KEYNES'S SERIOUS MONETARY THEORY:

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**"The terms in which contracts are made matter. In particular, if money is the goods in terms of which contracts are made, then the prices of goods in terms of money are of special significance. This is not the case if we consider an economy without a past or future. . . . <u>if a serious monetary theory</u> comes to be written, the fact that contracts are made in terms of money will be of considerable importance"-- Arrow and Hahn (1971, pp. 356-7, italics added).**

**"In the first place, the fact that contracts are fixed ... in terms of money unquestionable plays a large part" – Keynes (1936a, p. 236).**

**"...in the <u>General Theory</u> ...injustice becomes a matter of uncertainty, justice a matter of contractual predictability": – Skidelsky, (1992, p. 223).**

**"It seems to me that economics is a branch of logic: a way of thinking.... One can make some quite worthwhile progress merely by using axioms and maxims. But one cannot get very far except by devising new and improved models. This requires... vigilant observation of the actual working of our system. Progress in economics consists almost entirely in a progressive movement in the choice of models"**

**-J. M. Keynes (1938)**

In his 1935 new year's day letter to George Bernard Shaw Keynes indicated that he was writing a book that would revolutionize economic theory. Keynes's theory would describe a real world economy where liquidity and money contracts play a dominant role in the organization of production and exchange processes. For several decades after the second world war economists spoke about this Keynesian Revolution in economic theory and policy. In 1971 even an American President, Richard M. Nixon, announced "now I am a Keynesian". Today however, the teaching of Keynes's revolution in theory and policy is dead, at least in economics textbooks, the writings of mainstream economists, and speeches of governmental policy makers whether they be "liberal" or "conservative".

How can we explain the death blow given to this revolutionary analysis developed by the greatest thinker in economics in the 20th century? And what was revolutionary about Keynes's theory vis-a-vis earlier 19th and 20th century economic theory?

Keynes's biographer, Lord Skidelsky [1992, p. 512] has noted that "the validity of Keynes's 'general theory' rests on his assertion that the classical theory ... is, as he put it in his lectures, 'nonsense'. If it [the classical theory] were true, the classical 'special case' would in fact, be the 'general theory', and Keynes's aggregative analysis not formally wrong, but empty, redundant. It is worth noting...that mainstream economists after the Second World War treated Keynes's theory as a 'special case' of the classical theory, applicable to conditions where money wages ... were 'sticky'. Thus his theory was robbed of its theoretical bite, while allowed to retain its relevance for policy"

If Keynes was merely arguing that unemployment was the result of price and wage

rigidities, then Keynes was not providing a revolutionary theory of a monetary economy that experienced problems of unemployment. For even in the 19th century classical economists had argued that the lack of flexible wages and prices (supply side imperfections) is the cause of unemployment. In The General Theory Keynes specifically denied that the fundamental cause of unemployment is the existence of wage and/or price rigidities when he [Keynes, 1936a, p. 257] wrote: "the Classical Theory has been accustomed to rest the supposedly self-adjusting character of the economic system on an assumed fluidity of money wages; and when there is a rigidity, to lay on this rigidity the blame of maladjustment.... My difference from this theory is primarily a difference of analysis."

Given this statement of Keynes, how could mainstream economists after the second world war ever conceived that Keynes's theory required sticky wages, prices, to demonstrate the existence of involuntary unemployment? Even those who attribute unemployment to an absolute liquidity trap (i.e.,a fixed minimum interest rate[1]) have not read Keynes (as endnote 1 documents).

A sage once said that the definition of a "classic" is a book that everyone cites but no reads. Mainstream economists who call themselves "Keynesians", and yet attribute unemployment to wage, price rigidities or an interest rate liquidity trap, must think of Keynes's *General Theory* as a literary classic that they can cite without bothering to read or understand Keynes's serious monetary theory.

In most universities students have always been taught that Keynes's book The General Theory of Employment, Interest and Money is an obscure and confusing book[2] and therefore they need not read or comprehended. Instead, students are taught that it is supply side imperfections, what I call the "welfare queen theory of unemployment where the "welfare" state has coddled

workers, that is the basic cause of observed unemployment in the real world. Today's hi-tech mathematical version of the 19th century classical theory is the foundation of all mainstream economic models of the economy where economic problems are always associated with the existence of some wage and/or price rigidity and these rigidities are often associated with government regulations and policies that interfere .with a free market environment.

When asked what was revolutionary about Keynes's Theory, economist such as Don Patinkin has argued it is "the multiplier". But the multiplier was invented by Keynes's student Richard Kahn, and hence if that is what was revolutionary, we should talk about the "Kahnian Revolution". Surely Keynes revolution was not based on what his student had published five years before The General Theory.

Yet Keynes told the reader what he was going to do to create a revolutionary theory. On his The General Theory, John Maynard Keynes stated that classical economists "resemble Euclidean Geometers in a non Euclidean word who, discovering that in experience straight lines apparently parallel often meet, rebuke the lines for not keeping straight – as the only remedy for the unfortunate collisions which are occurring. Yet in truth there is no remedy except to throw over the axiom of parallels and to work out a non Euclidean geometry. Something similar is required today in economics"

In this paper we will explain how why Keynes's "nonEuclidean"economic theory was never incorporated into mainstream macroeconomic theory even though Keynes's analysis is relevant to the economic world in which we live – a world where financial markets can not be "efficient". In Keynes's analysis, the civil law of contracts and the importance of maintaining liquidity in financial markets play crucial roles in understanding the operations of a money using,

market oriented, entrepreneurial economy – both from a domestic national standpoint and in the context of a globalized economy where nations may employ different currencies and differing civil laws of contracts.

In order to provide concrete evidence of why Keynes's revolution was never understood before it ever had a chance of entering the professional economic literature, we will use primarily the example of Paul Samuelson's attempt to propagate Keynesianism and compare it with Keynes's revolutionary monetary theory– where the latter meets Arrow and Hahn's criterion for developing "a serious monetary theory".

We will then explain how Debreu and the Cowles Commission of the 1950s added their bullets to Samuelson's mortal attack on Keynes. We will also explain why, beginning in the 1970s, J. R. Hicks, progenitor of the ISLM version of neoclassical Keynesianism and winner of the Nobel Prize in 1972 for his "pioneering contributions to general equilibrium theory", recognized that his classical general equilibrium analysis of Keynes - the ISLM version of neoclassical Keynesianism – was not representative of Keynes's general theory framework. In the 1980s, Hicks stated that ISLM did not represent Keynes's revolutionary analysis and that John Hicks was, after all, a Post Keynesian.

## II. SAMUELSON'S NEOCLASSICAL SYNTHESIS KEYNESIANISM

For most students who studied economics in any American University during the last half of the 20th century, Samuelson was thought to be a direct disciple of Keynes and his revolutionary general theory analysis. Samuelson is usually considered the founder of the American Keynesian school which he labeled Neoclassical Synthesis Keynesianism because of the classical microeconomic theory that Samuelson had developed in his Foundations of Economic Analysis

[1947] that Samuelson claimed was the micro foundation of Keynes's macro analysis. Samuelson's neoclassical synthesis brand of "Keynesianism" , however, is logically incompatible with Keynes's theoretical framework.

