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# MONEY, DEREGULATION AND THE BUSINESS CYCLE

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Gerald P. O'Driscoll, Jr.*
Research Department
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In this paper, I examine a burgeoning literature on the behavior of unregulated banking systems. Its analysis of banking and money has been dubbed the legal restrictions theory. Many of the theory's conclusions are startling, as, for example, the proposition that it is unnecessary to control the quantity of depository liabilities in a competitive banking system. Similarly, the theory's mode of analysis is unconventional; for example, its benchmark for examining the nature of banking services is a nonmonetary economy. It is precisely its unconventional analysis and startling conclusions, however, which make the legal restrictions theory both stimulating and worth further consideration.

In what follows, I first explicate the new view on banking; I next consider implications of the new view for controlling economic fluctuations; I then present a critique and, finally, I suggest how some of the valuable insights of the legal restrictions theory might be integrated with important tenets of more traditional approaches to money and banking.[1]

## The Legal Restrictions Theory of Money

The legal restrictions theory examines the seeming paradox that individuals simultaneously hold government currency and government bonds. The currency is noninterest bearing, while government bonds bear interest. The paradoxical aspect of this behavior derives from the fact that both obligations are default-free liabilities of the same issuer. Assuming rational behavior by transactors, we would expect the interest-bearing securities to dominate currency. Accordingly, Wallace (1983, p.1)

investigates the features of interest-bearing government securities "that prevent them from playing the same role in transactions as Federal Reserve notes. For if they could play that role, then it is hard to see why anyone would hold non-interest-bearing currency instead of the interest-bearing securities." The new view identifies legal restrictions as the source of the simultaneous demand for both currency and bonds and contrasts the current environment with an unregulated or "laissez-faire system." Wallace (1983, p. 4) states the view forcefully and concisely.

> ...Laissez-faire means the absence of legal restrictions that tend, among other things, to enhance the demand for a government's currency. Thus, the imposition of laissez-faire would almost certainly reduce the demand for government currency. It could even reduce it to zero. A zero demand for a government's currency should be interpreted as the abandonment of one monetary unit in favor of another -- for example, the abandonment of the dollar in favor of one ounce of gold. Thus, my prediction of the effects of imposing laissez-faire takes the form of an either/or statement: either nominal interest rates go to zero or existing government currency becomes worthless.

Wallace (1983, p. 1) identifies two conditions, the presence of one of which is necessary in order that government bonds not be substitutable for currency.[2] Either the bond must be nonnegotiable (as is true of U.S. savings bonds) or not issued in small denominations (as is true of Treasury bills). As Wallace (1983, pp. 2-3) further observes, neither of these two restrictions by themselves could prevent arbitrage by

financial intermediaries. These intermediaries could purchase large denomination, negotiable bonds (i.e., Treasury bills in multiples of $10,000) and issue bearer notes in small denominations. By matching maturities of these notes and those of the Treasury bills, the intermediary would be perfectly hedged. Since its assets are default-free by assumption, its bearer notes would also be default-free (fraud aside). Wallace thus identifies a crucial legal restriction that is sufficient for the coexistence of currency and bonds: government is a monopolistic provider of currency.

Absent legal restrictions, arbitrage would drive down the yield differential between bonds and currency to the costs of intermediating between them. Wallace (1983, pp. 3-4) estimates that these might be less than one percent. As an approximation, one could ignore the difference. Accordingly, Wallace concludes that either interest rates on bonds are driven to zero or currency disappears.

Another way of stating the conclusion is that money would not exist as a distinct financial asset.[3] This restatement brings into sharper relief the clear connection between Wallace's statement of the legal restrictions theory and Fischer Black's earlier analysis of how an unregulated financial system would operate.[4] Black assumes that depository institutions have complete freedom to create liabilities and to purchase financial assets as they see fit.[5] Banks' income derives from the spread between their borrowing costs -- chiefly interest on deposit liabilities -- and their revenue -- chiefly interest on loans. Black envisions that loans will take the form of negative bank balances, or, in other words,

overdrafts on deposit accounts. Indeed, his description of the hypothetical system of positive and negative bank balances reads like a virtual foretelling of the modern cash management account at brokerage houses (Black [1970], pp. 10-11).

