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Unemployment and Production Flow Prices

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Journal of Post Keynesian Economics

The dual-faceted nature of the Keynesian revolution: money and money wages in unemployment and production flow prices

The Keynesian revolution has often been sited in the multiplier, the consumption function, animal spirits and investment, liquidity preference, dynamic disequilibrium, involuntary unemployment equilibrium, and perhaps several elements in combination. Most assessments, especially those by monetarists, have accused Keynes of *underplaying* the operation of the monetary mechanism—at least in *The General Theory*, though not in his *Treatise on Money* and in earlier work.

In contrast to these partly conflicting and partly complementary expressions, though it may take time to revise the conventional judgments, we should view Keynes' novel and incisive reflections on money as the clue to his theoretical system. Implications abound for economic theory in sustaining this interpretation: to wit, that Keynes' revolutionary take-off originated in the denial of the gross substitution axiom in a modern, monetized-production economy. Of course, gross substitution is a latter-day concept, so that Keynes' disclaimer covered the thought, not the name.

Disequilibrium economics

Often it is asserted that Keynes' theory of employment was *not* revolutionary in the sense of representing a change in paradigm. Instead, the allegation is that Keynes' analysis comprises merely a specific example of a general equilibrium (GE) system which produces an underemployment solution only because Keynes stressed either: (1) errors of foresight of entrepreneurs; and/or (2) badly

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behaved aggregate supply and demand relationships due to wage and price “rigidities.”

With regard to errors of foresight by entrepreneurs, the argument is that unemployment is merely a short-run “disequilibrium” solution where the “speed” of quantity adjustments exceeds that of price adjustment, and free market price flexibility would lead to a long-run full employment. Friedman (Friedman et al., 1974, p. 16 n.), for example, cites with approval Leijonhufvud’s claim that “in the Keynesian macrosystem the Marshallian ranking of price and quantity adjustment speeds is reversed. . . . The ‘revolutionary’ elements in *The General Theory* perhaps can not be stated in simpler terms” (Leijonhufvud, 1968, p. 52).¹ Similarly, Patinkin (1965, pp. 337-38) has averred that if market prices were flexible and could adjust by means of a *tâtonnement* process, then Keynes’ theory must be “disequilibrium economics,” where, by Patinkin’s definition of equilibrium, Walras’ law (i.e., the simultaneous clearing of all markets) does not apply.

Ill-behaved functions

If macro demand and/or supply curves are *not* well behaved, then either:

a) these curves do not intersect in the first quadrant, and thus “normal” market resolution is precluded (e.g., an interest-inelastic investment function faces a similarly interest-inelastic savings function); or

b) horizontal segments of supply and/or demand functions (due to monopolies or economic “irrationalities”) prevent the price system from working (e.g., sticky money wages or the liquidity trap); or

c) some systemic impediments in income flows over time constrain demand to less than full employment. Essentially, this argument is that income receipts are necessary to finance expenditures. As the former precedes the latter in time, demand curves are con-

¹ My 1974 article demonstrated that relative speeds of adjustment were not critical to the Keynesian revolution. Leijonhufvud, aware of my paper before publication, conceded that “it is *not* correct to attribute to Keynes a general reversal of the Marshallian ranking of relative price and quantity adjustments. . . . most of the recent writing on Keynes’ theory including my own, insist on analyzing it in a Walrasian perspective. . . . But Keynes was, of course, a price theoretical Marshallian, and . . . ignoring this fact simply will not do” (1974, pp. 164-65).

strained by actual income receipts so that “effective excess demand may be insufficient to induce price adjustment despite the obvious sufficiency of notional excess demand [to achieve full employment]”² (Clower, 1965, p. 123).

