
9 Keynes and money

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Introduction

John Maynard Keynes was probably the most important and famous economist of the twentieth century. Keynes was primarily a specialist in monetary theory. The words money, monetary, currency appear in the title of all Keynes's major books on economic theory. His conceptualization of money, however, differs significantly from that of classical economic theory, while the latter has dominated mainstream economists' thought from the eighteenth century to today. The purpose of this chapter is to explain why Keynes's conceptualization of money is revolutionary.

'Money', Nobel laureate John R. Hicks (1967, p. 1) declared, 'is defined by its functions . . . money is what money does'. While economists have spilled more printers' ink over the topic of money than any other, confusion over the meaning and nature of money continues to plague the economics profession. A clear, unambiguous taxonomy is essential for good scientific inquiry. All useful classification schemes in science require the scientist to categorize entities by their essential functions and properties. For example, even though a whale looks like a fish, swims like a fish, and will die (like a fish) if it is out of water too long, biologists classify whales as mammals not fish because whales suckle their young. Even though the uninstructed person may think a whale is more similar to a fish than to his/her own mammalian self, biologists classify whales according to an essential property and not to similarity in looks.

If a successful scientific taxonomy is to be developed in economics, therefore, money should be defined by its essential functions and properties. Most of the disputes among various schools of thought on the role of money in an economic system are due to differing conceptualizations of the functions and properties of money and its relations to the passage of time.

Time is a device that prevents all things from happening at once. The production process requires the passage of a significant amount of calendar time. Even consumption, especially of durables, may necessitate the passage of time. In all orthodox mainstream theories (i.e., monetarism, general equilibrium theory, neo-Walrasian theory, rational expectations theory, neoclassical synthesis Keynesianism, new classical economics, and New Keynesianism), on the other hand, historical time is treated as if it is irrelevant. All of these theories are explicitly or implicitly based on an Arrow–Debreu–Walrasian general equilibrium analytical framework where all contractual agreements for the production and exchange of goods and services from today until the end of time are assumed to be agreed upon in the initial instant of the economic system.

A general equilibrium analysis is the equivalent of the 'Big Bang' in astrophysics – an event thought to have occurred at the creation of the universe that sent the planets, solar systems and other heavenly bodies into a predetermined time path that can never be altered. The 'Big Bang' general equilibrium analysis that is the foundation of all mainstream theories requires the assumption that money is neutral, i.e., money does not

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affect all real production, consumption and employment decisions, at least in the long run.

In all these mainstream theories, present and future equilibrium economic activities are logically determined and paid for, *at the initial instant*, when spot and forward contracts covering all economic events until the end of calendar time are agreed upon by all parties to the contracts. Consequently these theories assume either that future events can be known to all economic decision makers with perfect certainty or at least that all future events can be reliably statistically predicted based on calculating probability distributions drawn from existing market data. These calculated probability distributions are assumed to govern all past, present and future economic events.¹ Accordingly, money need never be held as a security blanket to protect individuals against unforeseen and unforeseeable events.

The sole function of money in classical theory systems is as a numeraire, that is, a yardstick by which to measure the relative prices (and therefore scarcities) of the various goods that are produced. In the long run, real output, employment and economic growth are solely determined by the exogenous factors of technology and preferences. Money cannot affect long-run real outcomes. In the short run some classical-based theories where money wages and/or prices are assumed not to be freely flexible (e.g., monetarism, New Keynesianism), money is permitted to have a transient effect on employment and real output. Nevertheless, in the long run, money is assumed to be neutral. Say's Law prevails, so that supply creates its own demand, and there must be an automatic market mechanism that ensures the full employment of available resources in the most efficient manner possible, given the exogenously determined preferences of the residents of the economy and the technological properties of production.

Addressing *The General Theory* chiefly to his 'fellow economists', Keynes (1936, p. v) insisted that such classical theories were irrelevant to understanding real-world economic problems. He wrote (*ibid.*, p. 3):

the postulates of the classical theory are applicable to a special case only and not to the general case . . . Moreover, the characteristics of the special case assumed by the classical theory happen not to be those of the economic society in which we actually live, with the result that its teaching is misleading and disastrous if we attempt to apply it to the facts of experience.

Keynes (*ibid.*, p. 26) believed that he could *logically* demonstrate why 'Say's Law . . . is not the true law relating the aggregate demand and supply functions' in either the short run or the long run, even if, hypothetically, all money wages and prices are flexible. Keynes's message was that, until we get our theory to accurately mirror and apply to the 'facts of experience', and especially the role of money and liquidity, there is little hope of getting our policies right. Unfortunately, since Keynes's revolutionary theory was aborted in the 1940s by leading American economists who called themselves neoclassical synthesis Keynesians, Keynes's message was forgotten. Consequently this message is just as relevant today as it was in 1936.

Keynes (1936, p. 16) compared those economists whose theoretical logic was grounded in the neutral money axiom and Say's Law to Euclidean geometers living in a non-Euclidean world,

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 taking

place. 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.