Black presents an evolutionary model of financial innovation, which begins with a commodity money and ends in a moneyless world. Early in the evolutionary process real goods, as well as the commodity money, become priced in terms of an abstract unit of account. Black hypothesizes, however, that the means of payment will likely be a portfolio of common stocks. He thereby invokes an assumption that characterizes subsequent presentations of the new view: the separation of the means of payment and the unit of account.

Black (1970, p. 9) is also responsible for first articulating another characteristic proposition of the legal restrictions theory: in a deregulated financial environment, "it would not be possible to give any reasonable definition of the quantity of money. The payments mechanism in such a world would be very efficient, but money in the usual sense would not exist."[6] In other words, having merged money and other financial assets, Black cannot readily quantify the former separately.

Wallace (1983, p.4) takes a different tack and analyzes open-market purchases and sales of Treasury bills by a central bank in a laissez faire regime. He assumes that there is a constant-cost technology for producing currency, which is shared by private and government intermediaries (a situation of "technological symmetry"). In other words, government and private notes are perfect substitutes produced under

identical cost conditions. In Wallace's example, there is a given private-sector demand for currency. Thus, an expansion in the production of one type of currency results in the contraction of other types. An open-market purchase of bills by the central banks constitutes just such a change. As the central bank increases its assets (Treasury bills), it will issue more liabilities (including currency). Since individuals now hold central bank currency, they will curtail their demand for commercial bank currency. In the process, resources are reallocated from private- to public-sector producers of currency. Wallace (1983, pp. 4-5) concludes that:

> ...Under Laissez-faire and technological symmetry, the open market purchase does no more than change the location from the private sector to the government of a given quantity of economic activity, the production of small-denomination notes. Nothing else is affected, neither interest rates nor the price level nor the level of economic activity. A similar argument applies to open market sales.[7]

In a laissez faire system, then, there are no macroeconomic effects of banks' issuing their own liabilities to purchase financial assets. This conclusion, which holds for central banks and private issuers alike, is in starling contrast to conventional wisdom and constitutes the most important policy conclusion of the legal restrictions theory. The contention will be the focus of most of the rest of the paper.

Once again, Black suggests how a laissez faire banking system might operate. The world is a far cry from a monetarist environment containing a well-defined transaction money, whose total quantity is linked to an exogenous monetary base by a stable money multiplier. In Black's world, debits and credits would be created and extinguished with every transaction. In terms of Wallace's example, under competitive conditions expansion by one intermediary would come at the expense of contraction by others. Both analyses conclude that, in a laissez faire system, the provision of payment services by banks would have no special effects on prices or output (Cf. Fama [1980], pp. 45-47).

Economists traditionally model banks as creators of money. Certain liabilities of private banks are added to those of central banks with the resulting magnitude constituting the money stock. The money-creation function is the benchmark for analyzing banks; of course, in creating money banks are also providing the payments services on which legal restrictions theorists concentrate. In the latter view, however, banks as creators of money are peculiar to a regime of legal restrictions. Consequently, conventional monetary theories are applicable only to a specific set of institutions. The legal restrictions theory lays claim to being a more general theory of financial intermediation. Moreover, by abstracting from banks' role as creators of money in a regulated system, legal restriction theorists feel that they better understand the nature of banking services. Or, as Fama (1980, p. 42) phrases it, "the banking system is best understood without the mischief introduced by the concept of money." Legal restriction theorists focus instead on the accounting and portfolio management services provided by banks.

It is now possible to restate the legal restrictions theory as a set of five interrelated propositions.[8]

(1) Money would not exist as a distinctive financial asset in the absence of legal restrictions;

(2) The unit of account is separable from the means of payment;

(3) Conventional monetary theories are applicable only to a specific set of financial institutions;

(4) In a laissez faire system, the provision of payment services by banks would have no special effects on prices or macroeconomic activity;

(5) The provision of payment services -- not the production of money -- is the benchmark for analyzing banks.

In the next section, I focus on an implication of the legal restriction theory, namely, that a laissez faire system would be insulated from economic fluctuations caused by monetary shocks.

## Economic Fluctuations

Some writers have suggested that the problem of economic fluctuations would be attenuated if not eliminated in an unregulated banking system. Greenfield and Yeager (1983, p. 304) contend that such a system "offers much less scope than an ordinary monetary system for destructive monetary disequilibrium." They also suggest that runs on banks "would be less catastrophic under [this] system," essentially because banks would exchange liabilities under a floating rather than a fixed-rate domestic exchange system.