Given Samuelson's dominance of the American macroeconomic scene after the second world war, the different axiomatic foundation of Samuelson's popularization of Keynesianism vis-a-vis Keynes's General Theory aborted Keynes's truly revolutionary analysis from being adopted as the basis of mainstream macro economics. Consequently in the 1970s, the Monetarists easily defeated Samuelson's 'Keynesianism" on the grounds of logical inconsistency between its microfoundations and its "Keynesian" macroeconomic policy prescriptions. The effect of this defeat was to change the domestic and international choice of policies (1) to prevent unemployment, (2) to promote economic development, and even (3) to finance government social security systems away from prescriptions founded on Keynes's revolutionary analysis and towards the age-old laissez-faire policies promoted by classical theory. .Consequently, socially acceptable macroeconomic policies regressed, with the result that the "golden age of economic development" experienced by both OECD nations and LDCs during the more than quarter century after world war II has disappeared[3] despite the technological advances in the study of economics.

As a result of the Monetarist victory over Samuelson's Keynesianism in the 1970s, New Keynesian theory as espoused by Mankiw and others tended to replace Samuelson's Keynesianism. Just as Friedman's Monetarism had conquered Samuelson's brand of Keynesianism, however, New Classical theory and its concept of rational expectations easily made a mockery of the New Keynesians approach which relied on the rigidity of wages and prices to achieve Keynesian-like results. Rational expectations required the ergodic axiom as a basis and

therefore presumed that with free markets there already existed a full employment economic future that rational decision makers would reach without any interference by the State. Accordingly, the New Classicists could argue that our economic problems were associated with supply side problems primarily due to government interference that prevented free competition in the labor, product and financial market place. The result was to lead policy makers to dance to the Panglossian siren song that "all is for the best in the best of all possible worlds provided we let well enough alone" (Keynes, 1936a, p. 33) by encouraging adoption of policies of "liberalizing" all domestic and international financial markets and encouraging emasculation of labor unions and competition in labor markets – including offshoring and outsourcing.

**III. THE COMING OF KEYNESIANISM TO AMERICA**

In their wonderful book The Coming of Keynesianism to America, Colander and Landreth (1996, p. 23) [hereafter C-L] credit Paul Samuelson with saving the textbook pedagogical basis of the Keynesian Revolution from destruction by the anti-communist spirit (McCarthyism) that ravaged America academia in the years immediately following the second world war.

Lori Tarshis, a Canadian who had been a student attending Keynes's lectures at Cambridge during the early 1930s had, in 1947, wrote an introductory textbook that incorporated Tarshis' lecture notes interpretation of Keynes's General Theory. Despite the initial popularity of the Tarshis textbook , its sales declined rapidly as trustees of and donors to American colleges and universities, attacked Tarshis's book as preaching an economic heresy, . The frenzy about Tarshis's textbook reached a pinnacle when William F. Buckley, in his book God and Man at Yale (1951), attacked the Tarshis analysis as communist inspired.

In 1986 C-L interviewed Samuelson, [C-L, 1996, pp. 145-178] about his becoming an

economist and a "Keynesian". Samuelson indicated that he recognized the "virulence of the attack on Tarshis" and so he wrote his textbook "carefully and lawyer like" [C-L, 1996, p. 172]. The term "neoclassical synthesis Keynesianism" did not appear in the first edition of Samuelson's textbook, Economics An Introductory Analysis[1948], which was published after the early attacks on Tarshis's text. This neoclassical synthesis terminology, however, does appears prominently in the later editions of Samuelson's textbook. Samuelson's assertion that his brand of Keynesian macroeconomics is synthesized with (and based on ) traditional neoclassical microeconomic assumptions made the Samuelson version of Keynesianism less open to attacks of bringing economic heresy into University courses on economics compared to Tarshis's Keynesian analysis.

Unlike Tarshis's analysis which was based on separate aggregate supply and demand functions, the analytical foundation of Samuelson's Keynesianism was imbedded in Samuelson's 45 degree Keynesian cross. Samuelson derived this cross analysis from a single equation aggregate demand function. This mathematical derivation in conjunction with the claimed synthesis of neoclassical microtheory foundations made it more difficult to attack the Samuelson version of textbook Keynesianism as politically motivated. Thus for several generations of economists educated after World War II, Samuelson's name was synonymous with Keynesian theory as various editions of Samuelson 's neoclassical Keynesian textbook -- the best selling economics textbook of all times with over a million copies sold -- dominated the teaching of economics. Even those younger economists who developed their own branch of New Keynesianism based their analytical approach on the Samuelson's Foundation of Economic Analysis [1947] and its classical microeconomic axiomatic foundations.

From an historical perspective it appears that Samuelson saved the textbook pedagogical

basis of the Keynesian Revolution from McCarthyism destruction simply by ignoring the less restrictive axiomatic foundation of Keynes's analytic revolution. And if a theory has fewer restrictive axioms then it can be described as a more general theory.

**IV. HOW DID SAMUELSON LEARN KEYNES'S THEORY?**

In his 1986 interview Samuelson indicated that in the period before World War II, "my friends who were not economists regarded me as very conservative" [C-L, 1996, p. 154]. Samuelson graduated the University of Chicago in June 1935 and were it not for the Social Science Research Council fellowship that he received upon graduation, he would have done his graduate studies at the University of Chicago [C-L, 1996. P. 154-5]. It was the visible hand of a fellowship offer that placed Samuelson at Harvard when Keynes's General Theory was published in 1936. What information about Keynes's General Theory was Samuelson exposed to at Harvard?

Robert Bryce, a Canadian, had attended the same Keynes's Cambridge lectures as Tarshis between 1932 and 1935. In a 1987 interview with Colander and Landreth [1996, pp. 39-48] Bryce indicated that in Spring of 1935 he [Bryce] spent half of each week at the London School of Economics and half at Cambridge. At LSE Bryce used his Cambridge lecture notes to write an essay on Keynes's revolutionary ideas -- without having read The General Theory -- for the people at the LSE. Bryce's essay so impressed Hayek that Hayek let Bryce have four consecutive weeks of Hayek's seminar to explain Keynes's ideas as he had written them out in this essay. Bryce's lectures were a huge success at the LSE [C-L, 1996, p. 43].

In the fall of 1935 Bryce went to Harvard and stayed for two years. During that time, informal groups met during the evenings to discuss Keynes's book. Bryce, using the same pre-General Theory essay that he had used as the basis for his talks at the LSE, presented to these

groups what he believed was Keynes's General Theory analysis -- although he still had not read the General Theory. As Bryce put it "In most of the first academic year [1935-36] I was the only one who was familiar enough with it [Keynes' theory] to be willing to argue in defense of it." [C-L, 1996, p. 45-6]. So in 1936 Bryce's essay became the basis of what most economists and economic students at Harvard, including Samuelson, thought was Keynes's analysis – even though Bryce had not read the book when he made his presentations. Even in 1987, Bryce stated that, " anyone who studies that book is going to get very confused. It was ... .a difficult, provocative book" (C-L, 1996p. 44-46).