Of course, if Keynes’ unemployment analysis depended either on erroneous expectations and ensuing “disequilibrium” or on badly behaved supply-demand functions, then Keynes was mistaken in his 1935 letter to George Bernard Shaw, in which he saw himself “to be writing a book on economic theory which revolutionizes . . . the way the world thinks about economic problems” (1973, p. 492). Long before Keynes wrote his *General Theory*, economists (e.g., Pigou) had often concluded that business cycles were attributable to entrepreneurial errors of optimism and pessimism; even more universal was the recognition that unemployment persisted because workers refused to lower their money wages. Thus, unemployment, based on errors or rigidities, was a pre-Keynesian concept. Indeed, if Keynes’ model merely emphasized these aspects, he contributed nothing new to economic theory.

For completeness, it should be noted that although Clower’s “constrained” demand curves concept may not appear to be a pre-Keynesian concept, it is in fact similar to Keynes’ analyses of the classical doctrine of “Supply creates its own Demand” (Keynes, 1936, pp. 25-26). For Keynes this doctrine meant that the aggregate demand function, $f(N)$, and the aggregate supply function, $\phi(N)$, were “equal for *all* values of N , i.e., for all levels of output and employment; and that when there is an increase in $Z(= \phi(N))$ corresponding to an increase in N , $D(= f(N))$ necessarily increases by the same amount as Z ” (pp. 25-26). In other words, if $f(N) = \phi(N)$, then, when firms hire less than the full employment level of workers, income will be constrained and aggregate demand will

² Thus, for Clower (at least) unemployment occurred because there was no market mechanism, in a monetary economy, to *coordinate* full employment hiring decisions with the full employment *purchasing* decisions that would then be forthcoming. Apparently, in a Clower context, if entrepreneurs hire the full employment level of workers, then notional and actual household income receipts would be equal, and actual purchases would equal desired (notional) demand at full employment. Sufficiency of *current* effective demand for the product of workers, and full employment, could be maintained.

Interestingly, although Clower declares that he cannot find any passage in Keynes to indicate that the latter utilized the “dual decision hypothesis” of income-constrained demand curves, either Keynes had this “hypothesis at the back of his mind, or most of the *General Theory* is nonsense” (Clower, 1965, p. 120).

equal supply at less than full employment. Thus, any level of income can be an equilibrium one if $f(N)$ and $\phi(N)$ are equal for all levels of N ; i.e., there “is an infinite range of [equilibrium] values all equally admissible” (p. 26). Hence, if firms initially produce the full employment level of output and if $f(N) = \phi(N)$, then there will be no shortage of effective demand; i.e., there is “no obstacle to full employment” (p. 26).

Thus Clower’s construction, though it may seem to some GE theorists to obtain “Keynesian” results, does not get to the essence of the underemployment problem of monetary economies. In a monetary, production, market-oriented economy, even if entrepreneurs hire the full employment level of workers, there can be an insufficiency of aggregate effective demand when all goods currently produced cannot be profitably sold *at any price-money wage level*. It is the prospect of possible insufficient effective demand at full employment that clearly differentiates Keynes’ analysis of a monetary economy from either a general equilibrium system or Clower’s model.

Gross substitution

As judged from the title of his 1936 book, his letter to Shaw, and elsewhere, Keynes surely thought he had altered the substance of economic theory. As a trained logician he well knew that if he was to transform the way the world *thinks* about economic problems, he had to dispel one of the fundamental axioms of orthodox theory. As Keynes explicitly stated:

If the classical theory is only applicable to the case of full employment, it is fallacious to apply it to the problems of involuntary unemployment—if there is such a thing (and who will deny it?). The classical theorists resemble Euclidean geometers 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 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.* (1936, p. 16; italics added)