Fama (1980, p. 40) offers the most explicit underpinning for the position that economic fluctuations result from regulations compelling banks to play a special role "in the process by which a pure nominal commodity or unit of account is made to play the role of numeraire in a real world monetary system."[9] He argues that money's causal inefficacy in a laissez faire regime can best be understood as an implication of the Modigliani-Miller theorem: "...The portfolio management activities are the type of pure financing decisions covered by the Modigliani-Miller (1958) theorem."[10]

The core of Fama's argument is as follows. First, if there is competition, then there are actual or potential substitutes for the portfolios offered by any banks. Second, to attract depositors, banks must hold portfolios against which depositors are willing to hold claims. Third, competition insures that depositors are paid a return equaling that earned on the bank's portfolio less a management fee. Given that they are

pure profit maximizers, the last assumption renders banks indifferent to the composition of their own portfolios (Fama [1980], pp. 45-46)

What determines the portfolio composition of banks? Both the financing and the nature of economic activity are determined by "the tastes and endowments of individual economic units and the state of the economy's technology (Fama [1980], p. 46). In this sense, then, banks are passive agents, whose portfolios are determined by the nonfinancial sector.

If Fama's argument is correct, however, then banks are passive in another important sense: they exert no independent force on prices or real activity (Fama [1980], p. 45). The quantity and composition of banks assets and liabilities are entirely demand determined. If one bank were autonomously to change its assets and liabilities, competition would insure offsetting changes by other banking firms (Fama [1980], p. 46). In the aggregate, banks would thus play no causal role in the determination of equilibrium price and quantity vectors. This conclusion is a neutrality finding writ large.

In Fama's analysis at least, a real good functions as the numeraire. There is no price level as such to be determined, but only an equilibrium price vector. What would be the question of price-level determination reduces to the issue of the stability of equilibrium in a barter, general equilibrium system (Fama [1980], p. 44). Consequently, macroeconomic phenomena constituted by or attendant upon price-level fluctuations are absent by assumption in the competitive banking environment postulated by Black, Fama and Wallace.

In Fama (1980), the assumption of a nonmonetary economy is a modeling strategy to isolate the essential functions of a competitive bank. By contrast, Greenfield and Yeager (1983) view the abolition of money as an essential feature of a reform (one hesitates to say "monetary reform") that they propose. In the process, however, they appear to have confused an assumption with a substantive proof.

Greenfield and Yeager (1983) rely on the analysis of monetary disequilibrium presented in Yeager (1968). Money is unique in having no market of its own. Accordingly, an excess demand for money must be worked off in all other markets. Sticky prices result in quantity responses and pervasive real effects of the initial excess demand for money (Cf. Greenfield and Yeager [1983], p. 309). In their analysis, Greenfield and Yeager (1983, p. 310) identify the inelasticity of the supply of money as the necessary condition for macroeconomic disequilibrium to develop out of an excess demand for money.[11] The superiority of the proposed system, they assert, devolves around the demand determination of the means of payment.

Greenfield and Yeager seem to have confused themselves, if not their readers, with their argument about the demand determination of the means of payment. They point out that their "system would get rid of any distinct money existing in a definite quantity.... A wrong quantity of money could no longer cause problems because money would not exist" (Greenfield and Yeager [1983], p. 305).[12] Simply put, there is no monetary disequilibrium in their system because there is not money! The argument about the demand determination of the means of payment, which

appears to be a substantive proof, really reduces to a crude approximation of the kind of stability analysis suggested by Fama. As will be seen, however, the Greenfield-Yeager system is still susceptible to economic disorders similar in effects to that of monetary disequilibrium.

What, then, of the substantive issue of the existence of economic fluctuations in unregulated banking system? As already mentioned, the problem facing Greenfield and Yeager is not that of price-level determination but the attainment of a general equilibrium price vector. Actually, it would be instructive to focus on a more basic question: can market prices be determined in the Greenfield-Yeager system?

The latter is the operative question because, as Greenfield and Yeager (1983, p. 307) clearly state, they are proposing a barter system.

> With no money quantitatively existing, people make payments by transferring other property. To buy a bicycle priced at 100 value units or pay a debt of 100 units, one transfers property having that total value. Although the...system is barter in that sense, it is not <u>crude</u> barter. People need not haggle over the particular goods to be accepted in each transaction. The profit motive will surely lead competing private firms to offer convenient methods of payment.