To throw over an axiom is to reject what the faithful believe are 'universal truths'. Keynes's revolution in economic theory was truly a revolt against orthodox theory since it aimed at rejecting some basic mainstream axioms to provide a logical foundation for a non-Say's Law model applicable to the real world in which we happen to live. Unfortunately, since Keynes, orthodox economists, seduced by a technical methodology which promised precision and unique results at the expense of applicability and accuracy, have reintroduced more sophisticated forms of the 'special case' classical axioms that Keynes rejected. Consequently Keynes's revolution against classical theory was almost immediately shunted on to a wrong track as more obtuse versions of classical theory became the key-stone of modern mainstream macroeconomic theory. Neoclassical synthesis Keynesians,² monetarists, the new classical economists, as well as the New Keynesians, have reconstructed macrotheory by reintroducing the restrictive classical axioms that Keynes struggled to overthrow.

Keynes's revolution against classical theory requires the analyst to recognize that a monetary economy operates quite differently from a non-monetary system, so that, in the short as well as the long run, money is never neutral. Spot and forward money contracts and the civil law of contracts are human institutions created to organize production and exchange transactions that will be operative over an uncertain (not statistically predictable) future. A spot contract is one that specifies that delivery and payment are to be made on the spot; that is, the moment after the spot contract is agreed upon by the contracting parties, delivery and payment are required. A forward contract, on the other hand, is one that specifies the future date(s) for delivery of goods and/or services by the seller and money payment by the buyer. Accordingly, in all real-world legal contracts a calendar time date is specified when the buyer must meet his/her contractual obligation (liability) with the delivery of money to the seller, who must deliver the 'goods' at a specified date. An economy that utilizes spot *and* forward money contracts to organize production and exchange activities is called an entrepreneurial economy.

In the world of experience, that thing that the state declares will legally discharge any contractual obligation under the civil law of contracts is *money*. In an entrepreneurial economic system the concept of money requires two concomitant features and two necessary properties. A necessary characteristic of money in an entrepreneurial economy was spelled out by Keynes as early as the very beginning of his *Treatise on Money* (1930, p. 3): 'Money [is] that by delivery of which debt-contracts and price-contracts are *discharged*, and in the shape of which a store of General Purchasing Power is held.' In other words, that thing that we call money has two specific functions: (1) money is the *means of contractual settlement* and (2) money is a *store of value*, i.e., a vehicle for moving purchasing power over time – a time machine.

This time-machine function is known as *liquidity*. The possession of liquidity means that the person has sufficient money (or other liquid assets that can be readily resold for money in an orderly, organized market) to meet all his/her contractual obligations as they come due. In a world of uncertainty, a decision maker cannot know what spot and forward contracts either already entered into or entered into in the future will either (1) be defaulted by the buyer when the decision maker is the seller, or (2) will come due, for which

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there will be a need for money to discharge these contractual obligations when the decision maker is the buyer. Accordingly, the more uncertainty the decision maker feels about future economic events, the more money he/she will desire to hold to meet such unforeseen contingencies.

This characteristic of liquidity can be possessed in various degrees by some, but not all, durables. Since any durable besides money *cannot* (by definition) settle a contract, then for durables other than money to be a liquidity time machine they must be resaleable in well-organized, orderly spot markets for that thing (money) that the civil law of contracts declares can discharge a contractual liability. Money therefore is the liquid asset *par excellence*, for it can always settle any contractual obligation as long as the residents of the economy are law abiding and recognize the civil law of contracts.

The degree of liquidity of any durable asset other than money depends on its prompt and easy resaleability in well-organized and orderly spot markets. For any market to be organized and orderly there must be a *market maker*, i.e., an institution that stands ready to:

- (a) sell the asset whenever those who want to buy (the bulls) are overwhelming those who want to sell (the bears), or
- (b) buy when the bears are overpowering the bulls.

By making the market, the market maker assures all market participants that, no matter what happens, the market price of the asset in terms of money will change over time in an orderly manner upwards or downwards.

A *fully liquid asset* is defined as any durable other than money where the participants 'know' that the market price in terms of monetary units will not change for the foreseeable future. For a durable to be a fully liquid asset there must be a market maker who can guarantee that the price of the asset will not change over time even if circumstances change. An example of a fully liquid asset is a foreign currency whose value in terms of domestic currency is fixed by the central bank of the nation. (As long as the central bank has sufficient foreign reserves, it can, if it wishes, guarantee a fixed exchange rate.)

A *liquid asset* is a durable asset readily resaleable in an organized market, but the market maker does not guarantee an unchanging market price. The market maker only guarantees that the market price will change, *in an orderly manner*, given the explicit, known rules under which the market maker operates. For any liquid asset the next moment's market price is never known with certainty. What is known is that the next moment's price will not differ in a disorderly way from this moment's price – as long as the market maker has a sufficient stock of the asset and liquidity to back up his/her assurance of an orderly market.³

An *illiquid asset* is a durable that cannot be readily resaleable at any price. Illiquid assets do not have organized, orderly resale markets. There is no market maker who is willing to organize an orderly spot market for the asset.

According to Keynes (1936, ch. 17), all liquid assets have certain necessary properties. These essential properties are: (1) the elasticity of production of money and all other liquid assets is approximately zero, and (2) the elasticity of substitution between liquid assets and the products of industry is zero. (These elasticity properties will be discussed below.)

What are the classical axioms that Keynes overthrew?

There are three fundamental restrictive classical axioms that Keynes rejected in developing his revolutionary logical analysis of an entrepreneurial economy. These classical axioms are (1) *the axiom of neutral money* where money does not affect real outcomes, (2) *the axiom of an ergodic economic world* where the future can always be reliably predicted, and (3) *the axiom of gross substitution* where everything is a substitute for everything else. Keynes believed that the characteristics of a real-world entrepreneurial economic system could be modelled only by overthrowing these fundamental axioms that are the foundation of all mainstream theories.

