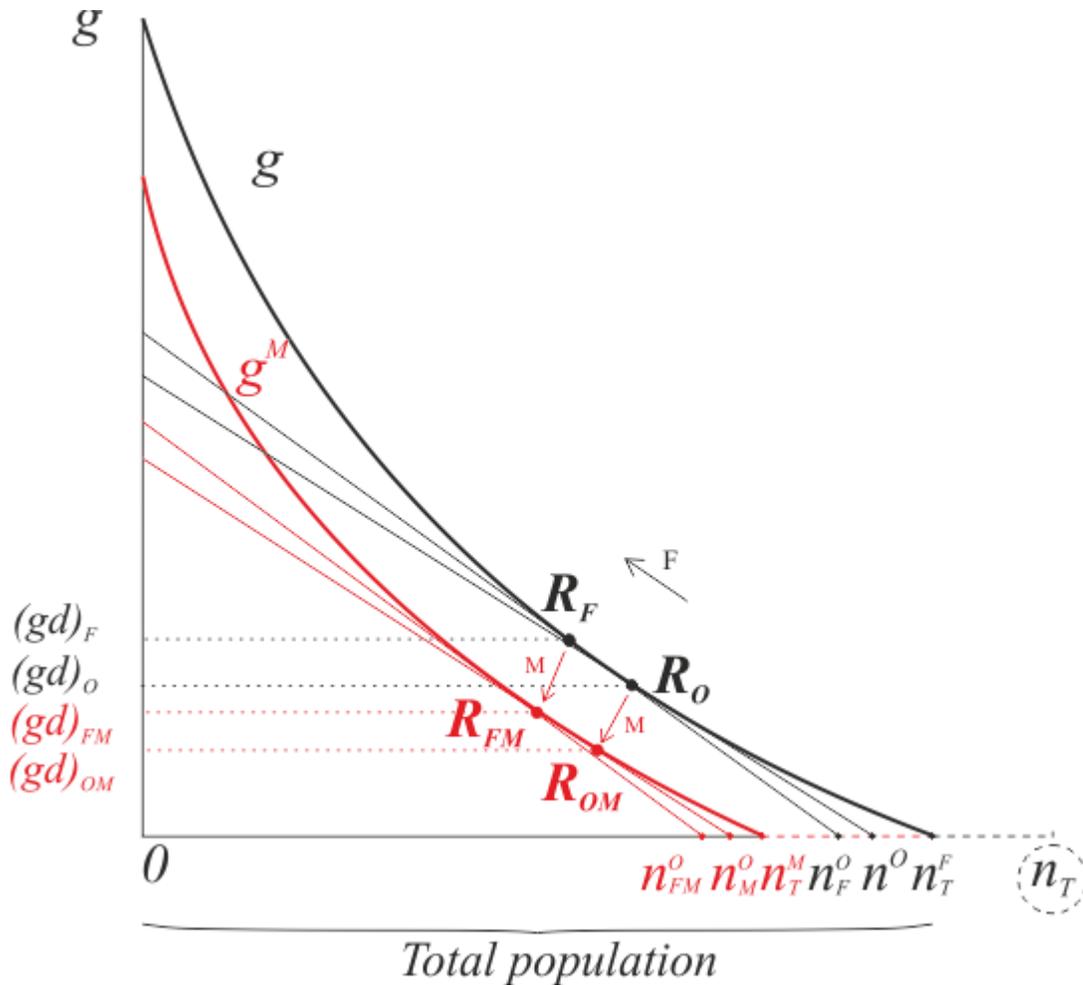
Again, it is also very important to see that the descending displacement of curve g to curve g^M originates $R_{FM} < R_F$.

Again, also, it is very important to see the downward displacement of curve g to the curve g^M originates $R_{FM} < R_F$.

Thus, the descending displacements of curves g and d (implicit in *points R*) as a consequence of currency policies (expansive that generate a fall in the price of the unit of economic calculus) are shown with the descending red arrows indicated with M. Arrows that in turn are displaced from right to left in both cases.

Chart 35 M

Consequences of *Monetary* policy



Summary of the consequences of fiscal and currency policies:

Fiscal policy implies:

- 1) Displacements *in* the g curve —remember this is produced by a displacement of curve d , i.e., fiscal policy displaces curve d up, and produces upward displacements of *point R*, within the same g curve.
- 2) Displacement of *point R* with the same curve g , because of fiscal policy, implying upward movement of *point R*, with the same g curve —with or without currency policy, g or g^M . Then, since this derives due to the law of decreasing yields, the higher level of *point R* implies higher level of the velocity of net positive wealth generation of the set of

producers, which is attained with a lower number of wealth generators, i.e. it implies an increase of unemployment (Δn_D).

Currency policy implies:

- 1) Displacement of curve g —remember there is also displacement of curve d , i.e., currency policy displaces both g and d , and it does so in both cases descending.
- 2) The displacement of curve g due to currency policy always implies the descent of *point* R , both in the case of there being or not being (improbable case) fiscal policy. This explains why currency policy is devastating, since it implies destroying “everybody’s” wealth (n_o), and at the same time it *does not* solve the problem of the few (n_D).

It is evident that the slopes of curves g and d are what will allow the evaluation of the levels of destruction of wealth and employment generated by currency policies, but a look at the graph by itself shows that the area of generated wealth and the point where we represent the total population in each case had to be very restricted, which shows clearly how devastating currency policies are when currency expansions result in the fall of the *quantity-price-currency*.

We Argentines have lamentable and devastating experiences: when the monster shows its face in the form of “devaluation”, you have the symptoms of a neutronic bomb, the buildings are still there but the population totally sinks into destruction. Destruction that appears as a “deepening and expansion of poverty”, as a consequence of the multiplication of the poor (poorer than before, *points* R_{FM} and R_{OM} far below R_F and R_O), and on the other hand concentration of wealth with less rich (fall of n_O). A scenario of violence similar to the phase of primitive man —individual progress resulted from sacking the neighbor— a consequence of leaders that take advantage of the electorate’s ignorance. Which shows arrogance is a disagreeable personal trait, but when it refers to those who hold power and is accompanied by ignorance, it has devastating consequences.

In short, the marginal laws of decreasing yields and marginal utility are expressed in both fiscal and currency policies, but they appear more aggressively in currency policies. All this as a result of the fact that all “economic policies” imply orienting the economy in search of a higher level of *point* R —velocity of generation positive net wealth of the community as a whole— which implies an inevitable regression to a previous phase of production, with a lower level of individuals generating wealth, and an increase in the number of individuals that only destroy wealth.

On the other hand, those displaced of the group of generators of wealth belong to the lowest level of productive capacity, the weakest marginal producers, because it is the place where there is the earliest perception that effort is not valued by the community. In other words, the lowest value is found at the end of the g curve, the first to be displaced by fiscal and currency policies —i.e., the poor directly above pay the consequences for the poor directly below, while the highest levels of wealth generation read about it in the papers.

Conclusion:

- *The two marginal laws of economics not only govern the relation between man and economic goods, but also the economic relations of men among themselves. Which implies they are sufficient and necessary for explaining human economics: wealth (generation-destruction-distribution) and unemployment.*
- *The model was produced considering wealth is generated in a period based on the pre-existing productive and institutional structures, and is destroyed —the wealth available in the period, be it from the initial stock or that generated in the period— according to the current economic institutions and policies. All of which not only relates the past and to the present, but considers the economic institutions and policies as endogenous variables of the model.*
- *All we have expressed is captured by double entry accounting, insofar as the information, though a-temporal, is homogeneous being expressed in the unit of measure in a specific spatio-temporal moment, as we shall see in the practical proposal for implementation of the model.*
- *In this work we have corroborated another hypothesis of TET, that referred to the economic cycles originated in currency explained by price controls, which we have corroborated here when studying the consequences of currency policy, be it with the intention of controlling i_m and/or p_m (by the axioms of equality and equivalence).⁽⁵²⁾*
- *We consider that the methodology used in TWU and its SEE model will clarify things for theoreticians that, confusedly in our criterion, pretend to explain economic behavior in time with the expedient of separating the flows of consumption and rent, the relation between present and future wealth (income), an attempt at explaining whether income comes from wealth or vice versa.
Evidently our model does not present this contradiction since we consider the wealth “incorporated” in the period (g) and that which is destroyed in the period, which comes from that “obtained” in the period and from previous periods.
In short, we believe the error was in pretending to explain economic policies with the same laws that govern the economy. Ergo, it was not possible to obtain a theory that would explain both scenarios based on the laws that govern the economy.
The only way economic policy can be considered endogenous is considering its laws, and thus creating a model that simultaneously contemplates the functioning of both scenarios: the one governed by economic laws, and the one governed by political laws, which is precisely the synthesis attained with TWU and its SEE model.*

SOCIO ECONOMIC EVOLUTION IN HISTORY

We consider this is a good moment to introduce a brief graphic summary of all we have deduced up to this point, with the *a priori* logical-deductive causality chain that we have called *theory of socio economic evolution*. And it is very useful to present the evolution of human economy through history with it. Let us see chart 36, divided in charts 36 (a) and 36 (b) for visual reason, and that we reproduce on a higher scale as Appendix A:

Chart 36

Curve of socio economic evolution in history

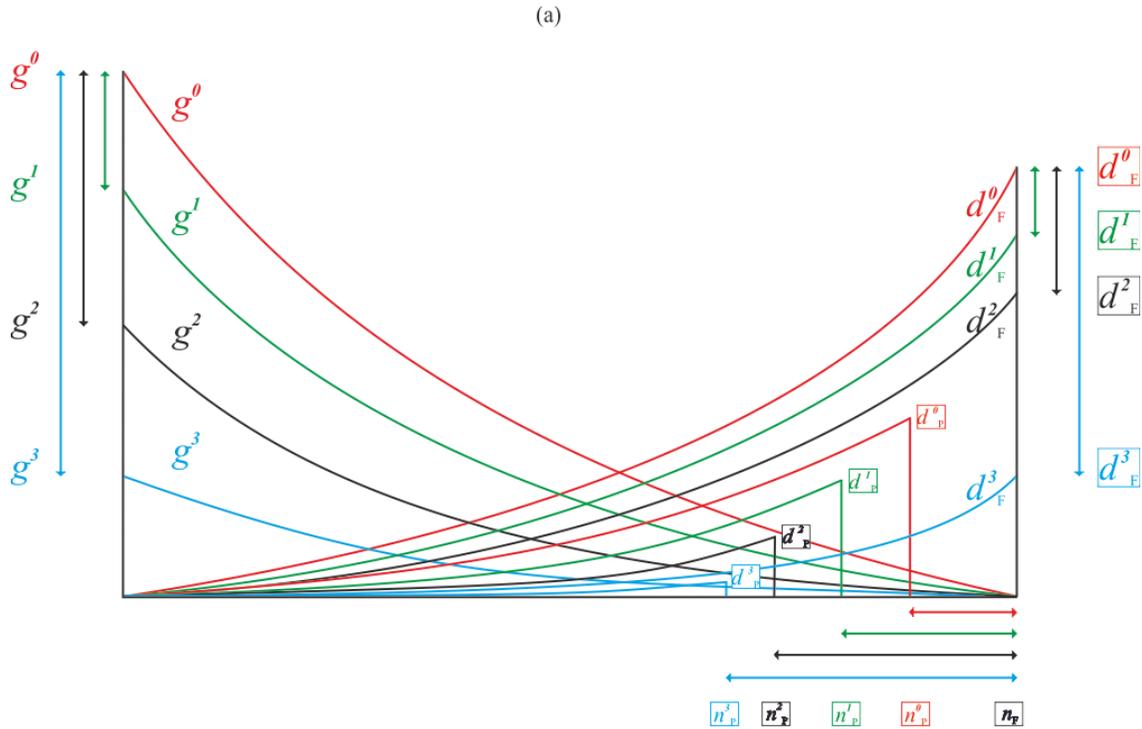


Chart 36 has the following characteristics in its construction:

- A social economy with n_F individuals is analyzed, i.e., with a fiscal policy (n_F) in a constant population, with individuals that are not part of the labor force subsidized by the owners.
- Curves of wealth generation, g :

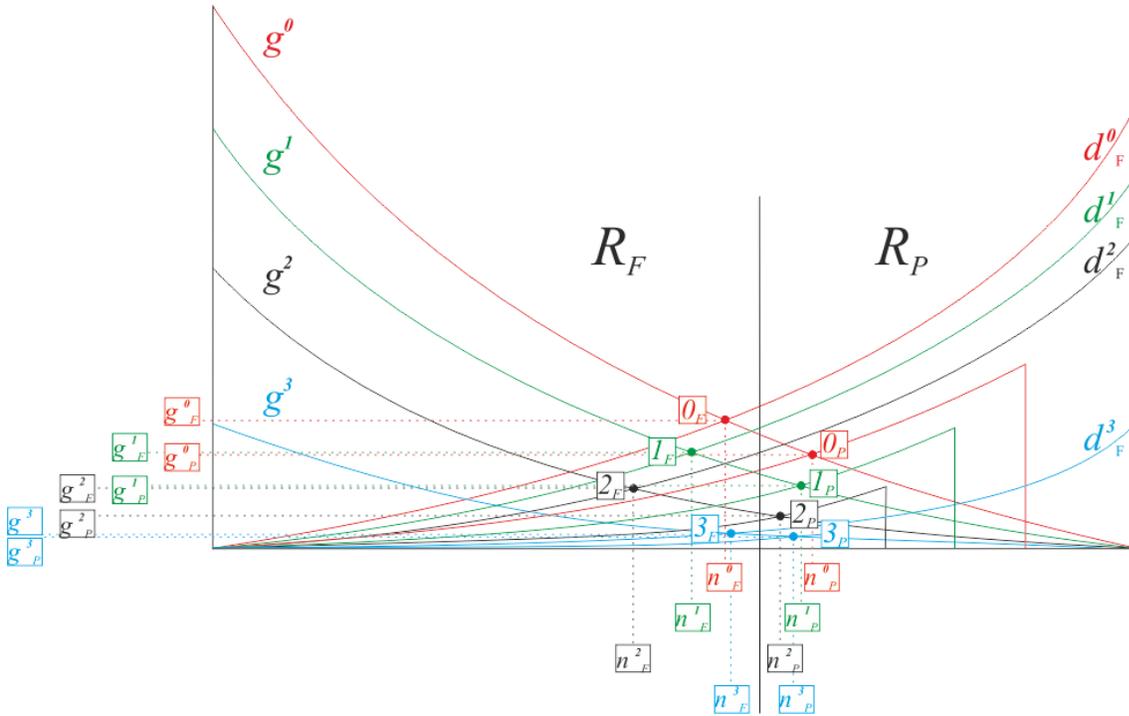
Red (g^0): economy with currency and credit.

Green (g^1): economy with currency, credit and expansive currency policy ($\downarrow p_m$).

Black (g^2): economy with currency, credit, expansive currency policy ($\downarrow p_m$), and decrease of credit.

Blue (g^3): barter.

(b)



- Curves of destruction of wealth d_O and d_F

Red (d^0_F and d^0_O): economy with currency, credit and fiscal policy.

Green (d^1_F and d^1_O): economy with currency, credit and expansive currency policy ($\downarrow p_m$), with fiscal policy.

Black (d^2_F and d^2_O): economy with currency, credit, expansive currency policy ($\downarrow p_m$), decrease of credit and fiscal policy.

Blue (d^3_F and d^3_O): barter with fiscal policy.

- The displacements of point R (crosses of g with d_O and d_F) are defined.
- The displacements of n_F for each point R are defined.
- The movements of the variables represented in them (gd and n_F) are indicated with arrows by the ordinates.

From chart 36 the following conclusions can be derived:

Curve of generation of wealth g :

a) *Economic involution:*

$$g^0 > g^1 > g^2 > g^3$$

orientation of reading: →

This clearly indicates that in an economy with currency, without an expansive currency policy, the generation of wealth is greater than with an expansive policy, which in turn is superior to one where there is a decrease of credit (generally derived from currency policies), which is superior to the primitive barter economy, This analysis implies reading the arrows ↓ by the g ordinate. When the factors that allowed the evolution of society (exchange-currency-credit) are destroyed, everything seems to lead back to previous states (Argentina's recurring involution with its inflationary processes that destroy the currency, where some again observe and practice barter).

b) *Economic evolution:*

It is more eloquent to remember the inverse path and observe the sequence of economic evolution presented by the human species in history:

$$g^3 < g^2 < g^1 < g^0$$

orientation of reading: →

This clearly indicates that human economic evolution starts from its primitive state of barter and reaches our times. This analysis implies reading the arrows ↑ by the g ordinate.

