THEORY

OF

VALUE

AND

PRICES

—Proposal of a synthesis of economic thought—

Carlos A. Bondone

THEORY of VALUE and PRICES

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ABSTRACT

In our humble understanding, the most precious of all theoretical aspects that allow us to understand the relation of ***macroeconomics*** ―the economics that refers to a set of human entities― and ***microeconomics*** ―the economics that refers to individual human entities― is that which specifies and causally establishes the relation of **"*the*" *theory of value*** and **"*the*" theory of prices.** [(1)]

Yes, it is based on an adequate theory of value, from which an adequate theory of prices is derived, that the economic individual ―microeconomic sphere― connects with all the individuals that interact economically ―macroeconomic sphere.

Further, it is based on the achievement of an adequate theory of value, operating causally on an also adequate theory of prices, that a theory synthesizing economic theory can be achieved.

This consists of showing how *"the" theory of subjective value* ―by Menger― allows us to achieve *"the" theory of prices* ―by Menger―, and supplement it with Marshall's neoclassic theory, insofar as it is feasible to consider its curves of demand and supply as tool for microeconomic calculus, instead of considering it a "theory" of "price *determination*".

Based on the proposed synthesis of economic theory, we will perceive the causal relation of individual (microeconomics) and general interest (macroeconomics), where it will arise that individual interests are not necessarily correlated positively with the general interest. With which we will have proven the inconsistency of the intuitive "iron" proposal by Adam Smith: individual interest always works according to the general interest. On the contrary, based on Smith's proposal, economic evolution cannot be explained, since it is not a linear summation of successes. In turn, our demonstration of the "inexistence of Smith's invisible hand" is the ***antithesis*** of what is known as game theory: methodological positivism on the basis of which there was the pretension of invalidating Adam Smith.

THEORY of VALUE and PRICES

INTRODUCTION

From the beginning of my incursion in economic science I was intrigued by everything relating to value: what value is; what has value; how to identify value; if value is measurable; how value can be measured; if value and price are the same entity, and if not, how they are related… It is not an exaggeration to say I always studied economics insofar as I was studying value.

As I progressed in my research on economic theory I corroborated that this concern was completely justified, to the point that it still is center of economic theory. Yes, the main flaws of economic theory to this day have been a result of developing theoretical proposals not derived from "the" single theory of value that is scientifically consistent. Among the mentioned deviations, one of the most transcendental has been the "theory" of prices that was derived from an erroneous theory of value, such as the failed classic-neoclassic attempt.

That is why we begin with "the" theory of value, and then proceed to "the" theory of prices. In this section we refer to the theory of value, pretending to prove that:

- There necessarily is a theory of value that precedes and sustains a theory of prices.

- That there is only one ***theory of value*** from which only one ***theory of prices*** can be derived, which allows us to deduce the ***general theory of economic calculus***, and the ***special theory of currency economic calculus***.

To achieve this, it will be necessary to look at the different theoretic proposals that the history of economic thought presents. Task that we will circumscribe to presenting the two schools of thought, the traditional classic school —"rejuvenated" with the neoclassic offering by Marshall—, and the Austrian, based on the *fundamentals of Carl Menger*. Let us see then the two proposals of value theory, based on which we can explain the origin and behavior of prices, entity from which derives economic calculus in an exchange society.

Before we study each proposal, we should reflect on the previous paragraph: evidently economic calculus, general and special —that arises as a consequence of prices generated in exchange— can be based on an adequate theory or not, which has incidence in the quality of the social institutions that govern the economic life of human beings.

THE CLASSIC-NEOCLASSIC APPROACH TO VALUE AND PRICES

Let us see then the classic-neoclassic proposal of a theory of value, and then derive its proposal of a theory of prices.

The classic-neoclassic theory of value

The *theory of objective value* has been attributed to the classics, and according to this theory things have value in themselves. In other words, wealth —the value that human beings attribute to economic beings: useful and things that satisfy human needs and that are scarce— is something that pertains to economic goods, human beings simply notice this when in contact with them.

Evidently there was a great confusion, insofar as what they wanted to express is that things have qualities, which may or may not be useful to man, and they may or may not be scarce. Which leads immediately and compellingly to conclude that they were not referring to the economic sphere, insofar as in economics we refer to human beings that have needs and satisfy them with things that are useful and scarce, and which makes them act to obtain them.

In short, if we refer to the qualities of things, we are not in the sphere of economics, of economic goods that satisfy human needs that are scarce. In other words, things that do not satisfy human needs and are not useful to man and are not scarce do not belong to the economic sphere and have no value, considering that something useful that is not scarce is a good, but not an economic good.

We conclude then that the theory of objective value is not a theory of economic value. Let us see then the theory of prices it offers based on that "non" value theory. Considering that price theory is a theory that explains there origin, according to their definition and relative ontology.

Classic-neoclassic theory of prices

Accepting the classic-neoclassic proposal as a theory of value implies accepting also that prices derive from costs. ¿Why do we say this? Simply that saying that value is in things, includes the idea that the value is what it "cost me" to obtain the thing, independent from the fact that it is useful and scarce.

This is the essence of why the proposal of the theory of objective value is invalid, along with the theory of prices derived from it. Generally it is said that the classic-neoclassic proposal is wrong because it pretends to explain prices in terms of costs, and costs in terms of prices, which is known as the classic vicious circle, an undetermined or un-caused relation, it is bidirectional, and we have always expressed it in this manner: *prices* ↔ *costs.*

In short, without a theory that explains the value of things, it is impossible to derive their price; prices exist because of the exchange of things that have value. I.e., value precedes price, there cannot be economic exchange of things without value, exchanging things with no value implies obtaining zero prices in exchanges. **(2)**

Classic-neoclassic epistemology

The epistemology that was present in classic-neoclassic reasoning was not interested in defining entities and relating them causally based on proven scientific laws. It neglected theory and its corroboration, explaining in terms of causality of and among things and/or phenomena. Thus it settled for an empirical calculus of undefined and confused entities.

Referring to epistemology we have anticipated the methodological procedure we will use in this work. We will adopt the method of mathematical graphs used by Marshall, the neo-classic author, to show *the inconsistency* of the price theory proposed by the classic-neoclassic school.

MENGER'S THEORY OF VALUE AND PRICES

Just as we did with the classic-neoclassic proposal, we will first present Menger's theory of value, and then the theory of prices derived from it.

Menger's theory of prices

Carl Menger postulated his ***theory of subjective value***, basing the existence of value in the usefulness human beings assign to scarce things. Usefulness that derives from the fact they satisfy human needs. This brief synthesis allows us to recognize the entities and their order of causality, underlying Menger's theory of value that we will define further on.

Menger's theory of prices

From Menger's *humanist* theory of value —value is exclusively a function of the utility of economic goods for human beings— we conclude that prices derive *only from utility*. Therefore costs have no incidence in price formation, as classic-neoclassic theory postulated.

Menger's epistemology

The epistemology present in Menger's reasoning is based on defining entities and then establishing the laws that govern their relations and their behavior in time. [(3)]

Speaking of epistemology, we anticipate the methodological procedure we will use in this work, adopting the method of mathematical graphs used by Marshall, the neo-classic author, to show the *consistency* of the proposal we present here. Based on a *special theory of currency economic calculus*, derived from a *general theory of economic calculus*, in its turn derived from a *theory of prices*, and derived finally from a *theory of value*. A chain of causality of theories we express thus:

> *"The" theory of value → "the" theory of prices → "the" general theory of economic calculus→ "the" special theory of currency economic calculus.*

In other words, we will use Marshall's universally accepted methodology, with which he used a misguided logic, to present Menger's correct logic, both of which pretended to explain the origin of prices.

Entities of the theory of subjective value

Following Menger's epistemology, the following economic entities are what we need to define and causally organize, according to the laws of economics that we will also see in this work:

Human needs that must be satisfied

Utility of things that satisfy needs

Scarcity –economic goods or wealth: are the useful and scarce things that human beings identify as apt to satisfy their needs.

In turn, these entities present an order of causality

Need → utility → economic good ≡ wealth

Causality we can abbreviate thus:

Need → wealth

And being a need that implies utility, we can express it thus:

Utility → wealth

Expression that according to modern terminology we can summarize thus, since we can consider utility is manifested through demand of wealth by human beings:

Demand → wealth

This simple expression is the ***fundamental economic causality***, composed only of the two causally ordered elements: demand and wealth. Which means that man is the origin of the whole causality: without his presence there is no need, there is no utility satisfied by wealth. In other words, utility is attributed by man to things; things are not useful *per se* —Menger's humanism *versus* classic-neoclassic materialism (dialectical in Marx' case).

These causally ordered entities are what constitute the theory subjective value. Thus, ***value*** *is the utility that wealth offers human beings.* Value is a human entity, not of their surroundings, which they value according to the utility it offers.

In short, the theory of subjective value, from which we will derive the theory of prices, is telling us that: prices derive exclusively from the utility offered by exchange.

ONLY ONE THEORY OF VALUE

For the purpose of clearly establishing why there is only one theory of value, based on utility and scarcity, we present these reflections on daily life:

- Nobody values what is not useful and scarce, even if it required an "effort to obtain".
- Nobody who is economically sane will work for something that has no value.
- There are things that have a "cost" but not value.
- There are things that "cost" more than what they are worth.
- Why is one thing more useful than another, even though they "cost" the same?
- Why do we prefer to possess what has greater value without knowing the cost?
- Why do I value the "same thing" differently from yesterday and different from how I will value it tomorrow? Thus, we must explain that temporally the same "physical" thing is not the same "economic thing". Which makes time dependent of the "economic thing".
- Why can the same thing be sold at different prices?
- Why would anybody of sane economic mind want to exchange something for another, if not to obtain a profit in the exchange, no matter what it cost?
- ***How do we explain the negative correlation between utility and prices?*** Because an economic good is more useful if it price is lower and vice versa. A central aspect for comparing the validity of conflicting theories is the moment we explain the causality of the theory of value and the theory of prices.

We can present these and many more question in reference to the relation between value and pries, especially in the cases in which value and prices seem to behave in opposite senses. It is evident that this is the central question that economic theory more solve, since based on the answer we will be able to adequately relate the macroeconomic sphere, where prices appear, with the microeconomic sphere, where we calculate in terms of those prices.

It is clear that human beings value wealth, that things have no value *per se*. It is in valuing these things that human beings are forced to classify the different manifestations of wealth, taxonomy that is developed according to our objective. In our case (to relate *value → price*) we will refer to the composition of wealth to the use or destination human beings assign it.

The composition of wealth

Arriving at this point it is very necessary to refer to the composition of the wealth of an owner, or a group of owners. Of the different classifications possible, we are primordially interested in the taxonomy referred to the use human beings make of wealth. The traditional classification, considering the relation between value and prices, is based on the difference between wealth for personal ***use*** and wealth for ***exchange***. And so we refer to ***use value*** and ***exchange value***, with which truly we are referring respectively to the ***value*** and the ***price*** of things.

But, as we saw, these are two different spheres, since *value* refers to all wealth, and *price* only to wealth that is exchanged. Also we know that value precedes price, ***since without value there is no price, but there is value without price.***

To establish this circumstance, differentiating *use value* from *exchange value* —which refers to an inconsistent theory of value and theory of prices— we consider appropriate to

present this composition, classification, or taxonomy of wealth, according to its use or destination:

$\boldsymbol{R^T}$: total wealth; $\boldsymbol{R^C}$: wealth for consumption; $\boldsymbol{R^I}$: wealth for exchange; $\boldsymbol{R^K}$: wealth for capital; $\boldsymbol{R^S}$: wealth for savings; $\boldsymbol{R^E}$: wealth for speculation (with prices); $\boldsymbol{R^A}$: wealth for hoarding; $\boldsymbol{R^\$}$: wealth for cash;… ; $\boldsymbol{R^{¿?}}$: wealth for as many uses as human beings consider adequate. This is how we present the composition of an owner or a group of owners: **(4)**

$$\boldsymbol{R^T = R^C + R^I + R^K + R^S + R^E + R^A + R^\$ + \ldots + R^{¿?}}$$

This taxonomic presentation of wealth is not fanciful; on the contrary, it is the essential concept that allows us to see the difference of theoretical spheres in which the theory of value and the theory of prices operate. Yes, the theory of value refers to $\boldsymbol{W^T}$ while the theory of prices refers only to $\boldsymbol{R^I}$. I.e., based on this simple classification we can that the theory of value absorbs the theory of prices, insofar as the theory of value must explain the utility of all kinds of wealth, while the theory of prices only needs to explain the wealth (utility) that is interpersonally exchanged —about the relative amounts of economic goods exchanged.

Though we will expand on the precedence of the theory of value over the theory of prices, we alert the reader that the proposed taxonomy is in line with said precedence, insofar as it considers exchange as an aspect of the theory of value: $\boldsymbol{R^I}$ belongs to the set $\boldsymbol{R^T}$. This allows us to show how Menger's subjective value theory solved the classic confusions relative to use value and exchange value, that Schumpeter (*6th edition, Digital edition*) summarizes as follows.

> (a) *The Theory of Exchange Value.* The first problem that Jevons, Menger, and Walras —Gossen too— tackled by means of the marginal utility apparatus was the problem of barter. (…) In other words, they established what A. Smith, Ricardo, and Marx had believed to be impossible, namely, that exchange value can be explained in terms of use. **(9)** (p. 878)

> Nota 9: …But all the same there is point in emphasizing, against one particular form of unfair criticism, that it is not true that A. Smith or Ricardo or J. S. Mill scorned this approach to the economic phenomenon because of its obviousness. The truth is that they did not see how 'value in use' could possibly be made to explain 'value in exchange.' They saw no further that the former was a condition of the latter, (p.879)

Though Schumpeter tries to downplay the classic error, is its huge, to the point that current economic institutions are still guided by this theoretical disgrace: Marshallian neoclassic theory (the origin of prices in terms of intersection of demand and costs; Keynesian effective demand, etc.).

On the other hand, it is just as true that prices obtained through $\boldsymbol{W^I}$ can be used to measure the rest of wealth, but that has to do with economic calculus which comes after the theory of value and the theory of prices. And this is how we see the causal sphere of each theory: *value → prices → general economic calculus → special currency economic calculus*.

We have already determined why things have value: because they are useful and scarce. Now we must show why things have prices, based on the fact that they first have value, they are useful.

THEORY OF PRICES

Considering the epistemology that first defines entities and then explains their relations causally —which it does with laws—, we will begin by defining the entities that will help us define prices:

Economic exchange: it is the transaction of a specific amount of a specific economic good, for another specific amount of another specific economic good. In other words, it is the barter or transaction a one manifestation of wealth for another. Exchange can be:

- *Intrapersonal*: it is the economic exchange a human being carries out in time.

- *Interpersonal*: it is the economic exchange between two or more human beings.

Utility of the exchange: any exchange is originated in the utility it offers humans. Therefore, any exchange is explained with its utility, ergo, according to the theory of value, exchange is an economic good, it is a manifestation of wealth.

Price: the amount of another economic good for which an amount of an economic good is exchanged interpersonally. Since all prices derive from an interpersonal exchange, and this also implies the presence of value, since there is utility and scarcity, this shows that prices also have their origin exclusively in utility, not in costs. In other words, the utility they generate for the participants are necessary and sufficient to explain the exchange, ergo, they are also for generating the prices derived from it. That simple logical chain is what connects ***"the" theory of value*** by Menger, with ***"the" theory of prices*** we derived from Menger: ***"the" theory of value → "the" theory of prices***.

We can express the chain of logical deductive reasoning by which prices derive from utility, thus:

- There is a theory of value.
- The theory of value is based on utility. Value is explained by utility.
- Only value ≡ utility is exchanged. Ergo, without value there is no exchange, and without exchange there is no price.
- There is no theory of prices without a theory of value. The theory of value precedes the theory of prices.
- Prices are (also) based on utility. Prices (also) are explained by utility.

We reiterate: ***the theory of value precedes the theory of prices***. This is so since everything that is useful and scarce for man has value, and prices derive from the exchange of useful and scarce things —that are the economic goods or wealth.

This simple causality explains: *first*, why things have value; *second*, once we are in possession of things with value we exchange them for other things to which we assign greater value and, *third*, prices derive from these exchanges. In other words, value precedes prices, which is the reason it is not consistent to pretend to explain the origin of prices without a theory of value —which is what happened with the classic-neoclassic theory and that is why it had to resort to "costs" to explain the origin of prices, instead of "relatively" relating economic goods through their utility.

Once we are here, it is indispensable to verify if the subjective theory of value is adequate to prove its efficacy for explaining the *origin of prices*, respecting their ontology of being *relative*. In other words, we must compare the two theoretical offerings

that pretend to *explain the relative origin of prices*, one that is exclusively based on the utility of thing, and the other in a mix that combines demand and costs. The first one derives from the *theory of subjective value*, and the from the so called *"Theory" of objective value*, based on a mix of demand and costs —in truth it is a deficient theory of the origin of prices, not a theory of value.

In short, we wish to prove that there is an *only theory of value*, Menger's subjective theory, and from there derive an *only theory of prices* —which implies rejecting the neoclassic offering that tries to explain the (relative) origin of prices by the intersection of demand and supply (cost). And if so?, how do you prove it?

We have the adequate tools to compare the theories in dispute, representing the *theory of subjective value*, according to Menger's logic, with the tools with which the classic-neoclassic "theory" of prices –Marshall's mathematical model of the curves of supply and demand —for which "the determination of prices" was considered—, let us see what happens if we apply Marshall's accepted mathematical methodology to represent Menger's logic. Knowing from the start that Marshall's methodology has not been an adequate price theory to explain the relative origin of prices, let us see if Menger's proposed logic can do it.

The two laws of marginal utility

To proceed to compare the two theories of prices in dispute, to see if they can demonstrate their origin in terms of their relative ontology, economics uses the powerful tool of marginal calculus, which refers to variations of totals in time. I.e., instead of explaining by totalities, it explains based on their variations, which no more than based on their behavior in time. This supposes that every law —insofar as it must explain changes in entities, using laws referring to their causal relations—, must consider time, without the presence of which there is no change in relation in and between entities.

Marshall used the mathematical tool of graphic curves to make his exposition, as Newton and Leibniz illustrated; Menger instead expressed himself logically. That is why one was cataloged as a mathematical economist and the other as a logician. As we have said, here we are going to use Marshall's mathematics to express Menger's logic, which is feasible since both applied marginalism, which implies changes of entities (totalities) in time.

As a consequence of the use of marginal analysis, economics was able to discover the law of decreasing marginal utility, which has two meanings, the first is the traditionally presented, and the second we have explicitly included it —as far as we know:

Law of decreasing marginal utility of an economic good: The unit *n* of *an economic good* produces less utility than the unit *n-1*.

Law of decreasing marginal utility of wealth: the unit *n* of wealth produces less utility than the unit *n-1*. We have also called this law, the *law of extended or aggregate decreasing marginal utility*, insofar as it refers to wealth in general, not to one individual manifestation of the same, represented by one economic good. This is essential since it is the epicenter of ***"the" theory of prices***, and of economic calculus, which derives from Menger's theory of subjective value. I.e., the concept of extended wealth implies comparing the satisfaction offered by different expressions of wealth —different economic goods— which is in line with the ***relative*** ontological nature of what we interpret as price.

As we shall see, this inclusion of the *creasing marginal utility of wealth*, different from that which we know, the laws of decreasing marginal utility of an economic good will be essential when judging one or other theory of prices. In this law we find the fundament that allows us to explain: why does the utility of an economic good increase with the decrease of its price?, which explains the "phenomenon" by which the decrease of prices is an expression of economic progress.