Removal of these three axioms permits an analysis of an economic system where (1) money matters in the long and short run; that is, money is never neutral; it affects real decision making.⁴ (2) The economic system is moving through calendar time from an irrevocable past to an uncertain, not reliably predictable (non-ergodic), future. In uncertain, non-ergodic circumstances, decision-making agents 'know' that the future cannot be reliably predicted in any probability sense (see Davidson, 1982–83). (3) Forward contracts in money terms are a human institution developed to efficiently organize time-consuming production and exchange processes. The money-wage contract is the most ubiquitous of these contracts. Modern production economies are therefore organized on a money-wage contract-based system. (4) Unemployment, rather than full employment, is a common *laissez-faire* situation in a market-oriented, monetary production economy.

Only the monetarists and the new classical theorists (like Ricardo before them)

offer us the supreme intellectual achievement, unattainable by weaker spirits, of adopting a hypothetical world remote from experience as though it was the world of experience and then living in it consistently. With most of . . . [the neoclassical synthesis Old and New Keynesians] common sense cannot help breaking in – with injury to their logical consistency. (Keynes, 1936, pp. 192–3)

Spending, constrained demand, Say's Law and gross substitution

Keynes's *General Theory* is developed via an aggregate supply–aggregate demand function analysis which can be used to illustrate the difference between Say's Law and Keynes's analytical structure (Keynes, 1936, pp. 25–6).

The process of production takes time from inception to completion. Entrepreneurs must hire workers and order raw materials before the product can be finished and sold to the buyer. For entrepreneurs to hire workers and order raw materials they must have some expectation of possible sales revenues at a future date when the product is fabricated and available for sale. The aggregate supply function (Z) relates entrepreneurs' expected sales proceeds with the level of employment (N) entrepreneurs will hire today for any volume of expected sales receipts in the future. In Figure 9.1a this aggregate supply (Z) function is drawn as upward-sloping, indicating that the higher entrepreneurs' sales expectations, the more workers they will hire. The aggregate demand function relates buyers' desired expenditure flows for any given level of employment. In Figure 9.1b, the aggregate demand (D) function is drawn as upward-sloping, indicating that the greater the level of employment hire, the more income households will earn and therefore the more buyers will spend on goods and services.

The aggregate supply and demand functions can be brought together in a single quadrant to provide the equilibrium employment solution. In Figure 9.2a the aggregate supply

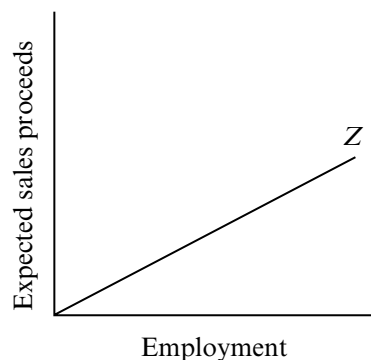
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Figure 9.1a

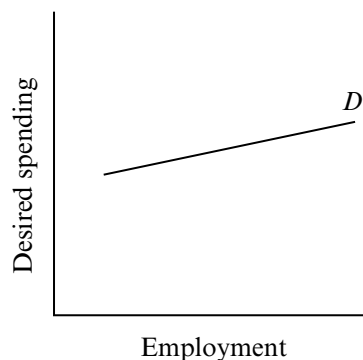


Figure 9.1b

(Z) and aggregate demand (D) functions are drawn as they would be developed in a Say's Law world where supply creates its own demand. In a Say's Law world (as explained below and as shown in Figure 9.2a), the aggregate supply and demand functions are coincident throughout their entire length. Thus, if at any point of time the actual employment level is N_1^q , actual demand is constrained to point G . Any coordinated expansion in hiring by entrepreneurs to provide additional output (say to point H in Figure 9.2a) will (by definition of Say's Law) increase actual demand concomitantly to point H and full employment (N_f^q) could be established. In a Say's Law world there is no obstacle to full employment.

In Figure 9.2b, on the other hand, the aggregate demand and supply functions are distinguishable functions which intersect at a single point, the point of *effective demand* (E); and in a manner consistent with Keynes's theory (1936, p. 25) the equilibrium level of employment is N_1^b . At the full employment level (N_f^b in Figure 9.2b) there is a deficiency in effective demand equal to the vertical distance JK . Accordingly, if entrepreneurs hire N_f^b , when they bring the product to market they will find aggregate demand is less than their sales receipts expectations. Hence these disappointing sales will force entrepreneurs to recognize that the output produced by hiring the full employment N_f^b number of workers cannot be profitably sold. Entrepreneurs will reduce their hiring of workers until N_1^b workers are hired. At that point sales (and therefore) profit expectations will be met and there is no reason for entrepreneurs to change their hiring decisions unless their expectations of buyers demand change.