Curve of wealth destruction by owners (d_O):

$$d^0_O > d^1_O > d^2_O > d^3_O$$

orientation of reading: →

Which is in line with what we have observed in the case of wealth generation curve (g). This analysis implies reading the ↓ arrows by the d ordinate, here ↓ d_O .

The same can be explained in the opposite sense, where ↑ d_O , we see:

$$d^3_O < d^2_O < d^1_O < d^0_O$$

orientation of reading: →

Curve of wealth destruction by Society (d_F):

$$d^0_F > d^1_F > d^2_F > d^3_F$$

orientation of reading: →

Which is in line with what we have observed in the cases of the wealth generation curve (g) and of destruction of wealth by owners (d_O). This analysis implies reading the arrows ↓ by the d ordinate, here ↓ d_F .

The same is explained in the opposite sense, where ↑ d_F , we see:

$$d^3_F < d^2_F < d^1_F < d^0_F$$

orientation of reading: →

Points R:

$$R^0_F > R^1_F > R^2_F > R^3_F$$

$$R^0_O > R^1_O > R^2_O > R^3_O$$

orientation of reading: →

What was observed in the development of the *a priori* logical-deductive chain with which we have built the social economic evolution curve is ratified, since anything that goes against exchange (destruction of currency and credit) implies the destruction of wealth along with its concentration, which is reflected in the sense of the displacement of *point R* ↓.

The same is corroborated in the opposite case, the deployment of the benefits of exchange (currency and healthy credit) imply displacement of *point R* in the opposite sense (↑), which can be simply observed reading the curve in the opposite sense, indicating that the state of barter is left behind and there is an increase of healthy credit and the price of currency rises: this is a harsh blow for those that promote the deterioration of currency based on erroneous theories (“barbarous relic”). Let us see:

$$R^3_F < R^2_F < R^1_F < R^0_F$$

$$R^3_O < R^2_O < R^1_O < R^0_O$$

orientation of reading: →

Finally, in chart 36 (b) we observe the two key aspects of the analysis, that appear when representing the consequences of fiscal and currency policies. Let us see:

a) The following relations appear:

$$g^0_F > g^0_O$$

$$g^1_F > g^1_O$$

$$g^2_F > g^2_O$$

$$g^3_F > g^3_O$$

Which clearly shows us that *point R* rises following the slope of marginal utility implied by fiscal policy, whatever the situation, even with barter.

b) We drew a vertical line with the express intention of correctly showing how on the left of the same we have the four *points R_F* and to the right the four *points R_O*. Which is clear proof of the invariable consequences of fiscal policy, no matter what the currency system

is or even if there is no currency, in the case of barter. We have presented this separately, because it ratifies the urgent need to separate the currency issues from the fiscal issues when speaking of policies.

So we observe that:

$$n^0_F < n^0_O$$

$$n^1_F < n^1_O$$

$$n^2_F < n^2_O$$

$$n^3_F < n^3_O$$

- c) **Conclusion:** if we take both expressions together [a) and b)], we observe that the consequence of combining *expansive fiscal and currency policies implies contraction and concentration of wealth:*

$$(g^0_F > g^0_O) + (n^0_F < n^0_O)$$

$$(g^1_F > g^1_O) + (n^1_F < n^1_O)$$

$$(g^2_F > g^2_O) + (n^2_F < n^2_O)$$

$$(g^3_F > g^3_O) + (n^3_F < n^3_O)$$

(In barter there is no currency policy, only fiscal policy)

The inverse analysis is what gives us hope, with healthy fiscal and currency policies there is expansion of wealth with better distribution

Displacements of n_F :

$$n^0_F > n^1_F > n^2_F \blacktriangleleft n^3_F$$

$$n^0_O > n^1_O > n^2_O \blacktriangleleft n^3_O$$

What we saw in the development of the *a priori* logical deductive chain with which we have built the curve of socio economic evolution is ratified, since anything implying an attack against exchange (destruction of currency and credit and fiscal taxes) implies exclusion of owners (unemployment in common academic terms), reflected in the sense of the displacement of n_F : ($n^3_F \blacktriangleright n^2_F \leftarrow n^2_F \leftarrow n^0_F$) and ($n^3_O \blacktriangleright n^2_O \leftarrow n^2_O \leftarrow n^0_O$).

Seen from the inverse side we also observe inverse consequences:

$$n^3_F \blacktriangleright n^2_F < n^1_F < n^0_F$$

$$n^3_O \blacktriangleright n^2_O < n^1_O < n^0_O$$

which extends to ($n^3_F \blacktriangleleft n^2_F \rightarrow n^1_F \rightarrow n^0_F$) and ($n^3_O \blacktriangleleft n^2_O \rightarrow n^1_O \rightarrow n^0_O$)

Evidently the case highlighted in green ($n_F^2 \ll n_F^3$) and ($n_P^2 \ll n_P^3$), that shows an increase of n when we revert to the extreme situation of barter, merits a commentary. To understand the situation properly we must:

- a) Remember that though we have included barter in the chart, there is no currency policy here.
- b) Relate the increase of n_F^3 over n_F^2 and n_O^3 over n_O^2 to the fall from R_F^2 to R_F^3 and R_O^2 to R_O^3 .

The study of these two concurring consequences indicates that in the barter phase it is feasible to observe higher employment with less qualification, i.e., people employed in less productive chores, and that is why their median per capita wealth level is lower. In other words, in barter there is more occupation of less qualified labor, at a subsistence level, which means more people working with less productivity, and this is so since they produce only for their neighbors, those that are closest and allow them to barter, which leads to less production because the market is smaller and does not promote production at a larger scale, as a market with currency would. Something like “everybody employed, everybody equal, everybody very poor”.

In the modern era this situation can occasionally be found after severe currency-fiscal crises, where the destruction of the currency makes the economy regress to barter. Personally I have seen a “modern” economy without currency: it is the case of my city, Venado Tuerto, in the province of Santa Fe, Argentina, when it returned to cleaning the streets manually (with brooms), abandoning mechanical means, because of its lower cost and a “social” policy of promoting employment. A consequence of pauperism resulting from the recurring and catastrophic fiscal and currency policies in Argentina, that lead to the rejection of currency.

Wealth generated (α):

Though we have not included it in the chart, so as not to make it overly complex, we know how to shade them. Let us see the comparative conclusions:

$$\alpha^0 > \alpha^1 > \alpha^2 > \alpha^3$$

orientation of reading: →

Which implies ↓ α .

A conclusion that is in line with what we saw when we explained the displacements in economies that hinder exchange (the incidence of the marginal laws), and translates into a decrease of wealth generated.

The opposite situation implies an increase of wealth generated:

$$\alpha^3 < \alpha^2 < \alpha^1 < \alpha^0$$

orientation of reading: →

Which implies ↑ α .

Wealth destroyed by society (β_F):

The same case, we have included it in a graph but we know what it would look like:

$$\beta^0 > \beta^1 > \beta^2 > \beta^3$$

orientation of reading: →

Which implies ↓ β .

Conclusion that is in line with what we just saw referring to wealth generated, which also allows us to express the inverse:

$$\beta^3 < \beta^2 < \beta^1 < \beta^0$$

orientation of reading: →

Which implies ↑ β .

Conclusion:

Summarizing, we observe:

- 1) The conclusions we reached seem to indicate that what we observed through history corroborates the *theory of socio economic evolution* developed here. Man passed from a very poor phase with no exchange, to progress generated by exchange with barter, the evolutionary leap forward with money (TET's present economic good), regular-credit-currency denominated in money and the instabilities with recurring cycles due to the advent of the irregular-credit-currency defined by TET. Instabilities that in extreme cases produce a return to barter, when the irregular-credit currency is completely destroyed, with all that descent implies, constituting a socio economic regression. Argentina is a recurring case of this costly regression from a currency economy to barter, with the deterioration of the last 90 years, not only affecting past generations but strongly conditioning future ones.

We sincerely believe this can be the summary of Argentine decadence. A phenomenon that is apparently difficult to explain when asking: How could a country regress from development to under-development? From these pages we answer: because it violated the marginal laws that govern the relations between economic entities, and economic relations between men.

- 2) We did not need a special currency theory. In so far as it is an economic good that solves the problem of liquidity that blocks exchange, and is adopted by humans as a unit of measure to calculate the prices of goods, that orient economic life in a society. Among other things, what in TET we have called the *paradox of currency demand* ⁽⁵³⁾ does not exist.

We can say that though currency appears to solve the problem of liquidity, which characterizes the previous state of barter, its function as unit of measure for calculating

economic value is no less important. This is the reason why officials in charge of “currency policies” follow very closely what they call “the general level of prices or inflation”. But they do so with erratic policies, typical of those who are not conscious of the *equivalence axiom* ($i_m \equiv p_m$), when currency is credit.

- 3) We did not need to resort to the *phenomenon* of interest, which ratifies TET since it places time and its price, interest, as subordinated variables of the economic goods they materialize in. In other words, time and its *quantity-price*, interest, are represented in the economic goods and temporal laws of marginality of diminishing utility and returns, and increase effort, since marginality implies time.
- 4) We did not need to recur to the unfortunate entity of absolute prices, or the theoretical developments of the twentieth century.

Here we produced a theoretical development with a scientific basis —established by the *a priori* logical-deductive causality method— of the fundamental economic causality *man* → *economic good*. Both components were treated in the framework of the relations that postulate the temporal marginal laws of (diminishing) utility and returns, and increase effort (*since marginality implies time*), from where we derived the *law of exchange*, all this audited with the proven technique derived from double entry accounting, possible because it shares the fundamental economic causality.

We can summarize saying there is no “invisible hand” (Adam Smith) governing individual economic interest and its harmony with social interest. On the contrary, the socio-economic relation of men among themselves is governed by the marginal laws of utility and decreasing yields, and of increasing effort. Notice we are referring to economic and social relations, since this work refers to the “market” and “policies”.

QUANTITIES-PRICES CONTROL, SUBSIDIES, AND OTHER POLICIES

Here we simply state that any *economic policy* one wishes to adopt —apart from those we have studied here, including currency, fiscal and employment policies— can be analyzed based on the *curve of socio economic evolution*, since it includes the two aspects that explain economics, the creation and destruction of wealth (generation of net worth), and its distribution, and unemployment.

This includes any price control (since it implies the same as a reduction of price that destroys value, affecting both curves), and the instrumentation of a subsidy, that also affects the composition and enlargement of n_D . It is important to bear in mind that an unnecessary job is a subsidy, with the extreme case of digging holes and filling them (Keynes). Thus, what is commonly known as bureaucracy, which is consciously done against efficiency, means creating n_D and implies the existence of a fiscal policy.

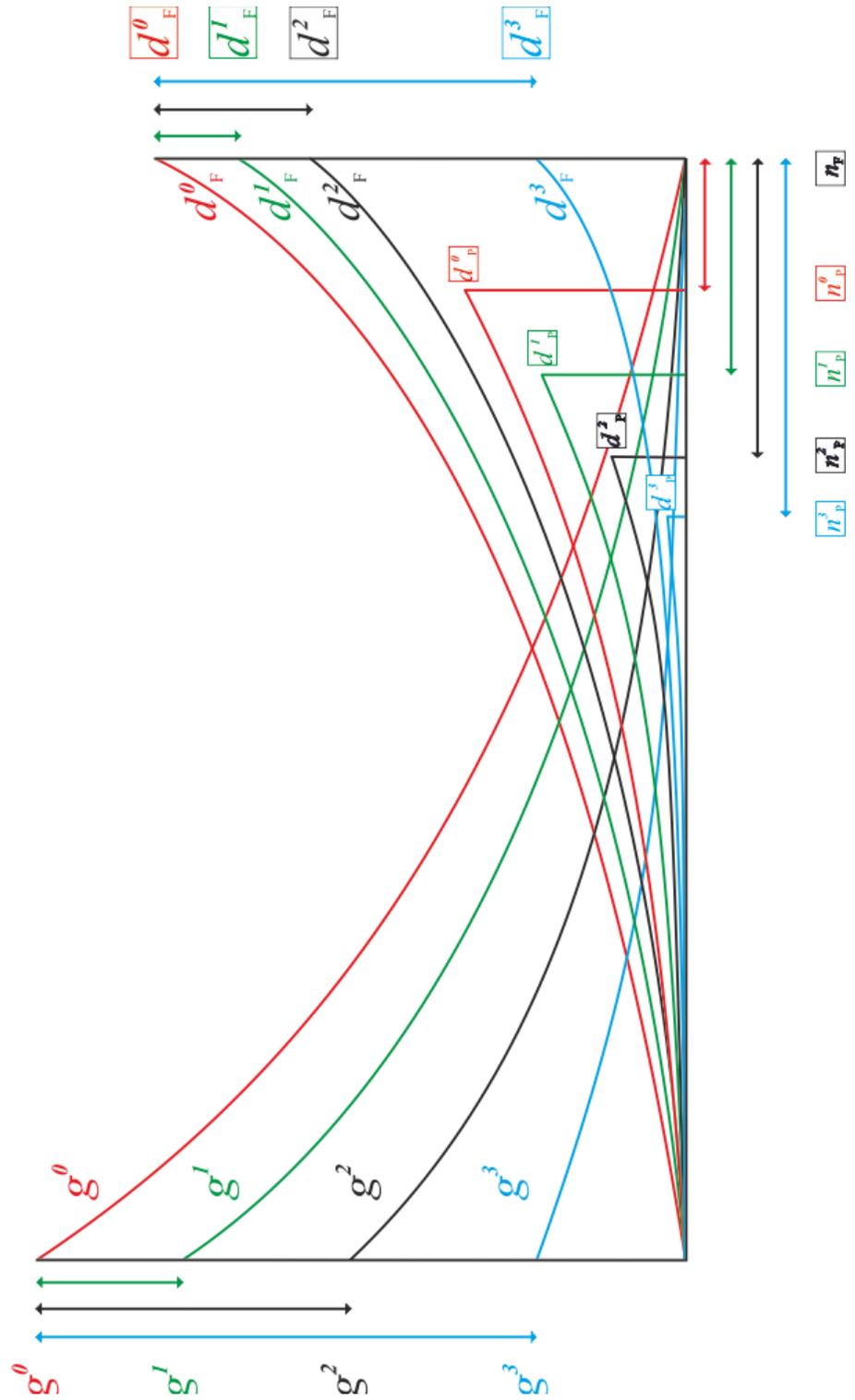
Thus, any policy against the incidence of the fundamental economic marginal laws, can be explained by the displacements it originates in the curves of wealth generation and destruction, along with the variations in n_O and n_D , and R .

In short, the model of the curve of socio economic evolution allows us to study the consequences of anything altering the free incidence of the marginal laws, which is confusedly called attacking freedom, and which we have proven means going against the laws of the “nature” of the economy. I.e., “economic policies” (currency, fiscal, employment, etc.) are no longer in the ethical, moral or political sphere that invoke freedom, and become an issue of science. We can say science corroborates the ethical and moral aspect, if such corroboration is necessary, since we can say: *science* ↔ *ethics*.

