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Supply and Demand Is Not a Neoclassical Concern

Gerson P. Lima[1]

The present treatise is an attempt to present a modern version of old doctrines with the aid of the new work, and with reference to the new problems, of our own age (Marshall, 1890, Preface to the First Edition).

1. Introduction

Many people are convinced that the contemporaneous mainstream economics is not qualified to explaining what is going on, to tame financial markets, to avoid crises and to provide a concrete solution to the poor and deteriorating situation of a large portion of the world population. Many economists, students, newspapers and informed people are asking for and expecting a new economics, a real world economic science. "The Keynes-inspired building-blocks are there. But it is admittedly a long way to go before the whole construction is in place. But the sooner we are intellectually honest and ready to admit that modern neoclassical macroeconomics and its microfoundationalist programme has come to way's end – the sooner we can redirect our aspirations to more fruitful endeavours" (Syll, 2014, p. 28). Accordingly, this paper demonstrates that current mainstream monetarist economics cannot be science and proposes new approaches to economic theory and econometric method that after replication and enhancement may be a starting point for the creation of the real world economic theory.

This paper does not ask for pluralism[2]. It is an attempt to present a new and consistent version of one of the oldest ideas in economics with the aid of a traditional econometric method that may be applied to the solution of contemporaneous economic and social problems. In the real world people are always buying and selling goods and services, that is, demanding and supplying goods and services in such a way that the ancient notion of demand and supply interaction looks like the smallest economic act, an act without which there would be no economics. This paper first shows why the present mainstream notion of supply and demand has no scientific grounds, cannot be fixed and should be discarded. Next the paper develops a proposal of a real world supply and demand theory and describes the experiment on the US aggregate supply curve.

The basic assumption is that the supply and demand interplay depends on many exogenous factors, mainly human ontological behaviour, economic policy, technology and natural resources. Methodologically, the leading assumption is that production takes time, implying that the normal status of the supply and demand interaction is disequilibrium; supply and demand here proposed is in no way an equilibrating device. It is also assumed that the exogenous phenomena, especially the economic policy, give the capacity and the limits of the human performance in the demand and supply interactions; everything that people buy may stem from a desire but they realise only what they are allowed to.

It is also assumed that supply and demand interplay bears consequences to the whole economy. Actually, supply and demand interactions generate prices and production amounts of all relevant products, services and natural resources, being thus the basic cause of all economic outcomes like employment, wage, income, investment, tax receipts, pensions, etc., and their social consequences on health, housing, education, retirement, wealth distribution, peace, and so on. Exogenous phenomena, especially economic policy, command supply and demand and supply and demand commands the economy. Without supply and demand interactions economic policy would have no consequences. On the other hand, if the economic policy dismisses the real world supply and demand interactions then probably its consequences become surprising and difficult to be understood, if not inexplicable and incomprehensible.

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[2] Pluralism in economics implies accepting mainstream monetarist economics as science, avoids paradigm change and does not provide sound scientific progress. More in Davies (2014).

The paper refers to an experiment, the estimate of the US aggregate supply and demand, giving some support to the hypothesis that the supply and demand theory may adhere to reality also at the macroeconomic level. However, considering that such an experiment requires a very long report it is here described only a small part of the whole work, the estimate of the US aggregate supply of national products equation.

Organisation of the paper is as follows: Section 2 brings a critical appreciation of the mainstream economics aiming at the demonstration that it is scientifically unfeasible and that, as *neoclassical* writers say, there is no *neoclassical* supply and demand theory. Section 3 presents a new approach to the real world supply and demand theory, based on the psychological Hierarchy of Needs and on Book V of Marshall's Principles. Section 4 is dedicated to modelling the supply and demand theory emphasising that equilibrium is actually unattainable. Section 5 collects some statements about equilibrium in economics, stressing its straight implication to econometrics. Section 6 presents the estimate of the US national aggregate supply curve and some commentaries on the results obtained. Finally, Section 7 offers some conclusions.

2. What is wrong with mainstream economics

The economy is moved partially by credit and partially by cost-free money that people get from different sources to spend and satisfy their needs. It follows that money creation is crucial in the study of economics; without exogenous cost-free money there would be no economics but only barter systems. Despite the strategic role of money the present mainstream economics blurred its concept to the point that all people and many economists do not know from where and how money is created. "The study of money, above all other fields in economics, is the one in which complexity is used to disguise truth or to evade truth, not to reveal it" (Galbraith, 1975, p. 5).

Such a disguising attitude may be a matter of politics for it is the political power that has the legal right to print money and whoever has the power to print money does it for the own sake. The political power in modern democratic countries is, officially, established by their constitutions. So, the democratic congress should be the monopolist of money emission and should do it for the sake of society. From the standpoint of law and economics a democratic government can print money (Werner, 2011; 2012). However, the exclusive power of printing money has been "spontaneously" transferred by many congresses to some private bankers, be it directly (EU, for instance) or "disguisedly" (USA, for instance[3]). The transfer of the monopolist power of money emission is an anti-democratic act implying that the private or "privatised" central bankers were also given a large share of the political power and the power of commanding the economic policy (Polleit, 2013; Auerbach, 2011).

Banks are concerned with money and therefore the main tool of the economic policy so created shall be money, a strong instrument banks have to influence the economy. Hence, mainstream economics became essentially monetarist; the interest rate has actually been the Maslow's hammer of the monetarist economics. Given that monetary interests prevail it may be said that the present mainstream economics is the *monetarist mainstream economics* and its public version is the *monetary policy* played by the *monetarists*. The economic *paradigm*, *subject area, method* and *objects* are thus submitted to the single instrument available.

Many paradigms have been associated with present mainstream economics but it seems that above all monetarists must necessarily abide by one ultimate commandment: "government should not print money". This statement looks like the true but covered *paradigm* of mainstream monetarist economics and is kept closely watched by central banks staffs (Grim, 2013; Auerbach, 2011). "An adverse aspect of a paradigm is that new

[3] The history of the privatisation of the American central bank is well known; an outstanding reference is Brown (2010). Daniel Benham simulates an amazing phone conversation to the FED and gives legal information demonstrating that the FED legal support is questionable (Benham, 2002). The site http://publiccentralbank.com provides huge information on the matter.

ideas outside the paradigm will be difficult to understand by most and, the greater the originality of the ideas, the greater will be resistance to acceptance. The monopoly-like power of a paradigm exists in many areas of research, where standard rejection … of original ideas serves to frustrate many who want to publish genuinely new ideas in "respectable" established journals" (Sy, 2012, p. 68).

Mainstream research agenda cannot admit the possibility that governments print money to execute the budget democratically discussed and approved by their congresses. Mainstream economics states that government must issue Treasury bonds; only central banks can print money out of nothing – and they do so to buy Treasury bonds, then paying the interest rent to the private holders of the public debt bonds – and collecting more bonds from the Treasury as payment for such interests. The *subject matter* of the mainstream economics, since it must be associated with money, is inflation. The purpose of inflation control was not necessarily chosen to please society but seemingly to support the value of central bankers' financial capital. The *modus operandi* of mainstream monetarist economics may be anything, provided that its permanent and major *object* is inflation control by means of the monetary policy. In contrast to sciences that deal with people, mainstream economics is not concerned with men but only with money, or perhaps only with men that have huge amounts of money.

Monetarist mainstream economics is a doctrine that absorbed and refined few scientific-looking contributions that were convenient to it. So, it is not necessarily due to its occasional social merits, if any, that neoclassical and monetarist principles were developed and marketed to be the introductory manual of monetarist mainstream economics; mainly, they are convenient to the mainstream monetarist economic policy. Neoclassical doctrine would not exist if it did not suit the undemocratic political power. Neoclassical and monetarist principles do not need to be connected to reality; above all they must be convenient to the mainstream monetarist economics. Notwithstanding, the idea of utility and profit maximisation seems to be compelling for it remains in many research agendas. But since suggested models of maximisation are not actually different from each other, all of them exhibit the same three basic mistakes.