The immediate question therefore is: "Did Bryce ever really comprehend the basis of Keynes's analytical framework?". And if he did not, how did that affect how the young Samuelson and others at Harvard in 1936 learn about Keynes's analytical framework? Bryce's presentations at the LSE and Harvard were supposed to make Keynes's ideas readily understandable -- something that Bryce believed Keynes could not do in his General Theory book. Bryce indicated that in his first year at Harvard "I felt like the only expert on Keynes's work around" [C-L, 1996, p.45]

Samuelson has indicated that his first knowledge of Keynes's General Theory was gained from Bryce [C–L, 1996, p. 158]. Moreover, even after reading the General Theory in 1936, Samuelson, perhaps reflecting Bryce's view of the difficulty of understanding Keynes's book, found the General Theory analysis "unpalatable" and not comprehensible [C-L, 1996, p. 159]. Samuelson finally indicated that "The way I finally convinced myself was to just stop worrying about it [about understanding Keynes's analysis] . I asked myself: why do I refuse a paradigm that enables me to understand the Roosevelt upturn from 1933 till 1937? ... I was content to assume

that there was enough rigidity in relative prices and wages to make the Keynesian alternative to Walras operative" [C-L, 1996, pp159-160].

In 1986 Samuelson was still claiming that "we [Keynesians] always assumed that the Keynesian underemployment equilibrium floated on a substructure of administered prices and imperfect competition" [C-L, 1996, p.160]. When pushed by Colander and Landreth as to whether this requirement of rigidity of wages and/or prices was ever formalized in his work, Samuelson's response was "There was no need to" [C-L, 1996, p. 161].

Yet specifically in chapter 19 of The General Theory and even more directly in his published response to Dunlop and Tarshis, Keynes [1939b] had already responded in the negative to this question of whether his analysis of underemployment equilibrium required imperfect competition, administered prices, and/or rigid wages. Dunlop and Tarshis had argued that the purely competitive model was not empirically justified, therefore it was monopolistic and administered pricing and wage fixities that was the basis of Keynes's unemployment equilibrium. Keynes reply was simply :"I complain a little that I in particular should be criticised for conceding a little to the other view" [ Keynes, 1939b, p. 411]. In chapters 17 -19 of his General Theory, Keynes explicitly demonstrated that even if a competitive economy with perfectly flexible money wages and prices existed ("conceding a little to the other view"), there was no automatic market mechanism that could restore the full employment level of effective demand . In other words, Keynes's general theory could show that, as a matter of logic, less than full employment equilibrium could exist even in a purely competitive economy with freely flexible wages and prices.

Obviously Samuelson, who became the premier American Keynesian of his time, had

either not read, or not comprehended, (1) Keynes's response to Dunlop and Tarshis or even (2) chapter 19 The General Theory which was entitled "Changes in Money Wages". As we have already noted, in chapter 19 Keynes explicitly indicates that the theory of unemployment equilibrium did not require "a rigidity" in money wages [Keynes, 1936a, p. 257].

Keynes [1936a, p. 259] indicated that to assume that rigidity was the sole cause of the existence of an unemployment equilibrium lay in accepting the argument that the micro-demand functions "can only be constructed on some fixed assumption as to the nature of the demand and supply schedules of other industries and as to the amount of aggregate effective demand. It is invalid, therefore to transfer the argument to industry as a whole unless we also transfer the argument that the aggregate effective demand is fixed. Yet, this assumption reduces the argument to an ignoratio elenchi."

An ignoratio elenchi is a fallacy in logic of offering a proof irrelevant to the proposition in question. Unfortunately Samuelson invoked the same classical ignoratio elenchi when he argued that Keynes's general theory was simply a Walrasian general equilibrium system where, if there is an exogenous downward shock to aggregate demand, rigid wages and prices created a temporary disequilibrium that prevented full employment from being restored in the short-run[5].

As Keynes went on to explain, "whilst no one would wish to deny the proposition that a reduction in money wages accompanied by the same aggregate effective demand as before will be associated with an increase in employment, the precise question at issue is whether the reduction in money wages will or will not be accompanied by the same aggregate effective demand as before measured in term of money, or, at any rate, by an aggregate effective demand which is not reduced in full proportion to the reduction in money-wages" [ Keynes, 1936a, pp.259-60,see

Davidson 1998 for an explicit diagrammatic analysis of this point]. Keynes then spent the rest of chapter 19 explaining why and how a general theory analysis must look at the relationship between changes in money wages and/or prices and changes in aggregate effective demand – an analysis that, by assumption, is not relevant to either a Walrasian system[6] or Samuelson's neoclassical synthesis Keynesianism.

At the same time that Samuelson became a Keynesian by convincing himself not to worry about Keynes's actual analytical framework, Tarshis had obtained a position at Tufts University, a mere half-hour of travel from Harvard. Tarshis would often met with a group at Harvard, including Bryce, who were discussing Keynes. Tarshis notes that "Paul Samuelson was not in the Keynesian group. He was busy working on his own thing. That he became a Keynesian was laughable." (C-L, 1996, p. 64).

Yet, Paul Samuelson has called himself a "Keynesian" and even a "Post Keynesian" in several editions of his famous textbook. Nevertheless, as we will explain infra, Samuelson's theoretical "neoclassical synthesis" axiomatic foundation is logically different from Keynes general theory of a monetary economy.

## IV. THE AXIOMATIC DIFFERENCES BETWEEN SAMUELSON'S NEOCLASSICAL KEYNESIANISM AND KEYNES'S THEORY OF A MONETARY ECONOMY

At the same time that Samuelson was developing his neoclassical synthesis Keynesianism, he was working on his masterful Foundations of Economic Analysis [1947]. In his Foundations Samuelson asserts two specific classical axioms are the foundation of economic analysis and therefore, by extension, his neoclassical synthesis Keynesian macroeconomic analysis-- the neutral money and the gross substitution axioms. For example Samuelson noted that utility

functions are homogeneous of degree zero [Samuelson, 1947, pp. 119-121] and in a purely competitive world it would be foolish to hold money as a store of value as long as other assets had a positive yield (Samuelson, 1947, pp. 122-4). These statements means that (1) money is neutral and (2) any real producible capital goods that produce a positive yield are assumed to be gross substitutes for money. Thus at the same time Samuelson was promoting his pedagogical brand of Keynesianism he was arguing that the gross substitution and the neutral money axioms are the foundation upon which all economic analysis must be built. But in his writings Keynes specifically rejected these two classical axioms.