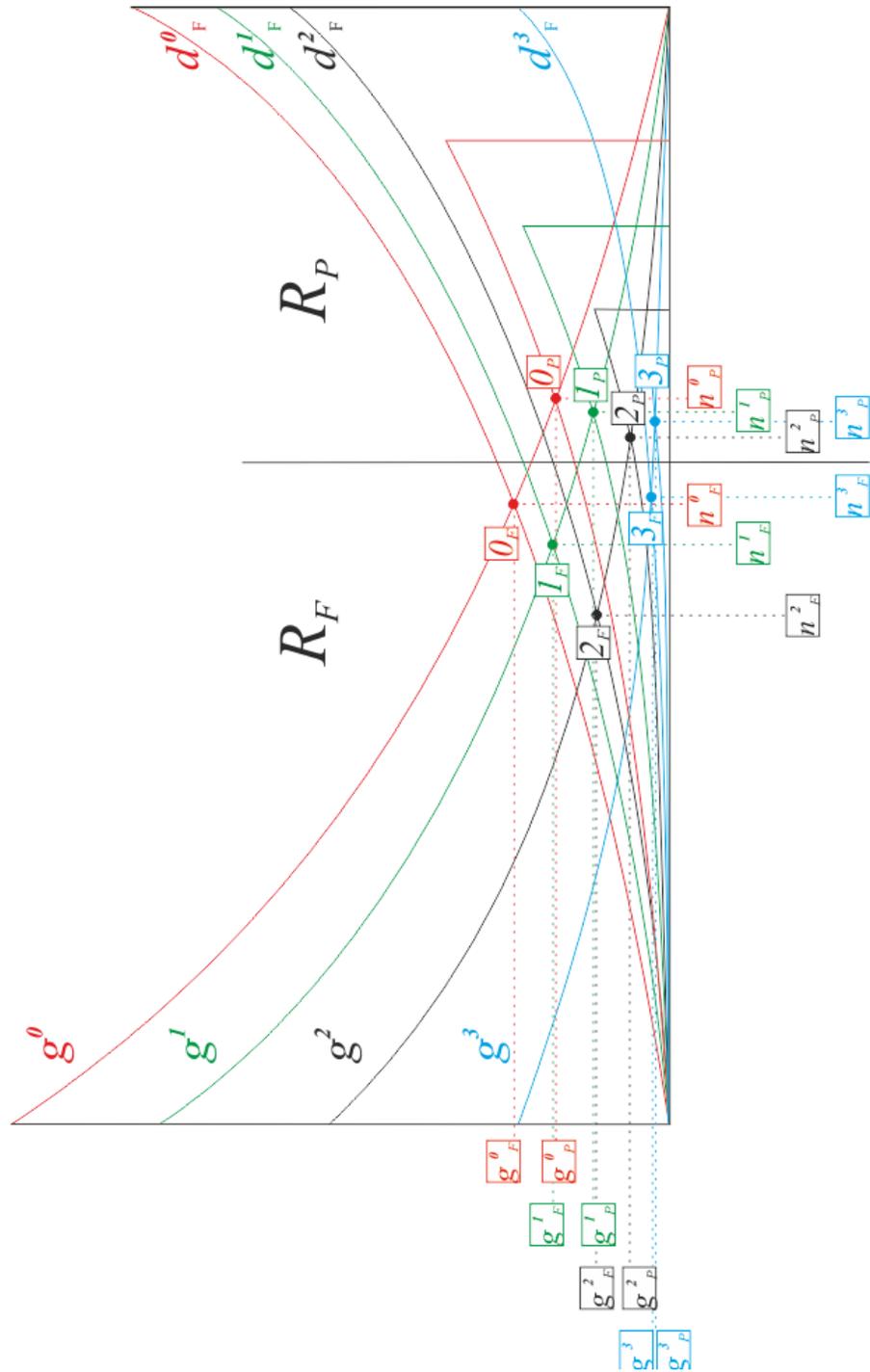
APPENDIX A

Charts 36 amplified

(a)



(b)



APPENDIX B

EPISTEMOLOGY

This appendix is destined for the reader that considers he needs an orientation on epistemological and conceptual aspects that could have distracted in the text, and that could be considered important previous to a second reading.

CONCEPT OF EVOLUTION

Let us first refer to what we interpret by the concept of evolution included in the title of the text. In a generic sense we adopt the Popperian criterion: we can consider evolution to be the process that goes from solving more elementary problems to solving problems less elementary. If a species follows the process in that sense, it is said to have evolved, if the opposite is true it has involved. Which can be also expressed as the process of elimination of unsatisfactory solutions. Thus, an economy evolves from the barter stage to the currency stage, and regresses from the currency stage to the barter stage.

I think a concise development and very much in line with what we understand by evolution can be found in the first chapter of a 1994 collection of Popper's writings in Spanish titled *La responsabilidad de vivir (The responsibility of living - Chapter I: The theory of science from a theoretical-evolutionist and logical point of view)*. Popper has approached the issue in many writings, but I think he summarizes the idea here, since it includes the spheres that are analyzed in this text: *theoretical-evolutionary-logical*. In this work Popper amplifies his original triad, that was *problem 1 → solution → problem 2*, including now four stages, allowing the study to start from any of them, preferring to begin with “problem”, with which we agree since it is the basis for Mises' *human action*, another achievement of the twentieth century along with economic calculus.

Here the issue is human evolution in the economic field, as in Darwin it was human evolution in the biological sphere and for Popper in the epistemological field.

CONTINUITY FOR EXPLAINING THE DISCRETE

Since we consider the epistemological method used in the text, that we called the *a priori* logical-deductive causality, as belonging to the world of metaphysics (theories) that helps in solving empirical problems,⁽⁵⁴⁾ we believe it is pertinent to include this appendix since we are speaking of continuous variables when refering to what in the real world are discrete variables (economic activities). We believe it to be indispensable so the reader will be reassured in the sense that the use of continuities in a discrete world does not go against scientific rigor, on the contrary, scientific rigor included this epistemological procedure, that gives it greater explaining power, which is the final goal of science.

The operative variables that derive from the work, at the disposal of the investigator that wishes to use the model, are: man, economic goods, and time (a variable subordinate to the previous two). Thus, once the society that is the object of study is chosen, it comes down to studying economic goods, since in *TET* they constitute necessary and sufficient variables to

explain wealth and its distribution, under the dominion of the marginal laws of diminishing utility and returns.

The human mind manages continuity where there is none, because it is very useful to the explanation, and the distance with discreteness of reality is considered and solved by science—in everything affecting the calculus with which measurements are made—with the admission of the *error tolerable for the object*, attitude with which *all sciences* ratify theoretically the fallible nature of man.

Thus, humans accept the passage of time as continuous, and that is why it is very adequate to treat anything that is a representation of the behavior of variables in time in continuous form. In this manner man (and the scientist with greater rigor) calculates based on knowing that where time intervenes there is continuity, knowing that when prioritizing this he discards the error resulting from using discrete non-continuous variables. Let us see how it is applied in some spheres.

Economics

- a) *Curves of supply and demand*: they are drawn as continuous knowing that in reality this does not exist, but the information needed for the analysis in which said curve is used is very useful, dispensing with the error because the decision that will be adopted with that result will not be affected. On the other hand, nobody denies its huge expositive, explicative and academic power. Since we have proven that the curves that are based on the “laws” of supply and demand (expressed in continuous curves), are not what they appear to be but only observational expressions of the validity of the marginal laws of diminishing utility and returns, the use we have given them is totally pertinent. In other words, we have not been original in the use of continuities to explain the behavior of discrete economic variables.
- b) *Continuous interest*: its formula is derived from infinitesimal calculus and no-one rejects the use derived from the formulas thus obtained.
- c) *Benefit of the consumer*: included in our broadest concept of benefit of demand, it is well understood with the use of curves and surfaces (derivates and integrals of calculus).
- d) *Explanation of marginality*: everything related with the explanation of marginality generally is very well represented with the continuity of the drawing, knowing it is based on discretionary variables, and its explicative power is extraordinary. A result that is not surprising since it refers to the behavior of a variable in the *time continuum*, which is what is prioritized in the explanation, and as information for calculus. I.e., the continuous treatment of discretionary variables allowed us to explain marginalism by means of charts, a key resort when producing economic theory, as has been shown in this work. Starting from the simple presentation of the two marginal laws we have been able to explain human economic evolution, from one individual to a society, and this from its barter stage to our times.

Summary for economics: rejecting the idea of continuity to explain economics is rejecting marginalism, since the laws of marginality imply the inclusion of time, that is continuous. Not accepting continuity is rejecting the huge contribution of marginalism, having added time to the comparatively static developments which was what economic theory had achieved until its

irruption, with all the errors that implied. Not considering time is not considering changes, ergo, we deduce:

- Time is continuous.
- Considering time implies considering changes.
- The existence of changes implies the passage of time.
- Marginalism (the derivate) is the tool for explaining changes in time.
- Therefore, the explicative continuities that involve time cannot be exempt of the continuum, even if changes are discrete “to the capacity of observation”. What is relevant is taking this consideration into account and disregarding the error in accordance with the goal.
- On the other hand, seen from the point of view that everything changes in time, even if we cannot perceive it, or that even with the smallest imaginable period of time nothing remains the same, we can think that changes are also continuous; our fallibility does not allow us to capture it.
- By one alternative or the other of the two presented in the preceding sections – disregarding the error that appears between continuous and discrete, or considering there is no error, and that we cannot observe the continuity of change, in which case the error is in the incapacity to observe- the deduction is that it is wrong not to include continuity when referring to time, not forgetting the need to “limit the error” that arises one way or another, so that the result is satisfactory for our goal. In Popper’s epistemology we could say the issue is to achieve a successful demarcation of the object, that in economics is configured by the two marginal laws.

In short, economics, the same as the other sciences, adopted the continuum in its theoretical and applied developments, without forgetting to consider the deviation-error relative to discrete reality, at least of human observation. They jointly accept the difference with the real non continuous world of discrete variables, as long as the dimensions of the difference are within acceptable limits according to the theoretical or practical object.

I.e., the use of the continuum knowing it does not exist or it exists and we cannot observe it, is the price and the explicit acceptance by science of the natural state of fallible man, that condemns him to work with errors, which he tries to limit so as not to be ridiculous in his explanations and not act without an intelligent calculus.

Human fallibility limits man to coexist with error, which he achieves by imposing tolerable limits (*I consider it to be the essence of Popper’s falacity, though he did not express it this way*). Scientific admittance of fallible man that is condemned to work with limited continuities” (continuity that is not such), that is not limited to economics, on the contrary, THE GOOD NEWS –against what many economists suppose, that the use of the continuum is prohibited for economics and can be applied to other sciences insofar as they belong to the world of exactitude that implies determinism- is to be able to show that other sciences use it too, as we shall see below presenting a few examples.

Precisely we have seen that working with data derived from accounting we impose limits on theoretical developments that other models do not impose, limits that are nothing more than data from reality: stocks of real economic goods, weighted by the *quantities-prices-currency* exchanges originate in daily life. Simply put, it is like Einstein’s proposal on Newton’s

abstraction, which we can interpret saying Einstein possibly would not have thought of what needed limitation, it was Newton that posed the problem that needed to be defined.

The greatest expression in economics on demarcating theory (metaphysics) when entering the empirical world (physics) is here:

The quantities-prices-currency are the tool that allows us to demarcate the theoretical concept of subjective value and makes it observable

A reality that double-entry accounting reflects very well.

Statistics

We only need to refer to the huge finding that was regression, correlation, least squares, median distribution, etc., that allowed the use of the continuous to interpret the disperse information observed in the discrete world.

Physics:

- a) *Quantum physics*, that re-wrote all the fundamentals of physics, insofar as its explanations are based on probabilistics and not Baconian classical determinism. I have expanded on this, especially since I found “*Quantum Theory and the schism in physics*” by the great Popper. In Popper I found great support for my first scientific views, since they gave my analysis huge scientific support. I.e. economics not only belongs to the world of discrete variables that can be explained from continuous variables, accepting that the result-objective can support the deviation or error between the imagined continuum and the real discrete, or non-observable continuum. In short, quantum means ignoring the error, limited to be able to know.
- b) On the other hand, physics, starting from the concept that any measurement is an approximation to the real value, will always have an uncertainty that works as a strong corroboration when considering human fallibility. Fallibility and uncertainty that *need* to be negotiated with the unavoidable process of limiting everything and resigning oneself to the acceptable error according to the goal, from that necessarily finite range where humans can understand and calculate.
- c) Einstein’s famous equation $e=mc^2$, in truth is a polynomial. Einstein and all physics scientists only consider that first term of said polynomial and rejected all the others, because the error implied by that attitude did not affect their theoretical and observational scientific objectives.
- d) Einstein’s famous equation $e=mc^2$, has as its insignia difference vis-à-vis Newton having limited the displacement of bodies to the range of a constant (c). Which not only allowed him to express time in elements of physics, mass, and energy (relativity of time to other entities, from where I adopted the concept of the *Theory of Economic Relativity*, making it relative to economic goods), but to make those variables observable.

- e) Finally, without exhausting the list, we need to quote Heisenberg and his so called “uncertainty relations” or “indeterminacy relations”, derived from his formulas $\Delta p_x \Delta q_x \geq h/2\pi$. (Is the use of similar symbology to ours $-\Delta p_x \Delta q_x$ - mere coincidence?).

Mathematics

We only need to mention:

- a) The use of the continuous line by mathematicians, knowing that in nature there is nothing linear or continuous. Or if it does exist we cannot capture it in our observations.
- b) Gödel’s theorem of the incompleteness of mathematics, which attacks the heart of all dogmas.

CONCLUSION

I have always considered that Popper’s famous and extraordinary idea of “demarcation” referred precisely to what is expressed here: *human fallibility implies demarcation*. I use it in terms that are possibly more appropriate for the layman in epistemological issues, which does not surprise me since I am a confessed layman in this field. I tried to understand what I needed for my goals, which as an error is very big in terms of epistemology, but negligible in terms of my object.

Scientific man in all spheres discovered that the theoretical developments based on continuity, with the acceptable error in terms of the object, was an excellent epistemological tool to deal with his innate fallibility. I.e., in one way or another (Plato from the discrete to Socrates from the continuous) we know that perfection does not belong to the world of man, that is precisely why man’s truth includes error. We cannot understand otherwise the huge utility of the “geometrical curves”, so fabulous for explaining, as the academic that uses them knows, *but* knowing they do not refer to reality, or refer to the reality that is continuous but we cannot observe it. If we use curves when explaining and do not know of their imperfection, we have not understood the explicative basics of curves (derivates).

In the same way physics and chemistry resort to using continuities when explaining and understanding the functioning of flows, that imply marginal behaviors, there was no reason why economics should not have the benefit of the phenomenal scientific tool. In so far as marginality is common to all things subject to the passage of time, and since everything changes in time, and time in science implies the study of marginality.

Based on knowing how marginality explains the consequences of the passage of time it is prudent to refer to the epistemological basics that connect the *theory of economic time* (TET) with what has been developed in this work:

- Its *theory of the relativity of economic time*, its *theory of interest* as the *quantity-price-currency* of time, its *theory of currency* with its *theorem of currency* and its *axioms of equality and equivalence*.
- Its derived *theory of economic evolution* presented here.
- And its derived *curve of economic evolution*, also presented here.

All which can be considered a summary of economic thought, continuing the compendium by Carl Menger at the end of the nineteenth century, we say:

The marginal laws of decreasing utility and yields, and of increasing effort, necessarily include interest (the Price of time in Economics). Not having realized this is what explains the failed efforts of the twentieth century, originated in the fatidic Ricardian question.⁽⁵⁵⁾

APPENDIX C

ACCOUNTING PRACTICE FOR ECONOMIC CALCULUS WITHOUT A CURRENCY VEIL

Here we begin from the fact that we have clarified that there is no currency veil, but that the economic unit of measure for calculating (value) is variable, since it is the *quantity-price* of an economic good. In other terms, what we pretend to say is precisely that: the originality in economics when calculating value —not counting things— is the variability of the unit of measure. A situation we are not used to in other disciplines, where the differences are negligible and are considered inexistent; instead in economics these differences depend on human conduct.

Considering the very important HUMAN ACTION of ECONOMIC CALCULUS —invaluable development by Mises— subject to the variability of the unit of measure, this appendix pretends to be a kind of practical guide for calculus in economics.

Having said this we can deduce that the framework in which the model and its conclusions must be analyzed implies that we can use the methodology of analysis of accounting studies to compare wealth in different periods. A methodology we propose to “clear” the incidence of the difficulty implied by the variability of the unit of measure.

With this goal we summarize the elements considered essential for a model of economic calculus to offer an efficient tool for comparing timeless states with the use of a temporal unit of measure. Let us see:

- 1) Displacements of curves g and d can result from:
 - a) The creation of “physical” economic goods that is the net result of creation (productivity-invention-innovation-discovery) minus destruction of “physical” economic goods in a period of time.
 - b) The variations of *quantities-prices* of goods in general and of the price of the good used as a unit of measure in particular.
 - c) Economic calculus refers to valuing wealth relative to the units of economic goods that compose the wealth generated, from which the destroyed wealth is deduced, weighted by the *quantities-prices-currency*, relative to the variable *quantity-price* of the economic good that is used as the unit of measure.

Which means humans value wealth relative to the quantities of economic goods (q) and their *quantities-prices-currency* [$p_{q(m)}$], which implies that q and $p_{q(m)}$ are complementary entities for making subjective value “observable”.