As defined by Keynes, Say's Law requires that the aggregate supply curve coincide with the aggregate demand curve over its entire length so that supply can create its own demand. Accordingly, *effective demand*, 'instead of having a unique equilibrium value, is an infinite range of values, all equally admissible' (Keynes, 1936, p. 26). If, therefore, Say's Law prevails, then the economy is in neutral equilibrium where actual demand is *constrained* only by actual income (supply). In other words, Say's Law requires that aggregate demand is a *constrained demand function* (in the terminology of Clower, 1965, or Barro and Grossman, 1976); and a 'short-side of the market rationing' rule limits employment opportunities. This short-side rule is specifically adopted by Malinvaud (1977, pp. 12–35) to 'explain' Keynesian unemployment. It has also been used by many self-claimed 'Keynesians' to explain what their logical unconstrained model cannot.⁵

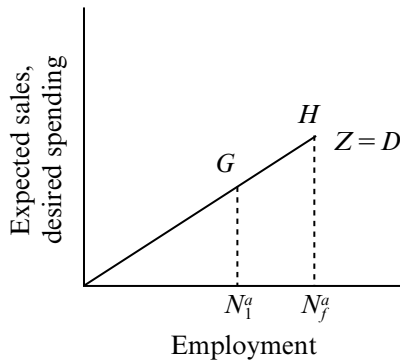


Figure 9.2a Say's Law

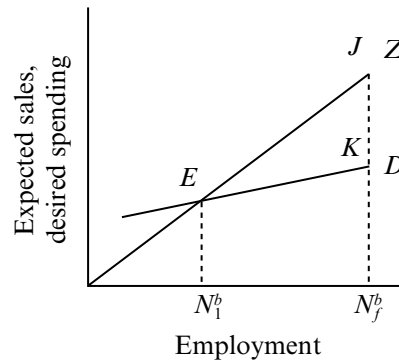


Figure 9.2b Keynes's theory

In the Clower neoclassical synthesis version of the Keynesian system, which has been labelled the dual decision hypothesis with a coordination failure, purchasing decisions are always equal to, and constrained by, *actual* income. The economy is in neutral equilibrium at any level of actual income. There is no obstacle to full employment except that entrepreneurs do not receive a market signal that they would be able profitably to sell the full employment output if only they coordinated and marched together to the full employment hiring level. Unemployment is solely due to a 'coordination failure' of the market system to signal entrepreneurs that if they only hired the full employment level of workers, actual income would equal *notional* (full employment) *income* and the spending decisions by income-earners would be equal to, and constrained by, the full employment budget line and all markets would clear.⁶ Hence, in contrast to Keynes (1936, p. 301), these 'Keynesians' argue that if only entrepreneurs hired all workers, there would never be an insufficiency of aggregate demand.

Those who believe that a short-side rule or constrained demand function limits employment opportunities, if they follow their logic and not their common sense, should have supported former President Reagan's proposal for solving the unemployment problem. In a conference with reporters in the spring of 1983 (when the USA was just beginning to recover from the largest unemployment rate that it had experienced since the Great Depression of the 1930s), President Reagan suggested that unemployment could be ended if each business firm in the nation immediately hired one more worker. Since there were more firms than unemployed workers in the economy at this time, this Reagan solution was obviously statistically accurate. Unless, however, the employment of these additional workers created a demand for the additional output produced at a profitable price (additional supply creating *pari passu* additional demand), it would not be in the self-interest of the existing firms to hire all the additional workers necessary to achieve full employment.

Nevertheless, neoclassical Keynesians, who believe in the so-called constrained demand function, should have applauded Reagan's clarion call for firms to coordinate increased hiring. If each firm does hire an additional worker so that full employment is (at least momentarily) achieved, then, in this constrained demand analysis, actual income flows earned would be equal to notional income and therefore aggregate demand would not be constrained short of full employment and the economy could reach the point *H* in Figure 9.2a. There is no coordination failure – and no short-side rule limits job opportunities.

In a Keynesian world of entrepreneurial decision making, on the other hand, involuntary unemployment is due to an insufficiency or lack of effective demand (at full employment), as shown by the vertical distance JK in Figure 9.2b. The sales of the additional output produced by private sector entrepreneurs hiring workers above the N_1^b level in Figure 9.2 cannot be profitable.

Keynes would never have endorsed Reagan's Say's Law solution to the unemployment problem. In a closed economy context, Keynes held that *neither* of the two private sector components of the aggregate demand function (D_1 and D_2 , i.e., aggregate consumption expenditures and investment spending) are necessarily constrained by actual currently earned income, although D_1 spending may be related to income earned! To put it bluntly and in its most irritating – thought-provoking – form, the underlying axioms of Keynes's revolutionary theory of effective demand requires that *the demand for goods produced by labour need never be constrained by actual earned income. Spending is only constrained by liquidity and/or timidity considerations.* Thus the budget constraint, in a Keynesian model, need never limit either individual spending or aggregate spending at less than full employment.

In the real world, planned spending need never be equal to, or even constrained by, actual income as long as (a) agents who earn income by either selling their labour or goods produced by labour in the private sector are not required to spend all of their earned income on goods produced by labour, and/or (b) agents who plan to spend on currently producible goods are not required to earn income (previously or concurrently) with their exercise of this demand (where by demand we mean *want plus the ability to pay*).

Hahn (1977, p. 31) has put point (a) as meaning that Say's Law is done away with and involuntary unemployment can occur whenever there are 'resting places for savings in other than reproducible assets' so that all income earned by engaging in the production of goods is not, in the short or long run, spent on assets producible by labour. For savings to find such ultimate resting places, the axiom of gross substitution must be thrown over.