Furthermore in an article published in 1969 Samuelson argued that the "ergodic hypothesis [axiom]" is a necessary foundation if economics is a hard science.[Samuelson, 1969, p. 184]. Keynes also rejected this ergodic axiom.

What is this ergodic axiom? If one conceives of the economy as a stochastic process, then the future outcome of any current decision is determined via a probability distribution. Logically speaking to make statistically reliable forecasts about future economic events, the decision maker should obtain and analyze sample data from the future. Since that is impossible, the assumption of an ergodic stochastic process permits the analyst to assert that samples drawn from past and current data are equivalent to drawing a sample from the future. In other words, the ergodic axiom implies that the outcome at any future date is the statistical shadow of past and current market data.

The ergodic axiom therefore assures that the outcome associated with any future date can be reliably predicted by a statistical analysis of already existing data. The future is therefore never uncertain. The future can always be reliably predicted (actuarially known) by a sufficient

statistical analysis of already existing data. Future outcomes, in an ergodic system, are probabilistically risky but are statistically reliably predictable from existing data. (In a nonstochastic deterministic orthodox economic model, the classical ordering axiom plays the same role as the ergodic axiom of classical stochastic models.[7])

Accordingly, in an ergodic stochastic world, in the long run, the equilibrium future is predetermined and can not be changed by anything human beings or governments do. It follows that any government market regulation or interference into normal competitive market (assumed ergodic) processes, may, in the short run, prevent the system from achieving the full employment level assured by the axioms of a classical Walrasian system. In an ergodic system where the future can be reliably predicted so that future positive yields of real capital producible assets can be known with actuarial certainty, and where the gross substitution axiom underlies all demand curves, then as long as prices are flexible, money must be neutral and the system automatically adjusts to a full employment general equilibrium.

If, on the other hand, in such an ergodic world prices are sticky in the short run, then it will take a longer time for the gross substitution theorem to work its way through the system but, at least in the long run, a full employment general equilibrium is still assured. Samuelson [C-L, 1996, p. 163] has stated that in his view Keynes's analysis is a "very slow adjusting disequilibrium" system where the "full Walrasian equilibrium was not realized" in the short-run because prices and wages do not adjust rapidly enough to an exogenous shock. Nevertheless the economic system would, if left alone, achieve full employment in the long run. In Keynes's general theory analysis, on the other hand a full employment equilibrium is not assured in either the short- or the long-run.

## V. SAMUELSON'S NEOCLASSICAL SYNTHESIS KEYNESIAN AXIOMS THAT KEYNES THREW OVER IN HIS SERIOUS MONETARY THEORY

Keynes was primarily a monetary theorist. The words money, currency, and monetary appear in the titles of most of his major volumes in economics. Post Keynesian monetary theory evolves from Keynes's revolutionary approach to analyzing a money using economy where money was never neutral even if a hypothetical pure competitive market conditions including instantaneously flexible wages and prices exists. Keynes (1936a, p. 26) argued that even if a hypothetical economy with perfectly flexible wages and prices existed, it would not automatically achieve a full employment general equilibrium in a money-using economy.

In light of Keynes's analogy to Euclidean vs. non Euclidean geometry and the need to throw over the axiom of parallels, we must investigate what classical axioms Keynes threw over in developing his analytical framework for a non-Euclidean serious monetary theory.

To throw over an axiom is to reject what the faithful believe are "universal truths". For example, Blanchard (1990, p. 828) insists that all New Keynesian macroeconomic models must be based on "hard headed" microfoundations that "impose long-run neutrality of money as a maintained presumption [axiom]. This is a matter of faith, based on theoretical considerations rather than on empirical evidence". Keynes's revolutionary analysis, however, requires economists to "throw over"of three restrictive classical axioms: [1] the neutrality of money axiom, [2] the gross substitution axiom, and [3] the axiom of an ergodic economic world.

In 1935 Keynes explicitly noted that in his analytic framework money matters in both the long and short run, i.e., money is never neutral. Money affects real decision making. In 1935 Keynes wrote:

> "the theory which I desiderate would deal...with an economy in which money plays a part of its own and affects motives and decisions, and is, in short, one of the operative factors in the situation, so that the course of events cannot be predicted either the long period or in the short, without a knowledge of the behavior of money between the first state and the last. And it is this which we mean when we speak of a monetary economy... Booms and depressions are peculiar to an economy in which... money is not neutral .... I believe that the next task is to work out in some detail a monetary theory of production.... that is the task on which I am now occupying myself in some confidence that I am not wasting my time" [Keynes, 1935, pp. 408-9].

As Keynes's developed his theory of liquidity preference he recognized that his theory of involuntary unemployment required specifying "The Essential Properties of Interest and Money" [1936a, ch. 17] that differentiated his results from classical theory. These "essential properties" assured that money and all other liquid assets[8] are never neutral. These essential properties [Keynes, 1936a, pp. 230-231]are:

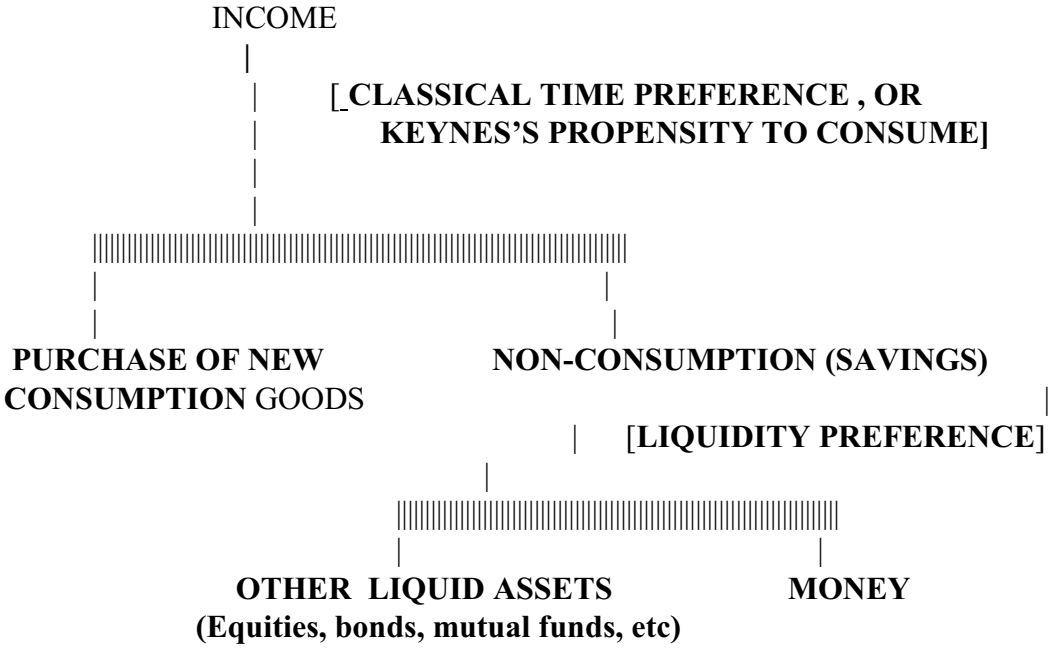
[1] the elasticity of production of all liquid assets including money is zero or negligible, and

[2] the elasticity of substitution between liquid assets (including money) and reproducible goods is zero or negligible.