- 2) The method consists of clearing from the calculus the variations in the unit of measure, i.e., the *quantities-prices-currency* of the economic good chosen as a unit of measure, currency. To do this we consider:

- a) The physical units of the economic goods that will be valued: those found in each inventoried stock (be it a stock or a flow of exchanges). In this manner we can include several inventories from different dates.
 - b) The units obtained of the different inventoried goods belonging to the inventory of a same date (stock) or a flow (period) are weighted, multiplying them by the relative *quantities-prices-currency* of the unit of measure that each economic good had at the same date (we relate *quantities-prices-currency* to a specific moment). This is the way we proceed to eliminate the consequences of the variations occurred in the unit of economic measure.
- 3) Let us see the opposite model, exemplified here comparing the wealth at the beginning (0) and at the end (I) of a certain period, what is known as the beginning and end of an economic exercise. This model shows that the challenge of increasing wealth is not limited to increasing “physical” quantities, but their *currency value*, which is linked to the product $q * p_{q(m)}$. So that the compared wealth, without the incidence of the variation of the unit of measure, at the end of two periods can be expressed by the following subtraction that we will call Gains (G) — *Profit* —, in line with the p in our model:

$$G = \sum q_{tI} p_{q(m)tI} - \sum q_{t0} p_{q(m)tI}$$

Where the addend of the summation of wealth at the end of the period tI is composed of the summation of the weights obtained by the multiplication of the quantities of the different products in stock at that date (tI) by their corresponding market *quantities-prices-currency* at the time (tI), and the subtrahend as the wealth at the beginning of the period ($t0$), where the quantities of the products in stock at that date ($t0$), are multiplied by the market *quantities-prices-currency* at the date of calculus (tI). In this manner we are revealing what interests us, and at the same time we clarify any doubts that can appear.

- a) We consider the “physical” quantities of products existent at the beginning and the end, where we consider the economic goods created in the period, including the “new ones”, that subsist at the end. And we consider the existent goods as economic goods at the beginning, that can still exist at the end, built they no longer are economic goods, and they will be eliminated because their *quantities-prices-currency* will be 0 .⁽⁵⁶⁾
- b) We consider the *quantities-prices-currency* at the end of the period, since they are the ones that allow us to include the variations of *quantities-prices-currency* of each product in time. As we said, this allows us to eliminate from the calculus of “physical” stocks of the economic goods that are no longer such, which will now be multiplied by 0 .
- c) In this manner current wealth (tI) will not only allow us to establish the relative value of the “physical” quantities of each economic good, weighted by their *quantities-prices-currency*, but it also allows us to observe the process of change of these relative wealth, since both calculus are carried out with the same *quantities-prices-*

- currency* referred to the same unique unit of measure. I.e., we eliminate the component of variability of the economic unit of measure.
- d) From all this process arises that the value of wealth not only depends on the qualities, but also the quantities, that in economics define *quantities-prices-currency*, entities that make subjective valuation “visible” daily. A situation that ratifies once again that humans first qualify and then quantify.⁽⁵⁷⁾
 - e) All this is derived from the initial analysis of the *closed box (observed reality)* of the “physical” quantities and *quantities-prices* of economic goods, which becomes the study of the behavior of q and $p_{q(m)}$ of the market, which derive from the validity of the marginal diminishing laws of utility and returns, and the law of exchange derived from them.
 - f) All this allows us to reiterate the huge importance of efficiency in economics, that goes hand in hand with productivity-invention-innovation-discovery. Among these, the scale of production is not a minor issue, since we can say it is the best tool to respond to the “decreasing” form of the *curve of socio economic evolution* (chart 32).
 - g) The weighted summation formula we have presented in this work for valuing and calculating the creation, destruction, and stock of wealth, is very appropriate for explaining another issue that has produced many headaches:
 - 1) If $G = \sum q_{t1} p_{q(m)t1} - \sum q_{t0} p_{q(m)t1} = 0$, i, this implies there was « zero » value of net wealth generation in the period. Which is highly improbable in practice.
 - 2) If $\sum q_{t1} p_{q(m)t1} = 0$, it is easy to see this is possible only in two circumstances : a) there are no economic goods, that is why any $q = 0$; and b) that the price considered as a unit of measure, of the economic good that is currency, is 0 , which is the same as saying that the unit of measure is not an economic good, configuring the theoretical cornice of the developments of the twentieth century with its virtual currency, that was an economic good in one situation and virtual in another. It is no coincidence that this last case is what we “almost” see in hyper-inflationary processes, the reason why the community regresses two barter, which is expressed in the destruction of the exchanges of commercial activity,⁽⁵⁸⁾ because of the destruction of the economic good chosen as the essential tool for exchange and calculus, that is currency.
 - h) Finally, we say it is not pertinent to consider the prices of previous periods instead of the final one, since at that time it is possible that economic goods that existed at the end were not present. A different situation from the economic goods that have disappeared in the period in study, that are not present at the end.

Conclusion

The proposed model allows us to manage the economic situation of having to calculate with a unit of measure that is variable in time, with economic goods that appear and disappear as such, apart from their physical existence —our definition of wealth implies that it is subjective value that man assigns them what makes things economic goods. For this we clear the variability of the unit of measure making it constant considering its *quantities-prices-currency* on the same date. To do it we weight different temporal stocks of economic goods using the same *quantities-prices-currency* relative to the unit of measure generated at a certain spatio-temporal point —the similarity with Einstein’s constant is no coincidence; it derives from the same epistemology. Thus, the general formula for weighting the wealth generated is given by the “physical” stock of economic goods at the end of the period t_n , valued at *quantities-prices-currency* relative to the *quantities-prices-currency* of the unit of measure at the end of the period t_n , to which we subtract the stock of economic goods at the beginning of period n , that is t_0 .

$$G_{t(n)} = \Sigma q_{tn} o_{q(m)tn} - \Sigma q_{t0} p_{q(m)t0}$$

We only need to add that the summation of the second term is the calculus of the currency value of the “physical” stock of wealth at a certain moment, at the end (t_n) and the beginning (t_0) of the period n .

It is important to retain the concept that we are referring here to economic calculus that, being weighted by *quantities-prices-currency*, eliminates any contamination from the pretension to include or exclude physical quantities that do not belong to the sphere of economic goods. I.e., we apply TET’s concept of wealth that defines it as value.

We clearly observe that the structure of the model proposed for economic calculus considers all the aspects of the chain of theoretical abstraction, with *a priori* logical-deductive causality that we have developed. Let us see:

- 1) In economics the issue is valuation of things by man, not the things themselves. I.e., things with no value assigned by man (subjective value theory) have no meaning for economic calculus.
- 2) The *quantities-prices-currency* of economic goods are the observable expression of value in economics.
- 3) The proposed model for valuing the “*physical*” wealth of inventories in different dates allows us to:
 - a) Consider the quantities of physical goods inventoried at different moments. In this manner not only will the quantities of goods change, but in the last inventory there will be economic goods that did not appear in the first, and some that were in the first inventory will not be there in the second, because of their physical inexistence or because they are no longer economic goods, which will be reflected when they are multiplied by their *quantities-prices-currency* that is zero —figurative expression, given the axiom: $p > 0$.

- b) In this manner the whole calculus is subject to the value man gives things and not things, insofar as they are or are not economic goods according to their having or not having a *quantity-price-currency*. ⁽⁵⁹⁾
- c) Only considering the *quantities-prices-currency* of the last inventory allows us to eliminate the problem of the variability of the unit of economic measure, and eliminates from calculus the economic goods existent at the beginning that are no longer goods (again price zero), and include new economic goods generated in the period. In turn the case of goods destroyed in the period is considered, weather they existed at the beginning or they were generated during the period.

We conclude then that the model contemplates the principles of the fundamental marginal laws of economics, necessary and sufficient entities to explain the relation of the entities component of the fundamental economic causality, and clear the problem of the variability of the unit of economic measure.

Note: Though in TET we have clarified that incomes taxes imply economic involution —shown in this work with the curve of economic evolution: consequences of fiscal policies—, it is important to consider the way we have proposed to value profits correctly when taxing them. So consider essential practical use of the proposed model, when calculating taxable profit.

Notes

- 1) Popper interprets this expression by Einstein saying that as he progresses in his writing, he finds unthought-of questions, which allow him to go deeper. He solves one situation and the “pencil” presents another, less trivial one. In this work we find the pencil is very useful when you follow a logical deductive causality like the one we have used. In this way, the “sharp” pencil is an ally when the method is true to the basics that are solidly included in the course of the deductive chain, avoiding the *ad hoc* paths that appear inconsistent when you respect the chain of logical-deductive causality.
- 2) *Theory of economic time (TET)* the central hypothesis of which are:
 - a) *Economic time is expressed in economic value.* I.e., economic time materializes in economic goods and since in economy what matters is economic value in general and currency value in particular, when currency is used, not economic goods in themselves, we refer to time in terms of value.
 - b) *Interest is the price of economic time*, therefore it is also expressed in the value of economic goods. Which needs no explanation, since it is a subordinate variable of economic value.
 - c) Thus, since credit is interpersonally exchanged economic time, it has interest as its price.

Though this note suffices for this work, for more on the subject, you can find material in all the writings that appear at our web page, www.carlosbondone.com.

I wish to stress that, while in our previous work we have always said that time expresses itself (materializes) in economic goods, it is appropriate to say that it is expressed in the value of economic goods, since what matters in economics is *economic value*. This is a more appropriate expression, since we have derived the theory of economic time from Heraclitus: *with time everything changes*, from which we deduce that if there is change, there is passing of time, then , *through the study of the changes of economic entities (economic values) we study time.* Thus, through changes in mass and energy we study physical time, in economics we do so through the *change of economic value*, which is *currency value* in a currency economy. Which is more perfect than saying we study economic time through changes in economic goods, which is true since what interests us in economics is the value of goods, not the goods themselves. This is very relevant, since economic value is the essence of the theory of subjective value, and referring to economic goods could induced to think of objective value —replacing the concept of changes in economic goods with the concept of change in economic value to express economic time, derived from intense and extensive talks with my dear friend engineer Manuel Polavieja.

- 3) If you wish to see more on the Böhm-Bawerk dichotomies of capital and interest, and of Wickesll’s prices and the two worlds, see *Theory of Interest* in its sections *Böhm-Bawerk’s theory of interest and Knut Wicksell’s theory of interest*, at www.carlosbondone.com.
- 4) See *Axiom of quality and quantity* in note 6.

5) See concept in note 6.

6) Below we explain, with a brief conceptualization, the primitive terms included in *TWU*:

Economic value: human appreciation of the quantities of economic goods (q_x) that allow us to manage the satisfaction and effort they imply.

Currency value: valuation in currency units of economic value. Thus, currency value = $q_x [p_{x(m)}]$ = Asset.

Economic calculus: action destined to obtain economic and currency value.

Law of increasing marginal effort: marginal effort since it generates economic goods is increasing. Thus, human effort is greater to obtain the unit n of an economic good than to obtain unit $n-1$.

Law of increasing marginal destruction: human n destroys wealth in greater proportion than individual $n-1$.

Axiom of quality and quantity: humans first qualify and then quantify (which we express in the ordered set: *quality* \rightarrow *quantity*). It makes no sense to quantify without qualifying. This in line with Popper's previous theoretical load.

Axiom of human action: all action derives from a state of insatisfaction that there is the desire to overcome. It is the basis for Popper's epistemological triad and for Mises' "human action".

Axiom of the fundamental economic causality: defined as the ordered set *need (man)* \rightarrow *economic good*, that implies the precedence of human need for the existence of an economic good. I.e., without the need there are no economic goods. In other words, it is the axiom of human action applied to scarce goods, to economics.

Benefit of demand: equivalent to available economic value in a specific spatio-temporal setting. This is so since *TET* \rightarrow *TWU* \rightarrow *SEE* consider as demand not only the economic goods destined to satisfy present needs in the period, but also those destined to *stock* for future needs. The reader will see the difference with the known expression of the benefit of the consumer, since it would be included in our benefit of demand.

Axiom of economic good \leftrightarrow *owner*: there is no such thing as an economic good without an owner or an owner without economic goods.

An axiom that is in line with the preceding one and is the basis of the double entry accounting, referring to the counterpart of Assets, Credit, that defines the property of assets.

Axiom of the temporal distribution of stocks: all stocks of available economic goods, in a defined spatio-temporal setting, are destined to satisfy needs of the period or needs of future periods.

Stock axiom: this axiom is derived from the temporal distribution of stocks axiom and it says: supply and demand of available economic goods in a defined spatio-temporal setting are equal. So when we refer to available stocks in a defined spatio-temporal setting, always $S = D$, independently of there being exchanged or not, which includes the idea present in Say's Law.

Law of exchange: man exchanges to improve his situation previous to exchange. It derives from the axiom of human action, since exchange is action.

Axiom of exchange: “only economic goods are exchanged”, i.e., he who does not have economic goods cannot exchange. Axiom that includes the idea present in Say's Law and it avoids different interpretations of the same.

Axioms of currency equality and equivalence: derived from the theorem of currency, $p_m = i_m$ (when currency is money) and $p_m \equiv i_m$ when currency is credit —where p_m implies the price of the currency and i_m interest expressed in currency. Specifically these axioms allow a clear differentiation of *TWU* and its *SEE model* from all other theoretical proposals, since they explain through the use of p_m , and not i_m as all other proposals do.

Theorem or axiom of currency: if currency is not a present economic good (money) it is a future economic good (credit). This could be considered an axiom, since it is only possible to consider in each spatio-temporal instant a present or a future economic good.

Theorem or axiom of wealth generation: all communities of human beings have producers-activities that generate *negative wealth* in terms of their average level of generation of net wealth.

Theorem or axiom of economic calculus: human existence implies economic calculus, since human fallibility is an existential category and scarcity is its economic expression.

Axiom of permanent positivity of prices ($p > 0$): otherwise the good of reference would not be scarce.

Theory of the impossibility of collectivism: any theory postulated based on the premise that all individuals are economically equal fails by ontology.

Curve of wealth generation: graphic representation of the law of decreasing marginal yields with which a society generates wealth, expressed in currency value.

Curve of wealth destruction: graphic representation of the law of increasing marginal destruction with which a society destroys wealth, expressed in currency value.

Curve of Socio-Economic Evolution (CSEE): it represents the behavior of the economy in a society over time, since it links the initial and final points of the economy of a community —points that appear in the intersection of the curves of wealth generation and destruction.

7) See your concepts in note 6.

- 8) Causality that goes from the *problem to the solution* ($problem \rightarrow solution \equiv need \rightarrow economic\ good$), the method of epistemological evolution of Carl Popper. Similarity that gives explaining power both to our proposal of the fundamental economic causality, and the triadic Popperian scheme, ratifying it as the causality of all knowledge, here observed in economics. In the *Theory of Economic Time* we gave the relation $need \rightarrow economic\ good$ the status of axiom.
- 9) For a simple and exemplary understanding of what economic goods are (things that are useful to man and scarce), we always look to Carl Menger and his exceptional work: *Principles of Economics*. In our retrospective investigative work, through several decades, when we came to this exceptional work we began to find solid ground on which we could “rebuild” the economic theory we propose in the *Theory of Economic Time*.
- 10) For more on this see Carlos A. Bondone *Theory of Economic Relativity* (p. 65/69). There the reader will find what is most important in Gossen’s work, the way he incorporates satiation in time (in www.carlosbondone.com).
- 11) The concept of *marginal* must be considered as an essential contribution that allows us to understand the behavior of the whole. In mathematical terms, marginality is represented by the *derivate* (expression of flow), that explains how a totality is generated, represented in mathematics by the *integral* or surface (expression of *stock*). For more on the idea of diminishing marginal utility see Carlos A. Bondone, *Theory of Economic Relativity*. (p. 65...), in www.carlosbondone.com.
- 12) Here we start to underline the fundamental premise that governs all knowledge, identifying first the *quality*, and then the *quantity*. In other words, in TET we have always stressed it does not make sense to quantify anything without qualifying first, and this is true for all human life. For more on this, specifically the consequences for currency theory of forgetting that qualifying and quantifying is an *ordered set*: $qualify \rightarrow quantify$, see *Theory of currency* and *Currency Causality* by Carlos A. Bondone, in www.carlosbondone.com.
- 13) We can appreciate the *closed box* model presented here from two perspectives:
- a) Belongs to Popper’s typical demarcation criterion, as he expresses in *La Responsabilidad de Vivir*, Ediciones Paidós, Barcelona-Buenos Aires-México, 1st edition 1995, p 33/34, of which we reproduce this part:

A scientific-empirical theory is different from other theories in that it can fail in possible experiences...