Which axiom did Keynes select for the rebuke and “throw-over”? Unfortunately, in his day Keynes did not have meticulous neoclassical workers such as Hicks, Patinkin, Arrow, Debreu, Hahn, and others to spell out in exacting detail the fundamental axioms

of the now standard general equilibrium analysis. Hence, in retrospect an extended, revised interpretation of his fine intuition can be made. Keynes detected the mischief as located in wage theory: he stated his obvious need to “throw-over the second postulate of the classical doctrine” (1936, pp. 16-17); that is, “the utility of the wage when a given volume of labor is employed is equal to the marginal disutility of that amount of labor” (p. 5). Thanks to neo-classical writers such as Arrow and Hahn as well as the others, however, it can now be demonstrated that Keynes’ jettisoning of this “second postulate” of the classical theory of employment, which defined equilibrium in terms of the clearing of the labor market, entailed repudiation of the axiom of gross substitution (GS) as a fundamental precept of a monetary, production economy. Gross substitution can be defined as the predominance of substitution effects in the economy, with substitution influences overwhelming negative income consequences.

Arrow and Hahn have noted that gross substitution is *the* predominant sufficient condition theorists rely upon to prove the *existence, uniqueness, and stability* of a GE solution (Arrow and Hahn, 1971, pp. 15, 127, 215, 305). In the absence of gross substitution, some excess-demand functions may *not* exhibit downward-sloping shapes; hence, there may be no price vector that clears all markets simultaneously (Walras’ law). Furthermore, even if such a market-clearing price vector exists, starting from any given disequilibrium position, a sequential price adjustment mechanism—without the GS axiom—need not converge to a general equilibrium at all (Arrow and Hahn, 1971, p. 305)!

Thus, insofar as neoclassical analysis is identified with the problem of reconciling all conditional intentions of economic agents within the productive capacity of the economy,³ the axiom of gross substitution is a fundamental building block of the system. To reject the GS axiom, therefore, is to overthrow all general equilibrium systems and to render them inapplicable to the problems which Keynes staked for his study.

Essential properties of money

Keynes, in his chapter “Essential Properties of Interest and Money” (1936, ch. 17), declares that the *essential* properties of money

³ And if GE is not involved with the reconciling of all conditional intentions, then what is the function of the market system in GE analysis?

(*and* any other assets that have the attribute of liquidity) are that (1) its elasticity of production and (2) its elasticity of substitution, are zero (or negligible). Because of this second essential property of money, however, Keynes must reject the neoclassical axiom of gross substitution, just as non-Euclidean geometry throws out the axiom of parallel lines. Here, rightly or wrongly, Keynes has imported a new and revolutionary way of thinking about real world economic problems that involve money and liquidity.

Economists who utilize gross substitution in the logical foundations of their models (i.e., all general equilibrium theorists) are forced by the logic of their system to respond as a Euclidean geometer in the real world: on observing the persistent unemployment and inflation in prices of producible goods—the equivalent of parallel lines crashing into each other—they “rebuke” the dual disorder in events and deplore government interference with normal market forces for the unseemly outcome. Logically, the only policy guideline that can be derived from GE systems—if *Keynes’ view of the essential properties of money is relevant*—is that if only the world complied with GE logic the perverse “accident” could not occur. But from Keynes’ standpoint, models based on gross substitution are irrelevant for monetary policy, for in any model that uses the GS axiom, money does *not* matter! Consequently, if the attribute of liquidity requires the elasticity properties postulated by Keynes, then general equilibrium models must be abandoned despite their air of precise and elegant structure. Economists will have to dwell in a world where gross substitution does not permeate every economic decision and where unemployment equilibrium *and* inflation are plausible potential outcomes of well-behaved (i.e., consistent with the axioms) aggregate demand and supply parameters.

The definition and essential properties of money

Any analytical method requires the tools of an unambiguous set of definitions, for controversy too often is generated by mere semantic obfuscation. Fruitful policy development impels a tidy language so both the problem and steps to its resolution can be well defined. Unfortunately, in many on-going policy debates, the concepts of money and inflation are ambiguous.