2.1. Three basic mistakes of the profit maximisation principle

The first neoclassical mistake is the notion of *competition*. Actually, competition among companies may be associated with individual actions intending to expand individual demand curves thus producing individual sales increases, usually taking clients from other competitors. The logical motive for a company to compete is that it must be profitable to offer lower prices through marketing strategies.

Sales expansion following price reduction may be explained by a supply and demand real world theory peculiarity. The individual demand's slope may be equal to the market demand's slope for consumers' preferences are strongly attached to the product or service and weakly to the particular seller. Consequently, at the same market price the individual demand elasticity e_i is equal to the market demand elasticity e divided by the market share (D_i/D) of the individual firm: $e_i=e/(D_i/D)$. Given that the individual market share is lower than one, it follows that even if the market demand is inelastic it may be expected that normally companies' individual demands are elastic for the majority of markets is composed by many relatively small firms and few large ones. High demand elasticity seems to be a good motive for competition since it means that lower prices may lead to greater sales and larger profits (Lima, 1992, pp. 54-57; Lima, 1995).

The second mistake is the notion of instantaneous equilibrium between production and sales required by neoclassical maximisation models and provided by the imagined auctioneer or the imaginary agents' rational expectations[4]. But in the real world production takes time and thus in no point of time there is equilibrium between quantities produced and sold. There always is an immeasurable discrepancy between actual amount produced and the amount that would be brought about if production were instantaneous.

[4] Syll (2012) presents a comprehensive criticism of the notion and use of rational expectation.

The third mistake, a consequence of the second one, is the attempt of estimating neoclassical and monetarist models as if production were instantaneous, assuming then that any value observed is the right measure of the neoclassical theoretically instantaneous equilibrium value of endogenous variables. The mainstream notion of equilibrium imparts an insoluble problem to its models' econometrics. The immeasurable discrepancy between actual and theoretical equilibrium values of endogenous variables is an immeasurable exogenous variable whose omission leads to the autocorrelation of residuals that plagues mainstream econometric models. Consequently, econometrics of mainstream models hardly produces statistically acceptable results. A conclusion about maximisation is that it is not sufficient to allow for the estimate of a supply curve for it is always necessary to include the competition – and then maximisation and competition effects cannot be split and the neoclassical hypothesis of profit maximisation no longer can be scientifically tested. However, it is possible to estimate the supply curve without imposing any special behaviour of producers (Lima, 1992, pp. 164-7); mathematically, economics cannot model maximisation and does not need to do so.

2.2. There is no neoclassical supply and demand theory

If incidentally neoclassical economics creators had intended to create a realistic supply and demand theory of price and production determination then they would have somehow adopted and developed Cournot's work (Cournot, 1838). But actually they never had such intention since they must abide by the monetarist dogma imposing that the general price index is determined by the money supply or the interest rate, both under control of the central bank. Mainstream monetarist economists cannot admit that actually prices are determined by supply and demand.

At the demand side there is a neoclassical demand model for it is necessary and convenient to the monetarist mainstream paradigm at least twice. First, to support the statement that free (financial) markets may assure social welfare, and second to construct the neoclassical labour market, the cornerstone of the mainstream aggregate supply model that really harms society. Notwithstanding, even in the mainstream academic world it remains applicable the statement that "The (neoclassical) theory of aggregate supply is among the most controversial and the least settled of any in macroeconomics" (Dornbusch & Fischer, 1990, p. 252). Dornbusch & Fischer offer an alternative but nowadays there are many others, all of them contriving arguments to convince other already convinced monetarists that full employment may be not the rule in the short run but certainly is the normal situation in the long run. Grieve presents a critical analysis of the mainstream AS/AD model stressing its shortcomings and concluding that "As Keynes said long ago, such a doctrine is 'misleading and disastrous' if taken as a guide to macroeconomic policy in the real world" (Grieve, 2014, p. 59). Mainstream researchers are not constructing hypotheses to be tested; they are stating how the real world people ought to perform to justify their theorems and support their paradigm. Mainstream economics is a doctrine that prevents itself from being promoted to the status of science.

At the supply side the mainstream economics statement is that the supply curve may be defined only under the perfect competition condition. Despite that, neoclassical economists are aware of the existence of many kinds of competition that are not perfect. Accordingly, they created a plethora of imperfect competition, game theory and likewise models that do not lead to the supply curve and therefore *neoclassical* economists state that there is no general *neoclassical* supply curve[5]. The conclusion is thus that in accordance with *neoclassical* economists, there is no *neoclassical* supply and demand theory.

The heterodox literature has many works demonstrating that the mainstream notion of supply and demand is flawed and should be dismissed[6]. But the rejection of the neoclassical doctrine on supply and demand does not harm the monetary mainstream

[5] Actually, they pretend that outside the perfect competition world there is no supply curve at all.
[6] To mention some works: Lee and Keen, 2004 and Zaman & Saglam, 2012.

paradigm. Central banks will keep supporting neoclassical economists by the traditional means (Grim, 2013) for the neoclassical broken doctrine is very much interesting to the monetarist paradigm dominance. Mainstream followers also developed convenient criticism to many economic theoretical findings that do not support or contradict their doctrine. The most important of these findings seems to be the aggregate supply and demand real world theory, since mainstream economists apparently convinced everybody that the general price level is a monetary concern and that monetary policy is a must to fight inflation.

If there were a supply and demand theory, be it neoclassical or "the" real world ones, then it would be very hard for monetarist mainstream economists to support their denial of the fiscal policy and justify the monetary policy. Moreover, the real world aggregate supply and demand theory will challenge mainstream economics since it may provide a sound support to the true Keynesian economic theory. The monetarist mainstream economics is not economic science, perhaps at best a doctrine based on faith, or faith and fraud (Galbraith, 2010; FBI, 2014; Baiman and Rothenberg, 2007). It looks very difficult to elaborate a real world economic theory without abandoning the monetarists' paradigm.

Notwithstanding, it seems that what is scientifically inacceptable in the mainstream supply and demand doctrine is not the idea of supply and demand itself but the mainstream set of assumptions, especially about maximisation, utility, preferences, rationality and equilibrium. Perhaps discarding these neoclassical assumptions is the right thing to do if the intention is to design what may someday be accepted as the real world supply and demand theory. Meanwhile, works into the real world supply and demand theory are hard to find. We may have been throwing the baby out with the bath water.

3. A proposed approach to the real world supply and demand theory

This section presents the assumptions and hypotheses that lead to the supply and demand theory and the model that comes next. Joan Robinson once stated that "In the serious sciences, original work is discovery - finding connections that were always there, waiting to be seen" (Robinson, 1965a, p. 95). For her the construction of a new economic theory should be based on the ever since existing reality. Accordingly, the proposal here is to go back to the real world economist's ideas before the neoclassical doctrine upsurge that provoked the economic science derailment – and restart from there. Alfred Marshall, John Keynes, Joan Robinson and many other old times economists gave contributions that are inconvenient to the monetarist mainstream but important to "the" economic science. Recovering and improving such contributions may be a good starting point in the search for a new real world economic science. "To a very great extent the term "science" is reserved for fields that do progress in obvious ways", (Kuhn, 1962, p. 159).

The economic science should not reduce people's motivations to make economic decisions aiming at just one goal that would furthermore be the best possible and always attained. A person is not only Homo Economicus but above all Homo sapiens; men are the subject matter of other sciences, if not all of them. For instance, Medicine is the science that studies how the human body works and how it is influenced by external conditions aiming at restoring, preserving and improving individual health. Economics could be dedicated to the study of how the economy works and how it is influenced by exogenous conditions and policy decisions aiming at restoring, preserving and improving individual and, mainly, social material wealth.