I have denominated the “problem of demarcation” the issue of separating the scientific-empirical theories from other theories, and the “demarcation criterion” the solution I propose. My proposal to solve the problem of demarcation consists of the following demarcation criterion. A theory belongs to empirical science when and only when it contradicts possible experiences, that is, it is falsifiable in principle through experience.
 - b) The similitude with physics insofar as it has to struggle with the expansion-contraction of matter and energy, but within the space occupied by these entities. I.e., energy expands

mass, but this expansion is always contained in a space that is in constant movement, but always occupied by mass and energy.

The potential of this *closed box* model will be fully seen in its highest expression when we present the issue of prices.

Finally we point out that a *closed box* model can be observed in the so-called *Egdeworth Box*, used to explain the *Indifference Curves* and the Pareto Optimal.

- 14) For more on the preceding, referring to the unknown, see Carlos A. Bondone, *Curve of human evolution* and *Curve of human evolution (continued)*, in www.carlosbondone.com.
- 15) Just as we have referred to Gossen when speaking of the law of diminishing marginal utility, historians refer, among others, to Thünen, Turgot, Malthus and David Ricardo (who is noted as one of the most interested in the issue and made it the centre of his theories). Not everyone attributed to it the same origin or the same explanation. Karl Marx, for example, referred to it in terms of a tendency towards zero of the rate of profit, in agreement with the confluence of prices and costs, which configured another version of the theory of objective value and the classic vice, that would be solved by the *theory of subjective value*, which we highlight here as the *confluence of the two fundamental marginal laws of economics*.
- 16) Efficiency understood as the highest stage of productivity.
- 17) With the quotient $\beta_{NqI} / \alpha_{NqI}$ we pretend to introduce the idea underlying the studies of stock rotation of economic goods in the world of financial analysis, where “spontaneously” and “unnoticed” *point E* is analyzed.
- 18) That is precisely what Israel Kirzner’s businessman’s alertness must “guess”.
- 19) The axiom *economic good* \leftrightarrow *owner* implies that one does not exist without the other. For more see Carlos A. Bondone: *Theory of Economic relativity, Theory of Currency, Theory of Interest*,... an axiom that we will ratify and use in all this work (www.carlosbondone.com.)
- 20) For more see Carlos A. Bondone, *Theory of Economic Relativity* or *Theory of interest (books section)*, or *Theory of Interest: Theory of Economic Time (TET) versus Theory of Time Preference (TTP)- Application Section*, www.carlosbondone.com.
- 21) For more on the demonstration see Carlos A. Bondone, *Aplication (Opinion) - Economic Equilibrium, Theoretical Error*, in www.carlosbondone.com.
- 22) Austrian theory of interest that postulates: with equal conditions, present economic goods are always worth more than future ones. For more on this see note 20.
- 23) Referred to virtualism derived from the Bawerkian-Wicksellian dichotomies. For more on this, see Carlos A. Bondone, *Theory of interest*, in www.carlosbondone.com.
- 24) We mention it insofar as it helps with expositive aspects, but we know it is unnecessary because it is subservient to the fundamental marginal laws of economics.

- 25) Another concrete proof of Popper's evolutionary triad, the solution leads to a less trivial problem, if not it is a regression.
- 26) Nevertheless, if there is any doubt, we can reason by *reductio ad absurdum* and say that if exchange were not an economic good, we could not explain specialization and division of labor, or the value of exchange of economic goods, insofar as it adds value to a use-good adding to its economic usefulness. In terms of identifying the price of the economic good exchange, since all economic goods have a price, it is necessary to say that it is the increase in economic value that is conferred by the greater utility of an economic good when exchanged, i.e., that differential is what measures the utility of exchange, what accounting registers as the profit of sale-price minus cost.
- 27) I.e., now the need is not satisfied by an economic good supplied by nature but produced instead by man, another man in the case of exchange.
- 28) As can be seen, we consider *quantity-price* is more precise, since economic calculus is done in quantities of economic goods, which also includes the individual that calculates without exchanging (we saw this in Robinson). I.e., the quantity of economic goods pre-exists price, which derives from exchange. An aspect that is precisely what is forgotten in the developments that include the concept of absolute price, which would imply that it is not relative, or not referred to quantities of (economic goods). From here on, referring to prices is only to the effect of using the term generally known, but we will always be referring to *quantity-price*.
We summarize saying stocks of economic goods are quantified, i.e., they are expressed in quantities, and of all quantities that refer to economic goods, it is relevant to highlight the *quantity-price*, which is what temporarily defines the end of exchanges and the beginning of stocks, it is not just another quantity, it is what explains the human temporal preference for economic goods. But there are also: the quantity-stock; the quantity-production; the quantity-rotation; etc.
- 29) For more on this see F.A. Hayek, *Against Keynes and Cambridge*, Works, Volume IX.
- 30) This is absurd because it means these laws are not valid. This is a serious blow to the well known quantitative theory of currency, because accepting it would imply rejecting the marginal laws and the law of exchange derived from them.
- 31) The reader that followed the dispute between Hayek (he maintained that lower prices were beneficial) and Keynes (he maintained that without price rises there was no profit for businesses), will see that neither of them was right, mentioning at the same time that Hayek's intuition was right, if what he meant was that price rises were not necessary for there to be a better situation of the population, which is Keynes' position —understanding as such the increase of the *benefit of demand*, which is what economics is about, being the beginning of the fundamental economic causality *market* → *economic good*.
- 32) Being credit, it is exchanged time, and being time it is subject to economic relativity.

33) Given the relevance of the issue of *quantity*, *quantity-price*, *quantity-price-currency*, and subjective value we resort to Alberto Benegas Lynch (jr.), *Fundamentos de Análisis Económico* (Basics of Economic Analysis, bibliography), page 85, since we consider the following paragraph as an exceptional summary of the state of price theory previous to TET:

“In the sphere of the market, currency prices have two basic functions: they tend to “clean” the market, i.e., equate supply and demand, and also serve as a guide for the allocation of the always scarce productive resources”. Supply is constituted by goods or services on sale and demand is made up of those that require certain good or service and have the necessary resources to acquire them (the desire, then, is a necessary but not sufficient condition for demand to exist). When we refer to a good we are thinking that its available quantity is less than the need for it, i.e., it has a use and it is scarce, if not it would have no marginal utility. But we must bear in mind nevertheless that when referring to the concept of *quantity* we are speaking of the capacity of that good (value) of rendering services or producing a utility for the subject and in no way are we circumscribing the concept of good to the material aspect...” – (highlighted passages by me, CB).

Let us see our comments in light of *TET*, made explicit here in *TWU*:

- As with all economic theory previous to TET, it refers to economic goods offered for exchange, which does not consider the economic goods not offered for exchange, as if **the stock of economic goods (not exchanged) had no marginal utility**. An enormous difference with our *axiom of stocks* ($O_d = D_d$), based on which there is no need to fret about what worried Say. In other words, this theory does not analyze with sufficient depth that: **1) the stock of economic goods is for responding to future demand, the marginal utility of which —valued in terms of the marginal effort—, is higher than the present demand, 2) the temporal function of the quantities, quantities-prices and quantities-prices-currency does not require a theory of interest to explain how humans relate the present and future of available economic goods, a circumstance we have shown with point E^P** .
- As all economic theories previous to *TET*, it refers to the functions of cleaning the market (ceasing of exchanges) and the distribution of resources among men, different from the emphasis we put on the temporal function of the *quantities, quantities-prices* (our *point E^P*) and *quantities-prices-currency*, that announce the demarcatory temporal limit of the resource allocation.

Mentioning that the quantity of goods refers to their capacity to satisfy utility, which is equivalent to our *quality* previous to quantity, in the ordered pair *quality* → *quantity*, causality that we consider of greater scientific weight and not only in economics. A superiority that is manifest since both categories have utility, given that zero quantity satisfies nothing and a positive quantity with no quality has no entity.

34) On differences in the concept of satisfying liquidity, as distinctive when conceptualizing currency, a Mengerian precept we continue from the *Theory of Economic Time*; more on this

in Carlos A. Bondone, *Theory of Currency and Currency causality*, in www.carlosbondone.com.

- 35) See more in Carlos A. Bondone, *Currency Theory and Currency causality*, in www.carlosbondone.com
- 36) We reiterate once again that currency does not merit a special theory, we only need an adequate taxonomy that will allow us to distinguish between money currency and credit currency (regular or irregular). Based on this we can see credit being economic time with its price, interest, which merits a special treatment, especially when it is irregular credit. We have highlighted the central concepts to be an “expert in the *theory of economic time (TET)*. As we shall see the previous paragraph does not imply reducing the enormous importance of the *quantity-price* of currency, since it will become a fundamental factor for understanding an economy where economic calculus is done pondered precisely by *quantities-prices-currency*.
- 37) In this sense we highlight the meaning for economics of the term *fungible*, accepting the meaning attributed by Jesús Huerta de Soto: ... *This indistinguishable mixture of different deposited units of the same gender and quality...* highlighted by Carlos A. Bondone in the *Theory of Economic Relativity*, page 52, in www.carlosbondone.com.
- 38) In truth, a lower number should be used, since they are the economic goods that *were not exchanged* because they were not offered at a lower price, a situation that should be informed in any financial statement. An aspect that the generally accepted accounting norms try to solve with the “valuation at cost”, in its different versions, including replacement cost.
- 39) We have always wondered why accounting does not place assets (property) to the left and debits (economic goods) to the right, in tone with our fundamental economic causality: *owner → economic good*. We believe this seeks to give informative preeminence to the goods and not the owners. Possibly influenced by the objective value theory of the times of Luca Pacioli?
- 40) Within this consolidation TET considers the item cash and banks, insofar as they are composed of materialized balances in paper currency (PC). Which must be consolidated with the liabilities of the issuer-debtor entity, since it is debt of the issuer and credit of the owner. From where the item cash and banks, in which generally are included the holdings of PC and bank balances, should be considered credit to the effects presented here. Evidently this new composition of wealth would allow an analysis of national accounts with greater precision and would allow a better appreciation of the “financial, patrimonial and economic” state of a society.
- 41) This should not be confused, undoubtedly credit is a good, but we must not forget that it is so because it is (exchanged) economic time, that is why it is not part of the present economic goods and is neutralized with its counterpart, debt. Bear in mind clearly when an economic good is not present: a) *economically* when it is economic time and has no life of its own, it

must materialize in another economic good, and b) *in accounting terms*, when it can be consolidated through accounting.

We reiterate the difference of working with a value of wealth of 7 that *exists*, and working with a value of 10 that *does not exist* —values referred to graph 19. It would be considering the 3 as wealth that does exist and increase it to 10, instead of considering it as affecting 3 over a wealth of 7 that does exist (not 10). The difference in proportions is sidereal, insofar as:

1) 7 over 10 implies 70%

2) 3 over 7 implies 43%

3) 3 over 10 implies 30%

Simple values that show us why we have instabilities that generate currency expansion, since the ***true currency illusion*** is to believe “social” debt (in reality it is individuals that acquire debt) is 30% when it is 43%, and considering present wealth 100%, when in truth it is 70%.

- 42) It is not by coincidence that they have the same explanation we have expressed when building the *Curve of human evolution*. See more in Carlos A. Bondone, the homonymous text and its *continuation*, in www.carlosbondone.com.
- 43) Which we already saw, but is worth reiterating, implies considering all economic goods, the productive structure and its ownership distribution. All which results from the current institutions that that govern economic life.
- 44) If you are interested in understanding the issue in depth, you will observe that the equivalent explanation we gave with the *Curve of knowledge* developed in the *Curve of human evolution and its continuation* is no coincidence, in www.carlosbondone.com.
- 45) You can derive the curve of wealth generation (*g*) from the behavior of the accounting asset in time, considering it continuous in explicative and academic terms, considering them to be discrete variables. This is more probable as measured assets accumulate in a smaller period of time. In turn, with the help of the economic results table, it is possible to study the components that had incidence in that wealth generation curve (income, costs and expenditure). The wealth of the analysis will be in direct relation to the structure of the accounts plan, that must obey the orientation deriving from the business strategy.
- 46) If you are interested in understanding the issue in depth you will observe that the equivalent explanation we gave with the ***Curve of ignorance*** we have developed in the *Curve of human evolution* and its *continuation* is no coincidence. Curve that has a direct relation with what we have developed as the *tragedy of the commons*, as the identification of the owner is diluted. I.e., the destruction of wealth is in inverse proportion to the zeal of the owner, the only recipe for managing the *law of economic destruction* is economic education based on the scientific rigor of the fundamental marginal laws, which is known as “solidarity” and respect for property. I.e., the destruction of wealth goes in the opposite sense of the zeal of the owner, the only recipe for coping with this *law of increasing marginal economic destruction*, is *economic education* based on the scientific rigor of the fundamental marginal laws.

Human knowledge that explains efforts are distributed based on specialized knowledge, which allows us to scientifically frame what is known as “solidarity”, since it identifies what constitutes true social injustice: demanding the right to destroy more wealth than what one generates.

- 47) Insofar as it represents the balance or financial statement of an owner in a certain period. Which, due to the double-entry accounting principle, gives the same result as the difference between the initial and final patrimony of the period.
- 48) From the *Theory of Economic Time* we have derived the *Currency Theorem*, based on which we have presented the axioms of equality ($i_m = p_m$) and of equivalence ($i_m = p_m$) — where i_m = interest expressed in currency and p_m = price of currency, used as the unit of calculus. In currency systems with money there is the equality axiom, in currency systems with credit there is the axiom of equivalence. For more on the basics and development of the currency theorem and its axioms, go to *Currency Theory*, by Carlos Bondone, at www.carlosbondone.com.
- 49) All this clearly reflects that in our *TWU* and its *SEE model* —all this expositive continuity of *TET*— there is no capital paradox, since we have no theoretical difficulty in explaining what is known as *reswithching* (the investment that is not possible at one moment is at another), nor *capital reversing* (that directly relates lower interest rates with a more intensive use of capital). Since it would be more difficult to understand investments to the right of n^R . Thus any notion of ignoring the existence of *point R* is void, since it is totally superior to *reswitching* and *capital reversion* — i.e., the demonstration of point R is of a higher theoretical to the afore mentioned paradoxes, ergo, there is no reason even to state them.
- 50) For more on the theoretical discrepancies we have presented previously —in reference to this issue with Mises— consult Carlos Bondone, *Theory of Economic Relativity*, Chapt. VI: *Economic Calculus*, in www.carlosbondone.com.
- 51) We can summarize saying everything financed with taxes is part of n_D , if not it would payment for a public service.
- 52) For more on the basics with which TET explains this, read *Causality of Economic Cycles (Theory)*, at www.carlosbondone.com.
- 53) *Demand paradox*: term with which in the *Theory of Economic Time* we define a situation in which theories cannot explain a lower demand of currency when its *quantity-price-currency* decreases. A paradox that TET of course does not present, which could not be since accepting it implies rejecting the fundamental marginal laws of economics.
- 54) In line with the concept developed by Karl Popper in *Quantum Theory and the Schism in Physics*, where he clearly stresses how from the world of ideas (metaphysics) problems of physics are generated and solve. Which implies that metaphysics is of the real world.

55) We have addressed this issue in *Theory of Interest*, a work in which we referred to the excellent text by Israel Kirzner: *Essays on CAPITAL and INTEREST – An Austrian perspective* (Edward Elgar Publishing Limited – 1969).

We must say that of all the works we have found referring to the “history” of the theory of interest, we consider this one “exceptional”. The exceptionality is due to the fact that it expresses with total simplicity that the problem of interest arises with David Ricardo’s question:

What is then the reason that capital goods allow their owners to obtain permanent rent –alternatively called benefit, interest, surplus value or surplus?

In *Theory of Interest* (available on the Carlos Bondone web page), where we approach Kirzner, we say that all economists after Ricardo remained within the framework of his question, since they all tried to answer it. As Ricardo stresses, they did so using alternatively the concepts of “benefit, interest, surplus value or surplus”, to which they later added productivity of capital, etc...

56) A very propitious moment to ratify the axiom that in TET we called the permanent positivity of prices ($p > 0$), that contemplates the negative variations of the same, since they are negative variations of *quantities-prices*, not *quantities-prices*.