Monetarists mistakenly surmise that the use of illustrative examples can provide a definition of a money concept; hence, mod-

ern theory abounds with “definitions” of $M_1, M_2, M_3, \dots, M_7$. Manifestly these are exemplifications rather than explanations. Confusion surely would be compounded if astronomers defined the concept of “planets” by using the names of specific heavenly bodies: how could one tell a planet from a moon? Even worse, if some chemists defined the concept of “molecule” in terms of specific inorganic salts, while a second group included inorganic bases, how would scientists know what to look for and isolate in a study of molecular systems?

Scientific communication and progress can occur only when definitions are not cast in terms of specific illustrations but are formulated in terms of *essential* features and properties. Then, if a specific item possesses these essential properties and features, it is an example of the defined thing no matter how strange this may appear to the layman; for example, a whale is a mammal, not a fish; bamboo shoots are grass, not trees.

In this spirit of scientific definition, it is possible to insist that the money concept in a modern, market-oriented production economy involves two fundamental, concomitant features embodying two necessary properties. Money is that thing which, by delivery, permits economic agents to discharge obligations that are the result of spot and forward contracts. Thus the first definitional feature is: (1) *money is the means of contractual settlement*. Money is also (2) capable of serving as an instrument to transport generalized (nonspecific) purchasing power over time, i.e., *money can act as a one-way (present to future) time machine*.

In modern monetary economies, feature (2) is known as liquidity; it is possessed in various degree by some, but not all, durables. Since by definition *no* durable besides money can be used as a means of settlement of future contractual obligations, in order for a specific durable other than money to be a vehicle for moving generalized purchasing power over time, it must be readily resalable for money at any time, in a well-organized, orderly *spot* market.⁴

⁴ In order to be a liquidity time machine, not only must a durable be resalable but also its carrying costs must be significantly less than the expected profit from future resale in order to make its holding as a store of value worthwhile. Since the marginal carrying costs of tangibles tend to rise rapidly with the size of stock held, those tangibles that are readily reproducible (at roughly constant costs in terms of the wage unit) will rapidly lose any time machine capabilities they might be thought to possess if the public attempts to buy (and hold as a store of value) any surplus over current consumption at the cost of reproduction of the tangible.

The degree of liquidity associated with any durable is a measure of its capacity as a “liquidity time machine,” a quality that depends on the degree of organization of its spot market.

The contractual settlement (or payment) feature of money, on the other hand, is *not* possessed by any other durable except money. If some “liquidity time machine” were suddenly to acquire this settlement feature (or to lose it), at that moment the durable would become (would no longer be) money. For example, after the U.S. Supreme Court upheld the abrogation of the gold clause in business contracts, gold dropped out of the money category in the United States—even though it retained a liquidity attribute to the extent that it was salable for money in (authorized) spot markets.

Money and contracts

It follows that exemplifications of money in any economy (e.g., M_1 , M_2 , etc.) can be identified only in relation to the prevailing *law of contracts* and the conventions associated therewith. Examples of money are restricted to the particular economic system under observation and the market organization and institutional arrangements that permit contracting *in money terms* over calendar time. Some monetarists have abused the money concept in their extended “definitions,” which include corporate securities, bonds, etc. (e.g., M_3 , M_4 , etc.), for they have improperly assigned the time-machine aspect as the essential feature of money and have tended to suppress the contractual settlement feature—which is the essence of anything that covets the title of money.⁵

Money plays an essential and peculiar role only when contractual obligations span a significant interval of calendar time. If the economic system being studied permits only *spot* transactions, i.e., contracts that require payments at the immediate instant, then even if its members utilize a convenient medium of account and/or exchange, such a *numéraire* is *not* money in the full sense of the term. Spot transaction economies—which are equivalent to Hicks’ flexprice economies—have, as Keynes insisted, “scarcely emerged from the stage of barter” (Keynes, 1930, vol. 1, p. 3). A world in which economic transactors abjure money payment contracts spe-

⁵ Friedman is primarily responsible for this monetarist confusion of associating money with “a temporary abode of purchasing power,” i.e., a *liquidity* rather than a mode of contractual *settlement* definition.

cified for weeks, months, or even years in the future, is an economy in which both the settlement concept of money and its related liquidity notion are vacuous.