The smallest economic interaction act is a buying and selling action; there is no economics without such action. This act involves at least two persons and determines the values of two endogenous variables, price and quantity sold/bought. So, the mathematical model that may theoretically explain the values of these two endogenous variables requires two equations, one at the seller's side and the other at the buyer's side. This mathematical model has been the supply and demand two equations system, which in Marshall's words is the fundamental idea of economics. The supply and demand process is the channel from exogenous causes to economic consequences; it has no life in itself and it is not prone to lead to some maximum. Actually, the opposite prevails; there

are more deprived people than welfare state societies. Social consequences of economic acts stem from exogenous causes that command supply and demand, not from the supply and demand interplay itself.

The paradigm followed by this theory is "none can spend more than one's earnings". This is not an apology of savings but a rule of life for everybody to be not systematically indebted. Saving is an individual virtue but a social disaster (Keynes, 1936) and hence economic policy should compensate for the social losses caused by personal savings. At the production side the paradigm must be rephrased to mean that "a company must raise more money than it spends". So, the basic duty of professional economists should be to advise companies on production investments decisions. However, the majority of the schools of economics dispensed with the project elaboration and management disciplines and are far from preparing for this or any other real world job. As non-mainstream people know "we need a revolution in the way we teach economics" (Chang and Aldred, 2014).

3.1. Demand

Basic assumptions on supply and demand theory are that demand comes first and that people's motivation to buy is the psychological notion of human needs; money comes next. Previously people must have motive to buy, a human unconscious or conscious need of something that may be satisfied with something that may be bought. Motivations to buy, that is, to act economically, are exogenous to economics. The origin of demand is at the human needs, be it directly (consumption goods and services) or indirectly (production inputs). These human needs whose satisfaction depends on human interaction mainly with money are, like sleeping, breathing and scratching, ontological. They refer to what men need to assure mental and physical health being thus immanent to the human species; their causes are just natural. Accordingly, what Maslow (1943) did was not explaining human needs but introducing the idea of classifying the human needs. Maslow created the long-lasting Hierarchy of Needs theory which is illustrated by the well-known five or six-stages model of human needs. The figure nearby is an "economic version" of the five-stage Maslow's model; it follows an order of predominance from the bottom to the top.

Maslow's Hierarchy of Needs

Stages	Category	Sample of Needs	Examples of Products and services	Degrees of satisfaction (by Maslow)	Price and income elasticities
5	Self-Actualization	Self-fulfillment, personal growth, peak experiences.	Post-graduation courses, cultural trips.	10	
4	Esteem	Achievement, mastery, independence, status, prestige.	The same below but with fashion and dearer trademarks.	40	↑
3	Love	Work group, family, affection, relationships.	Parks, restaurants, tourism.	50	
2	Safety	Security, order, law, income stability.	Medical assistance, insurance.	70	
1	Physiological	Food, drink, shelter, warmth, sex.	Potatoes, water, house, clothes.	85	

Source of original data: Maslow, 1943.

The bottom stage is the first one for it is the more essential to life; from there we go to higher stages after *some* degree of satisfaction is obtained in the preceding levels. In Maslow's words, "As for the concept of emergence of a new need after satisfaction of the prepotent need, this emergence is not a sudden, saltatory phenomenon but rather a gradual emergence by slow degrees from nothingness" (Maslow, 1943, p. 14). At each level the degree of satisfaction that Maslow considered reasonable for somebody to "be promoted" to the next level are "arbitrary figures for the sake of illustration", (Maslow, 1943, p. 14).

Maslow's classification of the human needs naturally follows the notion of essentiality of products and services, starting from the more essential and arriving to the more superfluous at the top level. Accordingly, in the last column it is added a seemingly idea about the evolution of the income and price elasticities from the bottom, plenty of the most essential products and services, to the esteem level, where it is expected that most of the products and services that satisfy this need probably bear the highest elasticities. At the top stage elasticities are expected to be greater than at stage 1 but not necessarily higher than at stage 4. Of course people are better at higher than lower stages of the Maslow's pyramid; they have then higher incomes and can buy better products that are naturally high-priced. The prevailing notion of inflation must be qualified. Economists could provide empirical findings giving support to Maslow's statements; demand elasticities are useful real world economic information that businessmen are waiting for.

Psychology tells us a realistic reason why people buy, and allows us to dispense with any concern about maximisation and all other mainstream assumptions on demand. The demand curve, be it individual, sectorial, regional, national, etc., is a line connecting the quantity bought (D) to the price (P) of the product or service and to a set of exogenous variables in which income (Y) is certainly the most important:

$D = f(P, Y, OV)$, where OV refers to Other Variables.

To trace this line in the plan (P x D) the income and all other exogenous variables must be fixed and hence the demand curve has a negative slope. One strategic exogenous variable among OV is the price of other products for the cross elasticity indicates the degree of competition between producers; the higher the cross elasticity, the more similar the products are and the more intense is the competition among sellers. Intensity of competition may be strategic information to companies in real world markets and economists could estimate the cross elasticity therein to provide a real world measure of the competition companies are facing.

3.2. Supply

This subsection is based mainly on the Book V of the Principles of Economics (8th Edition), where Marshall's proposal was to consolidate the supply and demand theory founded "on the pioneering work of his many predecessor economists" (Moss, 2003)[7]. So, Marshall was not creating the supply and demand theory; he was describing, and obviously improving when he considered appropriate, the state of arts of his own time. Becattini identified "a turning point in Marshallian studies" and "potential capacities in Marshall's thought" (Becattini, 2003, p. 13)[8]. He then states that Marshall "is now increasingly mentioned and more often in a favourable light" (Becattini, 2003, p. 14). According to Becattini, "Marshall cannot be considered a neoclassical economist, as most interpretations of the past did, because of the presence of important anomalies that make him clearly a sui generis economist", as Walras once put it, calling his English "colleague" a "white elephant" (Caldari, 2004).

About mathematics in Marshall's work Dardi states that "Marshall the mathematical economist and Marshall the methodologist on the use of mathematics in economics should be kept separate. The former was active approximately until the early editions of the

[7] Moss, L. S. *Marshall's Objective: Making Orthodox Economics Intelligible to Business Leaders*, fourth chapter of the book review by Caldari (2004).
[8] Becattini, G. *The Return of the White Elephant*, first chapter of the book review by Caldari (2004).

Principles of Economics, after which mathematics as a heuristic tool was renounced and remained solely as a forma mentis, in the background. The latter became more and more prominent as the former faded away, but the methodological criteria he elaborated … do not seem to convey the gist of his previous work as a mathematical economist" (Dardi, 2005, p. 1). Marshall's contribution to economics should never be associated with the neoclassical doctrine for "In sections of contemporary non-mainstream economics Alfred Marshall, one of the founding fathers of neoclassical orthodoxy, has been turned into a sort of anti-mainstream champion" (Dardi, N/D, p. 2). Marshall himself never agreed with being a "founding father of neoclassical orthodoxy".

The supply and demand theory directly from Marshall's time, that is, before its de-construction by the true creators of the neoclassical doctrine, has four fundamental assumptions: One, *demand comes first*, implying that Two, *supply adjust to demand, through marketing and production;* Third, *production takes time*, and consequently Fourth, *equilibrium is a theoretical idea*.

Marshall assumes that it is up to individual sellers to conform their targets to the demand reality, stating that "Production and marketing are parts of the single process of adjustment of supply to demand" (Marshall, 1919, p. 181). The difference in relation to Cournot and neoclassical creators is that in the process described by Marshall each company adjust its individual supply to its individual demand without following a fixed rule connecting its price and production. Instead, this process may even be split into two "departments" quite independents. One, the marketing department, regularly makes decisions on price considering the cost of production and the status of the individual demand. The other, the production department, regularly makes decisions on the production start-up considering profits realised in the near past and the status of individual demand and targeting some production level to be obtained some time ahead.