The importance of including the law of decreasing marginal utility of wealth can be seen in its full magnitude when referring to the theory of prices, since it makes use of this law —even if this has not been noticed and/or made adequately explicit. As opposed to Marshall's classic-neoclassic proposal, which refer to the law of decreasing marginal utility of an economic good. This is so, insofar as we shall see that the demonstration of the theory of prices based on Menger's theory of value will lead us to compare decreasing marginal utilities of different economic goods, as opposed to Marshall's traditional curves of supply and demand, which refer to the demand and supply of an only economic good —in terms of *its price*— which excludes the possibility of explaining prices, since by definition these are relative.

Thus it is in terms of the law of decreasing marginal utility of wealth, *versus* the law of decreasing marginal utility of an economic good, that we will be able to explain the logic of the two theories of prices in dispute, which we will do with the mathematical symbolism attributed to Marshall. I.e., we will represent the curves Menger would have drawn if he had dominated Marshall's mathematical technique or the curves Marshall would have drawn if he had dominated Menger's logic. A task that has been facilitated since we already have Marshall's curves with which he represented his classic-neoclassic logic.

The classic-neoclassic error

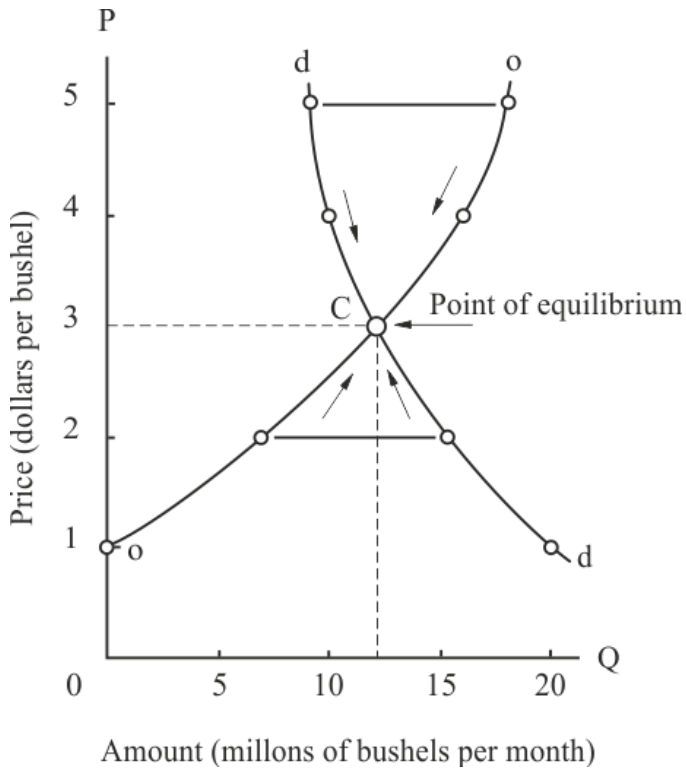
According to Schumpeter (1975), Marshall "proved" the origin of prices crossing the two blades of the same scissors, those of demand based on decreasing marginal utility —according to Marshall and him—, and that of supply, based on increasing marginal cost. Thus, the crossing of these curves would determine the market prices of economic goods. Let us see what arises from *Marshall's "scissors"*, and if it proves the relative origin of prices —in truth Marshall himself used the terms blades and scissors, in his *Principles of economics*.

Graph 1 is a replica of Paul A. Samuelson's traditional text (2010), under the following title. Economics, — added to ours: Marshall's *"scissors"*— and comment:

Graph 1

Curves of demand and supply

— Marshall's "scissors" —



"THE PRICE OF EQUILIBRIUM IS FOUND IN THE INTERSECTION OF THE CURVES OF SUPPLY AND DEMAND:

Figure 3-7 Market Equilibrium Comes at the Intersection of Supply and Demand Curves

The market equilibrium price and quantity come at the intersection of the supply and demand curves. At a price of $ 3, at point C firms willingly supply what consumers willingly demand. When the price is too low (say at $ 2) quantity demanded exceeds quantity supplied, shortages occur, and the price is driven up to equilibrium. (Samuelson, Economics, p. 67)

Let us analyze what Marshall's proposal represents —according to the impeccable interpretation of his disciple, Samuelson— referred to his conditions for considering it a theory of prices that explains their ***relative origin:***

Marshall's proposal was built based on these elements:

1) Quantities of an economic good, in specific spatial-temporal period —abscissa.

2) Price of that economic good, also in a specific spatial-temporal period — ordinate.

Evidently if we pretend to explain the origin of prices, here we are in the presence of three fatal errors:

a) *Pretending to explain the origin of prices with prices*, is pretending to define an entity based on the entity itself: *the price is the price*… That is why this graph can only tell us when exchanges would cease, based on knowing the decisions of the agents *knowing the prices*. Ergo, he starts from the same data he is searching for. This is the most relevant error of the theory of objective value, or failed theory of the origin of prices.

b) *Since prices are relative*, it is evident that the presence of another economic good is needed, without which there is no ontological relativity of prices, and its origin cannot be explained. You cannot argue saying the use of the price of the economic good in the ordinate is already expressing its condition of relativity, insofar as it is a price that in truth is not a price, instead it expresses the behavior of the agents that demand and supply according to the price, which it cannot explain.

c) BUT, the most serious of all is found in the text accompanying the chart: *Market Equilibrium Comes at the Intersection of Supply and Demand Curves*. This while the amounts exchanged are those that determine prices, then the price and the quantities involved and the amounts exchanged involve price. Failure arising as a result of failing to warn that prices are a fact scissors for Marshall, which arises only marginal profits from prices which is that you can explain the behavior of buyers and sellers.

Thus, *Marshall's "scissors"* could be reduced to a tool for understanding the behavior of microeconomic units ―that demand and supply an economic good based on a price―, considering the different alternatives of prices presented by the market for that economic good, but it does not explain the origin of the price of the good.

It is clear then that the classical theory of prices, in Marshall's neoclassic version ―classic marginalism― is not apt as a theory of prices to explain their origin, considering its relative ontology. Which is in complete contradiction with this sense is Marshall's fundamental sentence (1957), in his famous Principles of Economics

> "Thus it is not descriptive, nor does it deal constructively with real problems. But it sets out the theoretical backbone of our knowledge of the causes which govern value…" (P. 188)

Marshall believed his proposal explained value, being instead an instrument of microeconomic calculus that is based on knowing prices. Marshall's complete theoretical disorientation is evident, insofar as he believed he presented a theory of value, when he did not even offer a theory of prices, which, in turn, causally comes after value theory.

In Marshall's proposal, without him seeing it, prices are a known data; thus, it cannot pretend to have the status of a theory to explain the origin of the data.

Evidently Marshall did not have a theory of value and also he did not see that there cannot be al theory of prices that is not based on a previous theory of value. In short, Marshall did not see that his framework is based on considering price as a data, with which he does not explain its origin. And he did not have a theory of value, which must precede in theoretical causality a theory of prices, with which to explain their origin an

behavior —this was the true classic-neoclassic deviation, which it believed to have revealed criticizing the classical vicious circle: *price* ↔ *cost.*

To ratify what we have said, essentially with reference to Marshall's intention (1890) of offering a theory to explain the *origin of prices, based on prices,* we present paragraph from him:

> "There is then one general *law of demand* ... the amount demanded increases with a fall in price, and diminishes with a rise in price." (P. 64)

We have selected this paragraph for two reasons:

1) *Demand:* that is the only blade of Marshall's "scissors" which could interest us to explain the origin of prices. This insofar as, *according to Schumpeter*, it is the only point in common between Marshall and Menger, demand an exclusive function of utility, the behavior of which is governed by the law of decreasing marginal utility. But Marshall did not imagine his curve of demand to explain the origin of prices in terms of utility, but to explain the behavior of consumers with alternative prices. Which ratifies that Marshall tried to explain the origin of prices based on the *law of decreasing marginal utility of an economic good,* not the *law of decreasing marginal utility of wealth*.

2) *Origin of prices:* ratifying that the origin of prices cannot be explained referring to human behavior with different prices. The irreparable logical error of trying to explain a data based on the data itself. In other words, Marshall himself is recognizing that his "proposal" does not explain the origin of prices, but the behavior of humans according to prices.

In short with this paragraph we clearly see that Marshall did not build the demand curve as a function of *utility,* as Schumpeter suggested, when he pretended to assimilate Marshall's demand to Menger's marginal utility. Thus we can see the material with which Menger would build the two blades of the scissors —as suggested by Schumpeter— was not precisely the same material as Marshall would use for his curve of demand, since this does arise from the decreasing marginal utility the good offers the demander —the essence of Menger's value theory, from which we can derive a theory of the origin of prices consistent with it.

We cannot end this section without mentioning the text that goes with Samuelson's graph, we showed above, insofar as it refers to:

a) *How supply and demand determine the amount and the market price,* with which he would seem to tell us that Marshall's neoclassic proposal which he represents with his curves of supply and demand, and the determination of market prices at the intersection $\boldsymbol{D_{q1} \cap O_{q1}}$ does not refer to the origin of prices but to their determination. An expression that is also incorrect, since determination implies origin. In short, an imprecise terminology for an imprecise "theory".

b) Samuelson expression "exceeds quantity supplied" is only feasible in the framework of the classic-neoclassic price "theory" —see Say's Law below.

Evidently Marshall subscribes the *epistemology without a theoretical causality* —positivism that pretends to calculate results without theory—, with which he cannot

explain cases that can occur. Thus, as a consequence of this "*uncaused*" *epistemology* there have been unfortunate expressions such as that of J.S. Mill, as transcribed by Juan C. Cachanosky (1994) in the following text:

> "Mill closes the era of the theory of value and price of classical economists with a phrase that has become famous in the history of economic thought:
>
> > "Happily, there is nothing in the laws of Value which remains for the present or any future writer to clear up; the theory of the subject is complete …" (J.S. Mill, *Principles*, 1848: Book III, Ch. 1).

Instead, we now know that what they offered as a theory of prices or theory of the determination of prices, is simply a tool that serves as a guide for microeconomic calculus, based on the price-data. In other words, Marshall's proposal insofar as it pretends to explain the origin of prices, that by definition are relative, has no entity as a theory of prices, much less can it be considered a (previous) *meta theory* of value.

Having rejected the "theory" of prices proposed by the classic-neoclassic school, we now must prove that Menger's theory of value can generate a theory of prices, explaining their origin in the framework of its ontological relativism. Demonstration that we will effect based on the methodology accepted by science, Marshall's curve of demand. In other words, we will try to explain a "mathematically" unknown terrain ―*Menger's "scissors"*― based on known mathematical terrain ―*Marshall's "scissors*".

Menger was right

As Schumpeter said, for Menger the two *blades of Marshall's scissors* were made of the same material, marginal utility. Schumpeter (6th digital edition) interpreted Menger saying that the two blades of the scissors are of demand, not one of demand and the other of supply:

> "It is in this sense only that Jevons' saying should be understood: 'Value depends entirely upon utility' (*Theory p. 1*). Hence it is meaningless to accuse either Jevons or the Austrians of wishing to minimize the importance of the very theorem which they were the first to deduce rationally and which Wieser called the "law of cost". They stood in no need of being told about the two blades of Marshall's pair of scissors. What they aimed at showing was that *both* blades consist of the same material –that both demand and supply (no matter whether the case is one of exchanging existing commodities or one of producing them) may be explained in terms of 'utility'". (Schumpeter, History of Economic Analysis, section IV, p. 922)

Though Schumpeter here mentions Jevons, in the context that surrounds this paragraph he alludes essentially to Menger. He does so with the conviction that both shared the idea that value derives exclusively from utility, but Jevons was not very precise in this respect, and Schumpeter would point that out.

Nonetheless, this subtle expression of the two blades of a scissors did not help either Marshall or Schumpeter see that they were expressing *the fundament of the fatal error*. Since they referred to a scissors composed of a demand blade and another of supply, they were alluding to an only economic good, forgetting the relative essence of prices, that arises from the interaction of different economic goods, different manifestations of wealth. On the other hand, Schumpeter's interpretation of Menger's logic, that led him to refer to two blades of demand, inevitably implies comparing marginal utilities that underlay demand, but of different economic goods. Thus, Schumpeter's proposal for representing Menger's two blades would be an absurd, since according to the structure of Marshall's curve, we would have two curves of demand of the same economic good, i.e., an only curve of demand to determine the price.

Now we understand why, in the theory of value and prices, it is necessary to refer to the *law of decreasing marginal utility of* ***wealth*** (Menger's scenario) instead of the *law of decreasing marginal utility of an* ***economic good*** (microeconomic scenario in which Marshall built curves of supply and demand of an only good).

At this point we need to compare "the" theory of the origin of prices by Menger (confronting *curves of utility* of two different economic goods), with Marshall's "theory" (intersection of the curves of supply and demand of one economic good). Which leads us to interpret Menger's ***logic*** with Marshall's ***mathematical*** graphic methodology, according to Schumpeter's comparative-evaluative vision. In other words, we will represent *Menger's "scissors"*, as Marshall would have drawn them if he had interpreted Menger, to compare it with *Marshall's "scissors"*.

We will analyze a barter Exchange, where we will cross the demand (D_{q1}) of the good q_1, in terms of the decreasing marginal utility perceived by his demander *Robinson 2°* (R^2), with the demand (D_{q2}) of good q_2, in terms of the decreasing marginal utility perceived by its demander *Robinson 1°* (R^1).

I.e., we cross the curves of demand of two different economic goods q_1 and q_2—the only way to explain the origin of prices according to their relative ontology—, which arise from the preferences of potential demanders, both governed by the law of decreasing marginal utility.

The other essential data is to perceive that: the *stocks* of the respective economic goods, q_1 y q_2, are those destined for exchange ($R^I{}_{q1}$ y $R^I{}_{q2}$), in a specific spatial-temporal sphere, for each of their owners — R^1 and R^2 respectively.

The proposal will consist in confronting the curve of demand —that *Robinson 2°* (R^2) has— of economic good q_1, that *Robinson 1°* supplies (R^1), with the curve of demand —that *Robinson 1°* has (R^1) —of economic good q_2, supplied by *Robinson 2°* (R^2).

This simple presentation places us in the logical terrain of the ***theory of subjective value*** by Menger, and the ***theory of prices*** derived from it: the mere use of the demands of both economic goods implies explaining ***exclusively in terms*** of the (decreasing marginal) utility, from where arise the curves of demand of each good. Relation that indicates the ontological relative fundament of prices —we do no explain in terms of an only economic good, implicit, as we saw, in $D_{q1} \cap O_{q1}$.

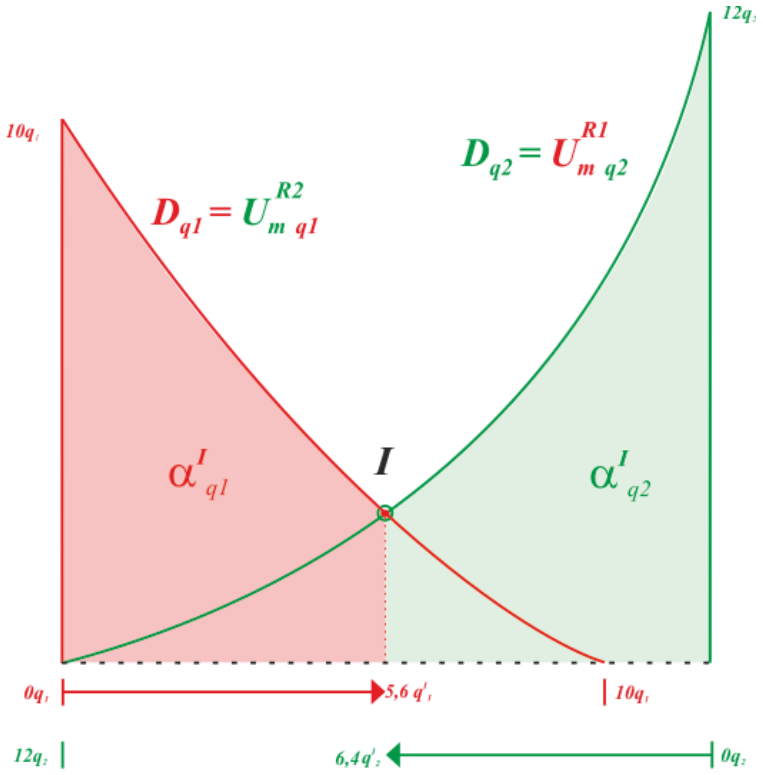
Graph 2 [(5)] consists simply of showing the demand of the *stock* of economic good q_1, which R^1 has available for exchange ($10q_1$), represented both in the abscissa and the ordinate —in red with the traditional order of reading from left to right (↑→), both coordinates go from $0q_1$ to $10q_1$. Said demand (D_{q1}) is the curve of decreasing marginal utility that expresses the valuation that R^2 has of good q_1, supplied by R^1. Demand that we also symbolize with $Um^{R2}{}_{q1}$, from where $D_{q1} = Um^{R2}{}_{q1}$, expressed in green and red because it is the marginal utility of Um^{R2}, from good q_1. In other words, the curve of demand of the stock supplied by R^1, for the exchange of q_1, is a function of the demand of it by R^2, which is decreasingly marginal.[(6)]

It is evident that the only finality of the curve of demand of q_1, is to express the decreasing marginal utility in terms of how the market values the supply of q_1. Here, according to Schumpeter, there would not "exist" a discrepancy between the "idea" of demand in Marshall and Menger, since both derive *exclusively* from utility, that is decreasingly marginal. But, as we have seen, the order of causality for the explanation is completely different. Marshall will start from the price, Menger will explain the price.

Graph 2

The Origin of Prices

— Menger's *"SCISSORS"*—



To fulfill our task we need only replace the curve of supply (O_{q1}) of q_1, the curve on the "right" of Marshall's "model" —knowing that our curves of demand are not the same. Which we do simply replacing O_{q1} with the curve of demand (D_{q2}) of q_2. Which implies doing the same we did with the representation of D_{q1}, only with an orientation from right to left (←↑). Construction from which we derive that $D_{q2} = Um^{R1}{}_{q2}$, an expression in red and green because it is the marginal utility of Um^{R1}, over q_2. Which we express in graph 2, that we built with the demand of the *stock* of the economic good q_2, that R^2 has available for exchange, $12q_2$ that we represent both in the abscissa and the ordinate —in green with the opposite sense of the traditional, from right to left (←↑), both coordinates go from $0q_2$ to $12q_2$.

There only remains for us to refer to graph 2 [(7)] of "the" *scissors of Menger*, insofar as it is Menger's logic expressed in terms of Marshall's mathematical curve. The interpretation of this curve does not differ from what we traditionally do with Marshall's supply and demand graph, that is why we only are interested in pointing out the following:

Demand curve or decreasing marginal utility of the good q_1: is the curve $Um^{R2}{}_{q1} = D_{q1}$, it is R^2 that demands q_1.

Demand curve or decreasing marginal utility of the good q_2: it is the curve $Um^{R1}_{q2} = D_{q2}$, it is R^1 that demands q_2.

Point I, arises from the intersection of both marginal utilities [$Um^{R2}_{q1} = D_{q1} \cap Um^{R1}_{q2} = D_{q2}$]. Any intention of R^1 and R^2 of opting for amounts different from $5{,}6q^I_1$ (in the case of R^2, measured from left to right) and of $6{,}4q^I_2$ (in the case of R^1, measured from right to left) would mean a worse option for both.

Prices: being relative they are the result of a quotient: the Price of $q_1 = 1.14\ q_2$ (result of **6.4**/**5.6**); and the price of $q_2 = 0.88q_1$ (result of **5.6**/**6.4**).

Utilities of the exchange: the areas indicated in α^I_{q1} (red shade), and α^I_{q2} (green shade) are representative of the total utilities of the exchange, perceived by the demanders q_1 y q_2 respectively.