A zero elasticity of production means that money does not grow on trees and consequently workers can not be hired to harvest money trees when the demand for money (liquidity) increases. Or as Keynes wrote: "money...cannot be readily reproduced ;--labour cannot be turned on at will by entrepreneurs to produce money in increasing quantities as its price rises" [Keynes. 1936a, p. 230 ].

In classical theory, on the other hand, money is a reproducible commodity. In many neoclassical textbook models as well as in the Walrasian general equilibrium system, peanuts or some other reproducible product of industry is the money commodity or numeraire. Peanuts may not grow on trees, but they do grow on the roots of bushes. In this case the propensity to save by buying the numeraire with the portion of one's income that one saves creates jobs in peanut farms and bottling factories just as much as the propensity to consume goods and services..

Keynes's "essential property" zero elasticity of substitution between liquid assets and the products of industry assures that portion of income that is not spend on by the products of industry for consumption purposes, i.e., what Keynes defined as savings, will find, in Hahn's [1977, p. 31] terminology, "resting places" in the demand for nonproducibles. Some forty years after Keynes, Hahn rediscovered Keynes's point that a stable involuntary unemployment equilibrium could exist even in a Walrasian system with flexible wages and prices whenever there are "resting places for savings in other than reproducible assets"[ Hahn, 1977, p. 31].



In classical theory, when income is received, the income earner decides (based on his/her time preference– see figure above) how much income to spend on consumption today and how much to save in order to spend on consumption at some future date. Since earning income causes disutility, utility maximizing income earners will spend their entire income on the only things that create utility in the classical system, consumption goods. For Keynes, however, this decision on how to allocate income is not a time preference decision. Instead Keynes labeled this decision the propensity to consume. For that portion of income that is not consumed, a second decision was necessary, namely the liquidity preference decision that determines which liquid assets would function as a time machine to move generalized purchasing power to the indefinite future.

In Keynes's system, because of uncertainty, savings were held in the form of money and liquid assets that possess a zero elasticity of production. If the demand for nonproducibles increases (an increased demand for liquidity), the (Marshallian or spot) market price for nonproducibles would rise proportionately. If, however, the elasticity of substitution between these nonproducibles and the products of industry is zero, then this rising price of liquid nonproducibles will not spill over into a demand for the products of industry.

Keynes (1936a, p. 161emphasis added) argued that the only "radical cure" for unemployment is "to allow the individual no choice between consuming his income and ordering the production of the specific capital asset which ... impresses him as the most promising investment open to him. It might be that, at times when he was more than usually assailed by doubts concerning the future, he would turn in his perplexity towards more consumption and less investment....But that would avoid the disastrous, cumulative and far reaching repercussions of its

being open to him, when thus assailed by doubts, to spend his income neither on the one or the other".

Hahn rigorously demonstrated what was logically intuitive to Keynes. Hahn [1977, p. 37] showed that the view that with "flexible money wages there would be no unemployment has no convincing argument to recommend it .... Even in a pure tatonnement in traditional models convergence to [a general] equilibrium cannot be generally proved" as long savings were held in the form of nonproducibles (e.g., money and other liquid assets). Hahn [1977, p. 39] demonstrated that "any non-reproducible asset allows for a choice between employment inducing and non-employment inducing demand". Accordingly, the existence of a demand for money and other liquid nonreproducible assets (that are not gross substitutes for the products of industries) as a store of "savings" means that all income earned by households engaging in the production of goods is not, in the short or long run, necessarily spent on the products of industry. Households who want to store that portion of their income that they do not consume (i.e., that they do not spend on the products of industry) in liquid assets are choosing, in Hahn's words " a non-employment inducing demand" for their savings.

If the gross substitution axiom was universally applicable, however, any new savings that would increase the demand for nonproducibles and therefore would increase the price of nonproducibles (whose production supply curve is, by definition, perfectly inelastic). The resulting relative price rise in nonproducibles vis-a-vis producibles would, under the gross substitution axiom, induce savers to increase their demand for reproducible durables as a substitute for nonproducibles in their wealth holdings. Consequently, as in classical theory, nonproducibles could not be ultimate resting places for savings as they spilled over into a demand

for producible goods [Cf. Davidson, 1972].

Samuelson's assumption that all demand curves are based on an ubiquitous gross substitution axiom implies that everything is a substitute for everything else. In Samuelson's foundation for economic analysis, therefore, producibles must be gross substitutes for any existing nonproducible liquid assets (including money) when the latter are used as stores of savings. Accordingly, Samuelson's Foundation of Economic Analysis denies the logical possibility of involuntary unemployment[9] as long as all prices are perfectly flexible.

Samuelson's brand of Keynesianism is merely a form of the classical special case analysis that is "misleading and disastrous"[Keynes, 1936a, p. 3] if applied to the operation of a monetary economy. In the absence of a restrictive universally applicable axiom of gross substitution, however, income effects (e.g., the Keynesian multiplier) can predominate and can swamp any hypothetical classical substitution effects. Just as in non-Euclidean geometry lines that are apparently parallel often crash into each other, in the Keynes-Post Keynesian non-Euclidean economic world, an increase demand for "savings" even if it raises the relative price of nonproducibles, will not spill over into a demand for producible good and hence when households save a portion of their income they have made a choice for "non-employment inducing demand".

Finally, Keynes argued that only in a money-using entrepreneur economy where the future is uncertain (and therefore could not be reliably predicted) would money (and all other liquid assets) always be nonneutral as they are used as a store of savings. In essence Keynes viewed the economic system as moving through calendar time from an irrevocable past to an uncertain, not statistically predictable, future. This required Keynes to reject the ergodic axiom.

Keynes never used the term "ergodic" since ergodic stochastic theory was first developed

in 1935 by the Moscow School of Probability and it did not become well known in the West until after the second world war and Keynes was dead. Nevertheless Keynes's main criticism of Tinbergen's econometric "method" [Keynes, 1939a , p. 308] was that the economic data "is not homogeneous over time". Non-homogenous data over time means that economic time series are non-stationary, and nonstationary is a sufficient (but not a necessary condition) for a nonergodic stochastic process. Keynes, with his emphasis on uncertainty had, in these comments on Tinbergen, specifically rejected what would later be called the ergodic axiom – an assumption that Samuelson has declared is a foundation necessary for economics to be a hard science.

## VI. LIQUIDITY AND CONTRACTS

Nevertheless, the question may remain "Does applying Keynes's smaller axiomatic base make any difference in our understanding of the real world in which we live vis–a--vis applying Samuelson's classical axiomatic foundation version of Keynesianism?". The answer is definitely yes because only if we overthrow these three classical axioms that are an essential part of Samuelson's foundations of economic analysis can the concept of liquidity play an important role in our analysis – as it does in our lives, especially as highlighted by the current financial crisis..