Producers do not impose prices; they propose prices (P_b) and buyers decide how much to buy at prices proposed, naturally after some possible bargaining. It is expected that competition leads all unknown bid prices P_b to be statistically not different from the actual sales price P, the publicly known market price. All the same producers do not impose production levels, they invest with a production level target that sometime later may succeed or not and may be sold or not. Both price (P_b) and production (Q) follow demand shifts in the same direction and producers notice demand variations observing their inventories variations. When their individual inventories (S) decrease producers deduce that their individual demands expanded and hence they, acting in cooperation or huge competition among them, raise their own prices and production levels. Next, each producer decide whether to accept the amount sold and keep the selling prices or to change bid prices and observe sales for a while to decide the new price bid and production start-up, endlessly looking for a satisfactory solution that usually never comes about. This satisfactory solution looks like what Keynes defined as producer's expectation (Keynes, Chapter 5, p. 46). So, Marshallian producers have a decision making model that is composed of two decision making functions like for instance the following model:

the price bidding function: $P_b = P = f(C^+, S^-, OV)$ (1)

the production level start-up function: $Q = f(R^+, S^-, OV)$ (2)

where C is the cost of production, S is the inventory of finished and processing goods and the idleness of the production and distribution capacity, R is the profit margin which depends on the price P and the production cost C, and OV stands for other variables suited for each particular good or service, company, season, location, and so on. Signs are positive to the cost C and to the profit R and negative to the inventory S.

The supply curve is the reduced equation of (1) and (2). In fact, replacing the inventory S taken from the price function (1) in the production function (2) it comes:

$Q = f(P^+, R^+, C^-, OV)$.

Next, given that $R = f(P, C)$

it comes the supply curve connecting the quantity produced to the actual sales price P with positive sign:

$$Q = f\,(P^{+}, C^{-}, OV). \qquad (3)$$

This function is the supply curve basic formula for it is the common place of the (price x production) points producers are looking for when, ceteris paribus the cost of production and OV, the individual demand curves for their products shift upwards and downwards (Lima, 1992). It is expected that all companies follow the same decision model and that parameters are different for each company in a branch. Assuming that all producers' decisions are consistent, it is expected that identical decision making model may be applied to the industry and the country as a whole.

The supply curve position depends on the exogenous variable cost of production with a negative sign and a set of other exogenous variables whose sign may be any. The supply curve is a positive slope line that shifts sideways when the cost components or other exogenous variables levels change. The supply curve slope depends on numerous internal and external relatively stable conditions touching companies, like characteristics of the product or service supplied, financial capital availability, perishability of raw materials, finished products and products in process, input's markets, company's organisation and personal abilities, and on the staffs and stockholders idiosyncrasies, among them the propensity to compete or cooperate with other companies in the same branch or outside it. The theoretical target of obtaining the highest profit possible may at best be one of these conditions; real world restrictions to obtaining it are other ones.

3.3. Real world supply and demand

This approach to the supply and demand theory is based upon two assumptions. First, after every exogenous shock some, many or all countless markets have their supply and demand curves moved. Next, it is the interplay of people supplying and demanding that determine the value of the basic endogenous variable price and production at the market level. Next step producers realize revenue and, after deducting the exogenous cost, the profit obtained defines, ceteris paribus, their demands for inputs. Combined then these demands with the respective supplies of inputs it comes about the price and production of capital and intermediary products and services, especially the wage and employment in the labour market, the amount of credit and interest rate in the financial market, the exchange rate, etc., and also the savings by people and companies, the personal and companies' wealth, the level of investment, the national economic growth, the tax revenue, etc., and social consequences on health, education, housing, retirement, peace, and so on. Price and production determined at single markets are at the root of every endogenous value that happens in the economy. If an exogenous variable variation or economic policy decision do not touch supply or demand in some, many or all markets then they have no effect on the economy. Economic policy imposes rules and values of policy instruments; given then these exogenous variables values people's interactions produce through supply and demand the economic and social consequences observed.

Second, it is assumed that every buyer and every seller always keep doing the same they always do, that is, buying and selling stuffs to satisfy needs and raise income. This assumption implies that aggregation refers not to quantities but to people's behaviour consolidation. Consequently, the aggregate supply and demand curves follow the same principles observed at the microeconomic level. In Keynes' words: "I regard the price level as a whole as being determined in precisely the same way as individual prices; that is to say, under the influence of supply and demand" (in Kahn, 1984, p. 59). Actually, the human collective behaviour exists but it concerns psychology, sociology, medicine, and other human and social sciences which bring important information to practical applications of the economic theory. But from the economic perspective the collective behaviour is an exogenous variable, it just happens like political decisions and natural resources availability.

At the macroeconomic level the economic science should search into the real world aggregate supply and aggregate demand process that explains the individual and social consequences of economic exogenous phenomena and decisions. Among these exogenous conditioning variables the most important is the economic policy for it depends on human attitudes and persuasion ability in social environments. The economic science mission should be to discover what might be changed in these real world exogenous conditioning variables in order to inform the authorities how to intervene, as positively as possible, aiming at improving the human condition like all human sciences ethically intend to do.

The slopes of the supply and demand curves reflect human behaviour conditioned by some exogenous variables while other exogenous variables shift the curves up and downstairs. Assuming that all buyers and sellers are consistent on their decisions, always producing, selling and buying for the same reasons, statistics allow for the estimate of the supply and demand for each and all products and services at the county, state, region, country or union of countries levels. Therefore, this Marshallian-based model of supply and demand may be submitted to the test of reality, both at microeconomic and macroeconomic levels.

4. Modelling supply and demand theory

The proposed model for a real world supply and demand is based on more two main assumptions. First, both supply and demand curve's slopes are supposed to be rather stable, but their positions are unstable, especially the demand curve. One may imagine that first some people somehow raise money or credit and demand stuffs they need. Then each producer perceives the level of its individual demand and decides the price to bid and the production amount to launch. Next, buyers decide how much to buy depending on the price asked by sellers. Next, each seller decides to take the quantity sold as a satisfactory production level or to change his price and observe competitors actions and buyers' decisions on how much to buy at the new price. The human decision process thus started would lead towards some accommodation of players when finally stable market price and production come about. But as a rule what actually happens is that before such accommodation is observed some new exogenous variables variations at both sides create another direction to the players' moves. Players do not complain about continuous reorientation, they keep buying and producing for they need to do so. There is no auctioneer, no invisible hand and no rational expectation; there is a process guided by quite independent but intrinsically consistent human decisions that yields price and production as endogenous variables.

Second, considering that production takes time, the effects of the exogenous variables on the endogenous variables are in general delayed; endogenous variables values in time t result from exogenous variables values distributed in time t, t-1, t-2, t-3... Keynes's idea on the subject was that "It is evident from the above that the level of employment at any time depends, in a sense, not merely on the existing state of expectation but on the states of expectation which have existed over a certain past period" (Keynes, p. 50). This does not mean that time must be included as an explanatory variable since "time" is not an exogenous variable germane to economic performance; what is exogenous is not "time" but the dynamic process that directs producers' and consumers' decisions to some practical realisation. This process obviously takes time, but it is an exogenous phenomenon in itself that probably has no regular time performance suitable to time series analysis.

This process is complex and unpredictable in essence and duration, for it depends upon consumer's diversified emotional reactions, data availability and quality, financial capital availability, staff and worker's skills, people's ability to analyse the situation, producer's emotional behaviour on decision making, actual producers and consumers alternatives, ability and restrictions to change, competition or cooperation, and so on[9].

[9] This process should not be confounded neither with the mainstream monetarist economics notion of hysteresis nor the classical notion of gravitation which is associated with actual values turning around a stable equilibrium point.