This concept, of the utility that each participant in the exchange perceives, is the total area, not what is known as the benefit of the consumer, which would be represented only by the area that descends from the curve to the imaginary line that goes from *point I* to the respective ordinate.[8]

This is precisely the relation of value (≡ *utility*) and *price*. Applying the concept of marginal utility that economics explain how the decrease of prices implies an increase in utilities. Which can be understood with graph 2. Let us see the case of q_1:

Utility:

- If *Point I* were on the right of that indicated in the graph —with a displacement of the curve of demand of q_2—, this would imply a greater utility for the demander of de q_1, and α^I_{q1} would be greater than the one preceding.
- If *Point I* were on the left of that indicated in the graph —with a displacement of the curve of demand of q_2—, this would imply a smaller utility for the demander of de q_1, and α^I_{q1} would be smaller than the one preceding.

Price

In both cases, the price (P_{q1}) can have had the same behavior as the utility (α^I_{q1}), or the inverse, according to the elasticity of both curve between the original *Point I* and the new one.

From the above we conclude that an increase of the utility of an economic good can imply a decrease or increase of its price. The inverse is also feasible. This can only be explained considering that prices have their origin based on the law of marginal utility of wealth, not of an economic good —we would only need to observe variations of P_{q1} without variations of the stock of q_1, in the case of variations of Um_{q2}, as we shall see.

Given the enormous relevance of the issue, since it is the epicenter of the economic theory we propound for the explanation of human economic evolution, we will present two cases (four in truth), which will allow us to corroborate what we have expressed here.

The limit of demand: if we observe the path of each curve of demand we will see that it reaches the totality of the *stock* of each economic good available for exchange, in a limited spatial temporal field —which can be observe in that the respective abscissas and ordinates are of the same extension for each of the economic goods that are different from

each other (***10*** ≠ ***12***). This essential and subtle observation assures us that there is no possible exchange other than that of available wealth. I.e., there is no exchange —there is no $Um^{R2}_{q1} \cap Um^{R1}_{q2}$, equivalent of $D_{q1} \cap D_{q2}$—, if not in terms of exchanging existent wealth. Which confirms that the value is previous to the price.

In other words, the total utility of demand —which we shall call α^{T}_{q}— is the area under its respective curve D_{q1} y D_{q2}, to their axis of coordinates. Thus our α^{I}_{q1} (red) and α^{I}_{q2} (green) only represent the demands q_1 of q_2 *exchanged*, the rest of the area, below the respective curves, is the utility of the demand that was not exchanged, because it was considered of lower utility than that assigned to the *stock* of the owner —final area of *stock*, after exchanges have taken place, which we will call α^{F}_{q}.

Say's Law: It is evident that the *limit of demand* presented here is, no less, what there is the intention to explain with ***Say's Law***, which becomes unnecessary, and defective in its tautological postulation. The same analysis is valid for Samuelson's expression "excess demand", as we saw.

It is based on this conception that prices themselves ***arise as relative***, by comparing marginal utilities. This is how we understand the economic dimension from which we can get a handle on "the" theory of prices, and economic calculus. Once this is understood, the paradox of value, the paradox of diamonds, etc., disappear, and we also understand why an increase of utility does not necessarily imply an increase of prices, which we consider the *central enigma of economics*.

This is what we call explaining economics in terms of an adequate theory of value that leads us to an adequate theory of prices, based on which we can explain in economic terms (the dimension of value measured by prices). In this sense we are categorical: with con $Um_x \cap Um_y$, ***we explain the origin and relativity of prices***; with $O_x \cap D_x$ we explain neither.

Marshall was so closet to explaining all this with his concept of marginal curve, and yet so far [9] —because he did not draw the $Um_{q...}$—, that he was unable to explain why: ***10****1.14q_2 = $\left|\mathbf{11.40}\right|$ >***12****0.88q_1 = $\left|\mathbf{10.56}\right|$, considering ***10*** < ***12***. In other words, when in economics we try to explain that *10 is more than 12*, this can only be done with "the" theory of value, and its derivate, "the" theory of prices. Which ratifies and corroborates that exchange occurs because the parties have different valuations, if not there could be no explanation why one delivers more units of something in exchange of less unites of something else, and vice versa —inversely, because "***5.6*** = ***6.4***". No more and no less, the theory of value, the theory of prices, and economic calculus is based on this. [10]

It is clear that insofar as prices are relative, they are expressed in quantities of others, only crossing demands, derived from decreasing marginal utilities of q_1 and q_2, can the origin of prices be explained. All that implies working with an only economic good, as in the case of Marshall's curves of demand and supply, implies necessarily the sphere of microeconomic calculus, based on which it is not possible to explain the prices that arise in the macroeconomic sphere. Therefore, (Marshall's) microeconomic sphere takes prices as data, and from there marginal incomes are compared with marginal "costs", that guide the decisions of the agents that demand and supply wealth.

It is clear that the origin of prices, since its ***relative*** fundament can only be explained in terms of the intersection ($D_{q1} \cap D_{q2}$), intersection that we have best expressed as: $Um^{R2}_{q1} = D_{q1} \cap Um^{R1}_{q2} = D_{q2}$. ***Menger's model of the "scissors"*** that Marshall would have drawn if he had so interpreted him, as we did here, instead of confronting the curves of supply and demand of an only economic good ($O_1 \cap D_1$) —where there is no *relative comparison* for prices to appear, and therefore it is not only that it cannot explain their

origin, but prices must be resorted to as data. Thus Marshall's curves are confined to the microeconomic calculus of each kind of manifestation of wealth or economic good.

We only need to add that from each individual curve of demand ($\boldsymbol{Um^{Rn}_{q1}}$) we can deduce the *aggregate* decreasing marginal utility curve of $\boldsymbol{q_1}$ that we symbolize with: $\boldsymbol{Um_{q1}}$. Which arises from the following summation, the traditional way the aggregate curve of demand is obtained:

$$\boldsymbol{Um_{q1}} = \boldsymbol{Um^{R1}_{q1}} + \boldsymbol{Um^{R2}_{q1}} + \ldots \boldsymbol{Um^{Rn}_{q1}}$$

Having determined prices exclusively in terms of the decreasing marginal utilities of *aggregate* demands of *wealth*, this allows us to ratify the central precepts of the Austrian School of economics:

1) That exchange arises from the utility that participants obtain from exchanging. Exchange arises as a consequence of agents valuing differently what they exchange —they find greater utility in what they receive than what they deliver— rejecting the idea that things of the same value are exchanged or that one wins what the other loses. A question that is solved crossing the curves of marginal utilities —expressed with the intersection $\boldsymbol{Um_{q1}} \cap \boldsymbol{Um_{q2}}$, insofar as any other option implies a less useful position for the participants. This cannot be explained by $\boldsymbol{D_{q1}} \cap \boldsymbol{O_{q1}}$, insofar as it is not possible to understand how someone could sell bellow cost, not knowing the cost; etc.
   It is so that the chain of causality of exchange, production, and prices, in Marshall's terms, is in complete dissidence with Menger's view, which we can express as:

Utility of Exchange for Robinson 1° ↔ *utility of Exchange for Robinson 2°*

   Where the arrow in both directions ↔ implies that both participants obtain utility through exchange. When the utility of exchanging is less than that of preserving *stock*, exchanges cease, which ratifies that exchange is necessarily the provider of utility. A completely different scenario from the arrow in both directions of the classical vicious circle:

price ↔ *cost*

   The arrow in both directions of the "classical vicious circle" implies that exchange occurs if the price is greater than the cost, and that the "classical adjustment" will make them converge. Which cannot explain the exchanges in which there would prices below "registered" costs; it cannot explain either the utility or benefit that arises form exchange; and what is worse, it cannot explain variations in the opposite sense between $\boldsymbol{Um_q}$ and $\boldsymbol{P_q}$: $\uparrow\boldsymbol{Um_q} \rightarrow \downarrow\boldsymbol{P_q}$, ó $\downarrow\boldsymbol{Um_q} \rightarrow \uparrow\boldsymbol{P_q}$ —which underlies the theory of subjective value based exclusively in utility. Not assigning utility to exchange is equivalent to qualifying it as "socially parasitic", "origin of poverty", ethical and moral valuation of ancient times.

2) That Marshall's "real" costs do not explain the origin of prices, limiting its validity to being a tool of microeconomic calculus. Along with the exchanges this theory cannot explain. It is thus completely discarded since we have been able to explain prices only based on utility, with no need to resort to costs. Which, as Popper says, validates a theory over another, only because it explains in a simpler manner, with less elements —not forgetting, of course, that the discarded theory in our case is not valid for explaining the origin of prices.

3) That Menger's marginal utility does not refer to the utility of an only good, but the utility that humans find in the different manifestations of wealth. The confrontation of marginal utilities $\boldsymbol{Um_{q1}}$ *versus* $\boldsymbol{Um_{q2}}$ underlying Bawerk's bickering between *Robinson 1 and Robinson 2*, refers to comparing needs, marginal utilities, of different economic goods. I.e., human utility does not refer to an only manifestation of utility, but to the option between different forms of wealth.[(11)]
Therefore, without comparing the utilities of different economic goods no relative prices arise, which is what occurs with Marshall, his supply and demand curves refer to the same economic good —in terms of relative prices, whose origin he not only cannot explain, but he considers them as data to explain the behavior of the economic agent.

4) Based the crossed curves of decreasing marginal utilities we can explain human economic evolution, based on the increase of wealth or utility. As opposed to the classical, neoclassical, Marxist, Malthusian, etc., dark and apocalyptic prognosis. All this considering the classic adjustment would lead inevitably to capitalism's demise because of the tendency of utility to fall to zero. I.e., while these schools postulated that competition would devour human economy, we have shown that competition is what stimulates obtaining utility, with which we are saying that $\boldsymbol{Um_{q1} \cap Um_{q2}}$ explains human economic evolution, while $\boldsymbol{O_{q1} \cap D_{q1}}$ —insofar as it is considered "the" theory of prices, which explains their relative origin and their behavior— would be the basic "explanation" of the economic apocalypse that did not come about.
We must reiterate, as a warning, that *the apocalyptic classic-neoclassic premonition derives precisely from its failed "theory" of prices*, insofar as it analyzes the present in terms of the past [(12)] —prices of the present based on the costs of the past up to today— as opposed to "the" theory of value, and its derivate, "the" theory of prices, that analyze the utility of human action in terms of future perspectives.

5) Only Menger's theory of value and the theory of prices we derive from it, can explain scientifically the connection between the macro and micro economic spheres. Being able to understand the macroeconomic origin of prices, we can explain the micro economic behavior of the agents that take those prices as data for their economic calculus.
It is no exaggeration to say the causality *value→ prices→ general economic calculus → special currency economic calculus* is the scientific demonstration of the misguided premonition of the "invisible hand" with which Adam Smith began systematizing economic knowledge. Given the importance of the issue we will dedicate a special section to it.

Though we have proven the existence of *"the" theory of value* that allowed us to reach *"the" theory of prices* —that have their origin exclusively in utility the behavior of which is explained by the relative decreasing marginal law— we cannot presume to know everything in terms of the connection of value and prices. In other words, we must dig deeper into the connection between the marginal utility ($\boldsymbol{Um_x}$) and economic good $\boldsymbol{x}$, and its prices, as a function of $\boldsymbol{y}$: ($\boldsymbol{P_{xy}}$). A task that is indispensable to be able to establish with greater precision what we cannot see at first sight, and avoid erroneous and/or extemporary suggestions. Errors and confusions that can only be perceived in this context of theoretical causality we have presented, insofar as a theory of prices without a theory of value preceding it does not let us perceive them.

But before going to our proposal it is convenient to convert our barter "model" into a currency "model", which is very easy, and will allow us to continue developing our word based on currency prices and currency calculus. In other words, from *"the" general theory of economic calculus* that arises from prices expressed in units of economic goods that participate in barter, we go *"the" special theory of currency economic calculus*. A theory that considers the price of the currency unit ($\boldsymbol{P_{\$q}}$) as the unit of measure of all prices, from where currency prices arise, in an economy that uses currency to elude the state of illiquidity of barter. Task that would only imply for us introducing the marginal utility of currency ($\boldsymbol{Um_\$}$), as the origin of its price.

But before that we must perfect Menger's "scissors" and generalize its use to give it the status of scientific knowledge.

Menger's infinite "blades"

What we have shown in truth that there is no Menger's "scissors", but "*infinite Menger blades"* — $\boldsymbol{Um_\infty}$—, as many as there are expressions of wealth or types of economic goods that, when participating in an exchange by their owners, determine their respective relative prices —only for that unique and unrepeatable exchange. I.e., we have $\boldsymbol{Um_x}$… $\boldsymbol{Um_\infty}$, that generate as many intersections $\boldsymbol{Um_x \cap Um_j}$, and subsequent relative prices of $\boldsymbol{x}$ and $\boldsymbol{j}$ as interpersonal exchanges of them there may be.

We must observe the real dimension of the fundamental connection established here between value and price. The infinite Menger blades ($\boldsymbol{Um_\infty}$) refer to the value of each blade, insofar as *Point I*, that only arises from the crossing of blades, refers to the prices of those blades ($\boldsymbol{P_x}$ and $\boldsymbol{P_j}$), generated by that unique and unrepeatable spatio-temporal exchange. Thus the blades exist previous to their exchanges, from where prices arise, not considering costs in any of this: the value is in the blades, from the exchanges of which arise the prices, ergo, without value there is no price event.

Then, the multiplicity of exchanges of a same type of wealth will conform what is called a market price —Mises' final price— of the exchanged goods, which constitutes their statistical average.

Thus the most trustworthy price, the most trustworthy statistical average, is that which arises from the economic good that has most intervention in the infinite exchanges that occur in the market, as is the price of currency. This is why the price of currency is considered as the unit of economic measure, and calculus is done in currency prices, i.e., the price of economic goods relative to the price of the currency unit.

Unit of economic measure

We have established that: the *economic dimension* is *value*, that is measurable expression are *prices*, expressed in quantities of economic goods in the case of barter, and

in the price of the currency in a currency economy, from which derive the currency prices of all economic goods, except of the currency itself, that is relative to all other prices.

We have underscored that: the price of currency is the one used as the unit of measure of the prices of all other economic goods, except currency itself, that arises in each exchange where it intervenes. This universal participation of the price of the currency unit in exchanges —including those in which it is only used as reference, even without its factual use— is what explains the error of Marshall's proposal of ($\boldsymbol{P_x}$ y $\boldsymbol{P_j}$) of considering that the price of the only economic good included in his model is based on currency and is "absolute", not relative —which is the error underlying all the models that propose two worlds that must be balanced, one based on currency and the other real, which have made explicit starting with Wicksell's unfortunate dichotomy.**(13)**

Our daily economic calculus is done in terms of the price we estimate of each currency unit, which could be expressed as the average deriving from the infinite exchanges in the market, which does not imply it is the price we assign it in our exchanges. In this manner we could express the average of the price of currency thus —considering these currency prices of each unit of economic goods that are not currency:

$$q_1 = 0.25\$;\ q_2 = 1.25\$;\ q_3 = 5\$;\ \text{y}\ q_4 = 10\$$$

We can obtain the average price of 1*$* this way:

$$(0.25\$ + 1.25\$ + 5\$ + 10\$) / 4q = 16.50\$ / 4q = 4.125\ \$/q$$

Which is an average price of a unit of *q*. Equivalent to saying 4,125*$* = 1*q*, which means the price of each unit of *$* is:

$$1\$ = (1 / 4.125)\ q = 0.24q$$

It is from here that *1 + x* is useful as a unit of measure, where the temporal variable is *x*, insofar as it represents the variation of the unit of measure in time, expressed in terms of quantities of all other economic goods —which is what is relevant in any calculus made with a universal unit of measure. That is why in daily life a price index of a basket of economic goods is used to see its variation.

Having established that the price of currency is the unit of economic measure, which is the reason we calculate in terms of currency prices, it is important to always bear in mind how we came to that conclusion, which we have done based on the theoretical causality chain we present in table 1.

Table that implies that the currency is an economic good, if it was not it could not have value, which would imply, in turn, that it did not participate of the essential attribute of the economic dimension: value. Therefore it would not generate prices of exchange, without which its price could reach the status of unit of economic measure for currency economic calculus.

Advised that currency economic calculus derives from a chain of causally ordered theories, it is feasible to understand the economic world, above all the laws that underlie it. Forgetting this is what has produced, and still produces, the most atrocious injustices and errors in human civilization, which should undoubtedly be considered crimes against humanity —if ethics, moral, justice, equality, and "social justice" are of human entity.

From here on we will refer to an economy with currency prices. This will allow us to prove that "the" theory of value and its derivate, "the" theory of prices, are fully valid in **a currency world**, with no need to explain based on two worlds, one of currency and the

other real, hat we should understand with a special theory of currency and economic balance. Now let us see the table of theoretical causality of value and prices:

Table 1

Theoretical causality of value and prices

Economic dimension	**VALUE** (Utility we assign to things that are useful and scarce: wealth and/or economic goods)
	↓
Law of economic good	**Law of decreasing marginal utility of economic goods** (The value of each economic good is governed by this law)
	↓
Law of wealth	**Law of decreasing marginal utility of wealth** (Exchange is governed by the law of decreasing marginal utility of wealth)
	↓
Prices	**Prices (of barter)** *General theory of economic calculus*
	↓
Currency prices	**Currency prices** *Special theory of currency economic calculus* (Individuals that calculate with currency prices)

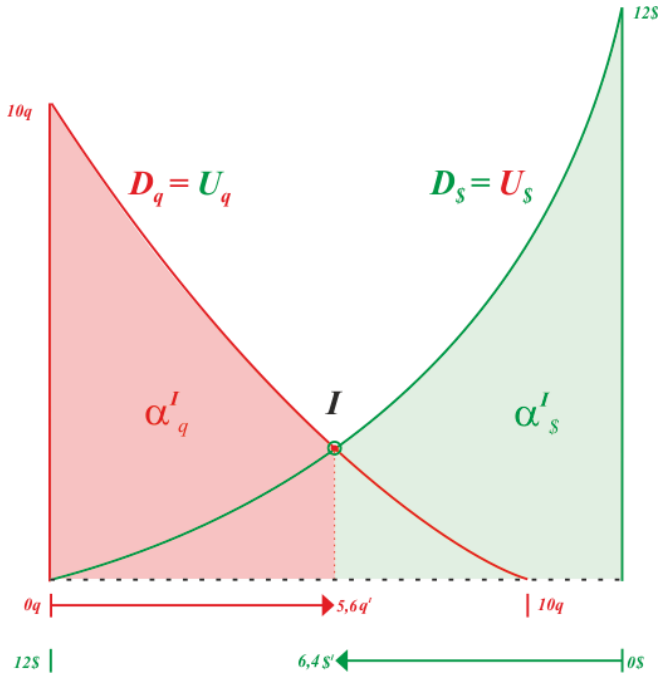
Currency prices

It is time then to obtain the price of currency, the relevance of which we already know as universal economic measure, in a currency economy. Task that will be very useful to continue unraveling the consequences of the chain of causally ordered theories that we are presenting, to explain micro and macroeconomic phenomena.

In the same manner we have derived the price of economic goods q_1 and q_2, we will proceed to determine the price of currency ($\$$) relative to the non-currency economic good (q); let us see and analyze graph 3.

Graph 3

The price of currency based on its marginal utility



If you observe a similitude with graph 2, of which we have only changed the symbols you are right. Let us see the reasons.