First, it must be noted that there is no other sense in which the term barter is used than to cover situations in which goods trade directly for goods.[13] Second, I know of no theory of "sophisticated" barter; Greenfield and Yeager (1983) does not present a theory of sophisticated barter but depends on the (nonexistent) theory of how such a world operates. One must conclude that they are talking of barter, pure and simple.

It might well be appropriate to reconsider the standard analysis of barter. Absent a new theory of barter, however, one must be pessimistic concerning the workableness of the Greenfield-Yeager system.[14] The system would appear to suffer from the textbook problems of barter. Although Yeager and Greenfield (1983, p. 303) really only assert the contrary, the claim is worth analyzing. They admit that the "system would indeed lack money as we know it," but they state that "it would not entail the textbook inconveniences of barter. The advantages of having a definite unit of account and convenient methods of payment would be retained and enhanced." The implicit argument is that it is capitalism's accounting system, not its payments system comprising a physical medium of exchange, which overcomes the calculational difficulties of barter.

A key element in the Greenfield-Yeager proposal is the government's defining a unit of value, which would then form a basis of a social accounting system.[15] Rather than choosing a single good (as in Fama's analysis) or securities (as in Black's model), Greenfield and Yeager (1983, p. 305) suggest a composite bundle of commodities.[16]

> The prices of the individual commodities would not be fixed and would remain free to vary in relation to one another. Only the bundle as a whole would, by definition, have the fixed price of 1 unit.... The bundle would be composed of precisely gradable, competitively traded, and industrially important commodities, and in amounts corresponding to their relative importance. Many would be the materials used in the production of a wide range of goods so that the bundle as the value unit would come close to stabilizing the general level of prices expressed in that unit.

Greenfield and Yeager (1983, pp. 303, 306) emphasize the differences between their proposal and those for a composite-commodity or commodity-reserve monetary system. No reserves of the composite bundle would be maintained by any agency or private entity. There is no convertibility but only a defined unit of value. The latter distinction is important to the authors as well as to the reader assessing their proposal.

There is a striking similarity between the logic of the trading process in the Greenfield-Yeager proposal and that in early Marxist schemes for allocating and distributing goods. It is instructive to draw the parallels, since doing so helps isolate a critical flaw in Greenfield and Yeager (1983).

Marx's overriding economic goal was to replace capitalism's "anarchic" system of production with a system of conscious social control of the means of production (Lavoie [1985]). Marx wanted to avoid any reliance on market prices in allocating resources and distributing goods. He suggested using labor time as a measure of the cost (value) of each commodity and actually exchanging goods according to their embodied labor time. Compare Greenfield and Yeager (1983, p. 307), who observe that "to buy a bicycle priced at 100 value units or pay a debt of 100 units, one transfers property having that total value."

Using labor time as a mechanism for allocating resources founders on the problem of labor's heterogeneity and nonuniformity. Marx tried to reduce heterogeneous, skilled labor to homogeneous, unskilled labor time. He did not, however, solve the valuation problem. A competitive market

evaluates different types of labor but Marx wanted to eschew the use of anarchic market values. This left him with analytically insoluble problem of evaluating heterogeneous labor without an evaluation mechanism (Lavoie [1985], pp. 67-74).

Greenfield and Yeager face the even more complex problem of homogenizing the heterogeneous commodities of their composite numeraire. Greenfield and Yeager (1983, pp. 313-14) mention but do not solve the calculational problem.

> Suppose that the ... bundle were defined as 1 apple + 1 banana + 1 cherry. Prices are to be paid and debts settled in bundles-worth of convenient payment property. Now apples are struck by a fungus. What market forces arise to accomplish the appropriate changes in relative prices while still enforcing the unit's definition?[17]

Greenfield and Yeager (1983, pp. 313-14) are, as it were, hoist on their own petard. They themselves note that if a fungus attacks apples, the bundle becomes relatively scarcer; deflationary pressure is exerted on other commodities. This is the evil from which their nonmonetary exchange system was to save us. They suggest that bananas and cherries are among the commodities whose relative price will fall. The need for an adjustment of the prices of other commodities within the bundle adds to the adjustment problem rather than (partially) offsetting it. In general, there will be more not fewer price changes necessary because there are two additional composite goods whose prices have changed.