57) We reiterate and on this issue we recommend Carlos A. Bondone, *Theory of decision making* in the *Theory of human evolution*, en www.carlosbondone.com.

58) Argentina is recurring in the destruction of currency, with the illusion that it is “virtual” and destroying it does not cause harm. This sad case is the reflection of the extreme use of the “Wicksellian magical virtue” based on the developments of the theory of currency of the twentieth century. The rest of the countries were more “civilized” in its use.

59) Here are combined the axiom of *positivity of prices* ($p > 0$) and the biunivocal relation *owner* ↔ *economic good*.

Charts

- Chart 1 – Curve of need (Gossen) – Curve of demand
- Chart 2 – Curve of economic good – Curve of effort (supply)
- Chart 3 – Curve of Fundamental Economic Causality (CFEC)
- Chart 4 – Decrease in stock demand
- Chart 5 – Decrease in stock supply
- Chart 6 – Behavior of Robinson's *fundamental Economic Causality*
- Chart 7 – Unsatisfied needs
- Chart 8 – The box of exchange of "First"

- Chart 8 (a) – CEF
- Chart 8 (b) – Curve of exchange of "*First*"
- Chart 8 (c) – Curve of exchange of "*Second*"
- Chart 8 (***E***) – **Point E**: Box of exchange of "*First*" and "*Second*"

Chart 9 – The *Quantities-Prices*

- Chart 9 (a) – Curve of exchange
- Chart 9 (b) – Curve of *quantity-price*

- Chart 10 – Variation of *quantities-prices* of *one* economic good
- Chart 11 – Variation of *quantities-prices* of *two* economic goods
- Chart 12 – Variation of *quantities-prices* of *two* economic goods –Consequences
- Chart 13 – The *quantity-price* of currency
- Chart 14 – Variation of the *quantity-price* of currency
- Chart 15 – Stock of Robinson's wealth

- Chart 15 (a) – Without *quantities-prices*
- Chart 15 (b) – With *quantities-prices-currency*

- Chart 16 – Stock of wealth of "*n*" owners
- Chart 17 – Stock of aggregate wealth of "*n*" owners
- Chart 18 – Property of the stock of wealth of "*n*" owners
- Chart 19 – Property of assets-wealth of present economic goods
- Chart 20 – Stock and distribution of wealth curve of "*n*" owners
- Chart 21 – Curve of generation of wealth by "*n*" owners
- Chart 22 – Displacement of the curve of wealth generation (by "*n*" owners)
- Chart 23 – Curve of destruction of wealth by "*n*" owners
- Chart 24 – Displacement of the curve of destruction of wealth (by "*n*" owners)
- Chart 25 – Point ***R*** of stock
- Chart 26 - Displacement of ***g*** with ***d*** and ***n*** constant
- Chart 27 - Displacement of ***d*** with ***g*** and ***n*** constant
- Chart 28 - **Curve of Economic Evolution** of "*n*" owners
- Chart 29 - Behavior of ***R*** with displacements of the curves ***g*** and ***d***
- Chart 30 - Behavior of ***n_{xx}*** with displacements of curves ***g*** and ***d***
- Chart 31 - Combined consequences for ***R*** and ***n*** of displacements in ***g*** and ***d***

Chart 32 - Curve of Economic Evolution of Owners (CEE-O)
Chart 33 - CEE-O from a spatio-temporal point
Chart 34 - Curve of Socio-Economic Evolution (CSEE)
Chart 35 - Curve of fiscal and currency policy combined

Chart 35 F – Consequences of *Fiscal* policy
Chart 35 M – Consequences of *Monetary* policy

Chart 36 - Curve of socio economic evolution in history
Chart 36 - Curve of socio economic evolution in history (Expanded)

Tables

Table 1 – Exchange magnitudes
Table 2 – Calculus with “*pure*” relative prices: with $p_{1(2)}$ and $p_{2(1)}$
Table 3 – Calculus with $p_{1(2)}$ as the unit of measure
Table 4 – Calculus with $p_{2(1)}$ as the unit of measure
Table 5 – Different values for the same stock
Table 6 – Table of (relative) *quantities-prices*
Table 7 – *Quantities-prices* of the economic goods expressed in currency
Table 8 – With d_0 constant and displacement $\uparrow g_1$
Table 9 – With d_0 constant and displacement $\downarrow g_2$
Table 10 – With g_0 constant and displacement $\uparrow d_1$
Table 11 – With g_0 constant and displacement $\downarrow d_2$
Table 12 – Behavior of Socio-Economic Evolution (CSEE)
Table 13 – With g constant and displacement $\uparrow d_1$
Table 14 – Analysis of fiscal and currency policy

BIBLIOGRAPHY IN SPANISH

(Consulted texts, according to subject matter)

EPISTEMOLOGY

- ARISTÓTELES, *Obras Filosóficas*, preliminary study by Francisco Romero, Océano Grupo Editorial, Barcelona, Spain.
- BACHELARD, Gastón, *La Formación del Espíritu Científico, Contribución a un Psicoanálisis del Conocimiento Objetivo*, translated by José Babini, Siglo XXI Editores, 22nd edition, Madrid, Spain, 1999.
- BACON, Francis, *El Avance del Saber*, translated by María Luisa Balseiro, Alianza Editorial, Madrid, Spain, 1988.
- BERNAL T., César Augusto, *Metodología de la Investigación para la Administración y Economía*, Editorial Pearson, Santa Fé de Bogotá, Colombia, 2000.
- BERTALANFFY, Ludwig Von, *Teoría General de los Sistemas*, translated by Juan Almela, Editorial Fondo de Cultura Económica, tenth reprint, Mexico, 1995.
- BRAVO GONZÁLEZ, Lucio E. and MARQUES, Gustavo, *Metodología de la Investigación, Ciencia y Tecnología en Acción su Aplicación a las Ciencias Económicas*, Editorial de Belgrano, Capital Federal, Argentina, 1996.
- BUNGE, Mario, *La Ciencia, su Método y su Filosofía*, Editorial Sudamericana, 4th edition, Buenos Aires, Argentina, 2001.
- BUNGE, Mario, *Las Ciencias Sociales en Discusión, Una Perspectiva Filosófica*, translated by Horacio Pons, Editorial Sudamericana, Buenos Aires, Argentina, 1999.
- CARNAP, Rudolf, *Autobiografía Intelectual*, translated by Carmen Castells, Editorial Paidós Ibérica, 1st edition, Barcelona, Spain, 1992.
- CHALMERS, Alan F., *¿Qué es esa cosa llamada ciencia? Una Valoración de la Naturaleza y el Estatuto de la Ciencia y sus Métodos*, translated by Eulalia Pérez Sedeño and Pilar Lopez Máñez, Siglo Veintiuno editores, 6th edition, Buenos Aires, Argentina, 1988.
- COPI, Irving M., *Introducción a la Lógica*, translated by Néstor Alberto Míguez, Editorial Eudeba, 4th edition, Buenos Aires, Argentina, 1999.
- COPI, Irving M., *Lógica Simbólica*, translated by Andrés Sestier Boulier, Compañía Editorial Continental, tenth reprint, Mexico, 1998.
- DÍAZ OBREGÓN, Carlos Federico, *De la Filosofía a la Economía, Historia de la Armonía Social*, Editorial Trillas, 1st edition, Mexico D.F., 1984.
- DÍAZ, Esther and HELER, Mario, *El Conocimiento Científico, Hacia una Visión Crítica de la Ciencia*, vol. I, Editorial EUDEBA, 7th edition, Buenos Aires, Argentina, 2001.
- DÍAZ, Esther and HELER, Mario, *El Conocimiento Científico, Hacia una Visión Crítica de la Ciencia*, vol. II, Editorial EUDEBA, 7th edition, Buenos Aires, Argentina, 2001.
- DYKE, C., *Filosofía de la Economía*, translated by Eduardo Prieto, Editorial Paidós, first edition, Buenos Aires, Argentina, 1983.
- EINSTEIN, Albert, *Sobre la Teoría de la Relatividad Especial y General*, translated by Miguel Paredes Larrucea, Alianza Editorial, first edition in Área de conocimiento: ciencia y técnica, Madrid, Spain, 2000.
- FEYERABEND, Paul K., *Ambigüedad y Armonía*, translated by Antoni Beltrán and José Romo, Ediciones Paidós Ibérica, Barcelona, Spain, 1999.

- FEYERABEND, Paul, *Adiós a la Razón*, translated by José R. de Rivera, Editorial Tecnos, third edition, Madrid, Spain, 1992.
- FEYERABEND, Paul, *Diálogos sobre el Conocimiento*, translated by Jerónima García Bonafé, Ediciones Cátedra, Madrid, Spain, 1991.
- FEYERABEND, Paul, *La Conquista de la Abundancia, La abstracción frente a la riqueza del ser*, translated by Radamés Molina and César Mora, Ediciones Paidós Ibérica, Barcelona, Spain, 2001.
- GAETA, Rodolfo and LUCERO, Susana, *El Falsacionismo Sofisticado*, Editorial Eudeba, first edition, Buenos Aires, Argentina, 1999.
- GARCÍA VENTURINI, Jorge L., *Historia General de la Filosofía*, Editorial Guadalupe, 2nd edition, Buenos Aires, Argentina.
- GUIBOURG, Ricardo A., GHIGLIANI, Alejandro M., GUARINONI, Ricardo V., *Introducción al Conocimiento Científico*, Editorial EUDEBA, 3rd edition, Buenos Aires, Argentina, 2001.
- HEMPEL Carl G, *Filosofía de la Ciencia Natural*, Version by Alfredo Deaño, Alianza Editorial, 1st edition in “Ensayo”, Madrid, Spain, 1999.
- HEMPEL, Carl G., *La explicación Científica, Estudio sobre la filosofía de la ciencia*, translated by M. Frassinetti de Gallo (chap.8) Néstor Míguez (chaps.1-6 y 12) Irma Ruiz Aused (chaps. 7 and 11), Ediciones Paidós Ibérica, 2nd reprint, Barcelona, Spain, 1996.
- HOFFMAN, Paul, *El Hombre que Sólo Amaba los Números*, Editorial Granica, Buenos Aires, Argentina, 1998.
- KUHN, Thomas S., *La Estructura de las Revoluciones Científicas*, translated by Agustín Contín, Editorial Fondo de Cultura Económica, 6th reprint, Buenos Aires, Argentina, 1999.
- LAKATOS, Imre, *Escritos Filosóficos, 2. Matemáticas, Ciencia y Epistemología*, version by Diego Ribes Nicolás, Alianza Editorial, 1st edition, Madrid, Spain, 1999.
- MASLOW, Abraham H., *La Personalidad Creadora*, translated by Rosa M. Rourich, Editorial Kairós, 6th edition, Barcelona, Spain, 1999.
- NAGEL, Ernest and COHEN, Morris, *Introducción a la Lógica y al Método Científico 1 y 2*, translated by Néstor A. Míguez, Amorrortu editores, 8th reprint, Buenos Aires, Argentina, 1993.
- NAGEL, Ernest and NEWMAN, James R., *El Teorema de Gödel*, translated by Adolfo Martín, Editorial Tecnos, 3rd edition, Madrid, Spain, 1999.
- NAGEL, Ernest, *La Estructura de la Ciencia, Problema de la Lógica de la Investigación Científica*, translated by Néstor Míguez, Ediciones Paidós Ibérica, 3rd reprint, Barcelona, Spain, 1991.
- NOZICK, Robert, *La Naturaleza de la Racionalidad*, translated by Antoni Doménech, Ediciones Paidós Ibérica, 1st edition, Barcelona, Spain, 1995.
- O`CONNOR, D. J., *Historia Crítica de la Filosofía Occidental, I La Filosofía en la Antigüedad*, vol. 31, translated by Néstor Míguez, Ediciones Paidós Ibérica, 1st reprint Barcelona, Spain, 1982.
- O`CONNOR, D. J., *Historia Crítica de la Filosofía Occidental, II La Filosofía en la Edad Media y los Orígenes del Pensamiento Moderno*, vol. 32, translated by Néstor Míguez, Ediciones Paidós Ibérica, 1st reprint, Barcelona, Spain, 1983.
- O`CONNOR, D. J., *Historia Crítica de la Filosofía Occidental, III Racionalismo, Iluminismo y Materialismo en los siglos XVII y XVIII*, vol. 33, translated by Néstor Míguez, Ediciones Paidós Ibérica, 1st reprint, Barcelona, Spain, 1983.

- O'CONNOR, D. J., *Historia Crítica de la Filosofía Occidental, IV El Empirismo Inglés*, vol. 34, translated by Néstor Míguez, Ediciones Paidós Ibérica, 1st reprint, Barcelona, Spain, 1982.
- O'CONNOR, D. J., *Historia Crítica de la Filosofía Occidental, V Kant. Hegel. Schopenhauer. Nietzsche*, vol. 35, translated by Néstor Míguez, María C. G. Gonzalez and Andrés Pirk, Ediciones Paidós Ibérica, 1st edition, Barcelona, Spain, 1983.
- O'CONNOR, D. J., *Historia Crítica de la Filosofía Occidental, VI La Filosofía en la Segunda Mitad del Siglo XIX*, vol. 36, translated by Néstor Míguez, Oscar Nudler and Andrés Pirk, Ediciones Paidós Ibérica, 1st edition, Barcelona, Spain, 1983.
- O'CONNOR, D. J., *Historia Crítica de la Filosofía Occidental, VII La Filosofía Contemporánea*, vol. 37, translated by Néstor Míguez, Nilda Robles and Andrés Pirk, Ediciones Paidós Ibérica, 1st edition, Barcelona, Spain, 1983.
- OLIVARES, César Monroy, *Teoría del Caos*, Alfaomega Grupo Editor, Mexico, 1997.
- PAULI, Wolfgang, *Escritos Sobre Física y Filosofía*, translated by Mercedes García and Rodolfo Hernández, Editorial Debate Pensamiento, Madrid, Spain, 1996.
- POPPER, Karl R., *Búsqueda sin Término, Una autobiografía Intelectual*, translated by Carmen García Trevijano, Editorial Tecnos, 3rd edition, Madrid, Spain, 1994.
- POPPER, Karl R., *El Cuerpo y La Mente*, translated by Olga Domínguez Scheidereiter, Ediciones Paidós Ibérica, Barcelona, Spain, 1997.
- POPPER, Karl R., *El Mito del Marco Común, En defensa de la Ciencia y la Racionalidad*, translated by Marco Aurelio Galmarini, Ediciones Paidós Ibérica, 1st edition, Barcelona, Spain, 1997.
- POPPER, Karl R., *El Universo Abierto, Un Argumento en Favor del Indeterminismo*, vol. II, translated by Marta Sansigre Vidal, Editorial Tecnos, 3rd edition, Madrid, Spain, 1996.
- POPPER, Karl R., *La Lección de Este Siglo, con dos charlas sobre la Libertad y el Estado Democrático*, translated by Emilia Ghelfi, Temas Grupos Editorial, 1st edition, Buenos Aires, Argentina, 1997.
- POPPER, Karl R., *La Lógica de la Investigación Científica*, translated by Víctor Sánchez de Zavala, Editorial Tecnos, 11th reprint, Madrid, Spain, 1999.
- POPPER, Karl R., *La Miseria del Historicismo*, translated by Pedro Schwartz, Alianza Editorial, 1st edition in Alianza Bolsillo, Argentina, 1992.
- POPPER, Karl R., *La Responsabilidad de Vivir, Escritos sobre Política, Historia y Conocimiento*, translated by Concha Roldán, Ediciones Paidós Ibérica, 1st edition, Barcelona, Spain, 1995.
- POPPER, Karl R., *Los Dos Problemas Fundamentales de la Epistemología, Basado en Manuscritos de los años 1930-1933*, translated by M. Asunción Albisu Aparicio, Editorial Tecnos, Madrid, Spain, 1998.
- POPPER, Karl R., *Realismo y el Objetivo de la Ciencia, Post Scriptum a La Lógica de la Investigación Científica*, vol. I, translated by Marta Sansigre Vidal, Editorial Tecnos, 2nd edition, Madrid, Spain, 1998.
- POPPER, Karl R., *Teoría Cuántica y el Cisma en Física*, vol. III, translated by Marta Sansigre Vidal, Editorial Tecnos, 3rd edition, Madrid, Spain, 1996.
- POPPER, Karl R., *Un Mundo de Propensiones*, translated by José Miguel Esteban Cloquell, Editorial Tecnos, 2nd edition, Madrid, Spain, 1996.
- POPPER, Karl R., *Conjeturas y Refutaciones, El Desarrollo del Conocimiento Científico*, translated by Néstor Míguez, Editorial Paidós Básico, 4th reprint, Barcelona, Spain, 1994.