Currency is an economic good: being an economic good it does not need a special theory of value and price. In other words, "the" theory of value and "the" theory of prices suffice for all economic goods, ergo, graph 2 also explains "the" theory of value and "the" theory of prices of currency. This observation is crucial and it has been important in the history of economic thought because:

1) *Means of exchange*: the function of currency as a *means of exchange*, "*not of use"*, demanded a special theory —as if *use as a means of exchange* were not a use. Insofar as we know that wealth has as many uses as man can imagine, being a means of exchange is just another manifestation of wealth, that of its *use as a means of exchange*, as is the use for consumption, investment, hoarding, savings, exchange, etc. They are all expressions to wealth, governed by "the" theory of value, "the" theory of prices, and the laws of decreasing marginal utility of economic goods and wealth. As we have seen, total wealth ($\boldsymbol{R^T}$) is composed of wealth with different uses: **Exchange (I)**; Consumption (C); Investment or Capital (K); Savings (S); Hoarding (A); Price speculation (E); etc. All which allows us to express total wealth thus:

$$\boldsymbol{R^T = R^I + R^C + R^K + R^S + R^A + R^E + \ldots + R^{i?}}$$

The search of a *special theory* for currency because of its function as a means of exchange ($\boldsymbol{R^I}$) was nefarious. This misguided idea arose from the erroneous belief that direct exchange or barter is different from indirect exchange carried out by

means of currency. This distinction came as a consequence of the fact that in direct exchange people barter things that are useful for their final destination, while exchange with currency implied that this was not the final destination of the exchange, since the currency will in turn be exchanged for the good that does satisfy the final destination.
Evidently the state of barter implied all the imaginable difficulties of illiquidity, solved by the spontaneous discovery of currency. But that does not justify saying that each exchange of an economic good for currency must be treated in economic terms differently from a barter exchange: an economic good that is not currency for another economic good that is also not currency.
In other words the study of $\boldsymbol{Um_x \cap Um_y}$,…, $\boldsymbol{Um_j \cap Um_z}$, is not different from $\boldsymbol{Um_x \cap Um_{\$}}$, $\boldsymbol{Um_y \cap Um_{\$}}$,…, $\boldsymbol{Um_j \cap Um_{\$}}$. I.e. the exchanges that are obtained as a consequence of the intersections of the different $\boldsymbol{Um_{¿?}}$ with $\boldsymbol{Um_{\$}}$ determine the price of both manifestations of wealth, of currency (***$***) and of the other good ***x, y, … j***, that is not currency.

2) *The price of currency as unit of economic measure*: insofar as the economic *dimension is* **value**, *and its* measurable expression the ***price***, that arises from interpersonal exchanges, this leads to the spontaneous [(14)] selection of the currency unit as universal economic unit of measure [(15)] —because of its universal participation in exchanges, even if only as reference, with no real participation as a means of exchange.

Based on considering the price of currency as the universal economic unit of measure we can homogenize our economic expressions, and thus we understand that ***5,6q*** "are worth" ***6,4$***, which leads us to say that ***1q*** "is worth" ***1,14$*** —the daily use of the term "are worth" instead of saying "has a currency price of" is considerable eloquence of the citizenry that perfectly relates value with prices.

Practical **and** ***theoretical*** **consequences of the causality *value → prices***

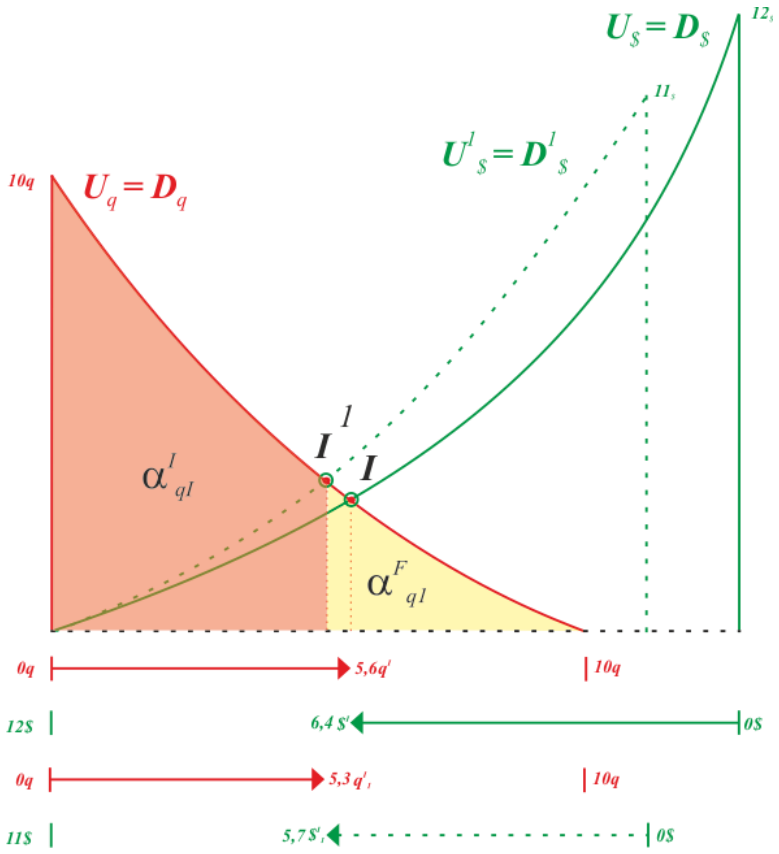
Now we will present different cases that will allow us to analyze in greater depth the connections that exist between "*the" theory of value*, with which we realize the value that humans assign to a manifestation of wealth ***q***, that we understand by means of the law of decreasing marginal utility ($\boldsymbol{Um_q}$), and *"the" theory of prices* derived from it which we know as $\boldsymbol{P_{q\$}}$ —subscript *$* is due to the fact we are referring to the price of ***q*** expressed in currency units ***$***—, arising from the intersection $\boldsymbol{Um_q \cap Um_{\$}}$.

Case 1: represented in graph 4.

We start from a point of origin $\boldsymbol{U_q}$ y $\boldsymbol{U_{\$}}$, derived from a *stock* available for exchange of ***10q*** y ***12$***, to which we add a change in the stock of ***$***, that becomes ***11$***. Which presents a new $\boldsymbol{U^1{}_{\$}} = \boldsymbol{D^1{}_{\$}}$, a new ordinate to the right (***0$ ↑11$***), and a new abscissa (***11$ ← 0$***), all expressed in a green dotted line.
We observe an upward displacement of $\boldsymbol{U_{\$}}$, from $\boldsymbol{U_{\$}}$ to $\boldsymbol{U^1{}_{\$}}$, at the same time the ordinate and abscissa —going from right to left— are reduced: ***11$*** < ***12$***. In short, we have a slope $\boldsymbol{U^1{}_{\$}}$ that is steeper above $\boldsymbol{U_{\$}}$, which indicates a greater marginal utility for each unit of the stock of ***$***. Circumstance that anticipates that the new $\boldsymbol{U^1{}_{\$}}$ will cross $\boldsymbol{U_q}$ —that remains unchanged— in a higher level of marginal utility of both curves.

Graph 4 - ***Case 1***

Displacement of $U_{\$}$ due to greater scarcity of $\$$



El *point* I^1 that derives from crossing the original U_q with the new $U^1_{\$}$, defines new quantities where exchanges cease: $q^I_1 = 5.3$ y $\$^I_1 = 5.7$.

The new *point* I^1, above and to the left of the original *point I*, presents the following conclusions relative to the relation between the ***Um*** and prices:

Table 2

Behavior of the economic good $\$$

$U_{\$}$		$P_{\$q}$		
$\uparrow U_{\$}$	$U^1_{\$} > U_{\$}$	$P^1_{\$q} > P_{\$q}$	$(5.3/5.7)q > (5.6/6.4)q$	$0.93q > 0.88q$

In table 2 we clearly observe that an increase of $U_{\$}$, with no variation in U_q, implied an increase in $P_{\$q}$.

In table 3 we clearly observe that with no variation of U_q, an increase in $U_{\$}$, implied a decrease in $P_{q\$}$.

Table 3

Behavior of economic good *q*

U_q		$P_{q\$}$		
$= U_q$	$U^1{}_q = U_q$	$P^1{}_{q\$} < P_{q\$}$	$(5.7/5.3)\$ < (6.4/5.6)\$$	$1.08\$ < 1.14\$$

In both cases we have observed how a relative increase of $U_\$$ over U_q, while the first increased and the second remained the same, implied an increase of $P_{\$q}$ and a decrease $P_{q\$}$.

Let us ratify the considerations expressed in the tables and see others:

Relative prices of both goods: we clearly observe the variation of the price of both goods based on the utility assigned to them, and according to the valuation of the utility of the other. While the unit price of $\$$ has increase relative to q, which we observe in $\$^1 = 0.93q > \$ = 0.88q$, and vice versa ($q^1 = 1.08\$ < q = 1.14\$$). All this considering that the decrease of available *stock* for exchange of $\$$, presupposes an increase of its "crossed" subjective valuation —due to the increase of its relative scarcity.

To analyze the behavior of the relation value → price of *case 1*, we will concentrate now on good q, based on which we will be able to due the same analysis of good $\$$. In each item analyzed we will underscore how it would "explain or not explain" each theoretical proposal: $U_q \cap U_\$$ y $Oq \cap Dq$.

Relative price of q ($P_{q\$}$): the fact that the stock of q available for exchange has not varied but its price ($P_{q\$}$) has varied.

- $U_q \cap U_\$$: it can only be explained in terms of crossed U_x —different behavior of U_q y $U_\$$ in the section from I to I^1.
- $Oq \cap Dq$: it cannot be explained by $Oq \cap Dq$, considering that the amount available of q has not changed, a variation of its price cannot be explained. If we said it happened because of variation of the demand of $\$$, we would only be ratifying that $Oq \cap Dq$ need the previous determination of q, in so far as a variation of the demand of q, by itself, cannot explain its price, since it disregards the incidence of $\$$ to determine both prices [*]

Exchanged amounts of q: we observe the quantity exchanged of q decreased ($5.3q^I{}_1 < 5.6q^I$), while its relative price fell ($q^1 = 1.08\$ < q = 1.14\$$), and the available stock remained constant, the same as U_q.

- $U_q \cap U_\$$: can only be explained in terms of crossed U_x —differentiated behavior of U_q and $U_\$$ in the section from I to I^1.
- $O_q \cap D_q$: considering the decrease of its price ($P_{q\$}$), a greater amount of q should have been exchanged —idem [*].

Quantities of final stock of **q**, *after exchanges*: we observe the final stock of **q** increased (**4.7q^F_1>4.4q^F**), while its relative price decreased (**q^1** = 1.08**$** < **q** = 1.14**$**), and the available *stock* remained constant, as did **U_q**.

- **U_q**∩**$U_\$$**: can only be explained in terms of the crossed **U_x** —different behavior of **U_q** y **$U_\$$** in the section from ***I*** to ***I^1***.
- **O_q**∩**D_q**: with the decrease of its price (**$P_{q\$}$**), the final *stock* of **q** should have decreased —idem [*].

Total currency wealth available for exchange (**R^{TI}_q**) of **q**: here we observe a decrease (**R^{TI}_{q1}**= 10*1.08**$**=**10.80$** **<** **R^{TI}_q** = 10*1.14**$** = **11.40$**), while the available quantities remain constant, the same as **U_q**.

- **U_q**∩**$U_\$$**: can only be explained in terms of the crossed **U_x** —different behavior of **U_q** and **$U_\$$** in the section from ***I*** to ***I^1***.
- **O_q**∩**D_q**: if the amount of **q**, available for exchange did not vary, it cannot explain a decrease of the *currency wealth available for exchange of* **q** —idem [*].

Exchanged currency wealth of **q**: here we observe a decrease (**R^I_{q1}**= 5.3*1.08**$** = **5.72$** < **R^I_q** = 5.6*1.14**$** = **6.38$**), while the available amounts remain constant, the same as **U_q**:

- **U_q**∩**$U_\$$**: can be explained by crossed **U_x** —different behavior of **U_q** and **$U_\$$** in the section from ***I*** to ***I^1***.
- **O_q**∩**D_q**: if the amount of **q** available for exchange did not vary it cannot explain a decrease of the reduction of *exchanged currency wealth* of **q** —idem [*].

Final currency wealth in stock of **q**: here we observe an increase (**R^F_{q1}**= 4.7*1.08**$** = **5.08$** > **R^F_q** = 4.4*1.14**$** = **5.02$**), while the available amounts remained constant, the same as **U_q**:

- **U_q**∩**$U_\$$**: can be explained by crossed **U_x** —different behavior of **U_q** and **$U_\$$** in the section from ***I*** to ***I^1***.
- **O_q**∩**D_q**: if the amount of **q**, available for exchange did not vary, it cannot explain an increase in the *final currency wealth in stock of* **q** —idem [*].

Utility of exchanged **q**: we observe a contraction of the utility that the exchanged amount of **q** offers (satisfaction of demand): **α^I_{q1}** < **α^I_q**, while the available amounts remain constant, the same as **U_q**:

- **U_q**∩**$U_\$$**: can be explained by crossed **U_x** —different behavior of **U_q** and **$U_\$$** in the section from ***I*** to ***I^1***.
- **O_q**∩**D_q**: if the amount of **q**, available for exchange did not vary, it cannot explain a decrease of the *utility of the exchanged* **q**: **α^I_q** —idem [*].

Utility of final stock of **q** *after exchanges*: here we observe an increase (**α^1_{qF}>α_{qF}**), while the available quantities remained constant, the same as **U_q**:

- **U_q**∩**$U_\$$**: can be explained by crossed **U_x** —different behavior of **U_q** and **$U_\$$** in the section from ***I*** to ***I^1***.

- $O_q \cap D_q$: if the amount of ***q*** available for exchange did not vary, it cannot explain an increase of the *utility of final stock of* ***q***: $\alpha^F{}_q$ —idem [*].

Evidently as we try to understand the connections between value, prices and quantities —insofar as they should reflect the behavior of utility or value, derived from exchange— that arise as a consequence of the curves of ***decreasing marginal utilities of wealth***, we observe that while Menger explains, Marshall does not.

Case 2: we represent it in graph 5.

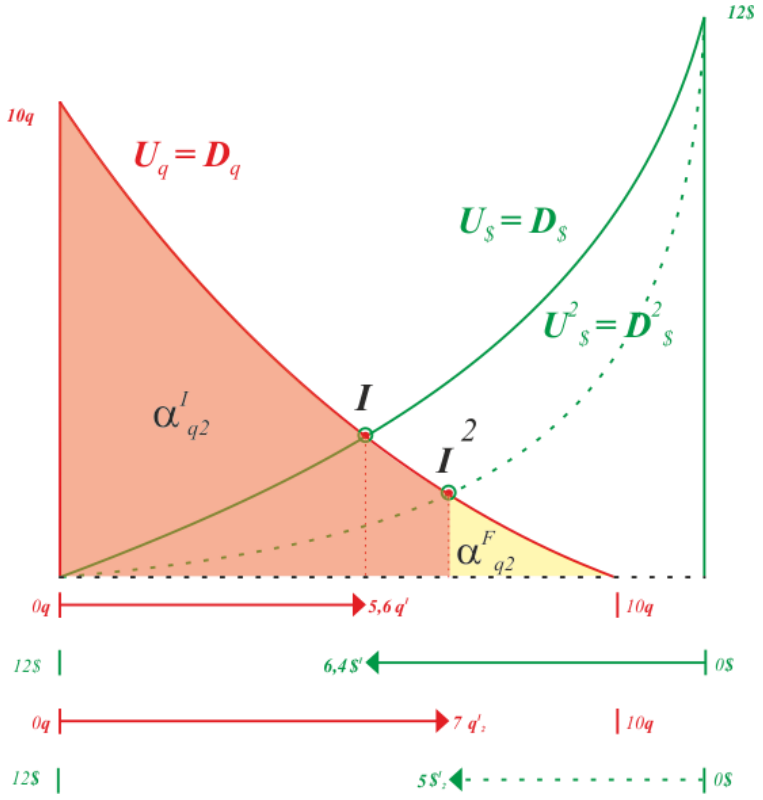
We preserve the available *stocks* in the position of origin ***10q*** and ***12$***, but we consider a curve $U^2{}_\$$ —green dotted line— under the original. In other words, the same amount of ***12$*** offers a lower marginal utility (slope or derivate), reading from right to left. Which is transferred to the utility offered by its total *stock* for exchange of 12 unites (un-shaded surface $\alpha^{TI}{}_{\$2}$, below $U^2{}_\$$, between its green ordinates, of magnitude ***12$***).

This case anticipates that the new $U^2{}_\$$ will cross U_q at a lower level of marginal utility of both curves.

Point I^2 that derives from intersecting the original U_q with the new $U^2{}_\$$ represented by the dotted green line, defines new quantities where exchanges cease: $q^I{}_2 = 7$ y $\$^I{}_2 = 5$. The new *point* I^2 presents the following conclusions:

Graph 5 – ***Case 2***

Downward displacement of $U_\$$



Relative prices of both goods: we clearly observe the variation of the prices of both goods *in terms of their utility, relative to the utility of the other*. The unitary price of **$** has increased relative to **q** that we observe in $\$^2$ = 1.40**q** > **$** = 0.88**q**, and vice versa (q^2 = 0.71**$** < **q** = 1.14**$**). This as its marginal compared utility $U^2{}_{\$}$ has fallen to the level of *stock* of **$**.

¿How can the relative price of **q** have fallen if there is an increase in the relative price of **$,** if $U_{\$}$ has fallen? It is a consequence of the greater decrease of U_q relative to $U_{\$}$ in the section from ***I*** to $\boldsymbol{I^2}$, which we can only observe precisely comparing the ***wide intersecting behavior of both curves of decreasing marginal utilities***, not of economic goods —a good example to show economic terms refer to wide marginal utilities, not to quantities, nor marginal quantities of a good.

we conclude that with:

- $U_q \cap U_{\$}$: we can explain in terms of the intersecting U_x —differing behavior of U_q and $U_{\$}$ in the section from ***I*** to $\boldsymbol{I^2}$.
- $O_q \cap D_q$ and $O_{\$} \cap D_{\$}$: we cannot explain any of the variations of the two relative prices: $P_{q\$}$ and $P_{\$q}$.

To analyze the behavior of the relation *value* → *price* of case 2, we will concentrate now on good **q** from where we will be able to do the same analysis of good **$**.

Exchanged quantity of **q**: here we observe an increase of ($7q^I{}_2 > 5.6q^I$).

- $U_q \cap U_{\$}$: can only be explained in terms of the intersecting U_x —differing behavior of U_q and $U_{\$}$ in the section from ***I*** to $\boldsymbol{I^2}$.
- $O_q \cap D_q$: if the available amount of **q** did not vary it cannot explain an increase of the quantities of **q** exchanged —idem [*].

Quantities in final stock of **q,** after exchanges: here we observe a decrease ($3q^I{}_2 < 4.4q^I$).

- $U_q \cap U_{\$}$: can only be explained in terms of the intersecting U_x —differing behavior of U_q and $U_{\$}$ in the section from ***I*** to $\boldsymbol{I^2}$.
- $O_q \cap D_q$: if the available amount of **q** did not vary it cannot explain a decrease in the final *stock* of **q** —idem [*].

Total monetary wealth of **q**, *available for exchange*: here we observe a decrease ($R^{TI}{}_{q2}$= 10*0.71**$** = **7.10** **$** < $R^{TI}{}_q$ = 10*1.14**$** = **11.40****$**).

- $U_q \cap U_{\$}$: can only be explained in terms of the intersecting U_x —differing behavior of U_q and $U_{\$}$ in the section from ***I*** to $\boldsymbol{I^2}$.
- $O_q \cap D_q$: if the available amount of **q** did not vary it cannot explain a decrease in the total currency wealth of **q** available for exchange —idem [*].

Exchanged currency wealth of **q**: here we observe a decrease ($R^I{}_{q2}$= 7*0.71**$** = **4.97****$** < $R^I{}_q$ = 5.6*1.14**$** = **6.38****$**).

- $U_q \cap U_{\$}$: can only be explained in terms of the intersecting U_x —differing behavior of U_q and $U_{\$}$ in the section from ***I*** to $\boldsymbol{I^2}$.

- $O_q \cap D_q$: if the available amount of q did not vary it cannot explain a decrease in the exchanged currency wealth q—idem [*].

Final currency wealth in stock of q: here we observe a decrease (R^F_{q2}= 3*0.71$ = **2.13**$ < R^F_q = 4.4*1.14$ = **5.02**$).