This gross substitution axiom is the backbone of mainstream economics; it is the assumption that any good is a substitute for any other good. The gross substitution axiom assumes that if the demand for good x goes up, its relative price will rise, inducing demand to spill over to the now relatively cheaper substitute good y . For an economist to deny this 'universal truth' of gross substitutability between objects of demand is revolutionary heresy – and as in the days of the Inquisition, the modern-day College of Cardinals of mainstream economics destroys all non-believers, if not by burning them at the stake, then by banishing them from the mainstream professional journals. Yet in Keynes's (1936, ch. 17) analysis 'The Essential Properties of Interest and Money' require that:

1. The elasticity of production of liquid assets including money is approximately zero. This means that private entrepreneurs cannot produce more of these assets by hiring more workers if the demand for liquid assets increases. In other words, liquid assets are not producible by private entrepreneurs' hiring of additional workers; this means that money (and other liquid assets) do not grow on trees.
2. The elasticity of substitution between all liquid assets, including money (which are not reproducible by labour in the private sector) and producibles (in the private sector), is zero or negligible. Accordingly, when the price of money increases, people will not substitute the purchase of the products of industry for their demand for money for liquidity (savings) purposes.

These two elasticity properties that Keynes believed are *essential* to the concepts of money and liquidity mean that a basic axiom of Keynes's logical framework is that non-producible assets that can be used to store savings are not gross substitutes for producible assets in savers' portfolios. If this elasticity of substitution between liquid assets and the products of industry is significantly different from zero (if the gross substitution axiom is ubiquitously true⁷), then even if savers attempt to use non-reproducible assets for storing their increments of wealth, this increase in demand will increase the price of non-producibles. This relative price rise in non-producibles will, under the gross substitution axiom, induce savers to substitute reproducible durables for non-producibles in their wealth holdings and therefore non-producibles will not be, in Hahn's terminology, 'ultimate resting places for savings'. The gross substitution axiom therefore restores Say's Law and denies the logical possibility of involuntary unemployment.

In *Debate With His Critics*, Friedman (1974, pp. 146–8) could correctly attack Tobin and other neoclassical Keynesians for logical inconsistencies involving 'differences in the range of assets considered' as possible gross substitutes in savings portfolios. For Friedman (1974, p. 29) the total spectrum of assets eligible for savings includes 'houses, automobiles, let alone furniture, household appliances, clothes and so on'. (After all, in his *permanent income hypothesis*, Friedman deliberately defines savings so as to include the purchase of producible durable goods.) Thus Friedman, in his logical world remote from reality, can 'prove' that savings do not create unemployment; for the Samuelsons, Tobins and Solows of the world, their common sense, if not their logic, tells them better. To overthrow the axiom of gross substitution in an intertemporal context is truly heretical. It changes the entire perspective of what is meant by 'rational' or 'optimal' savings, of why people save or what they save. Hicks (1979, pp. 76–7, n. 7) noted that all Keynes needed to say was that income was divided between current consumption and a vague provision for the uncertain future. The mathematical assumption that 'planned expenditures at specified different dates in the future have independent utilities [and are gross substitutes] . . . I find quite unacceptable . . . the normal condition is that there is strong complementarity between them [consumption plans in successive periods]'. Indeed Danziger et al. (1982–83) showed 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.

In the absence of the axiom of gross substitution, income effects (e.g., the Keynesian multiplier) predominate and can swamp any hypothetical neoclassical substitution effects induced by relative price changes. Consequently, relative price changes via a flexible pricing mechanism will not be the cure-all 'snake-oil' medicine usually recommended by many neoclassical doctors for the unfortunate economic maladies that are occurring in the real world.

Investment spending, liquidity and the neutral money axiom

Agents who plan to buy the products of industry in the current period are not required to earn income currently or previously to their exercise of spending in today's market. This implies that spending for what Keynes (1936, p. 24) called D_2 (the demand for fixed and working capital goods⁸) spending on the products of industry reproducible by labour in the private sector is *not* constrained by either today's actual income or endowments. For

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Keynes, given animal spirits and not timidity on the part of entrepreneurs, D_2 is constrained solely by the *monetary*, and not the real, *expected return on liquid assets* (ibid., ch. 17). As long as the expected monetary return on working and fixed capital exceeds the monetary rate of interest, it pays to borrow from the money-creating banking system to purchase newly produced capital goods. Accordingly, the rate of interest, which is strictly a monetary phenomenon in Keynes, rules the roost in terms of determining how much D_2 spending occurs in any period.

Keynes (1936, p. 142) believed that the 'real rate of interest' concept, developed by Irving Fisher, was a logical confusion. In a monetary economy moving through calendar time towards an uncertain (statistically unpredictable) future there is no such thing as a forward-looking real rate of interest. Moreover, money has an impact on the real sector in both the short and long run. Thus, money is a real phenomenon.

This is just the reverse of what classical theory and modern mainstream theory teaches students of economics. In orthodox macrotheory the rate of interest is a real (technologically determined) factor, while money (at least in the long run) does not affect the real output flow. This reversal of the importance of the significance of money and interest rates for real and monetary phenomena between orthodox and Keynes's theory is the result of Keynes's rejection of a second neoclassical universal truth – the axiom of neutral money.