The exogenous variable in this context is the continuous process of adjustment of producers' decision which, conditioned by consumers reaction, *would* in the long run lead to a situation that may ex post be said the best for them or accepted by them just since they really accepted it. This is what one can do, not the one's dreams situation; it is always possible that a more creative businessman or consumer find still better situations.

This "best" or "acceptable" situation seems to match the Marshall's normal or natural value, defined as the value that "economic forces tend to bring about *in the long run*. It is the average value which economic forces would bring about if the general conditions of life were stationary for a run of time enough to enable them to work out their full effect" (Marshall, 1890, p. 289). On the matter, Keynes stated that: "If we suppose a state of expectation to continue for a sufficient length of time for the effect on employment to have worked itself out so completely that there is, broadly speaking, no piece of employment going on which would not have taken place if the new state of expectation had always existed, the steady level of employment thus attained may be called the long period employment corresponding to that state of expectation. It follows that, although expectation may change so frequently that the actual level of employment has never had time to reach the long-period employment corresponding to the existing state of expectation, nevertheless every state of expectation has its definite corresponding level of long-period employment" (Keynes, p. 48). Robinson wrote that "The short period is here and now, with concrete stocks of means of production in existence. Incompatibilities in the situation (...) will determine what happens next. Long-period equilibrium is not at some date in the future; it is an imaginary state of affairs in which there are no incompatibilities in the existing situation, here and now" (Robinson, 1965b, p. 101).

So, their idea is that actual values are short run or daily market values while equilibrium refers to natural values or long run or an imaginary state, or a theoretical situation; supply and demand is never an equilibrating device, never a self-righting system. It is up to producers to adjust their bid prices and production plans when individually perceived existing demand, costs and other conditions indicate a disequilibrium situation. For each company disequilibrium means opportunity to raise more money or the need of cutting losses. The adjustment process restarts continuously at any point out of equilibrium, at each relevant new information obtained by each producer about own demand, inventories and costs, competitors' strategy, legal regulations, etc., pointing then towards a new point of equilibrium that as ever will be chased but never attained. Economic theory cannot explain the process of adjustment of supply to demand for it is immeasurable; it is a complex exogenous variable that has no central command. This approach to equilibrium or disequilibrium delivers an important consequence to econometrics.

5. Equilibrium and econometrics

Endogenous flow variables' disequilibrium values are consequences of exogenous variables' variations effects on the supply and demand interplay. Always that some endogenous variable's value varies at least one exogenous variable's value had changed first. As a corollary, endogenous variables cannot have a kind of "natural" time trend; their trends do not stem from time passing but from the observed combined time trends of their exogenous explanatory variables sets. Furthermore, any relation of one endogenous variable to any other endogenous variable is also an endogenous variable and thus short run relations among endogenous values also assume only disequilibrium values. Hence, all observed values used in estimating one reduced equation must be nominal values since all deflators are endogenous variables. Economic models cannot use actual data directly for economic theory cannot explain disequilibrium values and disequilibrium relations among endogenous variables. Notwithstanding, despite unattainable equilibrium values may be theoretically deduced, or constructed, from observed exogenous variables' values that touch buyers and sellers. It is only in a laboratory experiment or theoretically created equilibrium situation that economic theory can explain endogenous variables' values and relations, for instance the supply and demand curves.

By the way, the mainstream monetarist paradigm contradicts these principles for it requires that actual values of endogenous variables be equilibrium values. They are not allowed to see that actual values of endogenous variables are not equilibrium values since in so doing they deny the mainstream monetarist economics doctrine. One negative consequence is that it seems that the baby was once again thrown out with the bath water; bad econometric results offered by mainstream monetarists have often lead to the deduction that econometrics like the 2SLS model serves no purpose and seldom to the quite simple conclusion that monetarist assumptions are scientifically unsustainable.

Producers are assumed to make consistent decisions, but their targets, or expectations, depend on exogenous variables values that are unpredictable and unstable. Producers are supposed to notice changes in the demand for their individual products and therefore to make decisions on their constantly renewed targets; they are always chasing theoretical targets. From a methodological point of view the process of adjustment of supply to demand imparts an exogenous component to all endogenous variables that would be eliminated only if exogenous variables could stop varying. Being then natural, this exogenous component is not an "error" but a "deviation" or a "lacuna". In Keynes words: "For the state of expectation is liable to constant change, a new expectation being super-imposed long before the previous change has fully worked itself out; so that the economic machine is occupied at any given time with a number of over-lapping activities, the existence of which is due to various past states of expectation" (Keynes, p. 50). Consequently, before looking for relations among endogenous variables all endogenous variables' series may and should be estimated as lag distributed exogenous variables equations, for instance in the form:

$$Y_t(X) = a + D_i(L)\, X_{it} + \mu_t$$

where Y_t is the value of the endogenous variable in time t, D(L) is a lag operator on the exogenous variables set X_t and μ is the error term. The endogenous variable cannot be lagged for this procedure imparts a time component to the equation. This equation is also the first stage reduced equation of the two stages ordinary least squares (2SLS) econometric method for the estimate of simultaneous equations models. So, this econometric method is suited to estimate the supply and demand curves both at micro and macroeconomic levels. The first stage brings about the estimate of the endogenous variables reduced equations which will be transformed into "reduced theoretical equilibrium equations" through a "laboratory experiment". This experiment consists of adding up the coefficients of each significant exogenous variable in the equation above thus creating the expression:

$$Y_{te}(X) = a + (\Sigma b_i)\, X_{it}$$

where Y_{te} represents the theoretical equilibrium series of an endogenous variable Y and b_i are the coefficients of all significant exogenous variables X_i in the set X. The reduced equilibrium equation simulates a situation in which all exogenous variables stopped varying at the moment t and it is given time enough to the exogenous variables work out their full effect on the endogenous variable, thus producing the "laboratory" or "theoretical" "equilibrium" values of any endogenous variable at each moment t, that is, the theoretical equilibrium series of each endogenous variable. It may be expected that with some delay the line of actual values of endogenous variables somehow follow the line of their theoretical equilibrium values keeping a lacuna that may statistically be white noise or convergent or constant but never divergent. These theoretical equilibrium series are used in the second stage to estimate the structural relations of the model. This would be a "theoretical equilibrium method" (TEM); it allows for the estimation of the effect of each exogenous variable on all endogenous variables under the theoretical ceteris paribus condition[10].

[10] A necessary condition to talk "ceteris paribus the variable X" is the presence of the exogenous variable X in the endogenous variable reduced equation explanatory set.

6. Estimate of the US national aggregate supply curve

This section describes part of an experiment conducted in accordance with the suggested supply and demand theory and econometric method. The successful experiment was the estimate of the aggregate supply and demand model for the United States in the period 1960-2007. This is a new model that is naturally very large and requires an extensive report. Here it is only described the estimate and offered a short analysis of the past performance of the US aggregate supply curve of national products. The supply side decision making model defined by equations (1) and (2) translated to the macroeconomic level may be described by:

Producer's price bid $\mathbf{P_b = g\ (COST, GAP, OV_1)}$ (4)

National production (GDP) $\mathbf{Y = h\ (R, GAP, OV_2)}$ (5)

P_b is the price asked by producers which is supposed to be statistically not different from the market price **P**, **Y** is the US internal production as measured by the **GDP**, **GAP** is a measure of the product inventories and capacity idleness, **R** is the profit margin, and **COST, OV_1** and **OV_2** are exogenous variables defined in the sequence[11].