- $U_q \cap U_\$$: can only be explained in terms of the intersecting U_x —differing behavior of U_q and $U_\$$ in the section from I to I^2.
- $O_q \cap D_q$: if the available amount of q did not vary it cannot explain a decrease in the final currency wealth in *stock* of q —idem [*].

Exchanged utility of q: we observe an expansion of the utility yielded by the exchanged quantity of q in exchanges: $\alpha^I_{q2} > \alpha^I_q$.

- $U_q \cap U_\$$: can only be explained in terms of the intersecting U_x —differing behavior of U_q and $U_\$$ in the section from I to I^2.
- $O_q \cap D_q$: if the available amount of q did not vary it cannot explain an increase in the utility of exchanged q: α^I_q —idem [*].

Utility of the final stock of q *after exchanges:* here we observe a decrease: $\alpha^F_{q2} < \alpha^F_q$.

- $U_q \cap U_\$$: can only be explained in terms of the intersecting U_x — differing behavior of U_q and $U_\$$ in the section from I to I^2.
- $O_q \cap D_q$: if the available amount of q did not vary it cannot explain a decrease in the utility of the final *stock* of q: α^F_q —idem [*].

Thus, for case 2 we can reiterate the verdict at the end of *case 1:* evidently as we pretend to understand the connections between value, prices, and quantities —that must reflect the behavior of utility or value, derived from exchanger— that arise as a consequence of the curves of ***decreasing marginal utilities of wealth***, we observe that, while Menger explains, Marshall does not explain.

Quantitative analysis of *cases 1* and *2*

Though the graphs suffice to express the conclusions, it is useful to summarize in a table the numbers which we have referred to in the preceding narrative.

In said table we appreciate data in ***currency economic terms***, that will allow us to corroborate everything expressed in the curves, i.e., we will again corroborate that economics works and is explained in *terms of values*, manifested through relative prices that arise from "intersecting" marginal utilities.

Let us see then the construction and the *content of table 4*, which we have built based on the cases presented in the graphs.

The first column is of concepts, to which the data of the others refer. The first three rows indicate *position of origin in cases 1 and 2*. The two final rows indicate the percentage variations observed of each datum relative to the position of origin.

Table 4

Currency economic calculus of wealth

Concept	Stock						Relative prices		Wealth of q in $		
	Available		Exchange		Final		$q/\$$	$\$/q$			
	q_t	$\$_t$	q_i	$\$_i$	q_f	$\$_f$	q	$\$$	$R^{TI}{}_q$	$R^{I}{}_q$	$R^{F}{}_q$
Original Position	10	12	5.60	6.40	4.4	5.6	1.14$	0,88q	11.43$	6.40$	5.03$
Case 1	10	11	5.30	5.70	4.7	5.3	1.08$	0.93q	10.75$	5.70$	5.05$
Case 2	10	12	7.00	5.00	3.0	7.0	0.71$	1.40q	7.14$	5.00$	2.14$
% Var. Case 1	**0.00**	**-8.33**	**-5.36**	**-10.94**	**6.82**	**-5.36**	**-5.90**	**6.27**	**-5.90**	**-10.94**	**0.52**
% Var. Case 2	**0.00**	**0.00**	**25.00**	**-21.88**	**-31.82**	**25.00**	**-37.50**	**60.00**	**-37.50**	**-21.88**	**-57.39**

Note: the differences observed with the numbers in the text are due to differences of rounding in the calculus.

The columns of data refer to:

- *Stock:* in the three first we place the *stock*, subdivided in units of both economic goods, ***q*** y ***$***. *Stocks* referring to each situation that interests us: the *total stock available for exchange*, *the exchanged stock*, and *the final stock*, what is left after the exchanges.

- *Relative prices:* in the next column, subdivided for each good, we show the relative prices that have derived from ***point I*** —intersection of the two wide curves of decreasing marginal utilities. The same are deduced from the numbers indicated by the red, green, and dotted green abscissas, according to each case.

- *Wealth* ***q*** *in* ***$****:* here we show each expression of wealth of ***q*** —the total available for exchange ($R^{TI}{}_q$), the exchanged ($R^{I}{}_q$) and the final *stock* ($R^{F}{}_q$). Weighted by its relative currency price, according to each case.

It is evident we have here the *data of the economic terms*, which will be useful for comparison with the simple quantities of economic goods and, in this manner, appreciate even more that economy is governed by "*the*" *theory of value*, that is revealed through currency prices, not by physical quantities (of currency or other goods) or through costs. In other words, with "the" theory of prices, derived from "the" theory of value, combined with the aggregate decreasing marginal utility, we have been able to explain the economic terms, and from there currency economic calculus.

The inverse cases to those presented, from $U^1{}_\$$ and $U^2{}_\$$ towards $U_\$$ can be seen with a simple inverted reading, both in the table and the graphs.

The rows that show the percentage variations of the variables of each case relative to the position of origin, are eloquent as an exposure of the non existence of linearity or homogeneity when relating the behavior of the analyzed entities.

With the data offered by table 4, together with what the graphs show us, we can appreciate very well what it means in the real world to adopt institutions according to

"the" theory of value or the "theory" of objective value —an imperfect pretension of theory of prices.

Qualitative analysis of cases 1 and 2

Just as we have done a numeric analysis of cases 1 and 2, to understand the *value* → *price* connection, here we will do the same, but in their qualitative aspect. To do this we present table 5:

Table 5

Qualitative analysis of the relation *value* → *price*

Case	***Um***		***Available Stocks***		***Prices***		***Utilities q***			**Which theory Explains it**	
	Um_q	$Um_\$$	q	$\$$	$P_{q\$}$	$P_{\$q}$	$\alpha^{TI}{}_q$	$\alpha^{I}{}_q$	$\alpha^{F}{}_q$	$Um_q \cap Um_\$$	$O \cap D$
Case 1	=	↑	=	↓	↓	↑	=	↓	↑	**YES**	**NO**
Case 2	=	↓	=	=	↓	↑	=	↑	↓	**YES**	**NO**

In table 5 we have a reflection of the behavior of each case relative to the position of origin of the *Um*, the quantities of stocks available for exchange, and the prices corresponding to each economic good. The behavior of each variable is symbolized with: = (constant), ↑ (increase) y ↓ (decrease). In the last column we summarize which theory explains the behavior of the variables and which does not.

From table 5 we derive these conclusions, comparing each case with the position of origin:

A) Quantities (q *and* $\$$) *versus* prices ($P_{q\$}$ *and* $P_{\$q}$) in terms of U_q and $U_\$$:

1) Quantities (q) and prices ($P_{q\$}$). Ie, Δq *versus* $\Delta P_{q\$}$:

In both cases the quantities of q remained constant ($= q$), while their price ($P_{q\$}$) decreased. It is evident, as the two last columns show, that the theory based on $Um_q \cap Um_\$$, can explain it, not so the theory based on $O \cap D$.

2) Quantities ($\$$) and prices ($P_{\$q}$), i.e., $\Delta\$$ versus $\Delta P_{\$q}$:

In the first case the quantity of $\$$ decreased ($\downarrow\$$) and its prices increased ($\uparrow P_{\$q}$), in the second case the quantity of $\$$ remained constant ($=\$$), and its price increased ($\uparrow P_{\$q}$). It is evident that: while the theory based on $Um_q \cap Um_\$$ explains both cases, with the theory based on $O \cap D$ we cannot explain either case, though in the first case the correlation *coincides* with $O \cap D$ but it does *not explain*.

B) Marginal utilities (*Um*) *versus* prices (*P*):

1) Marginal utilities (Um_q) of q and prices ($P_{q\$}$) of q, i.e., ΔUm_q *versus* $\Delta P_{q\$}$:

The marginal utilities q remained constant ($=Um_q$), while the price ($P_{q\$}$) decreased in both cases. It is evident, as the last two columns indicate, that the theory based

on $Um_q \cap Um_\$$ can explain it, but not the theory base don $O \cap D$, considering it never even states the issue, though it says it explains in terms of marginal utilities —at least partially through demand, but we know it is not so either.

2) Marginal utilities ($Um_\$$) of $\$ and prices ($P_{\$q}$) of $\$ I.e., $\Delta Um_\$$ *versus* $\Delta P_{\$q}$:

In the first case the marginal utility of $\$ increased ($\uparrow Um_\$$), and its price also increased ($\uparrow P_{\$q}$). In the second case the marginal utility of $\$ decreased ($\downarrow Um_\$$), and its price increased ($\uparrow P_{\$q}$). It is evident that the second case cannot be explained by the theory based on $O \cap D$, but the first cannot be explained either, because in its analysis it does consider what has happened in the market, what happened with the price of q. This is a case in which the correlation *coincides* with $O \cap D$ but it does *not explain*. On the other hand the theory based on $Um_q \cap Um_\$$ explains both cases.

C) Utilities (α_q) *versus*: prices ($P_{q\$}$) and currency values ($q * P_{q\$}$):

It is evident that of all the analysis that interest us this is the one that receives all the praise, since it compares the behavior of the utilities, represented by the value (area α), with the utilities represented by the price (P). Here we will only refer to the good q:

Case 1:

Here we observe a decrease of the price ($\downarrow P_{q\$}$: **$1.08 < $1.14**) with:

- $= \alpha^{TI}{}_q$ while $\downarrow R^{TI}{}_q$

  I.e., a decrease of the price of q is correlated with a similar area of total utility of wealth available for exchange ($\alpha^{TI}{}_q$) and a lower currency value of the total wealth available for exchange ($R^{TI}{}_q$) that can only be explained with $Um_q \cap Um_\$$.

- $\downarrow \alpha^{I}{}_q$ while $\downarrow R^{I}{}_q$

  I.e., a decrease of the price of q is correlated with a lower area of utility of exchanged wealth ($\alpha^{I}{}_q$) and a lower currency value of exchanged wealth ($R^{I}{}_q$). That can only be explained with $Um_q \cap Um_\$$. This is a case in which the correlation *coincides* with $O \cap D$, *but it does not explain*.

- $\uparrow \alpha^{F}{}_q$ while $\uparrow R^{F}{}_q$

  I.e., a decrease of the price of q is correlated with a greater area of utility of final wealth ($\alpha^{F}{}_q$) and a higher currency value of final wealth ($R^{F}{}_q$). It can only be explained with $Um_q \cap Um_\$$.

Case 2:

Here we observe a decrease of the price ($\downarrow P_{q\$}$: **$0.71 < $1.14**) with:

- $= \alpha^{TI}{}_q$ while $\downarrow R^{TI}{}_q$

I.e. a decrease of the price of q correlated with a similar area of total utility of wealth available for exchange (α^{TI}_{q}) and a lower currency value of total wealth available for exchange (R^{TI}_{q}). That can only be explained with $Um_q \cap Um_\$$.

- $\uparrow \alpha^{I}_{q}$ while $\downarrow R^{I}_{q}$

  I.e., a decrease in the price of q is correlated with a greater area of utility of exchanged wealth (α^{I}_{q}), and a lower currency value of exchanged wealth y (R^{I}_{q}), which can only be explained with $Um_q \cap Um_\$$.

- $\downarrow \alpha^{F}_{q}$ while $\downarrow R^{F}_{q}$

  I.e. a decrease in the price of q is correlated with a smaller area of utility of final wealth (α^{F}_{q}), and a smaller currency value of final wealth (R^{F}_{q}), that can only be explained with $Um_q \cap Um_\$$. This is a case where the correlation *coincides* with $O \cap D$, *but it does not explain*.

Marginal utilities axiom: in this *case 2* we can observe a decrease of the price of q ($\downarrow P_{q\$}$: **\$0.71 < \$1.14**) and an increase in the utility provided by its exchange ($\uparrow \alpha^{I}_{q}$) because of a downward displacement of $Um_\$$, with the same quantity of both goods available for exchange (q = **10** y $\$$ = **12**). This situation is axiomatic insofar as a displacement to the right of ***Point I***, with similar quantities in the coordinates, always will produce a smaller coefficient of the price of q. This is due to a greater denominator (q^{I}) and a smaller numerator ($\$^{I}$). According to the axiom it will also be the inverse behavior.
It should be observed that the axiomatic case can only be explained by $Um_q \cap Um_\$$, not by $O \cap D$.
In this manner we can enunciate the ***axiom of marginal utilities****:* in a barter of economic goods q_1 y q_2, the variation of the marginal utility of q_2, as long as the available amounts of both economic goods and the marginal utility of q_1 remain constant, the price (P_{q2}) of q_1 will vary in the same sense as the displacement of Um_{q2}, and the utility of its exchange (α^{I}_{q1}) will do so in the opposite sense. The opposite situation will occur with the price (P_{q2}) and the utility of the exchange (α^{I}_{q2}) of the good q_2.

Table 6

Axiom of marginal utilities

Conditions				***Consequences***							
				Prices		***Utilities q_1***			***Utilities q_2***		
q_1	q_2	Um_{q1}	Um_{q2}	P_{q1}	P_{q2}	α^{TI}_{q1}	α^{I}_{q1}	α^{F}_{q1}	α^{TI}_{q2}	α^{I}_{q2}	α^{F}_{q2}
=	=	=	↑	↑	↓	=	↓	↑	=	↑	↓
=	=	=	↓	↓	↑	=	↑	↓	=	↓	↑

The *axiom of marginal utilities* is expressed in table 6:

In the first four columns of table 6 we show the conditions for exchange corresponding to the axiom of marginal utilities, in the next columns we show the consequences, according to the variable indicated in each one.

We will expand on the detailed analysis, considering we already know how to do it. We will only reiterate that **ALL** the feasible conclusions only be explained in terms of $Um_{q1} \cap Um_{q2}$ not by $O_{q1} \cap D_{q1}$, nor $O_{q2} \cap D_{q2}$.

We clearly observe that the correlations between value (utility measured by the areas) and prices (utility measured by the quantities that determine the prices) —decreasing marginal utilities of wealth— do not present an axiomatic positive correlation, except for the case of variations of ***Um*** if there are identical quantities available for exchange.

***Value → prices*: quantitative and qualitative analysis of cases 1 and 2**

Of the qualitative and quantitative analysis realized, of the two (four) cases, we can conclude:

- *Evolution of human wealth*: only with $Um_q \cap Um_\$$ can we conclude that a lower price of wealth can have greater utility. I.e., the only way to explain the case in which the decrease of prices is grater utility, one of the fundamental aspects of human endeavor in fighting scarcity —making things "cheaper"— is with the $Um_q \cap Um_\$$ theory. In other words, with "the" theory of prices, derived from "the" of value —the only theory that explains the *relative* origin of "relative prices"— can we understand that lower prices can imply greater value or utility.
  In other words, only with $Um_q \cap Um_\$$ can we explain the economic evolution of the human species, while the classic-neoclassic "adjustment" condemned it to apocalypse implied in the fall of prices due to competition.

- *Distribution of wealth*: with $Um_q \cap Um_\$$ we can explain that the decrease of the price of economic goods is what allow the "same" wealth" to be expanded to a greater population. Yes, while 1.000 cars that have a unit price of $ 100.000 conform a total wealth of $ 100.000.000 owned by 10.000 owners of a single car each, 10.000 cars with a unit price of $ 10.000 represent the same total wealth of $ 100.000.000 with 10.000 owners of one car each. Evidently there was an increase of the utility achieved with a decrease in the unit price.

- *Economic terms*: only with $Um_q \cap Um_\$$ can we explain the variations of wealth that quantities and prices by themselves do not show. Costs can show these variations even less.

- *Menger's logic with Marshall's mathematics*: we have proven the veracity of Menger's logic —utility is the only source of origin of prices, not costs, nor Marshall's demand curve. Demonstration we have done with an expanded use of Marshall's mathematic: we have obtained the *prices* with total or aggregate calculus (areas and/or integrals). A procedure that has allowed us to understand that: the utility with which we calculate the *value* perceived by demand (total areas α_q) does not present an axiomatic positive correlation with the utility with which we calculate the (currency) prices and (currency) wealth), that guides our micro economic sphere ($q * P_{q\$}$).
  In other words, we have been able to understand the ***correlation*** of ***value*** (α_q) → ***prices*** ($P_{q\$}$) based on the value that arises exclusively from utility (non measurable demand: area α_q) from where prices are deduced (measurable with quantities of q and $\$$). *Non axiomatic positive correlation*.

Thus in one graph we can understand the relation of value and prices, which is the relation $\alpha \rightarrow p$, which is the graphic relation of the area and the quotient of quantities of the abscissa of the Cartesian coordinates system.

With the tools presented up to this point it is worthwhile to analyze the consequences of the manipulations of quantities of currency in the name of "currency and credit policies".

Say and quantitative tautologies

We cannot leave this section without mentioning one of the main theoretical consequences of the chain of causality "the" theory of value and "the" theory of prices, which is the inconsistency known as Say's Law and as the quantity theory of money-whatever be their versions.

While this issue we have tried on several occasions —always disqualifying themselves initiative—, and will continue to do, stop it here in Table 4. In this regard it is important to note the equivalence enters columns $\$_i$ and R^I_q: 6,4 - 5,7 - 5.

Meanwhile R^I_q arises from the combination of multiple quantities of q interchanged (qi), by currency prices q, which arise from this equation: $P_{q(\$)} = \$_i / q_i$, it is clear that, yes or yes should be given equal $\$_i = R^I_q$, see:

$$R^I_q = q_i * P_{q(\$)} = q_i * (\$_i / q_i) = \$_i$$

Equality, for its components, disqualifies any proposition of Say's Law and quantitative theory of money (labor). Quite apart from the interpretations thereof can offer.

In a further work we will return about $R^I_q = \$_i$.

VALUE AND CURRENCY PRICES

Having been able to understand the relation between value and prices in general, and currency prices in particular, we can study the systems that carry out "currency policy", expanding currency printing in currency systems with (irregular) credit-currency.

Let us see then a synthesis of the tools we need for the analysis of currency policies:

Curves of decreasing marginal utilities: we already know that they represent the utility obtained by demand. Which is marginally decreasing.

Value: equivalent to the "non-measurable" utility we observe in our surfaces of total utility available for exchange (α^{TI}_q) of exchange (α^{I}_q) and of final *stock* available after exchanges α^{F}_q. Thus value means utility.

Prices: arising by relative comparison (quotient) of exchanged quantities as ***Point I***, indicates of the intersection of decreasing marginal (demand) of two different manifestations of wealth that are exchanged. Thus prices arise exclusively from utility.

Utility: it is a common denominator that relates value and prices.

Value prices correlation: with the utility present in value (area **α**) and prices (quotient of the exchanged quantities: q^I_1/q^I_2 y q^I_2/q^I_1) we can study the (positive or negative) correlation of general (area) and particular (prices) economic interest.

Currency prices: are the prices of all economic goods except of currency expressed in relation to the price of currency.

Non currency economic goods: in our exposition we will denominate them ***q***, which will represent all the "non-currency" wealth.

Currency: we represent with ***$***, which represent the *stock* of wealth in currency, and its respective curve of demand or decreasing marginal utility. Given the purpose of the analysis with the exercise we propose we suppose it is irregular credit currency, which is what governs our economies, since it is the one considered "apt" for "currency policy".