Important decisions involving production, investment and consumption activities are often taken in an uncertain (nonergodic) environment. Hiring inputs and buying products using forward contracts in money terms are a human institution developed to efficiently organize time consuming production and exchange processes. Since the abolition of slavery[10] the money-wage contract is the most ubiquitous of these contracts. Unemployment, rather than full employment, is a common laissez-faire outcome in such a market oriented, monetary production economy.

The economy in which we live utilizes money contracts -- not real contracts -- to seal

production and exchange agreements among self-interested individuals. The ubiquitous use of money contracts is an essential element of all real world entrepreneurial economies. Moreover recontracting without income penalty (an essential characteristic of the Walrasian system) whenever parties have entered into a contract at a price other than the implicit full employment general equilibrium price is never permitted under the civil law of contracts. Why, one might ask Samuelson, do economies continue to organize production and exchange on the basis of money contracts, if such use interferes with the rapid achievement of a socially optimal general Walrasian equilibrium?

The use of money contracts has always presented a dilemma to classical theorists. Logically consistent classical theorists must view the universal use of money contracts by modern economies as irrational, since such agreements fixing payments over time in nominal terms can impede the self-interest optimizing pursuit of real incomes by economic decision makers. Mainstream economists tend to explain the existence of money contracts by using non-economic reasons such as social customs, invisible handshakes, etc. -- societal institutional constraints which limit price signaling and hence limits adjustments for the optimal use of resources to the long run.

For Keynes binding nominal contractual commitments are a sensible method for dealing with true uncertainty regarding future outcomes whenever economic activities span a long duration of calendar time. In organizing production and exchange on a money contractual basis, buyers need not be as unduly worried about what events happen in the uncertain future as long as they have, or can obtain, enough liquidity to meet these contractual commitments as they come due. Thus liquidity means survival in a money-using contractual entrepreneurial directed market

economy. Bankruptcy, on the other hand, occurs when significant contractual monetary obligations can not be met. Bankruptcy is the equivalent of a walk to the economic gallows.

Keynes's general theory that emphasizes money and liquidity implies that agents who planned to spend in the current period need not have earned income currently, or previously, in order to exercise this demand in an entrepreneur system. All these buying agents need is the liquidity to meet money contractual obligations as they come due. This means that investment spending , which we normally associate with the demand for reproducible fixed and working capital goods, is not constrained by either actual current income or inherited endowments– as long as there is unemployed resources available. Investment can be a form of exogenous spending that is constrained , in a money-creating banking system, solely by the expected but uncertain future monetary (not real) cash inflow (Keynes, 1936a, Ch. 17) upon which banks are willing to make additional loans.

In a world where money is created primarily only if someone increases their indebtedness to banks in order to purchase newly produced goods, then real investment spending will be undertaken as long as the purchase of newly produced capital goods are expected to generate a future of cash inflow (net of operating expenses) whose discounted present value equals or exceed the money cash outflow (the supply price currently needed to purchase the capital good.)

For any component of aggregate demand not to be constrained by actual income, therefore, agents must have the ability to finance purchases by borrowing from a banking system that can create money. This Post Keynesian financing mechanism where increases in the nominal quantity of money are used to finance increased demand for producible goods results in increasing employment levels. Money, therefore, can not be neutral and can be endogenous.

To reject the neutrality axiom does not require assuming that agents suffer from a money illusion. It only means that "money is not neutral" [Keynes, 1935, p. 411] in the sense that; money matters in both the short run and the long run, affecting the equilibrium level of employment and real output. If it weren't for Samuelson's (and Blanchard's) insistence on neutral money as a foundations for all macro economic theory, economists might recognize that in a money-using entrepreneurial economy that organizes production and exchange with the use of spot and forward money contracts, money is a real phenomenon. The money neutrality axiom must be rejected..

Arrow and Hahn [1971, pp. 356-7] implicitly recognized this necessity of overthrowing the neutral money axiom when they wrote about the requirements of a serious monetary theory. Moreover Arrow and Hahn demonstrate [1971, p. 361] that, if production and exchange contracts are made in terms of money (so that money affects real decisions) in an economy moving along in calendar time with a past and a future, then all general equilibrium existence theorems are jeopardized. The existence of money contracts -- a characteristic of the world in which we live -- implies that there need never exist, in the long run or the short run, any rational expectations equilibrium or general equilibrium market clearing price vector . Samuelson's Walrasian foundation is not a reliable base for real world economies that use money and money contracts to organize economic activities.

**DEBREU**

A theory is more general compared to another theory if it is based on fewer restrictive axioms. In the German language edition of The General Theory [1936b, p. ix] Keynes specifically noted "This is one of the reasons which justify my calling my theory a general [emphasis in the original]

theory. Since it is based on fewer restrictive assumptions ['weniger enge Voraussetzunger stutz'] than the orthodox theory, it is also more easily adopted to a large area of different circumstances" [Second emphasis added]. Keynes's theory provided the maximum level of generality while describing important real world monetary economic processes.

Classical theories such as General Equilibrium theory, Neoclassical synthesis Keynesianism, Monetarism, New Classical Theory, New Keynesian Theory, Behavioral Economics, etc. all impose three additional restrictive axioms into their foundation. Technically, these theories are special cases of Keynes's maximum general theory. From a logical standpoint the onus is those who add restrictive axioms to Keynes's general theory to justify these additional axioms. Those theorists who invoke only Keynes's general theory smaller axiomatic foundation are not required, in logic, to prove a general negative, i.e., they are not required to prove the additional restrictive axioms are unnecessary.

On the other hand for more than a half century, rather than Keynes's general theory, the conventional wisdom of mainstream economists is that, it is not necessary to justify the additional axioms foundation of the Walras - Arrow - Debreu general equilibrium theory when using general equilibrium as the bedrock upon which all economic analysis should be based.

The foremost proponent for using this mathematical general equilibrium theory approach as the mother of all economic analysis is Nobel Prize winner Gerard Debreu. Debreu was educated as a mathematician in France during the second world war.

Beginning in the 1930s in France, a small group of mathematicians (who became known as the Bourbaki school) attempted to "purify" scientific discourse in all disciplines. The philosophy of this Bourbaki school of mathematics captured mathematical economics in the 1950s

primarily through the work of Gerard Debreu. In his Nobel Museum (Internet) autobiography, Debreu states that during his formative years at school “Bourbaki...fashioned my mathematical taste”.

In his book How Economics Became a Mathematical Science Weintraub (2002, p.102) noted that by the second world war ”the predominant view in American mathematical circles was the same as Bourbaki ... mathematics is an autonomous abstract subject, with no need of any input from the real world”....[accordingly] Bourbaki came to uphold the primacy of the pure over the applied, the rigorous over the intuitive” .