Taking **GAP** from (4) and substituting in (5) it comes:

$$\mathbf{Y = GDP = f\ (P_b, R, COST, OV_1, OV_2)}$$

The national aggregate supply curve **AS** is obtained by replacing the price bid **P_b** by the market price **P** and replacing the profit margin **R** by **P** and **COST**:

$$\mathbf{GDP = \beta\ (P^+, COST, OV_1, OV_2)}$$

The aggregate demand of national products **AD** is defined by the expression:

$$\mathbf{GDP = \lambda\ (P^-, DI, OV_3)}$$

P is the general price index that results from the interaction of **AS** and **AD**, and **DI** is the disposable income. So, the explanatory set of the reduced equations for both **GDP** and price index **P** is:

$$\mathbf{GDP, P = \rho\ (COST, DI, OV_1, OV_2, OV_3)}$$

The econometric method adopted is the Two Stages Least Square (2SLS). The first stage is the estimate of the reduced equations, composed exclusively by exogenous variables, of the endogenous variables national production **GDP** and price index **P**. The next step is thus to identify the exogenous variables that explain the disposable income **DI** and the **COST** of production.

The disposable income **DI** depends on the endogenous variables **GDP** and income tax whose explanatory exogenous variables are already included in the model, the exogenous personal current transfer (**TR**), the rent from the interest upon the public debt (**INT**) and the net income received from abroad (**NIRFA**). The **COST** is an abstract measure of a theoretical national cost of production defined as a function of:

a) the wage determined in the labour market where the only exogenous variable is the minimum wage (**MW**);

b) the cost of financial capital measured by the interest rate determined in the financial capital market where the exogenous variables are the public debt (**DP**) and the money stock (**M**); and

c) the exogenous variables exchange rate (**ER**) and foreign price index (**PE**).

In the case of the **GDP** there is one immediate exogenous variable, the government expenses on consumption and investment (**FE**) and four endogenous variables, 1) private

[11] The total US aggregate supply was obtained by adding imports to the GDP and following the same method.

consumption, 2) private investment, 3) exports and 4) imports. For each of these endogenous variables the exogenous explanatory variables were defined as follows:

1) the private demand for consumption goods and services is an endogenous variable defined as a function of the endogenous variables price index **P** and disposable income **DI** and the exogenous variable credit, measured by the private credit balance **DEBTS**.

2) the private investment is an endogenous variable specified as a function of the profit margin **R,** which is defined as some function of the price index **P** and the **COST**,

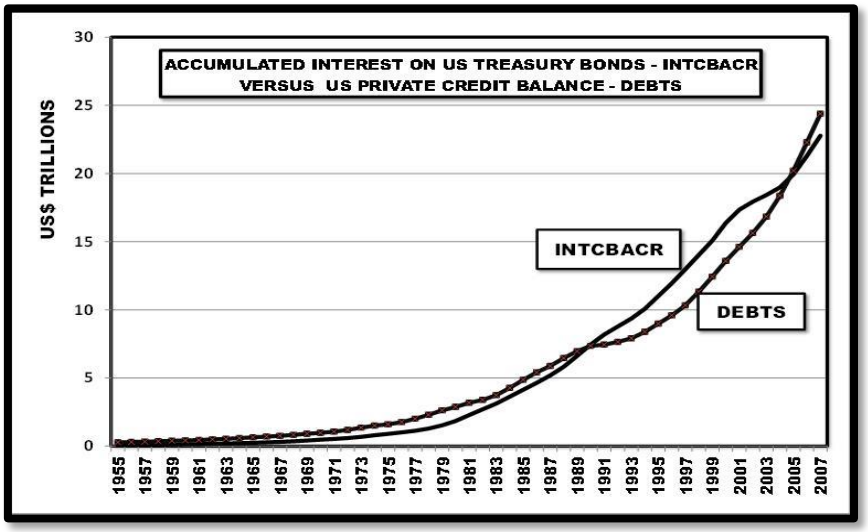
3) exports is an endogenous variable whose explanatory variables are the endogenous variable price index **P** and the exogenous variables exchange rate (**ER**) and rest of the world income (**YE**); and

4) imports are supposedly made by international trade companies intending to sell goods and services internally. Imports are thus an endogenous variable defined as a function of the profit margin **R** and the exogenous variables exchange rate (**ER**) and foreign price index (**PE**).

Finally, replacing the endogenous explanatory variables by their exogenous explanatory variables, the reduced equation for both **GDP** and **P** has the following exogenous variables explanatory set:

GDP, P = f (FE, MW, ER, DP, INT, TR, M, NIRFA, YE, PE, DEBTS)

Four considerations were then made. First, it is assumed that the credit supply **DEBTS** is partially fed by the interest rent **INT** from the public debt. This assumption follows the idea that the United States is a rentier-based country while its economy is finance-driven (Baiman and Rothenberg, 2007). The reasoning is that the major part of this rent is added to the financial capital stock thus fostering the credit supply as the Figure nearby suggests.



Source of original data: Federal Reserve System, Data Download Program.

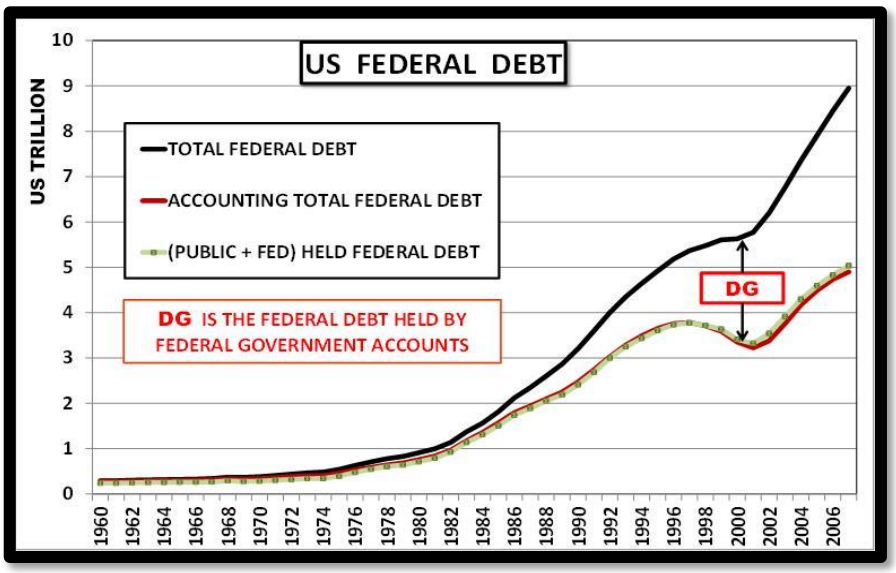
In this Figure **DEBTS** is measured by the total non-financial private sector debts balance and **INTCBACR** is the financial capital resulting from the accumulation since 1946 of the interest expenditure of the US Treasury as informed by the FED and yearly corrected by the yield estimated on the basis of the interest rate over US Treasury bonds. Considering that both variables show a quite similar time performance and that they measure the same phenomenon, **INT** was retained and **DEBTS** was dismissed.

Second, **TR** was included in **FE** and third the money stock **M** was dismissed for its measure is not free of controversies and it composes a linear combination with the exogenous variables **FE, ER** and **D** through the exogenous money stock **M** formation formula:

$$\Delta M = (FE + INT - T) + CAB - \Delta D$$

where **T** is the endogenous variable tax receipts which is a function of the endogenous variables **GDP** while the current account balance **CAB**, in this case a surplus, is tied to the exogenous variable exchange rate **ER**. Given that **INT** is a function of **D**, then one of the exogenous variables in the subset (**FE, ER, D, M**) should be discarded to eliminate the expected effect of a linear combination among the exogenous variables of the reduced equation explanatory variables set.