For the D_2 component of aggregate demand not to be constrained by actual income, agents must have the ability to finance investment by borrowing from a banking system which can create money in response to an increase in the demand for loans. Such money creation is therefore inevitably tied to the creation of money (debt) contracts. This financing mechanism involves the heresy of overthrowing the neutral money axiom. Hahn (1983, p. 44) describes this axiom as one where

The objectives of agents that determine their actions and plans do not depend on any nominal magnitudes. Agents care only about 'real' things such as goods . . . leisure and effort. We know this as the axiom of the absence of money illusion, which it seems impossible to abandon in any sensible sense.

This axiom implies that money is a veil, so that all economic decisions are made on the basis of real phenomena and relative prices alone. Money does not matter! But in the world we live in, money does matter, for: (1) money provides a liquid security blanket for those fearing an uncertain future where some contractual commitment can come due and cannot be met out of the expected cash flow in the future period; and (2) money can be created and lent to borrowers that the bankers deem creditworthy. These borrowers can then purchase goods and services from these borrowed (unearned) funds. To reject the neutral money axiom, therefore, does not require assuming that agents suffer from a money illusion. It only means that 'money is not neutral'; money matters in both the short run and the long run, or as Keynes (1973, p. 408) put it:

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 in either the long period or in the short, without a knowledge of the behaviour of money between the first state and the last. And it is this which we ought to mean when we speak of a monetary economy.

Can anything be more revolutionary? In this passage from an article entitled 'The Monetary Theory of Production' (and I emphasize the word *Monetary*) Keynes specifically rejects the neutral money axiom! The only objective for a firm is to end the production process (which takes time) by liquidating its working capital in order to end up with more money than it started with (Keynes, 1979, p. 82).

This can be easily illustrated. Suppose during the next great depression a firm has a production process gestation period of one year. At the beginning of the year it hires workers, buys materials, and so on, on forward money contracts for the entire production process and thereby has, except for acts of God, controlled its costs of production. Suppose that, during the year, the relevant price index falls by 10 per cent but the price at which the firm expected to sell its product at the end of the gestation period falls by only 5 per cent. In relative real terms the firm is better off; but in the real world the firm is really worse off as the market sales revenue falls by 5 per cent, but its money costs of production (which were fixed at the initial instant of hiring labour and ordering raw materials) are fixed by money contract.

Suppose we change the hypothesis to indicate a 50 per cent fall in the price index and a 45 per cent decline in the sale price of the firm's product. The firm still has a 5 per cent improvement in real terms, but in all likelihood if this occurs the firm will soon have to file for bankruptcy. (Of course a good classical economist would respond that the firm will not go bankrupt if it can recontract its labour hiring and raw material order contracts without penalty – but such recontracts without penalties are not a characteristic of the world we live in.)

If on the other hand we had assumed that the CPI goes up by 10 per cent (or 50 per cent) while the firm's product price went up by 5 per cent (or 45 per cent), although the firm's real position has deteriorated, its real-world position is better. As long as money contracts are used to efficiently plan the production process, production decisions will be affected by nominal values and money is a real phenomenon!

Once we admit that money is a real phenomenon, that money matters, then the traditional neutral money axiom must be rejected. Hahn should realize this, since Arrow and Hahn have demonstrated that:

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. . . . *If a serious monetary theory* 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)

Moreover, Arrow and Hahn demonstrate (*ibid.*, p. 361) that, if 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 existence theorems of a general equilibrium solution are jeopardized*. The existence of money contracts – a characteristic of the world in which Keynes lived and in which we still do – 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. The general equilibrium analysis is, therefore, inapplicable to a world where agents engage in production and exchange by the use of money contracts.

The pervasive ergodic axiom – precision vs accuracy

Most mainstream economists suffer from the pervasive form of envy which we may call the ‘Economist’s Disease’; that is, these economists want to be considered as first-class scientists dealing with a ‘hard science’ rather than be seen as ‘second-class’ citizens of the scientific community who deal with the non-precise ‘social’ and ‘political’ sciences. These economists, mistaking precision (rather than accuracy) as the hallmark of ‘true’ science, prefer to be precise rather than accurate.

Precision conveys ‘sharpness to minute detail’. Accuracy, on the other hand, means ‘care to obtain conformity with fact or truth’. For example, if you phone the plumber to fix an emergency breakdown in your plumbing system and he responds by indicating he will be there in exactly 12 minutes, he is being precise, but not exercising care to obtain conformity with fact or truth. If he says he will be there before the day is over, he is being accurate, if not necessarily precise.

Most economists, unfortunately, prefer to be precisely wrong rather than roughly right or accurate. The ergodic axiom permits economists to act ‘as if’ they were dealing with a ‘hard’ science where data are homogeneous with respect to time.

In order to predict the magnitude of future events, one should draw a sample from a future statistical universe. Since that is impossible, most hard scientists presume that they are studying ergodic stochastic processes. In an ergodic world, observations of a time-series realization (i.e. historical data) are useful information regarding the probability distribution of the stochastic process which generated that realization. If the process is ergodic, then using past-time series (or cross-sectional) data that are used to calculate probability distributions is equivalent to drawing the data from the future. In essence, past observations also provide information about the probability distribution over a universe of realizations which exist at any point of time such as today or tomorrow. Then the data drawn from past observations also provide useful information regarding the future probability distribution of events. Hence, by scientifically studying the past, as generated by an ergodic situation, present and future events can be reliably forecasted in terms of statistical probabilities calculated from past observations.