Money only matters in a world—our world—where there are multitudinous catenated forward contracts stipulated in money terms. In such an economy it is necessary that there be some continuity regarding the means that, by delivery, consummate the resulting obligations. The existence of market institutions that permit (and encourage) contracting for future payment creates the need for money, and liquidity.⁶ This is an essential feature of the performance of *all* real world market-oriented monetary economies, where production activity awaits the remorseless passage of calendar time.

Forward transactions

In a market-oriented economy most production transactions along the nonintegrated chain of firms involve forward contracts. For example, the hiring of factor inputs (especially labor) and the purchase of unfinished materials will normally entail forward contracting if the production process is to be efficiently planned. The financing of such forward production-cost commitments (i.e., taking a “position” in working capital goods) compels entrepreneurs to have money at hand to discharge these liabilities at one or more dates *before* the product is sold, delivered, and payment collected, and the position liquidated. Since orthodox neoclassical theory neglects the fact of contracting over calendar time in organized markets for future delivery *and* payment, the ubiquitous liquidity provision of entrepreneurs in capitalist economies is left unattended by mainstream economists in their nonmonetized theory of the firm. Consequently, they are irresistible targets of the businessman’s gibe: “They never met a payroll!”

Money wages and the price level

For a decentralized market economy moving irreversibly through and toward *uncertain* calendar time, forward contracting for inputs

⁶ “It is, however, interesting to consider how far those characteristics of money as we know it . . . are bound up with money being the standard in which debts and wages are usually fixed. . . . The convenience of holding assets in the same standard as that in which future liabilities may fall due . . . is obvious” (Keynes, 1936, pp. 236-67).

for the production sequence is essential to the execution of efficient production plans. Moreover, with slavery and peonage illegal, *the money wage contract* is the most ubiquitous forward contract of all. Since labor hiring, and wage payments, precede the delivery of newly produced goods, it is the (average) money wage, relative to productivity, that is the foundation upon which the price level of new goods rests. (Following Keynes, Weintraub [e.g., 1978] has been most persistent in this recognition and challenge to the Hicks-Samuelson “Keynesian” stream.)

As Arrow and Hahn have noted:

The terms in which contracts are made matter. In particular, if money is the good 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 and without a future. Keynes wrote that “the importance of money essentially flows from it being a link between the present and future” to which we add that it is important also because it is a link between the past and the present. If *a serious monetary theory* comes to be written, the fact that contracts are indeed made in terms of money will be of considerable importance. (1971, pp. 356-57; italics added)

Furthermore, as Arrow and Hahn recognized, in “a world with a past as well as a future and in which contracts are made in terms of money, no [general] equilibrium may exist” (p. 361), i.e., the presence of time-related money contracts is a sufficient condition for the possibility of nonexistence of general equilibrium.

Granted this Arrow-Hahn vision of the necessity of recognizing the importance of money-denominated contracts stretching over a period of calendar time, it follows that a “serious monetary theory” must be based on a system of *sticky* money wages and prices, i.e., the absence of rapid and explosive movements over time, generated by a system where economic agents are willing to enter into forward contracts that limit wage and price movements over the life of such contracts. Only a contractually fixed wage and product price system permits capitalist economies to engage in time-consuming production processes; for such a system provides the sticky (meaning normal) price level of producible goods that are the basis of decisions involving future economic consequences. This was the focal point of Keynes’ view on the workings of a monetary capitalist economy.