In taking account of the effects of the fungus attack, Greenfield and Yeager (1985, p. 314) suggest widening the definition of the bundle. Indeed, they indicate that the wider the definition, the better the results. Consider, however, what would occur if the suggestion were carried to its logical extreme. Every trade would constitute an exchange against a representative bundle of all commodities. Using a conventional medium of exchange ("money," as we now know it) avoids having to calculate n-1 relative prices in making individual exchanges The method of payment in the Greenfield-Yeager system would require just this exercise for each and every transaction. Their system would accordingly involve the calculational chaos of barter.

To give some historical-institutional relevance to the argument, the authors have observed that changes in the relative scarcity of gold under a gold standard produces familiar macroeconomic consequences. They suggest not a bimetallic but a trimetallic system as an improvement, ignoring the additional problems introduced by the possibility of relative-price changes between goods in the composite bundle.[18]

Actually, the analytical problem being discussed is inherent in any scheme to stabilize a price level or other constructed average price. The appeal of stabilizing a price level or subset of prices is that doing so will somehow minimize or diminish the number of relative-price changes necessary in a market economy (cf. Friedman [1969], p. 106). To my knowledge no one has ever demonstrated this rigorously; Greenfield and Yeager certainly do not do so.[19] They in fact have done us the service of inadvertently showing why stabilizing a price or subset of prices would not

necessarily diminish the costly market adjustments necessary in a monetary economy. Greenfield and Yeager have surely failed, however, to demonstrate their main practical point, that economic fluctuations would be eliminated in a nonmonetary system. In a sense, this is gratifying since it would be counter-intuitive to hold that a nonmonetary system is more efficient than a monetary economy.

Whether economic fluctuations would occur in an economy with unregulated banks remains an open question. Resolution of the question would require both a fuller development of the legal restrictions theory and careful specification of the sources of cyclical disturbances. Models of the business cycle increasingly identify real factors as the cause of fluctuations. If these models are correct, then it is unclear what effect monetary deregulation would have on the timing, amplitude or frequency of cyclical fluctuations.

Suppose, however, that economic fluctuations are caused by monetary shocks. It would still be unclear whether we could be confident that an unrestricted banking system would eliminate these fluctuations. The uncertainty devolves on the issue of bank reserves and interbank deposits. The literature on the legal restrictions theory has little to say about settlement practices for banks (financial intermediaries) in a deregulated environment. Yet the issue is crucial, since two banks can only settle their liabilities by transferring a third asset, which is the liability of neither bank.[20] To facilitate settlement, banks may hold interbank deposits. More generally, however, banks will hold <u>reserves</u> of some asset acceptable to all as final settlement. Today, base money

(deposits at Federal Reserve banks plus currency) constitutes the reserve asset. Even absent legal restrictions, there would be a finite demand for a reserve asset; again, the source of the demand would derive from the requirements of the interbank clearing process.[21] Indeed, these considerations lead Osborne (1985b) to conclude that banks would hold reserves even in a laissez faire payments system. The optimal reserve ratio would be much closer to zero, however, than to one, which exposes the system to the periodic crises inherent in a fractional-reserve banking system. Osborne (1985b, pp. 22-23) concludes as follows.

> It is hard to imagine that such a system could produce most of the uncertainties and absurdities that drive observers of our present system to despair.... But the speculations do not suggest that it would be free of monetary disturbances. The bankers of a free system would choose their reserve ratios as profit dictates. The optimal reserve ratio would be less than one. There would be furtive abundance, and it would vanish with the gusts of discredit that would blow among a free people as among others, even if less often.

## Barren Money

In this section, I concentrate on the assumptions of the legal restrictions theory. Bryant and Wallace (1980, p. 1) provide the most explicit statement of the underlying assumptions.

> (1) Assets are valued only in terms of their payoff distributions.
>
> (2) Anticipated payoff distributions are the same as actual payoff distributions.
>
> (3) Under laissez-faire, no transaction costs inhibit the operation of markets and, in particular, the law of one price.

Simply stated, the legal restrictions theory assumes away the existence of any nonpecuniary yield from holding money.[22] Since at least currency yields no explicit return, this quickly leaves us with no reason for rational economic agents to demand the asset. Any neoclassical economist worth his salt should be unsatisfied with this situation and quickly strive to identify the intervention generating this otherwise odd situation. In terms of their own assumptions, Bryant and Wallace, et al., have done a good job of modeling the problem. The assumptions must not go unchallenged, however.