This Bourbaki philosophy created an unbridgeable chasm between math and its applications in real world science, between the rigor of axiomatization and the rigor in the old sense of basing argumentation on observable real world phenomena. This Bourbaki desire for purity and isolation from the real world apparently did not unleash a backlash among natural scientists until the 1990's and it is now often claimed that the hold of “the Bourbaki plague is dying out” in the physical sciences ( Weintraub, 2002,p. 103), but the plague still infects all mainstream economic theory..

In economics, the Bourbaki philosophy was transplanted into post war American economics by Debreu and the seed bed that encouraged the domination of this non-real world view of economic theory was the Cowles Commission for economic research of the early 1950s (Weintraub, 2002, p. 104). Debreu’s Bourbaki method involved deducing special cases from what was considered the Walrasian general equilibrium approach. The general structure of this general equilibrium approach was obtained by developing chains of syllogisms from what were considered fundamental axioms that might, or might not, be buried under accumulated debris of

real world details.

Debreu, in his Bourbakian mathematical approach to economics has argued that "good general theory does not search for the maximum generality, but for the right generality" [Weintraub, 2002, p. 113 emphasis added] . In other words, Keynes's general theory based on fewer axioms than Debreu's general equilibrium theory is not "good" theory. Instead, Debreu's general equilibrium theory of value which expresses itself in terms that few, if any. would readily recognize as an apt description of a real world economy (Weintraub, 2002, p. 114) provides the Bourbakian "right" level of generality – even if this theory is not realistic. In Debreu's view of economics, theories that are readily recognizable as descriptions of reality are not necessarily important. Unfortunately Debreu, and other general equilibrium theorists, do not provide any criteria for what is the "right" level of generality, they merely claim their general equilibrium approach is the right level of generality. Weintraub notes that this Bourbakian case for the right level of generality is merely a matter "of style...and politics...and taste" (Weintraub, 2002, p. 125) and not of logic or describing a real world process..

Debreu considered that "the model of Walrasian equilibrium was the root structure [the right level of generality] from which all further work in economics would eventuate" and he showed disdain for attempts (like that of Kenneth Arrow and Frank Hahn) to forge explicit links between the Walrasian model and contemporary theoretical concerns in macroeconomics" (Weintraub, 2002, p. 121)

In his bold leap of faith, Debreu believed his work to be "the definitive mother-structure from which all further work in economics would start, primarily by weakening its assumptions or else superimposing new interpretations upon the existing formalism. But this required one very

crucial manoeuver that was never stated explicitly: namely, that the Walrasian general equilibrium approach was the root structure from which all further scientific work in economics would eventuate" (Weintraub, 2002,p. 121).

When after the second world war, economics became a mathematical based discipline, mainstream economists, in their desire to be seen as hard-headed scientists, signed on to this Bourbakian philosophy even if most did not recognize or comprehend the implications.

**VII. WHAT ABOUT HICKS'S IS-LM MODEL?**

Hicks [1939, pp. 1-4] wrote that he "had the fortune to come upon a method of analysis..The method of General Equilibrium... was specially designed to exhibit the economic system as a whole... [With this method] we shall thus be able to see just why it is that Mr. Keynes reaches different results from earlier economists". Hicks [1937] ] used this general equilibrium method to develop his IS-LM model where the real and monetary aspects of the economy are divided into independent subsets of equations. These independent subsets requires the neutral money axiom.. Accordingly, this ISLM model is merely another classical theory version of Samuelson's neoclassical synthesis Keynesianism.

In1971 I met John Hicks at a six day IEA conference on the microfoundations of macroeconomics. At the conference my participation [Davidson, 1977, pp. 313-17]emphasized the importance of contracts and the existence of spot and forward markets, the need for liquidity, and the fact that a classical "general equilibrium model was not designed to, and could not answer the interesting macroeconomic questions of money, inflation and unemployment.... [and] if we insist on balancing Keynes's macroeconomic analysis on an incompatible general equilibrium base we would not make any progress in macroeconomics; we would also regress to

the disastrous pre-Keynesian solutions to the macro-political-economic problems"[11] [Davidson, 1977, p. 392] By the end of the conference, Hicks informed me that the microfoundations of his approach to macroeconomics was closer to mine than to any one else at the conference (which included Nobel Prize winners Tinbergen and Stiglitz).

Over the next few years, Hicks and I met privately several times in the UK to continue our discussions regarding the microfoundation of Keynes's general theory. By the mid 1970's Hicks [1976, pp. 140-41] was ready to admit that his IS-LM model was a "potted version" of Keynes. By 1979 Hicks [1979] was arguing that economics is embedded in calendar time and a relationship that held in the past could not be assumed to hold in the future [Hicks, 1979, p. 38] In a 1981 article in the Journal of Post Keynesian Economics entitled "ISLM: An Explanation", Hicks recanted his ISLM model when he wrote [Hicks, 1980-81, p. 139]:"As time has gone on, I have myself become dissatisfied with it [ the ISLM apparatus]". In this JPKE article, Hicks admitted that ISLM did not describe Keynes's general theory approach at all.

Finally, after reading my paper on the fallacy of rational expectations [Davidson, 1982-3], Hicks wrote to me in a letter dated February 12, 1983[12] "I have just been reading your RE [rational expectations] paper....I do like it very much....You have now rationalized my suspicions, and shown me that I missed a chance of labeling my own point of view as nonergodic. One needs a name like that to ram a point home".

Thus the author of the IS-LM renounced his famous formulation of Keynes's framework and accepted the Post Keynesian view of what was the basic analysis of Keynes's General Theory

## VIII. THREE NOBEL PRIZE WINNERS HAVE APPROVED MY APPROACH

Some may think I present an idiosyncratic interpretation of Keynes and the real world in which we

live. But at least three Nobel Prize winners have accepted my argument. First, as I noted above John Hicks wrote that I rationalized his suspicions about modern mainstream macroeconomics and rational expectations and that he should have labeled his "point of view as nonergodic". Since I introduced the concept of nonergodic stochastic processes into the economic literature [Davidson, 1982-83] as the basis for uncertainty, it is obvious that Hicks has accepted my argument.

I also quote Robert Solow who wrote me that he "admired that article of yours [Davidson, 1982-3] on nonergodic processes and thought it was right on the button" [Davidson, 2007, p. 186]. Finally I note that Nobel Prize winner Doug North has cited my 1991 Journal of Economic Literature article on uncertainty in his emphasis on the importance on nonergodic processes in his book The Process of Economic Change [North, 2005, p. 19]. With three Nobel Prize winners in my corner, can my interpretation really be eccentric?

**IX. CONCLUSION**

Paul Samuelson saved the term "Keynesian" from being excoriated from post second world war textbooks by the McCarthy anti-communist movement at the time. But the cost of such a saving was to sever the meaning of Keynes's theory in mainstream economic theory from its General Theory analytical roots. Keynes's revolution was to demonstrate that in a money using, market-oriented economy, supply-side market imperfections including the fixity of money wages and/or prices or a liquidity trap are not necessary conditions for the existence of involuntary unemployment equilibrium, while flexible wages and prices and pure competition are not sufficient conditions to assure full employment equilibrium, even in the long run.