- SALAMA, R., *Los Conjuntos: Ensayo Lógico-Filosófico*, Editorial Biblos, 1st edition, Buenos Aires, 1999.
- SAMPIERI, Roberto Hernández, FERNANDEZ COLLADO, Carlos and BAPTISTA LUCIO, Pilar, *Metodología de la Investigación*, Mc Graw Hill, fifth edition.
- SARTORIO, Carolina Ana, *Conjuntos e Infinitos*, Editorial EUDEBA, 1st edition, Buenos Aires, Argentina, 2000.

ECONOMICS

- AFANÁSIEV, V. and LANTSOV, V., *El Gran Descubrimiento de Carlos Marx, el papel Metodológico de la Teoría del Carácter Dual del Trabajo*, translated from the russian edition by Vládov L., Editorial Progreso, URSS, 1986.
- ALBA, Ubaldo Nieto de, *Historia del Tiempo en Economía: Predicción, Caos y Complejidad*, Editorial Mc Graw Hill, Madrid, Spain, 1998.
- ÁVILA DEL PALACIO, Alfonso, *Estructura Matemática de la Teoría Keynesiana*, Editorial Fondo de Cultura Económica, 1st edition, Mexico D.F., 2000.
- BANNOCK, Graham, BAXTER, R.E. and REES, Ray, *Diccionario de Economía*, Editorial Trillas, Mexico D.F., 1999.
- BARRO, Robert J., *Macroeconomics*, Editorial Wiley, University of Chicago, printed in the USA, 1984.
- BENEGAS LYNCH, A., *Fundamentos de Análisis Económico*, Editorial Abeledo-Perrot, 8th ed., Buenos Aires, Argentina, 1985.
- BENEGAS LYNCH, Alberto, *Socialismo de Mercado: Ensayo sobre un Paradigma Posmoderno*, Ameghino Editora, 1st edition, Rosario, Argentina, 1997.
- BLAUG, Mark, *Teoría Económica en Retrospección*, translated by Eduardo L. Suárez Galindo, Editorial Fondo de Cultura Económica, 1st edition in spanish of the 5th edition in english, Mexico, 2001.
- BÖHM-BAWERK, Eugen von, *Capital e Interés*, Editorial Fondo de Cultura Económica, 2nd edition, Mexico D.F., 1986.
- BÖHM-BAWERK, Eugen von, *Teoría Positiva del Capital*, vol. IV of the “Biblioteca de Grandes Economistas del Siglo XX”, spanish edition under the supervisión of José Antonio de Aguirre, translated by José Antonio de Aguirre, Ediciones Aosta, Madrid, Spain, 1998.
- BONDONE, Carlos A. – see section in English.
- CACHANOSKY Juan Carlos, *Déficit Fiscal y Equilibrio Monetario*, <http://www.hacer.org/pdf/Cachanosky03.pdf>
- CHACHOLIADES, Miltiades, *Economía Internacional*, translated by Fernando Montes Negret, Editorial Mc Graw Hill, Mexico, 1982.
- CHIANG, Alpha, *Métodos Fundamentales de Economía Matemática*, translated by Enrique Molina de Vedia and Alberto Campanero, Amorrortu editores, Buenos Aires, Argentina, 1967.
- CORTÉZ CONDE, Roberto, *Historia Económica Mundial: Desde el Medioevo hasta los Tiempos Contemporáneos*, Editorial Ariel Sociedad Económica, Buenos Aires, Argentina, 2003.
- DERNBURG, Thomas F. and MCDOUGALL, Duncan, *Macro-Economía*, translated by José Alberto Blanco Losada, Editorial Revista de Derecho Privado, Madrid, Spain, 1962.

- DILLARD, Dudley, *La Teoría Económica de John Maynard Keynes, Teoría de una Economía Monetaria*, translated by José Díaz García, Editorial Aguilar, 9th edition, Madrid, Spain, 1968.
- DIZ, Adolfo C., *Oferta monetaria*, Centro de estudios monetarios latinoamericanos, 1975
- DORNBUSCH, Rudiger and FISCHER, Stanley, *Macroeconomía*, translated by Gimena García-Pardo García-Lorenzana, Editorial Mc Graw Hill, 3rd edition, Madrid, Spain, 1985.
- FISHER, Irving, *La Teoría del Interés*, vol. VI of the “Biblioteca de Grandes Economistas del Siglo XX”, spanish edition under the supervision of José Antonio de Aguirre, Ediciones Aosta, Madrid, Spain, 1999.
- FRANK, R. H., *Microeconomía y Conducta*, translated by Esther Rabasco and Luis Toharia, Editorial Mc Graw Hill, 4th edition, Madrid, Spain, 2001.
- FRENCH, Raúl, DAVID and GRIFFIN K. B., *Comercio Internacional y Políticas de desarrollo económico*, Editorial Fondo de Cultura Económica, 1st spanish edition, Mexico D.F., 1967.
- FRIEDMAN, Milton, BRUNNER, Karl, MELTZER, Allan, TOBIN, James, DAVIDSON, Paul and PATINKIN, Don, *El Marco Monetario de Milton Friedman, Un Debate con sus Críticos*, translated by José Mendoza de la Mora, Premia Editorial, D.F., Mexico, 1979.
- FRIEDMAN, Milton and Rose, *Libertad de Elegir: Hacia un Nuevo Liberalismo Económico*, translated by Carlos Rocha Pujol, Editorial Grijalbo, 2nd edition, Barcelona, Spain, 1980.
- FRIEDMAN, Milton, *La Economía Monetarista*, translated by Daniel Zadunaisky, Editorial Gedisa, Barcelona, Spain, 1992.
- FRIEDMAN, Milton, *Una Teoría de la Función de Consumo*. Versión española de Lorenzo Betancor Curbelo, Alianza Editorial, 2nd edition, Madrid, Spain, 1985.
- GALBRAITH, J. K., *El Dinero*, translated by J. Ferrer Aleu and Blanca Ribera de Madariaga, Editorial Ariel Sociedad Económica, 1st edition, Buenos Aires, 1996.
- GALBRAITH, John K., *Breve Historia de la Euforia Financiera*, translated by Vicente Villacampa, Editorial Ariel S.A., 2nd edition, Barcelona, Spain, 1993.
- GALBRAITH, John K., *Con Nombre Propio: De Franklin D. Roosevelt en adelante*, translated by A. J. Desmots, Editorial Crítica, Barcelona, Spain, 2000.
- GALINDO, Miguel A. and MALGESINI, Graciela, *Crecimiento Económico: Principales teorías desde Keynes*, Editorial Mc Graw Hill, 1st edition, Madrid, Spain, 1994.
- GARRISON Roger W., *Tiempo y dinero*, Unión Editorial, Colombia y Madrid, 2005.
- GRECO, O., *Diccionario de Economía*, Valletta Ediciones, Buenos Aires, Argentina, 2003.
- GUJARATI, Damodar, *Econometría Básica*, translated by Juan Manuel Mesa, Editorial McGraw-Hill, D.F. Mexico, 1985.
- HANSEN, Alvin H., *Guía de Keynes*, translated by Martha Chávez and Héctor Hernández, Editorial Fondo de Cultura Económica, 3rd spanish edition, Mexico D.F., 1964.
- HARRIS, Laurence, *Teoría Monetaria*, translated by Eduardo L. Suárez, Editorial Fondo de Cultura Económica, 1st reprint, Mexico, 1993.
- HAYEK, Friederich A., *Contra Keynes y Cambridge: Ensayos, Correspondencia*, complete works vol. IX, edition prepared by Bruce Caldwell, spanish edition under the supervision of Jesús Huerta De Soto, translated by José Antonio de Aguirre Rodríguez and Federico Basáñez, Unión Editorial, Madrid, Spain, 1996.
- HAYEK, Friederich A., *El Nacionalismo Monetario y la Estabilidad Internacional*, vol. III of the “Biblioteca de Grandes Economistas del Siglo XX”, spanish edition under the supervision of José Antonio de Aguirre, Ediciones Aosta, Madrid, Spain, 1996.

- HAYEK, Friederich A., *Ensayos de Teoría Monetaria I*, Stephen Kresge, complete works vol. V, spanish edition under the supervision of Jesús Huerta De Soto, translated by José Ignacio Del Castillo and Jesús Gómez Ruiz, Unión Editorial, Madrid, Spain, 2000.
- HAYEK, Friederich A., *Ensayos de Teoría Monetaria II*, Stephen Kresge, complete works vol. VI, spanish edition under the supervision of Jesús Huerta De Soto, translated by José Antonio De Aguirre, Unión Editorial, Madrid, Spain, 2001.
- HAYEK, Friederich A., *¿Inflación o Pleno Empleo?*, Unión Editorial, Madrid, Spain, 1976.
- HAYEK, Friederich A., *La Teoría Pura del Capital*, translated by Andres Sánchez Arbos, Editorial M. Aguilar, Madrid, Spain, 1946.
- HAYEK, Friederich A., *La Teoría Monetaria y el Ciclo Económico*, translated by Luis Olariaga, Editorial Espasa-Calpe, 1st edition, Madrid, Spain, 1936.
- HAYEK, Friederich A., *Hayek Sobre Hayek: un Diálogo Autobiográfico (La Fatal Arrogancia): Los Errores del Socialismo*, complete works vol. I, edition prepared by Stephen Kresge and Leif Wenan, spanish edition under the supervision of Jesús Huerta De Soto, translated by Federico Basáñez, Unión Editorial, Madrid, Spain, 1997.
- HAYEK, Friederich A., *La Desnacionalización del Dinero*, tome 29 of the “Biblioteca de Economía”, translated by Carmen Liaño, Editorial Hyspamérica, translated of the 2nd english edition Buenos Aires, 1983.
- HAYEK, Friederich A., *La Tendencia del Pensamiento Económico: Ensayos sobre Economistas e Historia Económica*, W. W. Bartley III and Stephen Kresge, complete works vol. III, spanish edition under the supervision of Jesús Huerta De Soto, translated by Eduardo L. Suárez, Unión Editorial, Madrid, Spain, 1991.
- HAYEK, Friederich A., *Las Vicisitudes del Liberalismo: Ensayos Sobre Economía Austríaca y el Ideal de Libertad*, complete works vol. IV, edition prepared by Peter G. Klein, spanish edition under the supervision of Jesús Huerta De Soto, translated by Antonio Castillo, Unión Editorial, Madrid, Spain, 1996.
- HAYEK, Friederich A., *Precios y Producción : Una Explicación de las Crisis de las Economías Capitalistas*, spanish edition under the supervision of José Antonio De Aguirre, Ediciones Aosta, Madrid, Spain, 1996.
- HAYEK, Friederich A., *La contrarrevolución de la ciencia*, Unión Editorial, 2003.
- HENDERSON J. M. and QUANDT R. E., *Teoría Microeconómica*, prologue by Emilio de Figueroa, translated by José Ramón Lasuen, Editorial Ariel, 3rd reprint, Spain, 1969.
- HUERTA DE SOTO, Jesús, *Dinero, Crédito Bancario y Ciclos Económicos*, Unión Editorial, Madrid, Spain, 1998.
- HUERTA DE SOTO, Jesús, *Nuevos Estudios de Economía Política*, vol. 30 of the “Nueva Biblioteca de la Libertad”, Unión Editorial, Madrid, Spain, 2002.
- HUERTA DE SOTO, Jesús, *Socialismo, Cálculo Económico y Función Empresarial*, vol. 1 of the “Nueva Biblioteca de la Libertad”, Unión Editorial, 2nd edition, Madrid, Spain, 2001.
- JAMES Émile, *Historia del Pensamiento Económico en el siglo XX*, Editorial Fondo de Cultura Económica, 1st reprint, Mexico D.F., 1974.
- JONES, Hywell, *Introducción a las Teorías Modernas del Crecimiento Económico*, vol. 2, translated by Eugeni Aguiló and Antonio Menduïña, Antoni Bosch editor, Barcelona, Spain, 1988.
- KEYNES John M., *La Teoría General del Empleo, el Interés y el Dinero*, vol. V of the “Biblioteca de Grandes Economistas del Siglo XX”, spanish editions under the supervision of José Antonio de Aguirre, Ediciones Aosta, Madrid, Spain, 1998.

- KEYNES, John M., *Breve Tratado Sobre la Reforma Monetaria*, translated by Carlos Rodríguez Braun, Editorial Fondo de Cultura Económica, 1st reprint, Mexico D.F., 1996.
- KEYNES, John M., *Teoría General: De la Ocupación, el Interés y el Dinero*, translated by Eduardo Hornedo, Editorial Fondo de Cultura Económica, 7th edition en español, Mexico D.F., 1965.
- KEYNES, John M., *Tratado Del Dinero: Teoría Pura y Aplicada del Dinero*, vol. I of the “Biblioteca de Grandes Economistas del Siglo XX”, translated by José Antonio de Aguirre, Ediciones Aosta, Madrid, Spain, 1996.
- KIRZNER Israel M., *Competencia y empresarialidad*, Second Edition, Unión Editorial, Madrid 1998.
- KRAUSE Martín E., ZANOTTI Gabriel J. y RAVIER Adrián O., *Elementos de economía política*, Editorial La Ley, Buenos Aires, Argentina, 2007.
- KRUGMAN, Paul R., *Crisis de la Moneda*, translated by Fabio Sánchez, Grupo Editorial Norma, 1st spanish edition, Santa Fé de Bogotá, Colombia, 1997.
- KRUGMAN, Paul R., *De Vuelta a la Economía de la Gran Depresión*, translated by Bernardo Recamán Santos, Grupo Editorial Norma, 2nd edition, Santa Fé de Bogotá, Colombia, 1999.
- KRUGMAN, Paul., *La Organización Espontánea de la Economía*, translated by Mónica Martín, Editor Antoni Bosch, Barcelona, Spain, 1996.
- KUZNETS, Simón, *Desarrollo Económico, Familia y Distribución de la Renta*, translated by Irene Cifuentes de Castro, Editorial Ministerio de Trabajo y Seguridad Social, Madrid, Spain, 1995.
- LAIDLER, David, *La Demanda de Dinero: Teorías y Evidencias Empírica*, vol 5, translated by Eugeni Aguiló, Elena Blanchar and Lluís Fina, Antoni Bosch (editor), Barcelona, Spain, 1977.
- LEONTIEF, Wassily, *Análisis Económico Input-Output*, “Biblioteca de Economía”, Ediciones Orbis SA, Hyspamérica.
- LEVENSON-SOLON, *Manual de Teoría de los Precios*, translated by Antonio Oyuela de Grant, Editorial Amorrortu, Buenos Aires, Argentina, 1967.
- LIPSEY, Richard G, *Introducción a la Economía Positiva*, preliminary note by J. Hortala Arau, translated from the 6th english edition by Eugeni Aguiló, edited by Antonio Menduïña, Editorial Vicens-Vives, 11th edition, Barcelona, Spain, 1986.
- MALTHUS, Thomas R., *Ensayo Sobre el Principio de la Población*, prologue by Fernando Tudela, Editorial Fondo de Cultura Económica, 2nd spanish edition, Mexico D.F., 1998.
- MARX, Carlos, *El Capital: Crítica de la Economía Política*, vol. I, tranlastion from german by Wenceslao Roces, Editorial Fondo de Cultura Económica, 5th ed., Mexico D.F., 1968.
- MARX, Carlos, *El Capital: Crítica de la Economía Política*, vol. II tranlastion from german by Wenceslao Roces, Editorial Fondo de Cultura Económica, 5th edition, Mexico D.F., 1968.
- MARX, Carlos, *El Capital: Crítica de la Economía Política*, vol. III, tranlastion from german by Wenceslao Roces, Editorial Fondo de Cultura Económica, 5th edition, Mexico D.F., 1968.
- Mc CONNELL, Campbell R. and BRUE, Stanley L., *Economía, Principios, Problemas y Políticas*, translated by Gladys Arango Medina, Editorial Mc Graw Hill, Santa Fé de Bogotá, Colombia, 1997.
- MENGER, Carl, *Principios de Economía Política (introducción: Friedrich A. Hayek)*, vol. 28, tranlastion from german by Marciano Villanueva, Editorial Hyspamérica, Buenos Aires, Argentina, 1985.
- MENGER, Carl, *Dinero*, document.