The denial of a nonpecuniary yield to money is really another way of stating the old view that money is "barren." In an undeservedly neglected essay, Hutt (1956) surveyed the history of monetary economics and could find only one orthodox monetary theorist (Greidanus) who was not, to one degree or another, under the sway of the doctrine that money is barren. Though <u>many</u> economists have had all the elements of a correct theory --

clearly perceiving that money provides conveniences services and cost savings -- virtually all continued to assume explicitly that money's yield is, in Keynes' words, "nil" (Keynes [1936], p. 226).

The view that money yields no return is as old as Aristotle. It entered modern economics through the schoolmen, thence via Locke and Adam Smith. Not surprisingly, Hutt traces the idea through the classical economists. What is surprising, however, are the illustrious neoclassical economists who have echoed the point down to the present. Whereas Locke said that "money is a barren thing" (Hutt [1956], p. 199), Bohm-Bawerk assured us that: "Money is by nature incapable of bearing fruit" (Hutt [1956], p. 203). Wicksell described money as "sterile" (Hutt [1956], p. 204).

Perhaps the most puzzling of all is Keynes. I've already quoted him as denying that money has a yield. This statement is the more remarkable, since it appears in the section of the General Theory in which Keynes analyzes the liquidity premium on money. If we take him literally, then economic agents exhibit a preference for an asset with no yield.[23]

The confusion is even clearer in Marshall than in Keynes. Marshall explicitly recognized that some capital assets yield an implicit or nonpecuniary return but denied that money is one of these assets. He averred that holding resources in the form of money "locks up in a barren form resources that might yield an income of gratification if invested, say, in extra furniture; or a money income if invested in extra machinery or cattle" (Hutt [1956], pp. 205-06).

Marshall was quite modern -- more so even than Keynes -- in noting that the yield on an asset can be either nonpecuniary or pecuniary. He simply denied that money has a yield of either kind. I submit that modern treatments of the demand for money make essentially the same mistake. The modern literature is quite clear in treating foregone interest as the cost of holding money, but is more ambiguous by far on the benefits derived from cash holdings. Following Baumol, one tradition focuses on brokerage costs of moving in and out of interest-bearing assets. This explanation rings hollow as we return to a financial system with sophisticated financial instruments and cash management techniques. Following Tobin, a second literature focuses on liquidity preference as behavior toward risk. The latter tradition perhaps adheres more closely to Keynes, but, in so doing, perpetuates his error on the yield from holding money.

Hutt contends that modern monetary theory perpetuates an 18th century view of productivity. The 18th century view treats productivity in entirely physical terms: an asset is productive if it yields a return in kind, i.e., if it bears fruit. If it yields no fruit, the asset is barren. Since money traditionally yielded no interest, 18th century economists viewed it as barren. Modern capital theory has moved beyond that view by accepting that assets can yield an implicit return. This insight explains, for example, the holding of so-called idle land.[24]

When it comes to "idle balances," however, the 18th century view holds sway. As suggested above, the neoclassical spirit is restive when confronted with a demand for an asset apparently having no yield. The restive spirit has yielded the legal restrictions theory. Indeed, so long

as economists adhere to the 18th century view on money, the legal restrictions theory may be the only consistent resolution of the conundrum.

Money yields a nonpecuniary return, just as does furniture, a painting or wine collection. In deciding whether to hold more or less money, an individual compares the advantages of holding the money balances with the advantages of holding other assets. In doing this, the individual is comparing different expected yields; he is not comparing an asset yielding a return with one yielding no return. The latter would, indeed, be a paradoxical situation.

Once we accept that money yields a nonpecuniary return, the paradox identified by the legal restrictions theory is seen to be apparent rather than real. In other words, the paradox is resolved by denying the thesis. Along the way, we also manage to jettison a good deal of philosophical baggage that we can do well without.[25]

What I am identifying is a property of money that is the property neither of legal restrictions nor of historical accident, but which reflects a preference exhibited by individuals over time and in radically different trading environments. The property or characteristic is money's liquidity.