Samuelson's view of Keynesianism resulted in aborting Keynes's revolutionary analysis

from altering the foundation of mainstream macroeconomics. In winning the battle against the forces trying to prevent the teaching of suspected communist inspired "Keynesian" economics in our universities, Samuelson ultimately lost the war that Keynes had launched to eliminated the classical theoretical analysis as the basis for real world economic problems of employment, interest and money. In 1986 Lorie Tarshis recognized this when he noted "I never felt that Keynes was being followed with full adherence or full understanding of what he had written. I still feel that way" [C-L, p. 72].

Mainstream economics – whether espoused by Old Neoclassical Keynesians, New Keynesians, Old Classical or New Classical theorists, etc[13] – relies on the three classical axioms that Keynes discarded in his general theory attempt to make economics relevant to the real world problems of unemployment and international trade and international payments. As a result these problems still plague much of the real world in the globalized economy of the 21 century.

Until mainstream journal of economics open their pages to the revolutionary (fewer axiomatic base) of Keynes's general theory of a monetary economy, mainstream economists will not be able to provide policy prescriptions for resolving the major economic problems (e.g., outsourcing, persistent US current account deficits, increasing inequality of income and wealth within nations as well as between nations, etc) of the global economy of the 21st century. Until then the best we can hope for is that the global economy muddles through without another great calamity such as the Great Depression of the 1930s. But when, not if, the next Great Depression hits the global economy, then perhaps economists will rediscover Keynes's general theory analytical system that contributed the golden age of the post second world war II.. For Keynes, however, that will be a Pyrrhic victory.

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## NOTES

1.This sticky interest rate argument is called the "liquidity trap" where at some low, but positive, rate of interest the demand to hold money for speculative reasons is assumed to be perfectly elastic (i.e., horizontal). After the Second World War, econometric investigations could find no evidence of a liquidity trap. Had mainstream economists read The General Theory, however, they would have known that on page 202 Keynes specifies the speculative demand for money as a rectangular hyperbola – a mathematical function that never has a perfectly elastic segment. Moreover, eyeball empiricism led Keynes [1936a, p. 207] to indicate that he knew of no historical example where the liquidity preference function became "virtually absolute", i.e., perfectly elastic. In sum, both from a theoretical and an empirical view, Keynes denied the existence of a liquidity trap.

2. For example, Mankiw [1992] has written that the "General Theory is an obscure book...[it] is an outdated book.... We are in a much better position than Keynes was to figure out how the economy works....Few macro economists take such a dim view of classical economics [as Keynes did]...Classical economics is right in the long run. Moreover, economists today are more interested in the long-run equilibrium. ...[There is] widespread acceptance of classical

economics" .

3.For almost a quarter of a century after World War II, governments actively pursued the types of economic policies that Keynes had advocated in the 1930s and 1940s. The result was that per capita economic growth in the capitalist world proceeded at a rate that has never been reached in the past nor matched since. The average annual per capita economic growth rate of OECD nations from 1950 till 1973 was almost precisely double the previous peak growth rate of the industrial revolution period. Productivity growth in OECD countries was more than triple (3.75 times) that of the industrial revolution era.

The resulting prosperity of the industrialized world was transmitted to the less developed nations through world trade, aid, and direct foreign investment. From 1950-73, average per capita economic growth for all less developed countries (LDCs) was 3.3 per cent, almost triple the average growth rate experienced by the industrializing nations during the industrial revolution. Aggregate economic growth of the LDCs increased at almost the same rate as that of the developed nations, 5.5 per cent and 5.9 per cent respectively. The higher population growth of the LDCs caused the lower per capita income growth. (See Davidson, 2002, pp. 1-3).

5. The particular proof that Keynes claimed was irrelevant was the classical assertion that a fixed and unchanging downward sloping marginal product curve of labor was the demand curve for labor and so that falling wages must induce an increase in employment. In chapter 20 of The General Theory, Keynes specifically develops an "employment function" that is not the marginal product of labor curve and does not assure that aggregate effective demand is fixed.

What the marginal productivity of labor curve indicates is that if in response to an expansion of aggregate effective demand, private sector entrepreneurs hire more workers to produce an additional flow of output per period , then in the face of diminishing returns (with no change in the degree of competition), the rise in employment will be associated with a fall in the real wage rate. In other words, the marginal product of labor curve is ,for any given the level of effective demand and employment, the real wage determining curve. For a complete analysis of this point see Davidson (1998) or Davidson (2002).

6. If the only things that provide utility are the reproducible products of industry, then Say's Law is operative and there is no barrier to the equilibrium point where there is the full employment of utility maximizing workers.

7.True uncertainty occurs whenever an individual cannot specify and/or order a complete set of prospects regarding the future, either because: 1) the decision maker cannot conceive of a complete list of consequences that will occur in the future; or, ii) the decision maker cannot assign probabilities to all consequences because "the evidence is insufficient to establish a probability" so that possible consequences "are not even orderable" (Hicks, 1979, p.113, 115). In such cases the ordering axiom is not applicable.

8.Liquid assets are defined as nonproducible financial assets that are traded in well organized and orderly markets. (See Davidson, 1994, p. 49)

9. To overthrow the axiom of gross substitution in an intertemporal context is truly heretical. It changes the entire perspective as to what is meant by "rational" or "optimal" savings, as to why people save or what they save. It would deny the life-cycle hypothesis. Indeed Danziger *et al.* (1982-83) have shown that the facts regarding consumption spending by the elderly are incompatible with the notion of intertemporal gross substitution of consumption plans which underlie both life cycle models and overlapping generation models currently so popular in mainstream macroeconomic theory.

10. There is never any involuntary unemployment of slaves.

11. Unfortunately my prediction involving the progress in macroeconomics has come true.

12. This letter is available in the collection of my correspondence that is on deposit at the Duke University Library Archives of economists's correspondence and writings.

13.Some economists, e.g., behavioral theorists, have tried to erect ad hoc models suggesting that agents do not always act with the economic rationality of classical theory's decision makers although there is nothing in their analysis that denies the possibility that rational decision making is possible. Unfortunately, such theories have no unifying underlying general theory to explain why such "irrational" behavior exists. Behavioral theorists can not explain why those who undertake non-rational behavior have not been made extinct by a Darwinian struggle with those real world decision makers who take the time to act rationally.

Had behavioral theorists adopted Keynes's general theory as their basic framework, irrational behavior can be explained as sensible if the economy is a non-ergodic system. Or as Hicks (1977, p. vii) succinctly put it, "One must assume that the people in one's models do not know what is going to happen, and know that they do not know just what is going to happen." In conditions of true uncertainty, people often realize they just don't a clue as to what rational behavior should be.