Fourth, the total public debt is split by the Office of Management and Budget of the White House into two components, **DP** and **DG. DP** is the Federal Government debt held by the Federal Reserve System and by the public. **DG** is the stock of Treasury bonds held by Federal Government Accounts at some Federal Government agencies. The excess of funds produced by such agencies must legally "be invested in interest-bearing securities backed by the full faith and credit of the United States" (Dave Manuel)[12], that is, Treasury bonds. Clearly, **DG** bonds are "money that the government basically owes to itself, because it borrowed the money from itself" (Dave Manuel). The figure nearby shows the total federal debt and its truly public held debt **DP**, named "(Public + FED) Federal Held Debt". The Total Federal Debt line is obtained by adding **DG** to **DP** lines. The series "Accounting Total Federal Debt" is a simulation of the public debt series constructed by accumulating to its actual value in 1945 the annual Federal Government deficits.



Source of original data: White House, Office of Management and Budget, Historical Tables, Fiscal Year 2014.

The coincidence of actual and simulate series of the "(Public + FED) Federal Held Debt" suggests that the debt held by Federal Government Accounts **DG** implies no cost to the Federal Treasury. Actually, the interest on **DG** could be paid at bonds' maturity with new bonds emissions. **DG** would thus grow continuously with the interest on the previous stock and new Federal Government agencies' excess funds. If this is the case then **DG** bonds would actually be not debt but a kind of tax revenue, an endogenous variable with an exogenous component that is not clear and therefore **DG** was dismissed.

This process of refining exogenous variables led to:

$$GDP, P = f\,(FE, MW, ER, DP, INT, NIRFA, YE, PE)$$

The reduced equation to be estimated is thus:

$$GDP_t\,,\ P_t = a + D(L)FE_t + D(L)MW_t + D(L)ER_t + D(L)DP_t + D(L)INT_t + D(L)NIRFA_t + D(L)YE_t + D(L)PE_t + \mu_t$$

[12] http://www.davemanuel.com/investor-dictionary/intragovernmental-holdings/.

Starting by the **GDP**, after several attempts it was observed that **NIRFA, YE** and **PE** were never statistically significant and so they were dismissed. After trying countless lags combinations it was obtained the **GDP** estimate presented in the Gretl's report nearby.

US GDP, 1963-2007
Dependent variable: GDP

	Coefficient	Std. error	t-statistics	p-value	
const	-277.807	114.228	-2.4320	0.01984	***
FE_1	6.36696	0.157544	40.4138	<0.00001	***
ER_2	15.5759	4.99176	3.1203	0.00344	***
DP	-2.38844	0.21573	-11.0715	<0.00001	***
DP_1	1.98116	0.226115	8.7618	<0.00001	***
INT_2	-7.76107	1.86308	-4.1657	0.00017	***
INT_3	11.6872	1.79965	6.4942	<0.00001	***

Dependent var. avg.	5283.698		Dep. var. std. error	4128.371
Square residuals sum.	719425.4		Regression std. error	137.5945
R-square	0.999041		Adjusted R-square	0.998889
F- statistic	6595.380		F p-value	9.53e-56
Durbin-Watson	1.754499		DW 1% (6,45): 1.065-1.643	

Collecting the coefficients for each lagged explanatory variable it comes about the theoretical equilibrium equation for the US **GDPe**:

GDPe = - 277.807 + 6.36696*FE + 15.5759*ER - 0.40728*DP + 3.92613*INT

This is a laboratory research work, a simulated situation in which the **GDP** would be in a state of equilibrium since the exogenous variables have theoretically been kept static at each point in time and were supposedly given time enough for their full effect to be worked out; every point is a provisional theoretical equilibrium.

The estimate of the price index **P** reduced equation is presented in the report nearby.

US PRICE INDEX, 1961-2007
Dependent variable: P

	Coefficient	Std. error	t-statistics	p-value	
const	2.94601	2.17025	1.3575	0.18225	
FE	0.0667977	0.0116013	5.7578	<0.00001	***
FE_1	-0.0315971	0.0128534	-2.4583	0.01839	**
MW_1	12.2312	0.883105	13.8502	<0.00001	***
ER	0.334376	0.0738559	4.5274	0.00005	***
DP_1	-0.00855379	0.00156301	-5.4727	<0.00001	***
INT	0.178412	0.0100652	17.7256	<0.00001	***

Dependent var. avg.	103.5404		Dep. var. std. error	58.21322
Square residuals sum.	114.7619		Regression std. error	1.693826
R-square	0.999264		Adjusted R-square	0.999153
F- statistic	9048.828		F p-value	5.05e-61
Durbin-Watson	1.783228		DW 1% (6,45): 1.123 – 1.639	

The theoretical equilibrium equation for the US price index **P** is:

Pe = 2.946 + 0.0352*FE + 12.2312*MW + 0.334376*ER - 0.008554*DP + 0.17841*INT

Finally, in the second stage of the 2SLS method these two equations are combined to bring about the US aggregate supply curve. This combination is done by taking the

expression of the government spending FE from the price index P equation and substituting FE it in the GDP equation. FE is the exogenous variable that must be chosen for it is the sole one that displaces only the aggregate demand and does not influence directly the supply curve. Therefore, ceteris paribus the other exogenous variables, FE variations cause aggregate demand shifts while the aggregate supply remains fixed, thus tracing out the line of theoretical equilibrium points of the aggregate supply and aggregate demand crossroads. Following an easier way it was run the OLS regression of GDPe as a function of Pe and all exogenous variables but FE, obtaining the result reported nearby.

US NATIONAL AGGREGATE SUPPLY CURVE (1960-2007)

Dependent variable: GDPe

	Coefficient	Std. error	t-statistics	p-value	
const	-810.678	4.049e-11	-2.002e+13	<0.00001	***
Pe	180.88	1.275e-12	1.418e+14	<0.00001	***
MW	-2212.37	3.137e-11	-7.052e+13	<0.00001	***
ER	-44.9059	1.444e-12	-3.110e+13	<0.00001	***
DP	1.13996	0	4.083e+13	<0.00001	***
INT	-28.3446	2.087e-13	-1.358e+14	<0.00001	***

Dependent var. avg.	5783.001		Dep. var. std. error	4516.247
Square residuals sum.	5.45e-20		Regression std. error	3.65e-11
R-square	1.000000		Adjusted R-square	1.000000

Of course these statistics are irrelevant; this trick just avoids algebraic mistakes. What matters is the theoretical equilibrium **US national aggregate supply curve**:

$$\mathbf{GDPe = -810.678 + 180.88*Pe - 2212.37*MW - 44.9059*ER + 1.13996*DP + - 28.3446*INT}$$

All these estimates produce a sort of "average" results associated with the sample. So, the AS slope (180.88) is valid for this sample; other samples will generate different slopes[13]. By the way, this estimate of the US aggregate supply curve slope suggests that it is quite away from zero. So, this experiment gives no support to the neoclassical vertical aggregate supply curve and full employment ideas. Anyway, it should be interesting to estimate the slope of the aggregate supply curve for many successive samples since it indicates a country's industrial development; in relation to the horizontal line, the nearer the aggregate supply curve the more industrialised the country is.

On the other hand, inside a sample all coefficients vary for they depend on the time performance of all variables. Accordingly, the constant term also varies and thus the supply curve shifts constantly as time goes by. Companies do not follow an eternal relation among price and production; they adapt themselves to all market conditions and hence there is an aggregate supply curve for each point in time. Therefore, the supply curve, like all endogenous variables, must be estimated at each new data available.

Notwithstanding, most probably the sign of a coefficient is not expected to change as samples change; they reflect the logical influence of the exogenous variable on the endogenous one, ceteris paribus the other exogenous variables. For instance, in this case the minimum wage and the exchange rate push the US aggregate supply curve to the left. This means that higher minimum wage and more dollars per foreign currency play a cost effect over the aggregate supply curve, and this is theoretically logical. The monetary policy looks undefined for the public hold debt DP expands the aggregate supply while the interest expenditure INT does the opposite. But it is possible to estimate the combined effect of DP and INT by omitting DP in the AS equation. This omission imparts a bias to INT such that INT carries the effect of DP on it. Alternatively, this bias may be introduced without distorting the other coefficients by estimating DP as a function of INT:

[13] So, endogenous explanatory variables cannot be submitted to the ceteris paribus condition.