Keynes (1936, ch. 12) rejected this view that past information from economic time-series realizations provides reliable, useful data which permit stochastic predictions of the economic future. In a world where observations are drawn from a non-ergodic stochastic environment, past data cannot provide any reliable information about future probability distributions. Agents in a non-ergodic environment ‘know’ they cannot reliably know future outcomes. In an economy operating in a non-ergodic environment, therefore – our economic world – liquidity matters, money is never neutral, and neither Say’s Law nor Walras’s Law is relevant. In such a world, Keynes’s revolutionary logical analysis is relevant.

Conclusions

Mainstream economic theory has not followed Keynes’s revolutionary logical analysis to develop what Arrow and Hahn have called a ‘serious monetary theory’ in which contracts are made in terms of money in an economy moving from an irrevocable past to an uncertain, non-ergodic future. At the very beginning of his *Treatise on Money*, Keynes (1930, p. 3) reminded the reader that, in a modern economy, money exists only because there are contracts, and therefore money is intimately related to the existence of money contracts.

In his writings Keynes explicitly made assumptions that are incompatible with (a) the gross substitution axiom, (b) the neutral money axiom and (c) the ergodic axiom. Unfortunately, the early popularizers and professional interpreters of Keynes's analysis, such as Paul Samuelson, either did not read what Keynes wrote, or did not comprehend Keynes's revolutionary logic requiring the overthrow of these fundamental mainstream axioms. Nevertheless, Keynes's policy prescriptions made a great deal of common sense. Hence Keynes won the policy battles of the first three decades after the publication of *The General Theory*, even though 'Keynesians' had erected a 'neoclassical synthesis' microfoundation to Keynes's macroeconomics which could not logically support Keynes's general theory case.

From a logical standpoint the neoclassical synthesis Keynesians had created a Keynesian Cheshire Cat – a grin without a body. Thus Friedman and the rational expectations, new classical theorists were able to destroy the rickety neoclassical Keynesian scaffolding and replace it with a technologically advanced, logically consistent, but irrelevant and inaccurate theory.

Almost seven decades after publication of Keynes's *General Theory*, it is surprising how few in the economics profession are willing or able to defend the logical basis of Keynes's analysis. It is almost as if many believed that, as Clower (1965, p. 120) indicated, 'the *General Theory* is theoretical nonsense' unless Keynes believed in the constrained demand function, dual decision hypothesis. Yet we have shown above that this constrained demand function analysis implies Say's Law. Hence, if Clower was correct in his claim that Keynes had the dual decision hypothesis at the back of his mind, then Keynes was a theoretical charlatan in claiming that his analysis eliminated Say's Law. Of course, it is Clower and the other neoclassical synthesis Keynesians who maintain axioms rejected by Keynes who are in error in trying to apply Keynes's label to their logical system.

At the Royal Economic Society's centennial celebration of Keynes's birth in July 1983, the detractors of Keynes on the programme far exceeded those who were attempting to honour Keynes's accomplishments and build on his legacy. Some, such as Professors Samuelson and Solow, proudly labelled themselves as 'reconstructed Keynesians' to differentiate their theory from the 'unreconstructed' Keynesians of Cambridge, England. As Samuelson put it, a reconstructed Keynesian was one who found the Keynesian structure imperfect and had therefore to reconstruct it.

This 'reconstructed Keynesian' appellation is, however, a misnomer when applied to the neoclassical synthesis Keynesian approach of Samuelson and Solow. These mainstream American 'Keynesian' models never began with the same logical foundations and axioms as Keynes's model. Hence these Keynesians cannot, and will not, reconstruct Keynes until they throw over the neoclassical axioms rejected by Keynes.

The 'unreconstructed' Keynesians – or post-Keynesians as I would call them – recognize that there may be many flaws in the Keynes superstructure and that time has brought forth new and different pressing problems. Post-Keynesians may not have worked out all the answers, but at least they recognize that Keynes started with a logically different theoretical system – a system that accurately reflects the characteristics of the real economic world: those of Wall Street and the corporate boardroom, rather than those of Robinson Crusoe or the medieval fair.

Post-Keynesians recognize that their logical model is neither fully developed, nor as neat and precise, as the mainstream model. After all, the number of person-hours put into developing the orthodox model exceeds those invested in the post-Keynesian analysis

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several million-fold. Nevertheless, post-Keynesians believe that it is better to develop a model which emphasizes the special characteristics of the economic world in which we live than to continually refine and polish a beautifully precise, but irrelevant, model. Moreover, when one is dealing with human activity and institutions, one may be, in the nature of things, outside the realm of the formally precise. For Keynes, as well as for post-Keynesians, the guiding motto is 'it is better to be roughly right than precisely wrong!'

After the revolution comes evolution. Post-Keynesians are trying to build on the logical foundations of Keynes's real-world analysis to resolve modern-day economic problems. They invite all who possess open minds to undertake the further evolution of Keynes's logical heresy and to explore a Keynesian (non-Euclidean) world where the axioms of ergodicity, of gross substitution, and neutral money are not universal truths applicable to all economic decision-making processes.

Unlike Samuelson's 'reconstructed Keynesians,' post-Keynesians do not believe that a regression to pre-Keynesian (Euclidean) axioms represents progress, no matter how much technological garb these postulates are wrapped in. Only in the world of Doublespeak can a regressive analytical structure be considered an advance!