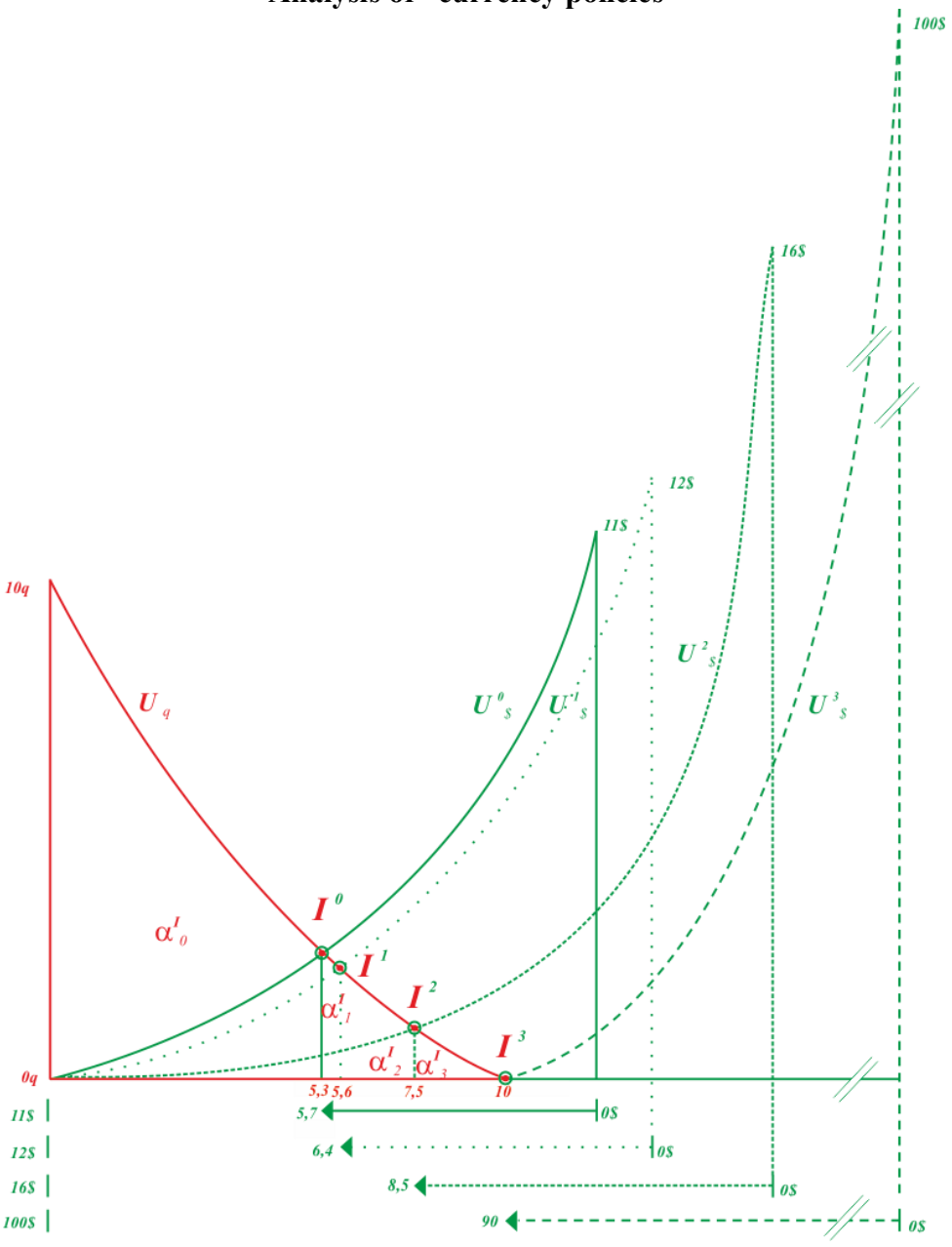
Analysis model: to the effect of analyzing "currency policy", we will use the "Menger model" that we have derived from his intersecting curves of marginal utilities. The analysis will be done in two stages: 1) Currency expansion, and then 2) Variation of *non-currency* wealth.

Currency expansion

We analyze first currency expansion. To do this we present graph 6.

Graph 6

Analysis of "currency policies"



Graph 6 was built with the same methodology as the preceding graphs:

- We have two types of manifestations of wealth: ***q*** that represents the whole *stock* of non-currency wealth and ***$*** that represents the s*tock* of wealth in currency available for exchange.
- The curve U_q is the same as in the preceding graphs. It represents the demand for the economic good ***q***, corresponding to a *stock* of 10 unites, represented in its two traditional coordinates (↑→). The total area below it to the coordinates represents the total utility of the *stock* available for exchange ($\alpha^{TI}{}_q$) which, as we know, will be composed of the exchanged utility ($\alpha^{I}{}_q$) plus the utility assigned to the final *stock* final that is not exchanged ($\alpha^{F}{}_q$). Thus, we know that: $\alpha^{TI}{}_q = \alpha^{I}{}_q + \alpha^{F}{}_q$.

- The curve $U_{\$}$ is the same of the preceding graphs, and it reads from right to left (←↑). We start from the curve $U^0{}_{\$}$ with a *stock* of ***11$***, and then go to curve $U^1{}_{\$}$ with a *stock* of ***12$***, then to the curve $U^2{}_{\$}$ with a *stock* of ***16$***, ending with an exaggerated currency expansion that we represent in the curve $U^3{}_{\$}$ with a *stock* of ***100$***.
- From the intersection of all the alternatives we present, *cases1*, *2* and *3*, which we will compare with the position of origin (***0***), arise the respective ***Points*** I^0. I^1. I^2 and I^3. From where derive the prices, areas, and currency wealth that we present in table 7.

Table 7

Analysis of "currency politics"

Pos.	*Stock*						*Prices*		*Wealth q in $*			Δ *Variation*	
	Available		*Exchange*		*Final*		*q/$*	*$/q*					
	q	*$*	*q*	*$*	*q*	*$*	*q*	*$*	R^{TI}	R^I	R^F	$P_{q\$}$	$\alpha^I{}_{q\$}$
$U^0{}_{\$}$	10	11	5,30	5,7	4,7	5,3	1,08	0,93	10,75	5,70	5,05	↑	↑
$U^1{}_{\$}$	10	12	5,60	6,4	4,4	5,6	1,14	0,88	11,43	6,40	5,03	↑	↑
$U^2{}_{\$}$	10	16	7,50	8,5	2,5	7,5	1,13	0,88	11,33	8,50	2,83	↑	↑
$U^3{}_{\$}$	10	100	10,00	90,0	0,0	10,0	9,00	0,11	90,00	90,00	0,00	↑	↑
Δ% 0→3	0	↑ 809	↑ 89	↑1479	↓100	↑ 89	↑ 737	↓88	↑737	↑1479	↓100	↑	↑

Let us see the consequences of the currency expansions:

Prices (↑$P_{q\$}$; ↓$P_{\$q}$):

↑$P_{q\$}$: 1.08 < 1.14 ≥ 1.13 < 9

↓$P_{\$q}$: 0.93 > 0.88 = 0.88 > 0.11

Which can only be explained by $Um_q \cap Um_{\$}$ but not by $D_q \cap O_q$ or $D_{\$} \cap O_{\$}$, together or separately, though there is *coincidence*, since it does not refer to relative terms.

Let us see the behavior of economic good ***q*** (non-currency wealth) with currency expansion:

Exchanged stock (↑q^I):

↑q^I: 5.30 < 5.60 < 7.50 < 10

How can we explain, based on Marshall that the exchanged quantity of ***q*** increases with an increase also of its prices? (↑$P_{q\$}$ ≡ ↑q^I**?**). The only explanation is with ↓$P_{\$q}$, based on $Um_q \cap Um_{\$}$, but $D_q \cap O_q$ and $D_{\$} \cap O_{\$}$, together or separate, cannot do so.

↑$\$^I$: 5.70 < 6.40 < 8.50 < 90

Here Marshall and Menger *agree*, since a decrease of the price implies an increase of exchanged quantities. **BUT**, only $Um_q \cap Um_{\$}$ explains in terms of relative prices.

Final stock ($\uparrow q^F$):

It is decreasing the *stock* available for exchange, remaining from previous exchanges.

$$\downarrow q^F: 4{,}7 > 4{,}4 > 2{,}5 > 0$$

A decrease of the final stock that can only be explained based on $Um_q \cap Um_\$$, insofar as it says that the remaining *stock* of q for future exchanges (α^F) is decreasing as its relative price increases ($\uparrow P_{q\$}$).

In other words, the currency expansion leads to the depletion of the *stocks of non-currency wealth* available for exchange. Thus, the extreme case is the cessation of exchanges *for* currency, which occurs because it is no longer an economic good, it does not produce marginal utility for exchange and, if its function is that of means of exchange, this implies it no longer exists as such. Then the path is a return to barter. Thus, the typical case of hyperinflation implies $U_q = 0 = U_\$ = P_{\$q}$.

There is no need to say that with $D_q \cap O_q$ we cannot explain the depletion of *stock*, since an increase of its price would imply its increase. Ergo, we can only explain the decrease of the stock of q with an increase in its price considering the rejection of $U_\$$.

Thus only $Um_q \cap Um_\$$ can explain the consequences of hyperinflation: the cessation of currency exchanges.

Exchanged utility ($\uparrow \alpha^I$):

$$\uparrow \alpha^I: \alpha^I{}_0 < \alpha^I{}_1 < \alpha^I{}_2 < \alpha^I{}_{03} = \alpha^{TI}$$

We observe that the increase of the relative price ($\uparrow P_{q\$}$) of q appears in positive correlation ($\uparrow \alpha^I$) with the exchanged utility (area shaded in red $\alpha^I{}_0 \rightarrow \alpha^I{}_3$). **BUT** in negative correlation ($\downarrow U_q$) with the decreasing marginal utility of q.

Decrease of U_q still it reaches zero at the point in which U_q intersects with the abscissa, as we have shown in the example with $U^3{}_\$$. I.e., in the case of extreme expansion of $\$$ its marginal utility is so contracted (rightward displacement of $U_\$$) that it will intersect U_q at the extreme of its *stock* available for exchange *for* currency, where $U_q = 0 = U_\$$.

In the case of extreme currency emission, where currency is no longer wealth, economic good, is where we observe that the total utility available for exchange ($\alpha^{TI}{}_q$) is equal to the exchanged utility: $\alpha^I = \alpha^{TI}$.

Once again we see the behavior of the price of an economic good does not explain the behavior of the quantities of its exchanged *stock*, or of the utility for demand. We can only explain the decrease of the decreasing marginal utility of an economic good —concomitant with the increase of its price— in terms of the decreasing marginal utility of wealth.

Total marginal utility to exchange (α^{TI}):

Here, it is important to note the positive correlation of: $\uparrow P_{q\$}$, $\uparrow \alpha^I$, and $\uparrow q^I$, which correlate negatively with $\downarrow U_q$.

Evidently:

- A concomitant increase of prices ($\uparrow P_{q\$}$) and of exchanged quantities ($\uparrow q^I$) can only be explained in terms of $Um_q \cap Um_\$$.

- Therefore, in the microeconomic sphere an increase of exchanged quantities ($\uparrow q^I$), in conformity with the law of decreasing marginal utility of an economic good, explains the behavior of total (α^I) and marginal (U_q) exchanged utilities: $\uparrow \alpha^I$ con $\downarrow U_q$.

Our considerations about q are also valid for the behavior of currency ($\$$) as an economic good. As to it being a currency, means of exchange of common use, it is important to ratify:

1) Currency is an economic good.
2) As an economic good it is governed by the axiom of the permanent positivity of prices ($P_{\$q} > 0$) to which we add the ***axiom of permanent positivity of marginal utility*** ($U_\$ > 0$).
3) An excessive expansion of $\$$ implies the possibility of $P_{\$q} \rightarrow 0$ as a consequence of $U_\$ \rightarrow \mathbf{0}$.

In this manner, we have duly demonstrated that:

- What explains *value* and *prices* are not quantities or costs, but utility.

- Utility is governed by the marginal laws of decreasing utility, with that of wealth determining prices (macroeconomics) and the corresponding law for economic goods determines the behavior of economic units (microeconomics)

- Currency as an economic good falls within the domain of the theory that explains value and prices and the marginal laws of decreasing utilities of any economic good. This denies the validity of any attempt to produce a special theory of currency and any quantitative theory that tries to explain currency prices and the price of currency.

Variation of *non-currency wealth*

We now analyze the variations of non-currency wealth, and for this we present graph 7.

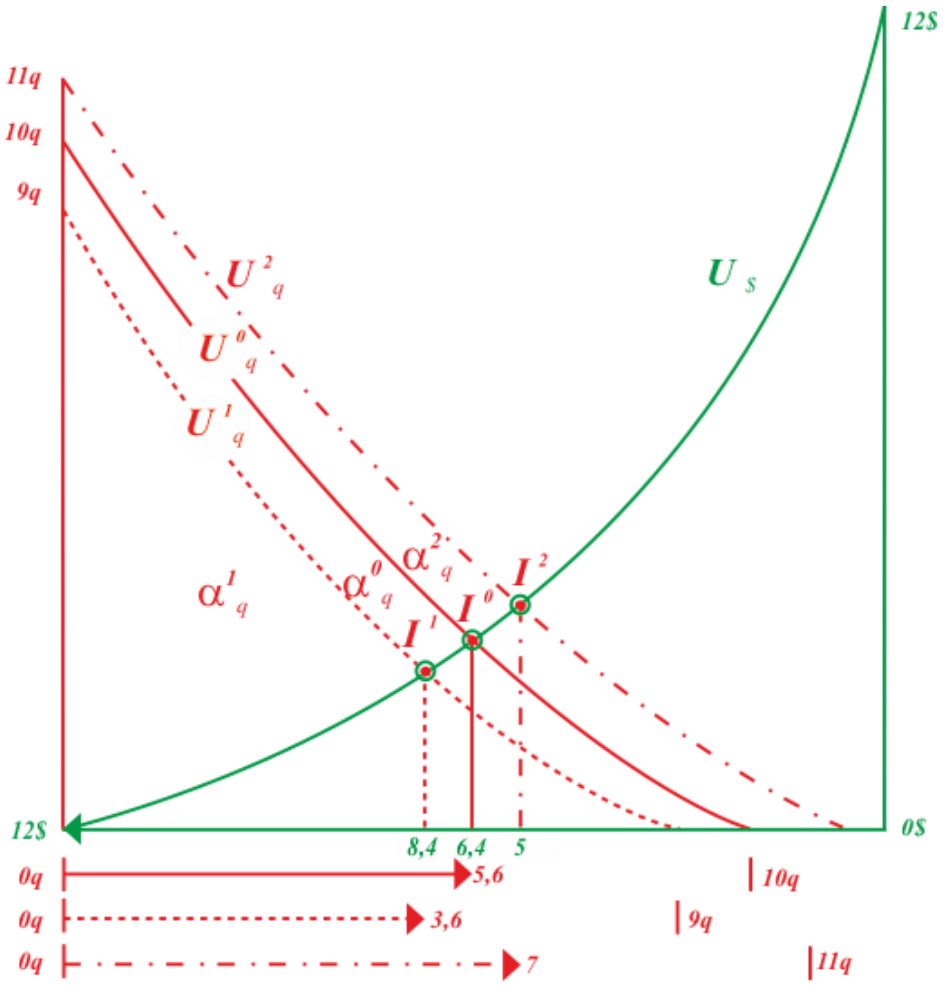
Graph 7 was built following the methodology of the preceding graphs:

- We have two types of manifestations of wealth: q that represents all the stock available for exchange of "non-currency" wealth, and $\$$ that represents the *stock available for exchange* of currency wealth.

- We must bear in mind that our curves of marginal utilities (U_q y $U_\$$) are different —because they represent the decreasing marginal utility obtained by the demander— from the traditional curves of demand by Marshall —variation of demand according to the price-data.

Graph 7

Variations of non-currency wealth



- The curve U^0_q is the same as in the preceding graphs, it represents demand —decreasing marginal utility— of the economic good ***q***, that reads from left to right (↑→). We begin with a *stock* of 10 units, with a continuous red line. The total area, below it to the coordinates represents the total utility of the *stock* available for exchange (α^{TI}_q), which as we know will be composed by the exchanged utility (α^{I}_q), plus the utility assigned to the final stock that is not exchange (α^{F}_q). Thus, we know that: $\alpha^{TI}_q = \alpha^{I}_q + \alpha^{F}_q$.

- Then, we suppose variations of the stock of ***q***: first, a decrease to 9***q***, and then an increase to 11***q***. As a consequence we represent to new curves ***Uq***: a) corresponding to the total *stock* available for exchange of 9***q***, U^1_q, that will be below the original U^0_q and, b) corresponding to the total *stock* available for exchange of 11***q***, U^2_q which will be above the original U^0_q.

- The curve $U_\$$ is the same as in the preceding graphs and it reads from right to left (←↑). We only consider the curve $U_\$$ with a *stock* of ***12$***, with its pertinent curve $U_\$$.

- From the intersection of all the alternatives we present, *cases 0, 1,* and *2,* derive the respective ***Points*** I^0, I^1, and I^2. From there we derive the prices, areas, and currency wealth that appear in table 8.

We produce the corresponding tables for these cases, variations of *stock available for exchange* of non-currency wealth (***q***):

Table 8

Analysis of the variations of *non-currency stock* for exchange

Pos.	Stock						Prices		Wealth q in $		
	Available		Exhange		Final		q/$	$/q			
	q	$	q	$	q	$	q	$	R^{TI}	R^{I}	R^{F}
U^0_q	10	12	5,60	6,40	4,4	5,60	1,14	0,88	11,43	6,40	5,03
U^1_q	9	12	3,60	8,40	5,4	3,60	2,33	0,43	21,00	8,40	12,60
U^2_q	11	12	7,00	5,00	4,0	7,00	0,71	1,40	7,86	5,00	2,86

Table 9

Qualitative behavior of variables

Conditions				Consecuencies							
				Prices		Utilities q			Utilities $		
q	$	Um_q	$Um_\$$	P_q	$P_\$$	$\alpha^{TI}{}_q$	$\alpha^{I}{}_q$	$\alpha^{F}{}_q$	$\alpha^{TI}{}_\$$	$\alpha^{I}{}_\$$	$\alpha^{F}{}_\$$
↓	=	↓	=	↑	↓	↓	↓	↓	=	↑	↓
↑	=	↑	=	↓	↑	↑	↑	↑	=	↓	↑

Considering that we can do the same analysis as in the preceding cases, here we only refer to the following central aspects:

- Non-linear and non-homogeneous behavior of exchanged quantities and prices, which ratifies that prices arise from the decreasing marginal utility of wealth, not the law of decreasing marginal utility of an economic good.

- Non-linear and non homogeneous behavior of the utility derived from the exchange with prices. Which ratifies also that both variables are governed by the law of decreasing marginal utility of wealth, not of an economic good.

- This ratifies that prices derive form the decreasing marginal utility of wealth (Menger), not the "real" costs" of economic goods (Marshall).

- It ratifies the way general interest (utility) relates to particular interest (prices). We corroborate that there is no axiomatic positive correlation of general and particular interest at the moment of exchange that Adam Smith postulated —method for corroborating the marginal laws, as opposed to the positivism implicit in the theory of games (eg.: the dilemma of the prisoner).

- This ratifies the connection of macroeconomics, where prices are determined, with microeconomics, where the provided utility is determined (known as effort or costs), according to their prices. Micro-macroeconomic connection with which we determine the distribution of wealth.

CONSEQUENCES OF THE PROPOSED THEORETICAL SYNTHESIS

This is a summary of the central aspects of the mathematical corroboration of the proposed causal chain of theories:

> ***"The" theory of value → "the" theory of prices → "the" general theory of economic calculus → "the" special theory of currency economic calculus***

We say the following:

- The "contradictions" observed —of quantities and values, for explaining economics— are not so. This is true as long as we deduce market currency prices and carry out the currency *economic* calculus derived from them based on *"the" theory of value*.
  Thus we have proven that subjective marginalism, based exclusively on the "broad", "aggregate" or "compared" law of decreasing marginal utility, is not only sufficient but necessary at the same time. This insofar as it is the only way we can understand how value explains economics, since "physical" quantities, by themselves are not adequate entities to explain economic phenomena. These are explained in the dimension of value, representation of utility, the *signs* of which we perceive through prices that guide our individual behavior.

- *Market prices: Point I*, where the slopes of both functions of the intersecting decreasing marginal utilities are equated indicate cessation of exchange. From this point we determine the relative price of each manifestation of wealth. Specifically we have determined the market currency prices of the different expressions of wealth (***q*** and ***$***), and price of currency according to the utility it offers human beings. This expresses:

  1) *Price as the exchange of utilities:* Insofar as it arises from "the" theory of value by Menger, *Point I* is where Böhm-Bawerk's market bargaining is replaced *by utilities*.