Capitalist entrepreneurs are, in theory and practice, agents who (as managers of business firms) are willing to commit themselves

contractually today to the purchase of working and/or fixed capital goods in order to provide an expected flow of produced goods at specific dates in the future. Since production takes time, for the production process to be organized efficiently, contractual commitments must be entered into at the start of the production process, so that delivery of components can be made as the goods-in-process (working) capital is fabricated from basic raw materials to finished product by the use of instruments of production and labor.⁷ Over the nonintegrated chain of firms linking raw materials to finished consumer goods, these overlapping forward money contracts are essential to providing an orderly market, when producers have sufficient demand and money-cost information to make “rational” decisions about time-consuming production processes that, once begun, are difficult and very costly if not impossible to interrupt (see Davidson, 1978, chs. 3 and 4).

Moreover, in a capitalist production economy organized on a money forward-contracting basis, hiring depends on entrepreneurs’ being willing *and* able to finance a “position” in working capital goods. Keynes’ theory of underemployment equilibrium is therefore *simultaneously* a theory of money and liquidity and a theory of the determination of the money prices of production flows. The Keynesian revolution was a *dual* revolution, for it not only explained why, in the real world, unemployment equilibrium could be a natural outcome of market forces, but also why, in a production monetary economy, forward money contracts (which are essential to production management decisions) require sticky money wages and production flow prices over time. Flexible money wages and production flow prices, rather than assuring full employment equilibrium in real world economies that organize production on a forward-contracting basis, would, whenever exogenous disturbances occurred, lead to the breakdown of capitalist production, since entrepreneurs would be unwilling and/or unable to take on the resulting potentially unlimited monetary “positions” in working cap-

⁷ As *The Economist* (March 10-16, 1979, p. 12, Survey) noted, the Japanese auto industry became an important world force when Toyota

implemented its radical production control system, known as the “just in time” method. This process was quickly copied by the rest of Japan’s motor industry. It likens each manufacturing stage to a customer. . . . The customer collects his goods in the precise quantity and at the exact time he needs them. The component producer, which may be part of the same company, thus has an orderly market and so can adjust its production (using the same approach) accordingly.

ital goods required because of price flexibility over the time interval necessary for production to occur. The existence of fixed money wage and price contracts for forward delivery and payment is therefore a *necessary* institutional arrangement for limiting liabilities in capitalist production processes.⁸

The existence of money contracts for forward delivery *and* payment is fundamental to the liquidity and money concepts. In such a setting, changes in money wage rates—Keynes' wage unit—determine changes in the costs of production and the price level associated with the production of goods that profit-oriented entrepreneurs are willing to undertake. The view that inflation, meaning a rising money price level of newly produced goods, is a monetary phenomenon makes logical sense only in an economy where time-oriented money contracts (especially labor hire) are basic to the organization of production activities.

The essential elasticity properties of money

The attribute of liquidity entails that money (and all other liquid assets) possess certain "essential properties," namely a zero (or negligible) elasticity of production and a zero (or negligible) elasticity of substitution between such liquid assets and goods that have a high elasticity of production, i.e., that are readily producible through the exertion of labor.⁹ Since the rationale for these salient properties for liquidity is developed at length elsewhere (Davidson, 1978), their implications will be summarized here.

1. To denote that the elasticity of production is zero is merely to recognize, in the language of economists, the old adage that "money doesn't grow on trees," and hence cannot be harvested (i.e., produced) by the use of labor. Because the elasticity of production is zero, if households, for example, decide to buy less auto-

⁸ Only in an economic system that organizes all production and distribution on a purely communal basis (e.g., a monastery or a kibbutz) so that (a) no factor inputs require payment *before* the completion of the production gestation period and (b) the initial division of the product is determined by some traditional nonmarket formula, will full employment of resources in the production process be assured. Of course, in such economies money is not necessary for either production or distribution.

⁹ "The attribute of 'liquidity' is by no means independent of these two characteristics. For it is unlikely that an asset, of which the supply can be easily increased or the desire for which can be easily diverted by a change in relative price will possess the attribute of 'liquidity' in the minds of owners of wealth" (Keynes, 1936, p. 241).

mobiles (or space vehicles) and buy more time vehicles (for liquidity) out of current income, while no one else concurrently spends more on the producible goods of our industries, then employment will decline in the automobile (space machine) industry, while the unemployed resources cannot be deflected into the production of time machines. (As Keynes noted [1936, p. 210], a decision to save is *not* a decision to order future goods.) Moreover, since the unemployed auto workers will buy less goods, additional or secondary unemployment (through a multiplier process) will occur in other industries that ordinarily sell goods to auto workers.