DP = -196.387 + 11.064*INTCB

Substituting this **DP** equation for the **DP** variable in the **GDPe** equation above it is obtained the abridged version of the US national aggregate supply curve:

GDPe = - 1034.551 + 180.88*Pe - 2212.37*MW - 44.9059*ER - 15.7321*INT

This means that if the public debt is allowed to vary instead of being under the ceteris paribus condition then INT bears a negative sign; the public debt effect is combined with the interest rent effect and the joint effect is negative. This means that the monetary policy caused a negative effect on the US production and distribution sector. These three economic policy instruments, minimum wage, exchange rate and monetary policy were a cost to the US producers, they impose costs to the production side of the US economy. However, they also shift the aggregate demand curve which is by now unknown. Notwithstanding, it is possible to find out the consequences of the economic policy over the economic activity and the price level by looking at the GDP and P reduced equations, in this case the abridged versions of their reduced equations. For instance, in this case the replacement of **DP** in the **GDPe** and **Pe** reduced equations by the **DP** expression above brings about the following equations:

GDPde = - 372.4629 + 6.36696*FE + 15.5759*ER - 0.62995*INT

Pde = 4.49523 + 0.03520*FE + 12.2312*MW + 0.334376*ER + 0.08421*INT

The fiscal policy has a straightforward interpretation for it does not touch the aggregate supply and has positive effects on both **GDPde** and **Pde** meaning therefore that more **FE** shifts the aggregate demand to the right. The minimum wage cause prices **Pde** to rise but has no effect on **GDPde**; so, higher minimum wage means aggregate demand expansion and more income to workers without causing unemployment. The exchange rate has a positive effect both on the **GDPde** and **Pde**; so, dollar undervaluation (higher **ER**) shifts the aggregate demand curve to the right thus more than offsetting the **ER** negative effect in **GDP**. Conversely, the monetary policy presented the opposite performance. Signs of **INT**, negative in the **GDP** equation and positive in the **P** equation, allow for the deduction that the monetary policy expanded the aggregate demand, through credit (**DEBTS**), but the shift so attained was less than the expansion required to compensate the contraction that the monetary policy imparted to the aggregate supply. The conclusion is thus that monetary policy caused unemployment to grow and price to rise. This experiment gives support to the principle that supply and demand moves the economy and generate economic and social consequences like GDP, price index, personal and national income, unemployment, investment, tax receipts, education, health, retirement, income and wealth concentrations, and so on.

7. Conclusions

The main conclusion is that this paper may be seen as evidence that there is a supply and demand theory that may drive the economic reasoning in the analysis of the causes of real world economic phenomena. The experiment reported gives support to the principle that the interplay of supply and demand is the natural system that connects economic policy decisions and other exogenous variables variations to the actual economic and social consequences perceived. One important side effect is that the law of supply and demand developed and marketed by mainstream neoclassical economists may be discarded. Sponsors of this false science induced the dismissal of the law of supply and demand by almost all real world researchers. This scientific bias helped mainstream economics to flourish and occupy minds and hearts the world around. The paper stresses three mistakes to demonstrate that there is no *neoclassical* supply and demand theory since *neoclassical* assumptions are scientifically unverifiable; what is wrong are the *neoclassical* assumptions, not the supply and demand idea. Hence, what must necessarily be dismissed is the neoclassical doctrine and not the supply and demand interaction. The fundamental idea here is that supply and demand is ruled by exogenous phenomena, especially human nature and economic policy, and moves the economy. Econometrics

applied may be seen as similar to a blood test; it must be repeated frequently and new methods are always welcome. Econometrics is not supposed to only prospect economic connections but mainly to systematically check them.

Smith, Marshall and Keynes seemingly thought that the supply and demand theory should be the foundation of the general economic theory. Supply and demand theory results from the contributions of many researchers; it has no single creator and does not call for an adjective; it is a collective work that for a long time has been there waiting to be seen and improved. This paper is founded on the hope that after replication and enhancements it is possible to restart the creation of the real world supply and demand theory thus creating a new economic theory founded on a sound economic and social paradigm. Economics main mission should be searching for the best economic and social targets, and defining the best policy mix to be reported in plain English to the congress; people would therefore perform socially to conducting the economy towards such targets.

According to the supply and demand theory an economic crisis is associated with an excess of supply or, more frequently, with a lack of demand. Short demand for economists seems be the nowadays a major concern of students, researchers, teachers and schools of economics. The reason for the demand for economists to be low may be a low quality of the services economists have been trained to supply to society, as indicated by the dissatisfaction that remains despite the non-mainstream huge efforts from the world around. Talking syllabus reformulation: suggestions here are that economists call for their basic tool, the real world supply and demand theory and that it should be searched what are the needs of the market that real world economists can supply and should be supplying. Such a survey must consult the real world market, and not teachers; search into the demand for economists by employers and not by the suppliers of economists. Mainstream economists cannot do that, even if they knew how to do it, but why have ethical economists, researchers and teachers not done that survey yet? It is indispensable information for a syllabus design.

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Appendix: Variables definitions and sources. Data are current values.

GDP – Gross Domestic Product, US$ billion, US Bureau of Economic Analysis. http://www.bea.gov/national/index.htm.

P - US Bureau of Labor Statistics, CPI Detailed Report. http://www.bls.gov/cpi/cpid1405.pdf.

FE - Federal Government, Fiscal Expenditure, estimated by subtracting Net interest expenditure from Total outlays, US$ billion, White House, Office of Management and Budget, Historical Tables, Fiscal Year 2014, Tables 3. http://www.whitehouse.gov/omb/budget/Historicals.

MW – Federal minimum wage, US$ per hour, U.S. Department of Labor. http://www.dol.gov/esa/whd/flsa/.

ER - Exchange rate, average exchange rate in US dollars needed to buy a foreign currencies basket weighted by the corresponding US exports. Original data: OECD. Sample: Austria, Belgium, Canada, China, France, Germany, Ireland, Italy, Japan, Mexico, Netherlands, Switzerland and United Kingdom. http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE4.

DG - Federal Government debt held by Federal Government Accounts, US$ billion, White House, Office of Management and Budget, Historical Tables, Fiscal Year 2014, Tables 7.1. http://www.whitehouse.gov/omb/budget/Historicals.

DP - Federal Government debt held by the central bank system and the public, US$ billion, White House, Office of Management and Budget, Historical Tables, Fiscal Year 2014,Tables 7.1. http://www.whitehouse.gov/omb/budget/Historicals.

INT – Federal Government interest expenditure, US$ billion, Federal Reserve System, Data Download Program. http://www.federalreserve.gov/datadownload/Choose.aspx?rel=Z1.

DEBTS - Private credit balance, Nonfinancial business, Households and Non-profit organizations, credit market instruments, liability, Series D.3, annual, US$ billion, Federal Reserve System. http://www.federalreserve.gov/datadownload/Choose.aspx?rel=Z1.

NIRFA - Net unilateral current transfers, U.S. International Transactions Accounts Data, US$ billion, US Bureau of Economic Analysis.

YE - foreign income measured by the GDP of the OECD area except US, US$ billions, OECD Statistics. http://www.oecd.org/statistics.

PE - foreign consumers price index measured by the average Consumer Prices Index, weighted by the GDP, base 2005 = 100, original data: OECD, consumer prices, sample: Australia, Austria, Belgium, Canada, Denmark, France, Germany, Greece, Italy, Japan, Netherlands, New Zealand, Portugal, Spain, Sweden and United Kingdom. http://www.oecd.org/statistics.