  2) *Relative origins of prices: Point I* is what determines the "true" relative prices based on comparing the marginal utilities that the different manifestations of wealth offer —broad marginal view.

  3) *Temporal function of prices: Point I*, insofar as it indicates the cessation of exchanges and the beginning of *stock* formation, ratifies the *temporal function of prices.* Temporal function that, along with Menger's causality of prices [(16)] are necessary and sufficient to explain the role of time in economics —we only need to remember interest is its price, as we have postulated in *the theory of economic time.*[(17)]

  4) *Point I* can explain: exchanges with "accounting losses"; the value of wealth not derived from exchange; the value of goods that are not produced; the value of "diamonds" (referring to the classic paradox); that greater quantities my imply les utility and vice versa; that competition is for greater utility, not because it

disappears (classic adjustment) —*while there is need and scarcity there is utility*—; that a lower price can be correlated with greater utility; …

5) *Point I* explains prices without resorting to Marshall's "real costs", or concepts such as "abstinence", "discomfort", and others —that have caused so much trouble as we know following the history of economic thought.

6) *Positivity of prices*: prices derived from *point I*, the intersection of curves of positive marginal utilities, ratifies what we have denominated the *axiom of permanent positivity of prices:* $p > 0$. In other words, the permanent positivity of prices should not be confused with decreasing nature of the curve of broad decreasing marginal utility, or with the negative variations that the price of the "same" economic good may undergo at different points in time.

- *"The" currency economic calculus of wealth:* In the three last columns of tables *4, 7, and 8*, we have expressed the economic calculus of three manifestations of wealth $\boldsymbol{q}$. according to their market monetary prices ($\boldsymbol{R^{TI}_q}$, $\boldsymbol{R^{I}_q}$ and $\boldsymbol{R^{F}_q}$), with no mention or reference to Marshall's "real costs".

- *Currency theory*: it is clear that currency theory does not justify special analysis or treatment. Its value and price is explained with the *same* theory for all economic goods, based on the chain of theories according to broad decreasing marginal utility. It is necessary to separate the study of currency determining if it is money or credit, and in the latter case, if it is regular or irregular. All are currency, but representing three completely different —economic and legal— categories.

- *Neutrality of currency:* we ratify that there is no such thing as a *neutral "economic" good* —since a good is or is not an economic good. So currency cannot be neutral, unless it is Wicksell's unfortunate "virtual currency".
  We have shown that the *price of a currency unit*, insofar as it has the function of unit of measure for economic calculus, not only is not neutral, but it is the component of subjective value of economic calculus, which also disqualifies physical productivity as an expression of value in economics.

- *Quantitative theory:* Since we have proven the full validity of the law of compared decreasing marginal utility, there is no room for any quantitative theory, neither currency theory or Ricardian-Marxist theory based on labor. Based on the intersection of two curves of decreasing marginal utility the behavior postulated by any quantitative theory is impossible, and it is circumscribed to an index of stock rotation.

- *Say's Law*: as we have explained that prices arise from the exchange of wealth destined for that use ($\boldsymbol{R^I}$) Say's Law ha son entity —in any interpretation.

- *Effective demand:* as long as it refers to the demand for exchanges ($\boldsymbol{R^I}$), the pretension to explain the behavior of total wealth ($\boldsymbol{R^T}$) based on the behavior of one of its components ($\boldsymbol{R^I}$) is inadmissible. That is why prices cannot explain the behavior of wealth: $\uparrow\downarrow \boldsymbol{Um_q} \neq \uparrow\downarrow \boldsymbol{P_q}$.

- *Economic decision-making:* we have seen why "the" subjective theory of value is *the" theory of value*. As long as we use the unit price of currency as the unit of measure, we

can clearly see that economic decision-making does not derive from quantities of economic goods, but from the utility assigned to them by humans —which is governed by the law of decreasing marginal utility of wealth ("broad" or "compared"), not from "real costs".

- *Economic balance:* theories and models that pretend to explain the function of balancing two worlds, one real (***q***) and the other of currency (***$***), absolute o virtual, as in Wicksell **(18)**, fall outside the domain of economic science. There is only one real and currency world that can be explained based on the causal chain of proposed theories, in terms of the decreasing marginal utility of *currency* wealth.

- *Logic and mathematics*: in terms of Schumpeter, we could say that the superior level of Menger's logic has been coupled with Marshall's superior level of mathematics. Both were very good in their own terrain, we only needed to organize what they pretended to explain in their spheres of specialized knowledge.
  Once more, history shows us how logic precedes mathematics, and mathematics is an excellent tool to explain what derives from good logic —we cannot deny the simplicity, clearness, and rigor (expressed in theorems) with which a curve expresses marginalism, which in turn includes the presence of time. Possibly if Menger had been very good at mathematics he would not have been a genius in logic.

- *Unified economic theory:* with the proposed theoretical causality chain and the theory of aggregate decreasing utility we believe we have contributed to the theoretical convergence of all the expressions offered by different schools of thought: Menger's macroeconomics with fundamental elements of micro economics, and Marshall's microeconomics.

- *Macroeconomics of value, for "the" theory of prices and the microeconomic technique of the use of prices*: related to the previous paragraph, we can say we have shown —together with "the" theory of value, and "the" theory of prices— how *"the"* macroeconomic theory of prices —derived from the law of decreasing marginal utility of wealth ("broad, "aggregate", "compared")— with "the" microeconomics of technique in the use of those prices —the sphere of the marginal currency inputs and outputs of each economic unit.
  If Marshall had understood that the "logic" was to put the cart before the horses (theory of value before the theory of prices), as Menger did, undoubtedly he would have derived market prices as we do, and he would have understood that "his real costs" referred, as an *imperfect orientation*, to microeconomic calculus —the sphere of *alertness* for businesspeople.

- *Distribution of wealth:* we only need to include in the chain we have developed (*valor → prices*) Menger's theory of the causality of prices, which assigned temporality to them with his proposal that the superior order prices be derived from inferior order or final prices. Temporal causality of prices that is telling us: *any manifestation of wealth that causally precedes another will derive its price from the latter, according to the necessary time.* With which we are saying that the distribution of wealth is a function of the *relative marginal utilities of wealth* —implying the presence of time—, that human beings owners of wealth assign to each manifestation of the same due to the *axiom wealth ↔ owner.*

It is this way that individuals that participate in a society define *what, how much, how, and for whom: to produce, destroy, and distribute wealth.* This is how *economic merit* can be understood:

Reward the effort to satisfy human needs.

- *Theory of interest:* according to our theory of interest, which we define as the *price of economic time*, it is clear that: Menger's theory of the causality of prices ratifies our theory of interest. Which is present in the preceding sentence: *any manifestation of wealth that causally precedes another will derive its price from the latter, according to the necessary time.*
  Since Menger's sentence incorporates time and derives it from its necessary presence in the causal relation of an economic good with others, economic time is the subordinate variable of wealth —what we have called the indirect materialization of economic time.

- *Economic terms and quantities*: we can conclude that *economics is about values*, not quantities: greater quantities do not imply greater value, or vice versa. In turn we have shown that the only way to corroborate this *ontological reality* is with the scientific causal chain we have presented: *"the" theory of value → "the" theory of prices → "the" general theory of economic calculus → "the" special theory of currency economic calculus*. No other theory, as we have seen, can explain economics based on *economic terms.*

- *Utility and prices:* It is essential to perceive that there is no linear causality of utility and prices, insofar as utility is present in each manifestation of wealth —exchanged or not— and prices arise from comparing those infinite individual manifestations of wealth. Among other things, understanding this *implies rejecting* all theories destined to explain the origin of prices with Marshall's curves; any quantitative theory, since they refer to the technical sphere of the study of the stock rotation; all theories of employment based on "effective demand", since it refers to a part of wealth ($\boldsymbol{R^I}$), it cannot refer to the behavior of the whole ($\boldsymbol{R^T}$); all theories of distribution based exclusively on prices, as they do not realize that the essence of economics is utility —to show this we have developed the cases presented (they are sufficient for the purpose but they do not exclude others); etc.

- *Fallible economic calculus:* evidently currency economic calculus makes life easier, but it is impossible that it could calculate perfectly any manifestation of wealth. We have shown that prices also do not show the variation of wealth, since this is *"non-measurable"* utility.
  In other words, we have discovered how the universe of currency economic calculus works, based on the law of decreasing marginal utility of wealth, and "the" theory of value, also the enormous relevance of having a unit of measure that facilitates it. ***BUT***, only the FATAL ARROGANCE denounced by Hayek could lead us to presume we can calculate perfectly the infinite curves $\boldsymbol{U_q}$ and $\boldsymbol{U_\$}$, in each spatial-temporal unique and unrepeatable moment. And only fatal ignorance could lead us to thing that

computers could develop the "walrasian model of equilibrium", considering that impossibility of calculating it goes hand in hand with impossibility of observing it —what we observe are prices, not utility ≡ value.

It is precisely human fallibility that leads man to pretend to dominant the finite, the circumstance that surround him, considering the impossibility of doing so with the infinite and disperse. This finite sphere is that in which the businessman develops his *alertness.*

- *Economic measurability:* we must underscore the most important consequence bequeathed to us by Menger and Mises: since utility is not measurable, we cannot thing that with price controls we are "solving problems of wealth ≡ utility —relative to its generation, destruction, and distribution.

  This scientifically lays bare the fatal human arrogance of pretending to assume the Lamarckian genius and direct the Smithian "invisible hand". We have shown there is no invisible hand, therefore there is no need for a price "dictator".

  All this insofar as we have shown how human beings "make do" with the *economic dimension —value—* that is presume not measurable —*utility*— but is governed by laws —decreasing marginal of economic goods and of wealth— the presence of which we perceive due to measurable signs —*prices*— that allow us to carry out economic calculus with the use of the price of currency. As a *universal unit of measure* it facilitates currency economic calculus. *This is how we calculate economically in a probabilistic manner, based on the scientific rigor of corroborated laws* —it is what Mises referred to. **(19)**

> *We have been able to understand how the immense and disperse world of currency prices works. Pretending to direct them is irrational. Insofar as the only thing we can be sure of is that altering their nature is attacking humanity.*

Conclusion

We believe the effort to measure is the origin of the failed theories that proposed a real and a currency world that had to be balanced, the origin of which we can find in works by Wicksell and Patinkin's dichotomy that we have to referred to in previous writings. **(20)**

At this point it is worthwhile to reiterate this essential questions:

1) Economics is governed by value that arises from the law of decreasing marginal utility of wealth ("broad or compared"), not by quantities of economic goods, which are "sifted" by the human valuation of subjective utility.

2) That a "general" or "aggregate" theory cannot be explained in terms of the theory of one of its components —only by the wealth that is exchanged ($\boldsymbol{R^I}$). On the contrary, based on an adequate general theory —such as "the" theory of value— we can explain the role of its components, such as: exchanged wealth and the prices that arise therein.

   In other words, seeing the elements that are part of $\boldsymbol{R^T}$, and the laws that govern their relations —which we derive from "the" theory of value to the special theory of currency economic calculus, based on the law of decreasing marginal utility of

wealth— can we understand $\boldsymbol{R^I}$. But based on $\boldsymbol{R^I}$ we cannot understand $\boldsymbol{R^T}$, that is what underlies the neoclassic marginalist proposal (Marshall, Keynes, quantitativists, etc.). Considering that they pretend to produce a general theory based on supply and demand for exchange that, as we have seen, along with being partial, is no more than a "proposal" of a technical micro economic resource.

In this sense we should bear in mind what Popper said: a theory must be judged in its totality (here we have judged "the" theory of value) that may or may not be corroborated and, even if it is not, this does not imply that a part cannot be valid. Here we have shown that Menger's micro-macroeconomic theory precedes, and explain, Marshall's microeconomic theory.

3) That economic evolution of human beings can only be explained in terms of "the" theories of value and prices, causally related. We have seen that the classic-neoclassic theory cannot do this.

It is evident that with the $\boldsymbol{U_x}$ curves we can explain what Marshall's supply and demand curves cannot —which is the origin of the paradoxes, since they pretend in terms of prices and not utilities. This is so insofar as the $\boldsymbol{U_x}$ curves, derived from "the" theory of value, explain both the quantitative data (quantities) and the qualitative data that refer to value (prices).

Thus, we have shown that the $\boldsymbol{U_x}$ curves are based on the causal chain *quality* → *quantity*, when judging a model of currency economic calculus. ***A theory explains reality in terms of the abstract***, such as the equivalent economic concepts of *value* ≡ *utility* ≡ *need*, that do not derive from prices nor "real costs —the causality is: *value* → *prices*.

Thus, "the" theory of value explains how ***the utility of exchange*** —expressed in terms of "the" theory of value, from which we have deduced "the" special theory of currency-economic calculus, all represented in our intersecting $\boldsymbol{U_x}$ curves, from where we obtain *point I* —explains the prices of the different expressions of wealth available. Then, human beings —the businessman, the consumer, the saver, the speculator— opts according to these market prices, derived from the infinite valuations of utility, that can be observed with the statistics presented in the form of curves of supply and demand.

We have demonstrated, no less, that in economics *value*, based on *utility* —that *quantities* of economic goods offer man— explains the *quantities*, but we cannot explain value only with quantities. This is precisely what Juan C. Cachanosky (1994) referred to when he summarized Johns S. Mill's in-caused contribution:

> "Thanks to John S. Mill we know that a variation of price produces changes in the 'demanded quantity', and that a variation of 'demand' produces changes in prices". (p. 83)

Of course we have proven this with Menger's logic, that Mill's and Marshall's do not prove, and that is why we use the term ***in-caused***.

UNIFIED ECONOMIC THEORY

Now we summarize saying our unified economic theory —proposed as a synthesis of micro-macroeconomic causality— consist of the conjunction of these two elements:

1) Causally ordered theories:

> ***"The" theory of value → "the" theory of prices → "the" general theory of economic calculus→ "the" special theory of currency economic calculus.***

2) Order of theories that are subject to the laws of decreasing marginal utilities:

- Law of decreasing marginal utility of an economic good.
- Law of decreasing marginal utility of wealth.

The history of economic thought presents two attempts or studies that pretended to explain, scientifically and/or intuitively, the relation of individual interest and that of all individuals. We refer to:

Adam Smith's *invisible hand*, by which individuals, acting in their own interest, did also in the interest of all individuals. As a consequence both interests are positively correlated.

The law of association: very well treated by Mises under the concept of *human cooperation*, tells us that individuals interact socially because they obtain a benefit. Which is in line with the fact that exchange implies utility for human beings.

Let us see considering our proposed theoretical summary, what results from each of these approaches, when explaining the causal relation of micro and macroeconomics.

Before we begin the analysis of each proposal, it is correct to say that: while Adam Smith's invisible hand was the origin of all the classic-neoclassic development we have seen —including the theory of welfare, etc.— the law of association implies the proposal presented here —within which, the question of spontaneous order only represents an issue of the different spheres of knowledge in the same theoretical direction.

Let us see then based on our proposal each of the two schools of thought. We must first produce a synthesis of the economic variables we need to observe, to present the link of individual and collective interest, if not we would continue in the sphere of intuition in which both proposals have operated.

UTILITY – The common micro and macroeconomic denominator

Considering the unified economic theory presented and corroborated here —consisting of the presented theories, causally ordered according to the laws of decreasing marginal utility— we can produce the following conclusions:

- ***Value*** is the fundamental of human economics, of economic man.
- ***Microeconomics****:* man values economically according to the ***utility***.
- ***Macroeconomics****:* it exists through ***interpersonal exchange***.
- Interpersonal exchange, being an exchange of values, is also based on utility.
- The common denominator of micro and macroeconomics is utility.
- Utility is governed by the ***law of decreasing marginal utility of the economic good*** and the ***law of decreasing marginal utility of wealth***.
- ***Prices*** arise from interpersonal exchange, according to the laws of decreasing marginal utilities.
- In a currency economy the price of currency appears as the ***unit of economic measure***, from where ***currency prices*** arise, and they are the center of currency economic calculus —though we know the chain of causality presented here is based on explaining barter previously: general economic calculus.
- Currency prices: derive from macroeconomic manifestations of value – interpersonal exchanges- that in turn are the central ***data*** *of microeconomic calculus.*

Considering the preceding synthesis we can say the answer to the micro-macro-economic connection is perfectly explained with the proposed causally ordered chain of theories or unified economic theory. We now only need to understand the causal relation of ***macroeconomic UTILITY (value)*** and the ***microeconomic UTILITY (price)***. This leads us to an adequate logical terrain, insofar as we are relating two different spheres-sets, with a common denominator that is the utility. I.e., we can analyze the macro-microeconomic connection with a common denominator that belongs to both sets.

In other words, scientifically we can understand the connection of microeconomic *individual interest*, present in the economic dimension value, insofar as it *signifies utility*, and the macroeconomic *collective interest*, where the dimension of value is expressed macro-economically with (currency) prices, that also *mean utility*. With which we are clarifying how ***individual interest for utility*** is related with ***collective interest for utility***, which is what economics is about: the economic issue is utility or value, with which we have related causally the two expressions, each one from its respective sphere, macro and microeconomic, causally ordered:

UTILITY
VALUE → PRICES

Based on this simple causal relation of macro and microeconomics we can understand and judge economic proposals relative to individual interest and collective interest. This is so and we only need to consider this situation:

Collective interest:

- Benefit: increase of utility ≡ increase of value.

- Detriment: decrease of utility ≡ decrease of value

Individual interest

- Benefit: increase of utility ≡ increase of price.
- Detriment: decrease of utility ≡ decrease of price

Therefore we only need to compare if there is a correlation or collusion of the increase-decrease of the marginal utility of wealth ($\boldsymbol{Um_{q1}}$), according to the law of decreasing marginal utility of wealth and the price of an economic good ($\boldsymbol{P_{q1}}$), according to the law of decreasing marginal utility of an economic good. Though we consider here only the relation of the marginal utility contributed by an economic good (not all economic goods or wealth), relative to the price of that economic good, the mere study of the entities of value and price, even if they refer to an only economic good, is sufficient for our goal. With this we are not avoiding comparing the variation of the price of an economic good with the variation of total wealth, and the variation of the price of a set of economic goods with the variation of the wealth of those same economic goods.

In other words, relating the entities of value (decreasing marginal utility) of a manifestation of wealth with its price is sufficient to explain the value-price relation. In turn, this does not imply we are in Marshall's sphere of microeconomics, even if we are referring to an only economic good. This is so insofar as our curve of demand is not the same as Marshall's. This is the reason why we have been very careful to present our graphic "model", to clarify that while we explain in terms of the origin of prices, Marshall explains in terms of the known price. Thus all we have said is centered on our intersecting curves of marginal utilities, not the intersection of Marshall's curves of demand and costs.

THE FALLACY OF THE INVISIBLE HAND

Let us see if there is an "invisible hand" that guarantees the permanent correlation of individual and collective interests. This leads us to present the following synthesis of the alternatives of correlation or collision of value and price, which is the same as referring to the correlation or collision of (areas $\boldsymbol{\alpha_q}$) and micro ($\boldsymbol{P_{q\$}}$) interests:

Positive economic macro and micro correlation:

- If the utility perceived by the demand increases with the increase of the price of the supplier evidently the interest of both will benefit: $\uparrow \boldsymbol{\alpha^I_q}$ with $\uparrow \boldsymbol{P_{q\$}}$.

- If the utility that the demand obtains decreases with the decrease of the price, evidently both interests suffer: $\downarrow \boldsymbol{\alpha^I_q}$ with $\downarrow \boldsymbol{P_{q\$}}$.

Negative economic macro and micro correlation:

- If the utility obtained by the demand increases with a decrease of the price evidently the interest of the demander will benefit against the interest of the supplier: $\uparrow \boldsymbol{\alpha^I_q}$ with $\downarrow \boldsymbol{P_{q\$}}$.