2. Since the elasticity of substitution is also zero (or negligible), as the hypothesized demand for money (or similar financial assets) increases, households will not substitute *other producible items* for these desired time machines. The demand for liquidity is “a bottomless sink,” and when the demand for liquidity increases at the expense of the demand for goods, there is no price at which this demand will be diverted back to the products of industry.¹⁰

These salient elasticity properties, it should be noted, do *not* mean that the money supply is unalterable. The money supply can be expanded exogenously (i.e., by the deliberations of the central bank) or endogenously when the banking system responds to an increased demand for money; in the latter instance, when part of the public wishes to enlarge its “positions” in capital goods and other durables (the “real bills” doctrine).

Hahn on the essential properties

Recently Hahn has noted that “to many economists Keynesian economics deals with important relevant problems and General Equilibrium Theory deals with no relevant problems at all. This view . . . has, alas, an element of truth” (1977, p. 25). Hahn, however, tries (vainly) to salvage the relevance of his GE research program by simultaneously incorporating the first of Keynes’ “essential properties” of money into a general equilibrium model, while severing the property from its tie to money.

Hahn assumes an economy “which can produce a single good by the aid of this good and labour. This good is perfectly durable if not consumed” (p. 27). He elicits underemployment equilibrium

¹⁰ In my published dispute with Professor Friedman he remarks that his theoretical framework specifically assumes that *easily reproducible commodities are good substitutes for money* (Friedman et al., 1974, pp. 27-29, 107-10).

from his general equilibrium model as long as there are “resting places for savings other than reproducible assets. In our model, this is money. But Land, as to his credit Keynes understood, would have the same consequence, and so would Old Masters. It is, therefore, not money which is required to abolish a Say’s Law-like proposition that the supply of labour is the demand for goods produced by labour. Any nonreproducible asset will do” (p. 31).

Nonreproducibility alone, however, will *not* be sufficient in the real world! A second elasticity property is essential if Say’s law is to be suspended when income earners divert demand to absorb the nonreproducible good (say, Marshall’s stones) for liquidity purposes in supplanting the durable producible good (say, furniture). As stones rise in price, if furniture is a substitute (as both Friedman and Tobin explicitly suppose in their portfolio balance approach to wealth holding, and the gross substitution maxim of Hahn’s GE model requires), then the increased demand for stones spills over into a furniture demand. The greater the *elasticity of substitution* between stones and furniture, the smaller the necessary price rise of stones to resuscitate Say’s law in Hahn’s model. Because Hahn has injected only the first of Keynes’ elasticity properties, his analysis of unemployment equilibrium is flawed.

Money, unlike the nonreproducible assets of Hahn’s general equilibrium model, possesses a second elasticity property. “The second differentia of money is that it has an elasticity of substitution equal, or nearly equal, to zero. . . . Thus not only is it impossible to turn more labour on to producing money . . . but money is a bottomless sink for purchasing power when the demand for it increases, since there is no value for it at which demand is diverted—as to slop over into a demand for other things” (Keynes, 1936, p. 231).

In a world of uncertainty where the institution of forward contracting, in money terms, for labor and other materials is an essential concomitant of production decisions, a money that carries these two elasticity properties enhances the expectations of sticky efficiency wages (Keynes, 1936, p. 238; Davidson, 1978, chs. 6, 9). In combination, these properties, and real world contracting institutions and economic organization, can inhibit neoclassical “natural market forces” from assuring a full employment equilibrium (Keynes, 1936, p. 235).