Notes

1. This assumption is called the ergodic axiom.
2. For example, Samuelson, Solow and Tobin.
3. In organized security markets, when the market maker appears to be running out of liquidity, there is usually an institutional stand-by 'circuit breaker' that closes the market until the market maker can obtain sufficient liquidity to reopen it. During the period when the market is shut down, the asset can be considered illiquid.
4. Despite Friedman's use of the motto 'money matters', he remains faithful to the neutral money axiom and therefore assumes that the quantity of money cannot affect the long-run real outcome of his system. In his own description of his logical framework, Friedman (1974, p. 27) states: 'changes in the quantity of money as such *in the long run* have a negligible effect on real income so that nonmonetary forces are "all that matter" for changes in real income over decades and money "does not matter" . . . I regard the description of our position as "money is all that matters for changes in *nominal income* and for *short-run* changes in real income" as an exaggeration but one that gives the right flavor to our conclusions'.
5. These economists, however, have the difficulty that their logic is based on Say's Law, but their common sense tells them that unemployment is a problem which the system cannot solve without direct government interference. Thus they turned to *ad hoc* modifications of their neoclassical model – a short-side rule or a constrained demand function – to abrogate Say's Law and achieve a non-Walrasian equilibrium, at least in the short run.
6. Since, in this neoclassical world, engaging in a production process is assumed distasteful, it would seem axiomatic that no agents would contribute to production unless they planned to spend all their income on producible goods. Consequently, full employment hiring decisions should always bring forth sufficient demand to buy all the products of industry.

This belief also underlies the rational expectations hypothesis via Lucas's aggregate supply analysis. Lucas believes there is no way of explaining real-world unemployment patterns except via an analysis of intertemporal substitutability of labour by optimizing households (see Lucas, 1983, p. 4). In order for households to achieve utility maximization solely in terms of the four arguments of Lucas's utility function – (1) today's consumption, (2) today's labour supply, (3) tomorrow's consumption, (4) tomorrow's labour supply – Lucas must assume that the intertemporal marginal propensity to spend on producible goods is unity. Say's Law therefore prevails by assumption. Unemployed workers are optimizing by preferring leisure today with rational expectations that they will get more real income per unit of effort tomorrow when they go back to work. Hence today's unemployed are not suffering any loss in permanent real welfare, i.e., the colliding lines that we observe are not really colliding it is all apparently an optical illusion.

If, on the other hand, you believe, as Keynes did and post-Keynesians do, that today's unemployed know they are suffering a permanent loss in real well-being, then you must throw off the classical axioms of gross substitution *and* the axiom of reals, and enter the world of Keynes' non-Euclidean economics! In such a world, the desire to possess liquidity – liquid assets not producible by labour – is also an argument in any labour (factor owner) supply function.

7. Empirical work by Benjamin Friedman (1993) has demonstrated that the facts do not justify assuming gross substitutability among all assets in savers' portfolios.
8. Or even consumer durables.

References

- Arrow, K.J. and Hahn, F.H. (1971), *General Competitive Analysis*, San Francisco: Holden-Day.
- Barro, R.J. and Grossman, H.J. (1976), *Money, Employment and Inflation*, Cambridge: Cambridge University Press.
- Clower, R.W. (1965), 'The Keynesian counterrevolution: a theoretical appraisal', in F.H. Hahn and F.P.R. Brechling (eds), *The Theory of Interest Rates*, London: Macmillan.
- Danziger, S., Van der Gaag, J., Smolensky, E. and Taussig, M.K. (1982–83), 'The life cycle hypothesis and consumption behavior of the elderly', *Journal of Post Keynesian Economics*, **5**, 208–27.
- Davidson, P. (1982–83), 'Rational expectations: a fallacious foundation for studying crucial decision making processes', *Journal of Post Keynesian Economics*, **5**, 182–98.
- Friedman, B. (1993), 'The substitutability of debt and equity securities', National Bureau of Economic Research working paper 1130, May.
- Friedman, M. (1974), 'A theoretical framework for monetary analysis', in R.J. Gordon (ed.), *Milton Friedman's Monetary Framework: A Debate with his Critics*, Chicago: Chicago University Press, Ch. 1.
- Hahn, F.H. (1977), 'Keynesian economics and general equilibrium theory', in G.C. Harcourt (ed.), *Microfoundations of Macroeconomics*, London: Macmillan, pp. 14–49.
- Hahn, F.H. (1983), *Money and Inflation*, Cambridge, MA: MIT Press.
- Hicks, J.R. (1967), *Critical Essays in Monetary Theory*, London: Clarendon Press.
- Hicks, J.R. (1979), *Causality in Economics*, New York: Basic Books.
- Keynes, J.M. (1930), *A Treatise on Money*, Vol. I, London: Macmillan.
- Keynes, J.M. (1936), *The General Theory of Employment, Interest and Money*, New York: Harcourt, Brace.
- Keynes, J.M. (1973), 'A monetary theory of production', in D. Moggridge (ed.), *The Collected Writings of John Maynard Keynes*, Vol. 13, London: Macmillan.
- Keynes, J.M. (1979), *The Collected Writings of John Maynard Keynes*, Vol. 29, edited by D. Moggridge, London: Macmillan.
- Lucas, R.E. (1983), *Studies in Business Cycle Theory*, Cambridge, MA: MIT Press.
- Malinvaud, E. (1977), *The Theory of Unemployment Reconsidered*, Oxford: Blackwell.