- If the utility obtained by the demand decreases with an increase in the price evidently the interest of the demander will be negatively affected and the interest of the supplier will be benefited: $\downarrow \boldsymbol{\alpha}^{\boldsymbol{I}}_{\boldsymbol{q}}$ with $\uparrow \boldsymbol{P}_{\boldsymbol{q\$}}$.

But we must be very careful with the interpretation of the conclusions. Let us see why.

If somebody suffers a fall of their economic interests, utility, as a consequence of exchange, this does not imply that exchange has not been useful. On the contrary, the exchange always generates utility, if not it would not be carried out. **BUT**, that the exchange that has implied a utility at the time of the exchange does not imply that the process of the exchange by which the good was acquired (or produced) ends in a positive currency result. In other words, the exchange is carried out because of the utility —to value more what is received than what is delivered— at the time of the exchange, which implies the possibility that the valuations will be completely different before (and after), the reason why there was the willingness to pay a higher or lower price than the present one. **(21)**

This is precisely what reflects the chain of causality we have proposed as a synthesis of economic thought: prices do not derive from costs, but exclusively from utility perceived by each participant at the time of the exchange-again, interest, being a price, does not escape this. If it were not so, economic theory could not explain the disappearance of suppliers —due "to higher currency costs" than the "currency income"— and the presence of new ones.

Thus we have shown that economics does not imply an axiomatic correlation of individual and collective interest. And it is also clear that the economy tries to maximize utility, be it of an individual (micro) or a group of them (macro).

This is how we understand human economic evolution. *The desire of utility* that gives an impulse to human action ***arises*** *from who has the need*, and to whom utility goes, *not from who offers the utility*. Therefore, who offers utility will be judged by who demands utility, and in the judgment suppliers of utilities appear and disappear.

This is the real competence of suppliers of utility-value, the capacity to offer the maximum possible utility is what can explain human evolution. Competition that will make those that do not offer utility disappear or those that do not offer sufficient in the eyes of those demanding utility. A scene of human evolution that can only be offered by this theoretical synthesis, since it allows us to explain the macroeconomic sphere (value dimension $\boldsymbol{\alpha}_{\boldsymbol{q}}$ and market prices $\boldsymbol{P}_{\boldsymbol{q\$}}$). And microeconomic (behavior of economic units, above all those of supply base on those market prices $\boldsymbol{P}_{\boldsymbol{q\$}}$).

We have shown how the "intuitive" idea of the invisible hand is no more than an intuitive fallacy. Let us see our proposal of unified economic theory.

CAUSALLY UNIFIED THEORIES: microeconomics ↔ macroeconomics

We refer directly to our proposal of unified economic theory, interpreting the law of association as the logical —not ethical, moral, mystical, etc.— expression of the fact that humans associate because they fin utility in this, which is the basis for our proposal. It is worthwhile to bear in mind what Mises said (1963) introducing us in the economic calculus of society in the same manner we have reached this point, explaining the causality of sociable man. Let us see:

> "Action is always action of individual men. The social or societal element is a certain orientation of the actions of individual men…" (p. 143)

> "The fundamental facts that brought about cooperation, society, and civilization and transformed the animal man into a human being are the facts that work performed under the division of labor is **more productive** than isolated work and that man's reason is capable of recognizing this truth..." (p. 144)

We have stressed "more productive" to underscore that human cooperation does not free man from his fallible condition, which in economics means scarcity. If human cooperation eliminated scarcity there would not be economic goods or economy. This is what led us to think of the need to discover the law of decreasing marginal utility of *wealth*.

Mises continues:

> "…all other human beings are potential collaborators in the struggle for survival because they are capable of recognizing the mutual benefits of cooperation, while the animals lack this faculty. (…) In a hypothetical world in which the division of labor would not increase productivity, there would not be any society. (p. 144)
> Human society is an intellectual and spiritual phenomenon. It is the outcome of a purposeful utilization of a universal law determining cosmic becoming, viz., the higher productivity of the division of labor. (p. 145)
> The advantages derived from peaceful cooperation and division of labor are universal. (…) In striving after his own —rightly understood— interests the individual works toward an intensification of social cooperation and peaceful intercourse. (p. 146)

Along with corroborating everything we have expressed —in the sense that social cooperation arises from economic laws that explain it, always within the ontological entity of scarcity— it is necessary to see that the salary is the benefit perceived by the worker for the exchange of the economic good that is implied by the result of his work.

From the preceding paragraph we must stress that Mises says: "*In striving after his own—rightly understood—interests the individual works toward an intensification of social cooperation and peaceful intercourse.*" Here Mises is careful not to positively correlate individual and collective interest, he only says it contributes to intensify social cooperation, i.e., he does not validate the positively correlative linearity of the "invisible hand".

Mises (1963) continues:

> "Law and legality, the moral code and social institutions are no longer revered as unfathomable decrees of Heaven. They are of human origin, and the only yardstick that must be applied to them is that of expediency with regard to human welfare. (…) The utilitarian economist does not (…) ask a man to renounce his well-being for the benefit of society. He advises him to recognize what his rightly understood interests are." (p. 147)
> "Society and state are on the contrary the primary means for all people to attain the ends they aim at of their own accord. They are created by human effort and their maintenance and most suitable organization are tasks not essentially different from all other concerns of human action." (p. 148)

The search for scientific causality to explain economic phenomena is precisely the origin of our proposal of a unified economic theory.

We can summarize Mises' preceding paragraphs saying that human "cooperation" is the "social" expression of the *utility* that arises from exchange. In other words, the ***law of association*** due to which ***human cooperation*** arises is the ***law of utility of exchange***, calculated in terms of aggregate marginal utilities. In other words, here Mises is pointing out that "the" theory of value is apt to explain the utility derived from exchange, one of the ways in which wealth, utility, value, is revealed to humans. Mises (1963) adds:

> "For the adjustment of the individual to the requirements of social cooperation demands sacrifices". (p. 148)

This sentence is the theoretical essence of the connection between macro and microeconomics, the synthesis of which we have expressed in these pages. We have said that the *economic link* of man and society is *utility*, manifested in value (what is useful and scarce has value), and prices (that arise from exchange that is useful). Which does not imply that we forget fallible man that must labor to overcome that ontological condition. **BUT** ¿what does this labor, this sacrifice, this cost to obtain utility imply? ¿Does it imply we must consider the cost to obtain the utility? ¿Does it imply we must resort to Marshall to explain the origin of prices and forget the utility as the only source that explains the *relative* origin of prices? … Since the doubt that arise from these question have been TOTALLY evacuated with the proposed unified theory, let us produce a summary of it, in symbols or commonly accepted micro and macroeconomic terms:

Macro → microeconomic causality:

It is pertinent to do the analysis with the tools we have in microeconomic theory, based on which we know that maximization of the utilities of a company is the result of the parity of the marginal currency ***income*** *and the marginal currency* ***expenditure***: $\boldsymbol{Im_{q\$} = Em_{q\$}}$. And we know that $\boldsymbol{P_{q\$} = Im_{q\$}}$.

Considering that the company seeks utilities, it is evident that the equation of business behavior is:

$$\boldsymbol{Im_{q\$} \geq Em_{q\$}}$$

The condition of parity is that of the maximum total utility, since even the exchanged weak additional unit produces utility —according to the law of decreasing marginal utility.

Since the businessman estimates a price for his production, with which he does his concrete calculus (*):

$$\boldsymbol{Im^*_{q\$} = P^*_{q\$} \geq Em^*_{q\$}}$$

Evidently the businessman can find himself in a real situation of currency loss:

$$\boldsymbol{Im^*_{q\$} = P^*_{q\$} < Em^*_{q\$}}$$

Situation that indicates concretely that the supplier is to the right of our *Point I*, since what he offers is of lesser utility than what the demanders perceive. Which in other words is equivalent to saying his labor for the other components of the society where he exchanges the result of that labor, is not worth what he supposed.

BUT, alert: *Point I* does not arise from $\boldsymbol{q}$ or **$**, but from $\boldsymbol{q}$ and $\boldsymbol{\$}$: $\boldsymbol{q \cap \$}$.

Things being what they are, if the supplier finds himself in a situation of currency loss, evidently he can only extract himself from it by one of these ways:

1) With the same $\boldsymbol{P^*_{q\$}}$ lower $\boldsymbol{Em^*_{q\$}}$. Which implies looking at the prices of the goods he uses in his production.

2) With the same $\boldsymbol{Em^*_{q\$}}$ speculate with a rise of $\boldsymbol{P^*_{q\$}}$. Which implies transferring his *stock* from exchange ($\boldsymbol{R^I}$) to speculation ($\boldsymbol{R^E}$).

Business alertness:

As in the previous section, the businessman is guided by the prices he expects form the market, which his reference framework. This is how we see that prices are his data.

We wish to underscore that it is the plural PRICES, since he can make his inputs compatible with those of the final product, to be able to make his currency income higher than his currency expenditure. In this manner, if we indicate with a subscript *in* each input, the equation that he must maximize is:

$$\boldsymbol{P_{q\$} \geq P_{i1\$} + P_{i2\$} + P_{i3\$} + \ldots P_{in\$}}$$

An equation of the general utility of each supplier of the production chain. An equation that synthesizes Menger's causality of prices. Exchanges are carried out to obtain utility, which, in the microeconomic sphere is perceived through the calculus of currency income that must be higher (or equal) to currency expenditures. That is why economics has to do with maximums (≥), not equilibrium. I.e., The "equal" must be understood as a maximum condition, not equilibrium.

Also, this chain of microeconomic calculus of participants in production is as Menger indicated. Let us see the case of the producer of the immediately previous input (***i1***): $\boldsymbol{P_{i1\$}}$ is what expresses this maximizing equation:

$$\boldsymbol{P_{i1\$} \geq P_{i2\$} + P_{i3\$} + \ldots P_{in\$}}$$

Let us see the maximizing equation of the producer of input 2:

$$\boldsymbol{P_{i2\$} \geq P_{i3\$} + \ldots P_{in\$}}$$

Evidently Menger's price causality explains perfectly the derivation of prices of superior order (means of production) from inferior order prices. In all cases the equation begins with a maximizing condition that must be fulfilled, a condition that is only expressing the presence of utility here in mathematical symbols (≥) from currency microeconomic calculus. **(22)**

BUT we cannot forget that the businessman is guided by the full spectrum of prices that interest him, in his circumstantially limited sphere —"final" prices, and "input" prices. Prices that do not necessarily imply a positive correlation behavior with the utility obtained by the demander. Ergo, the task of the businessman must be valued equally or above that of a scientific researcher —our case, for example— since he must find the right answer without it is presume being able to measure **VALUE** even though he calculates based on **PRICES**. Evidently the best recipe for economic progress can be by

many paths, but the worst is taxing those that generate utility: the businessman and the worker.

As a final thought: it should suffice to say we have explained macro and microeconomic behavior and, what is even better, its relations, without the use of costs, only based on utility, ***necessarily implicit*** in value and prices.

NOTES

1) In a new forthcoming work, the planned title of which is "The importance of ECONOMIC CALCULUS in MISES´ in Human Action for ECONOMIC THEORY", we continue with the theoretical fundamentals of the proposed synthesis of economic thought presented here. It is based essentially on the legacy of Menger and Mises, including the valuable approach by Dr. Juan Carlos Cachanosky that inspired "our" law of decreasing marginal utility of *wealth*.
2) What we have called the axiom of positivity of prices ($p > 0$) indicates that prices are positive by definition, there are no prices equal to zero or negative.
3) Menger (1976): "*All things are subject to the law of cause and effect. This great principle knows no exceptio*n". (p. 51).
4) In reference to the bi-univocal relation wealth–owner we must bear in mind what we have called *axiom of wealth: there is no wealth without an owner, nor an owner without wealth*, that we symbolize thus: w*ealth ↔ owner*.
5) Here it is worthwhile to refer to Einstein, in stating that in science imagination is more important than knowledge, alluding to the fact that *science progresses with imagination based on knowledge*. It is in this sense that we *extend* Marshall's imaginative work, which manifests itself in building the curves of supply and demand, here oriented to prove Menger's logic.
6) Different from the demand curve in the original graph that Marshall (1957) presents in Note 88 (page 591), in his work *Principles of economics*, where he derives his decreasing "demand curve", starting from the abscissa where he places quantities, and the ordinate where he places *prices*. I.e., as we see in the text, Marshall pretends to explain the origin of the prices in terms of the same prices, methodological absurdity that ratifies his classic argument ―*this error is of scientific importance, not paradoxical*.
7) This graph is a kind of synthesis of graphs we have presented in a previous work (Bondone, 2014). We say synthesis since it includes several graphs, of which we are especially interested in mentioning Graph 1: Curve of need (Gossen) ― Curve of demand (; and Graph 8 E under the title: Point E ― Cash account of the exchange of "First" and "Second").
8) It is important to see that our concept of utility of demand, the benefit received by the demander from the exchange, is different to what is traditionally known as the benefit for the consumer. While the utility of demand includes all the area below the curve of decreasing marginal utility, to the intersection with the coordinate axes, the benefit for the consumer includes the area below the curve of demand ―that is not our curve of marginal utility― to the imaginary line that would go from the price (obtained from the intersection of Marshall's supply curve) to the ordinate, parallel to the abscissa.
   In other words, while the benefit for the consumer refers to the "plus" the consumer obtains for having obtained the units previous to the ones that determine the price, at a lower price, our concept of utility refers concretely to the utility from the exchange, which is not measurable, since it refers to value, not prices, as does the concept of the "benefit for the consumer" ―which cannot be otherwise, since it is derived from Marshall's curves.
9) Which can clearly be observed in Marshall's text (1957) with his imperfect analysis of barter in *Appendix F* ― BARTER (p. 464 and ss). We say imperfect insofar as we judge it with Menger's logic presented here.
10) An issue that is not exclusive of economics, physics must also explain why a unit of q_1 weighs differently from a unit of q_2, even if they are of the same shape and

volume, and the same weight with different form and volume, and to do this it had to previously determine the dimensions it must calculate (weight), then came the units of measure. And based on this method of human calculus, as we saw, also in physics we observe it is not possible to explain the properties dimensioned base on simple quantities or the size of matter.

11) Cachanosky (1995) Expresses it very well when referring to the true interpretation of the law of decreasing marginal utility:

> "The law of decreasing marginal utility says that as an individual owns more units of the same good, the utility that it produces decreases (the units being of the same quality and quantity). But the theory of value based on marginal utility stats that **the value of a good is given by the utility of the last need it satisfies"**. (p. 12) (the underline is ours).

12) A replica of a salt statue ―of Lots wife fleeing Sodoma― in economic theory, because they look back.

13) On this specific issue previous works of ours can be consulted: Theory of Economic Relativity (2006), Theory of Interest (2011), and Theory of currency (2012).

14) Similar spontaneity as in the origin of money in Menger.

15) In a forthcoming work (see note 1) we will continue our analysis of the epistemology of human calculus, of which economic calculus is part. Humans calculate what surrounds them defining first the dimension that will be measured, then the adequate unit of measure ―meter for distance, kilogram for weight… this is how man discovers that the *economic dimension* is *value*, which is measured with *prices*, and it is homogeneously calculated with the price of currency, that operates as the universal *unit of measure*.

16) In line with Menger's causal ―and therefore temporal― classification: prices of economic goods of the superior order ―production means― derive from the prices of final products expected from them. It is important to note the presence of time in Menger's classification, since without its presence there is no such classification or causal order of goods. Causality from which arises, precisely, the dependence of the wealth of a certain moment on the prices of wealth of another moment.

17) The theory of interest we have proposed, that we first called the *theory of economic relativity (TER)* and then the *theory of economic time* (TET), says that time in economics materializes indirectly in wealth. In turn, being interest the price of economic time, this is also materialized in wealth. Which can be expressed saying interest is variable dependent on wealth.

Later we saw this is the same thing that happened with classic and modern physics, what Einstein (1920, English edition) expressed in this way:

> "As a matter of fact, according to classical mechanics, time is absolute, *i.e.* it is independent of the position and the condition of motion of the system of co-ordinates. We see this expressed in the last equation of the Galileian transformation ($t' = t$).
> "The four-dimensional mode of consideration of the "world" is natural on the theory of relativity, **since according to this theory time is robbed of its independence**". (p. 66) (underline ours)

Only God knows if at first we called our theory of economic time and theory of interest, theory of economic relativity, due to this similarity.

18) In previous works we have expanded on this subject, Wicksell's or Patinkin's dichotomies. Theory of economic relativity (2006); Theory of interest (2011); and Theory of Currency (2012).

19) Mises says:

> *"All that [Catallactics] can assert with regard to such exchanges is that they can be effected only if each party values what he receives more highly than what he gives away".* (p. 327)

Sentence with which he alerted us that the only thing to which we can assign scientific rigor, when referring to exchange, is the utility derived from it. Everything else, such as prices, is circumstantial and can be understood with probabilistic.

20) Which we have seen in Bondone (2006), (2009), (2011), (2012).

21) This is the essence of the theory of interest as the price of economic time. Since interest is a price, as all prices, it arises from its utility, subject to the intersected decreasing marginal law, relative or broad.

The theories that pretend to explain interest, as composed by uncertainty, risk, productivity, profitability, benefit, abstinence, return rate, ROI, WACC, etc.… are based on classic-neoclassic thought, which we have referred to. I.e. these analyses correspond to the sphere of microeconomic calculus, not macroeconomics, where interest arises. These theories do not differ from Marshall's curves of supply and demand, they are useful as tools for microeconomic calculus.

Though we fin Austrian authors that "defend" theories of interest within this repelled classic-neoclassic framework, this is because they do not accept Menger's epistemology, defining first the entity and then applying the laws of economics. Ergo, if interest is a price, it never has its origin in the entities with which they pretend to calculate "the interest rate".

The error of contemporary Austrians is understandable if Mises himself told us that *interest is not a price in itself*. Which is in line with our theory of interest, since we interpret that Mises meant *that interest is a price, but not a price in itself*, which implies our theory of the relativity of time and its price, interest. This interpretation of Mises is not unconceivable, in many of his texts he treats it as a price, with which he would be *intuitively* ratifying our theory of economic time.

On the other hand, if interest is the price of economic time, and both entities are dependent on wealth, are materialized as wealth, it is evident that the only way to explain time is comparing present and future wealth. Any other alternative implies working within the framework of classic-neoclassic theory of value and prices. In other works (2011 and 2014) we have referred to this with the idea that: as long as a theory of interest is based on answering David Ricardo fatidic question: *What is the reason why capital goods allow their owners to obtain a permanent rent, alternatively called benefit, interest, surplus value or surplus?,* it will be within the classic–neoclassic sphere.

As to the theories that try to explain interest by means of rent or income, we have already said that rent or income is the variation of wealth, i.e., this refers to total rent ($\boldsymbol{R^T}$). But, interest being a price, it arises from the wealth exchanged over time, credit, which circumscribes the entity interest (as the price it is) to inter-temporal exchanges of wealth between different individuals. Thus the price interest is explicated in the wealth exchanged as credit ($\boldsymbol{R^{IC}}$), which as is logical only expresses the interest-price agreed in each exchange. In other words, trying to explain interest is the same as explaining any price arising from *exchanged wealth*; in the case of interest, it is wealth

exchanged over time, which materializes in the *exchanged wealth*. Thus the theoretical chain of causality of interest is the following: economic time depends on wealth; interest is the price of economic time —ergo, it participates in the indirect materialization of economic time—; credit, being intertemporal exchange of wealth, is equivalent to the exchange of economic time; thus we deduce that the price of credit is interest. Then, the only scientifically rigorous relation of interest and rent or income is that the both refer to time. In all other senses, since interest is a price, it arises from the intersection of marginal utilities exchanged, not from or rent or income.

22) It is important to bear in mind that each $\boldsymbol{P_{in\$}}$ can participate in different productive processes, not only that of $\boldsymbol{P_{q\$}}$.

TABLES

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