Explicit acceptance of the second elasticity property by Hahn, however, would *violate* the gross substitution axiom. Consequently,

there is an elemental logical incompatibility between the “serious monetary theory” advanced by Keynes and the neoclassical general equilibrium analysis of Hahn (and Friedman and Tobin).

The Keynesian revolution

The “revolutionary” aspect in Keynes thus originates in his association of money, *and liquidity*, with essential properties that dislodge the axiom of gross substitution as a building block for analyzing an organized forward money contract, production economy. Since the money wage contract is the most ubiquitous of all forward contracts, the money wage relative to productivity is the anchor to which the general level of reproducible goods prices is tied.

Since gross substitution is an essential axiom of general equilibrium theory, it follows that Hicks “shunted the car of economic science to a wrong line” when he wrote

I believe I have had the fortune to come upon a method of analysis which is applicable to a wide variety of economic problems. . . . 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 on crucial matters of social policy. (1939, pp. 1-4)

After a “mere” thirty-two years of rigorous and profound general equilibrium theorizing, Arrow and Hahn have finally conceded that a serious monetary theory had to be identified with money contracts (1971, pp. 356-57) and that, in a contract economy, a general equilibrium model may tumble (p. 361)! This same view, however, was expressed by Keynes on the first page of the text of his *Treatise* (1930, vol. 1, p. 3), where he specifies the coexistence of contracts with the institution of money, and in chapter 17 of his *General Theory* (1936), where he explicitly associates liquidity with properties that violate the gross substitution “axiom.”

Price-level policy implications

Events have not stood still in the last fifty years. The ascent of labor power under full employment policies, and the bulge of multinational corporations since World War II, have spawned problems that, by 1970, were menacing the basic monetary institutions of

free market economies and posing the first major crisis for capitalist economies since the Great Depression. Aggravated by the economic power of OPEC (Organization of Petroleum Exporting Countries), the concomitant rapid disruptions in national and international monetary flows, as well as asset redistribution, jeopardize the viability of monetary institutions that developed slowly for a more leisurely environment. Bretton Woods exchange rate agreements have dissolved; dirty floats have evolved—to nobody's satisfaction. Mainstream neoclassical monetary theorizing does not meet the Arrow-Hahn criteria for a serious monetary theory; moreover, it has little advice to proffer on how the monetary framework can survive and adapt to the strains, except to advocate a steady hand at the money supply tiller for the long run—despite Keynes' disparagement of such "theory." Though we die and the system writhes, the monetary waters will at last be calm, claim the neoclassicists.

Going beyond the implications for underemployment "equilibrium" in the "essential" properties of money, Keynes never missed a chance to stress the interrelations between the money supply and the money wage unit (or, in a larger context, the cost unit including imports) for determining the price level. His monetary analysis led him to this penetrating conclusion, overlooked too often: that "money-wages should be more stable than real wages is a [necessary] condition of the system possessing inherent stability" (1936, p. 239).

In both the *Treatise* and *General Theory*, Keynes emphasized the money wage/money supply nexus. He noted that if we have control of both the earnings system (incomes policy) and the monetary system (monetary policy), and if we can control the pace of investment, we can "stabilize the purchasing power of money, its labour power, or anything else—without running the risk of setting up social and economic frictions or of causing waste" (1930, vol. 1, p. 169). Moreover, "if there are strong social or political forces causing spontaneous changes in the money-rates of efficiency wages [or in a modern context, energy costs], the control of the price level may pass beyond the power of the banking system" (1930, vol. 2, p. 351).

Having come full circle in economic theory to the point where eminent general equilibrium theorists in the 1970s reach conclusions basic to Keynes' writings of the 1930s, economists may be inspired to nudge our theories ahead by ejecting the gross substitu-

tion axiom from macroeconomics. Once the money wage contract is sighted as the fulcrum upon which the price level of producibles turns in both the short and the long run, much of the opaqueness regarding the confluence of incomes and monetary policies will evaporate.

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