- MILLER, Roger LeRoy and PULSINELLI, R. W., *Moneda y Banca*, translated by Gloria Elizabeth Rosas Lopetegui, Editorial Mc Graw Hill, 2nd edition, Santa Fé de Bogotá, Colombia, 2000.
- MISES, Ludwig Von, *La Teoría del Dinero y del Crédito*, translated by Juan Marcos de la Fuente, Unión Editorial, Madrid, 1997.
- MISES, Ludwig Von, *La Acción Humana: Tratado de Economía*, translated by Joaquín Reig Albiol, Unión Editorial, Madrid, Spain, 1980.
- MISES, Ludwig Von, *Liberalismo*, translated by Joaquín Reig Albiol, Unión Editorial, 2nd edition, Madrid, Spain, 1975.
- MISES, Ludwig Von, *Sobre Liberalismo y Capitalismo*, vol. 10 of the “Nueva Biblioteca de la Libertad”, translated by Joaquín Reig Albiol, Unión Editorial, Madrid, Spain, 1995.
- MISES, Ludwig Von, *Burocracia*, 2ª edición Unión Editorial, 2005.
- MOCHÓN, Francisco, BEKER, Víctor, A, *Economía Principios y aplicaciones*, Editorial Mc Graw Hill, 2nd edition.
- MYRDAL, Gunnar, *Equilibrio Monetario*, preliminary study by José Francisco Teixeira, translated by Jordi Pascual, Ediciones Pirámide, Madrid, Spain, 1999.
- PARKIN, Michael, *Macroeconomía*. Spanish edition by Francisco Reyes Guerrero, Editorial Addison-Wesley Iberoamericana, Wilmington, Delaware, USA, 1995.
- PÉREZ-GRASA, Isabel; MINGUILLÓN, Esperanza and JARNE, Gloria, *Matemáticas para la Economía: Programación Matemática y Sistemas Dinámicos*, Editorial Mc Graw Hill, 1st edition in spanish, Madrid, Spain, 2001.
- PÉREZ ENRRI, Daniel and MILANI Ana M., *Macroeconomía: Guía de Ejercicios y Aplicaciones*, Editorial Prentice May, Buenos Aires, Argentina, 2001.
- PREBISCH, Raúl, *Introducción a Keynes*, Editorial Fondo de Cultura Económica, 4th edition, Mexico D.F., 1960.
- RAVIER Adrián O., *En busca del pleno empleo*, Unión Editorial, 2010.
- RAVIER Adrián and LEWIN Peter - The Subprime Crisis, *The Quarterly Journal of Austrian Economics*, Vol. 15, Num. 1, Spring 2012, pp. 45-74.
- RAVIER Adrián O., *Revista Libertas XII: 43* (Octubre 2005) Instituto Universitario ESEADE www.eseade.edu.ar: Formación de capital y ciclos económicos - Una introducción al análisis macroeconómico.
- RECIO-VILLER, *El Banco Central y la Intermediación Financiera: Límites de su competencia*. Prologue by Dr. Carlos Gilberto Villegas, Ediciones Depalma, Buenos Aires, Argentina, 1989.
- REINHART Carmen M. y ROGOFF Kenneth S., *This time is different*, Princeton University Press – Princeton and Oxford.
- RICARDO, D., *Principios de Economía Política y Tributación*, “Biblioteca de Economía”, translated by Hazera, E., Editorial Hyspamérica, Buenos Aires, 1985.
- ROBINSON, Joan, *Ensayos de Economía Poskeynesiana*, translated by Domingo Alberto Rangel and Martha Chávez D., Editorial Fondo de Cultura Económica, 1st reprint, Mexico D.F., 1974.
- ROBINSON, Joan, *Ensayos sobre la Teoría del Crecimiento Económico*, translated by Rubén C. Pimentel, Editorial Fondo de Cultura Económica, 1st edition in spanish, Mexico D.F., 1965.
- ROBINSON, Joan, *Introducción a la Economía Marxista*, translated by Carlos Medina, Siglo XXI editores, 1st edition, Mexico D.F., 1968.

- ROJO DUQUE, Luis A., *Lectura sobre la Teoría Económica del Desarrollo*, Editorial Gredos, Madrid, Spain, 1966.
- ROLL, Eric, *Historia de las Doctrinas Económicas*, translated by Florentino M. Torner and Odet Chávez Ferreiro, Editorial Fondo de Cultura Económica, 1st reprint, Mexico D.F., 2000.
- ROTHBARD, M. N., *Historia del Pensamiento Económico Volumen I : El pensamiento económico hasta Adam Smith*, translated by Federico Basáñez and Ramón Imaz, Unión Editorial, Madrid, Spain, 1999.
- ROTHBARD, M. N., *Historia del Pensamiento Económico Volumen II : La Economía Clásica*, translated by Ramón Imaz, Unión Editorial, Madrid, Spain, 2000.
- ROTHBARD, Murray N., *El hombre, la economía y el Estado*, Volumen I, Unión Editorial, Madrid-Buenos Aires, 2011.
- ROTHBARD, Murray N., *El hombre, la economía y el Estado*, Volumen II, Unión Editorial, Madrid-Buenos Aires, 2011.
- SAIEH, A., *Dinero, Precios y Política Monetaria*, Ediciones Macchi, Buenos Aires, Argentina, 1983.
- SAMUELSON, Paul A., *Curso de Economía Moderna: Una Descripción Analítica de la Realidad Económica*, translated and preliminary note by José Luis Sampedro adapted to the 6th american edition by J. L. Barinaga, Editorial Aguilar, 16^o edition, Madrid, Spain, 1968.
- SAMUELSON, Paul A., *Fundamento del Análisis Económico*, Editorial El Ateneo, 4th edition, Buenos Aires, Argentina, 1981.
- SARGENT, Thomas J., *Teoría Macroeconómica: Macroeconomía no Estocástica*, vol. 1, translated by Carlos Cuervo Arango and Teodoro Millán, Antoni Bosch (editor), 2nd edition, Barcelona, Spain, 1988.
- SCHNEIDER, Erich Dr., *Teoría Económica: III Dinero, Crédito, Renta Nacional y Ocupación*, adaptation of the last german edition Luis A. Martín Merino, translated by Carlos Marich, Ediciones Aguilar, Madrid, Spain, 1972.
- SCHNEIDER, Erich Dr., *Teoría Económica: I Teoría de la Circulación Económica II Plan Económico y Equilibrio*, adaptation of the 8th and 6th german editions by Luis Adolfo Martín Merino, translated by Juan Eugenio Morera Altisent, Editorial Aguilar, 6^o edition, Madrid, Spain, 1970.
- SCHNEIDER, Erich. Dr., *Teoría Económica IV: Capítulos Escogidos de la Historia de la Teoría Económica*, vol. I, tranlaction from german by Luis A. Martín Merino, Editorial Aguilar, 2nd edition, Madrid, Spain, 1970.
- SCHUMPETER, Joseph A., *Historia del Análisis Económico*, edit of the handwritten version by Elizabeth Boody Schumpeter, Editorial Fondo de Cultura Económica, 1st edition in spanish of the 6th in english, Mexico D.F., 1975.
- SCHUMPETER, Joseph A., *Teoría del Desenvolvimiento Económico: Una Investigación sobre Ganancias, Capital, Crédito, Interés y Ciclo Económico*, translated by Jesús Prados Arrarte, Editorial Fondo de Cultura Económica, 4th edition in spanish, Mexico D.F., 1967.
- SCHUMPETER, Joseph A., *Capitalismo, Socialismo y Democracia*, tome I, “Biblioteca de Economía”, Ediciones Orbis SA, Hyspamérica.
- SCHUMPETER, Joseph A., *Capitalismo, Socialismo y Democracia*, tome II, “Biblioteca de Economía”, Ediciones Orbis SA, Hyspamérica.
- SEBASTIÁN, Miguel and GARCÍA-PARDO, Jimena, *Ejercicios de Introducción a la Macroeconomía*, Editorial McGraw-Hill, Madrid, Spain, 2000.

- SELDON Arthur and PENNANCE F.G., *Diccionario de Economía: Una Exposición Alfabética de Conceptos Económicos y su Aplicación*, spanish version by Antonio Casahuga Vinardell, Editorial Hyspamérica, Barcelona, Spain, 1983.
- SELGIN George A., *La libertad de emisión del dinero bancario – Crítica del monopolio del Banco Emisor Central*, Ediciones Aosta – Unión Editorial, Madrid 2011.
- SEN, Amartya, *Desarrollo y Libertad*, translated by Esther Rabasco and Luis Toharia, Editorial Planeta, 1st reprint, Buenos Aires, Argentina, 2000.
- SEN, Amartya, *La Desigualdad Económica*, extended edition with a very important annex by James E. Foster and Amartya Sen, translated by Eduardo L. Suárez Galindo, Editorial Fondo de Cultura Económica, 1st reprint en español, Mexico D.F., 2001.
- SMITH, Adam, *La riqueza de las naciones* I, II and III, “Biblioteca de Economía”, Ediciones Orbis SA, Hyspamérica.
- SMITH, Adam, *Papel Moneda*, translated by R. A. A., Editorial Grijalbo, Barcelona, Spain, 1983.
- SMITH, Vera C., *Fundamentos de la Banca Central y de la Libertad Bancaria*, vol. 4 de “Nueva Biblioteca de la Libertad”, collection under the supervision of Jesús Huerta de Soto, translated by Juan Aguirre Fernández, Unión Editorial-Ediciones Aosta, Madrid, Spain, 1993.
- SOLOMON, Robert, *Dinero en Marcha: La Revolución en las Finanzas Internacionales a partir de 1980*, translated by Daniel Zadunaisky, Editorial Granica, Buenos Aires, Argentina, 2000.
- SORMAN, Guy, *La Solución Liberal*, translated by Maria Cristina Sardoy, Editorial Atlántida, 4th edition, Buenos Aires, Argentina, 1984.
- STEEDMAN, Ian, *Marx, Sraffa y el Problema de la Transformación*, translated by Eduardo L. Suárez, Editorial Fondo de Cultura Económica, 1st edition en español, Mexico D.F., 1985.
- STIGLER, George J., *El Economista: como Predicador y otros Ensayos*, translated by Jorge Pascual, Edited by Folio, Barcelona, Spain, 1987.
- STIGLER, George J., *Historia del Pensamiento Económico*, translated by Emilio M. Sierra, Editorial El Ateneo, Buenos Aires, Argentina, 1979.
- STIGLITZ, Joseph E., *El Malestar en la Globalización*, translated by Carlos Rodríguez Braun, Editorial Taurus, 7th reprint, Buenos Aires, Argentina, 2002.
- SUÁREZ SUÁREZ, Andrés S., *Diccionario Terminológico de Economía, Administración y Finanzas*, Ediciones Pirámide, Madrid, Spain, 2000.
- THUROW, Lester C., *La Sociedad de Suma Cero*, translated by Antonio Bonano, Ediciones El Cronista Comercial, Buenos Aires, Argentina, 1981.
- VILLEGAS, *Régimen Legal de Bancos: análisis de la ley 21.526 y su reglamentación*, prólogo del Dr. Carlos Juan Zavala Rodríguez, Ediciones Depalma, 2nd edition, Buenos Aires, Argentina, 1987.
- WEATHERFORD, Jack, *La Historia del Dinero: De la Piedra Arenisca al Ciberespacio*, translated by Jaime Collyer, Editorial Andrés Bello, Barcelona, Spain, 1997.
- WEBER, Max, *Historia Económica General*, translated and foreword by Manuel Sánchez Sarto, Editorial Fondo de Cultura Económica, 7th reprint Mexico D.F., 1997.
- WICKSELL, Knut, *La Tasa de Interés y el Nivel de los Precios*, vol. VII de “Biblioteca de Grandes Economistas del Siglo XX”, spanish edition under the supervision of José Antonio de Aguirre, Ediciones Aosta, Madrid, Spain, 2000.
- ZALDUENDO, Eduardo A., *Breve Historia del Pensamiento Económico*, Ediciones Macchi, 3rd edition, Buenos Aires, Argentina, 1998.

- ZANOTTI, Gabriel J., *Economía de Mercado y Doctrina Social de la Iglesia*, Editorial de Belgrano, 2nd edition, Buenos Aires, Argentina, 1985.
- ZANOTTI, Gabriel J., *Introducción a la Escuela Austríaca de Economía*, Editorial Centro de Estudios sobre la Libertad, Buenos Aires, Argentina, 1981.
- ZANOTTI, Gabriel J., *La economía de la acción humana*, Unión Editorial, 2009.

ACCOUNTING

- BIONDI Mario, *Teoría de la Contabilidad*, Ediciones Macchi, Buenos Aires, Argentina, 1999.
- BIONDI-ZANDONA, *Fundamentos de la Contabilidad*, Ediciones Macchi, Buenos Aires, Argentina, 1996.
- BONDONE Carlos A., *Contabilidad del Conocimiento*, Editorial Buyatti, Buenos Aires, Argentina, 2000.
- CASALS Fernando, *Temas de Contabilidad Superior*, Editorial Buyatti, Buenos Aires, Argentina, 1997
- FOWLER NEWTON Enrique, *Contabilidad superior*, tomes I and II, Ediciones Macchi, Buenos Aires, Argentina, 1995/6.
- MATTESSICH, R., *Contabilidad y Métodos Analíticos: Medición y Proyección del Ingreso y la Riqueza en la Microeconomía y en la Macroeconomía*, Editorial La Ley, Buenos Aires, 2002.

BIBLIOGRAPHY IN ENGLISH

(The quotes in this translation were extracted from these texts)

- BLAUG, Mark, *Economic Theory in Retrospect*, Cambridge University Press, fifth edition, Cambridge, Mass. 1997.
- BONDONE Carlos A. *Theory of Economic Relativity – Solution for Currency Crisis*
www.carlosbondone.com
- BONDONE Carlos A.: *Theory of Interest* – 2011: www.carlosbondone.com
- BONDONE Carlos A.: *Theory of Currency* – 2012: www.carlosbondone.com
- BONDONE Carlos A.: *Curve of Human Evolution*– 2012: www.carlosbondone.com
- BONDONE Carlos A. *Curve of Human Evolution (Continuation)* - 2012:
www.carlosbondone.com
- BONDONE Carlos A.: *Price approach – An Austrian Theory of the firm* – 2012:
www.carlosbondone.com
- BONDONE Carlos A.: *Currency causality* – 2013: www.carlosbondone.com
- BONDONE Carlos A.: *Causality of economic cycles* – 2013: www.carlosbondone.com
- HAYEK, Friederich A., *Denationalization of Money*, The Institute of Economic Affaris, Second Edition, London, 1978.
- HAYEK, Friederich A., *The Trend of Economic Thinking*, University of Chicago Press, Chicago, 1991

- HAYEK, Friederich A., *The intertemporality of prices*, Essays on monetary theory I and II cap IV
- HAYEK, Friederich A., *Toward a Free Market Monetary System*, Journal of Libertarian Studies, Spring 1979, 3(1), pp. 1-8.
- KEYNES, John Maynard, *The General Theory of Employment, Interest, and Money*, rendered into HTML by Steve Thomas for The University of Adelaide Library.
- KIRZNER Israel M., *Essays on CAPITAL and INTEREST – And Austrian Perspective*; Published by Edward Elgar Publishing Limited, UK 1996.
- LAILER, David E. W. *The Demand for Money: Theories, evidence and problems*, Harper Collins Publishers, 4th Edition, New York, 1993.
- MENGER Karl, *On the origins of money*, Committee for Monetary Research and Education, 1984
- MENGER, Carl, *On the Origins of Money*, translation by C.A. Foley, Economic Journal, volume 2, (1892) p. 239-55.
- MISES, Ludwig Von, *The Theory Of Money And Credit, New edition, enlarged with an essay on Monetary Reconstruction*, translated from German by H. E. Batson, The Foundation for Economic Education, Inc. Irvington-on-Hudson, New York 10533 1971.
- MISES, Ludwig Von, *Human Action: Scholar's edition*, The Ludwig von Mises Institute, December 1998
- SAMUELSON, Paul, *Economics*, McGraw-Hill/Irwin, 18th edition, 2004