Hicks (1974, pp. 38-39) has succinctly characterized the demand for liquidity as a desire for flexibility: "Liquidity is not a property of a single choice; it is a matter of a sequence of choices, a related sequence. It is concerned with the passage from the known to the unknown -- with the knowledge that if we wait we can have more knowledge." In contrast, Hicks (1974, pp. 43-44) points out that "by holding the

imperfectly liquid asset the holder has narrowed the trend of opportunities which may be open to him.... He has 'locked himself in.'" In so characterizing the value of liquidity to transactors, Hicks clearly links the demand for money (and other liquid assets) to uncertainty. In this sense, money can only be analyzed with a theory incorporating uncertainty.[26]

Money is not merely highly liquid, but that asset which is perfectly liquid. It trades in every market and need never be sold at a discount.[27] Even highly liquid, nonmonetary assets are subject to price risk. For this reason, people are willing to forego substantial pecuniary returns in order to hold money balances. In highly regulated and substantially unregulated monetary systems alike, individuals have demanded absolutely liquid assets.

The above addresses the demand for liquidity. The legal restrictions theorists may be interpreted as emphasizing a supply issue: why cannot intermediaries purchase interest-bearing assets and issue circulating notes ("currency") backed by these assets? It is certainly true that the willingness of people to forego a pecuniary return does not imply that they need do so. As Bryant and Wallace (1980, p. 11) insist, we must investigate the "transaction technology" in a modern economy.

Bryant and Wallace (1980, pp. 14-15) and Wallace (1983, p. 3) estimate the costs of intermediating by observing the spread between the rates of return earned and paid by mutual funds. Wallace (1983, pp. 3-4) asserts that " there is no reason to expect that the cost of intermediating securities like Treasury bills into bearer notes would be much different

from the cost of operating these intermediaries." Observation suggests, however, that there is good reason to suppose a great deal of difference between the costs of suppling low-turnover deposits (money market mutual fund shares) and high-turnover currency. White (1985) examines the transaction-cost structure and concludes that the intermediation costs for currency are of an entirely different order of magnitude than for deposits. He offers three types of evidence: (1) historical evidence on currency issued in the Scottish free-banking system; (2) evidence current practice with respect to travelers checks; and (3) an a priori estimate.

With respect to the first type of evidence, White (1985, pp. 3-4) observes that "the legal restrictions theory provides us with a clear and falsifiable prediction: non-interest yielding currency should not coexist with positive-interest-yielding securities in the absence of legal restrictions against the sort of intermediation that could produce interest-yielding bearer bonds backed by those same securities." In the free-banking era (i.e., before 1844) Scottish banks had complete freedom to pay interest on bank notes and the banking environment was competitive. Yet noninterest-bearing currency flourished, falsifying the prediction of the legal restrictions theory.

Second, White (1985, p. 4) notes the nonpayment of interest on travelers checks today. Moreover, it would surely be computationally easier to pay interest on travelers checks than on currency. There appear to be no restrictions on paying interest on travelers checks.

White's third piece of evidence is perhaps the most interesting. He adduces arguments why interest-bearing currency would inherently be more

costly to transact with than noninteresting-bearing currency. He then makes a reasonable calculation of the costs of collecting the interest accrued on a note and concludes that it would be prohibitive (White [1985], pp. 7-10).

Both theoretical arguments and observational evidence suggest that there was never a paradox to explain. It is certainly true that the existing financial system is replete with regulations. Some of these regulations would even serve to restrain an issuer from circulating interest-bearing currency if he wanted to do so. The evidence indicates, however, that the restraints are irrelevant. Interest-bearing currency would not plausibly evolve with reasonable assumptions made about costs and benefits. It has not existed when banks were free to issue it. It will probably not exist when banks are free to issue it again in the future.

## Conclusion

In the previous section, White's analysis addressed the supply-side or cost considerations adduced by Bryant and Wallace. At least for argument's sake, the analysis accepts the plausibility of currency's yielding interest. At minimum, however, the interest earned on money must always be less than that earned on nonmoney assets. For if money were to yield both a nonpecuniary return of liquidity services and an explicit market rate of interest, then the return on holding money would be supra-normal. Osborne (1984 and 1985a) argued that base money alone corresponds to the money of economic theory. It would be plausible to suppose then that currency would be the most liquid transactions money. Its lack of an explicit yield scarcely seems troublesome in that light.

One can, of course, deny (as Bryant and Wallace [1980] did) that there is a distinctive asset called money. In their case, the denial really is an implication of a methodological argument about the form that economic reasoning ought take. It clearly is beyond the scope of this paper to deal directly with that debate.[28] It would be unfortunate, however, if the debate over banking deregulation became entangled in a modern methodenstreit. More concretely, commitment to (or against) banking deregulation does not presume commitment to the equilibrium theorizing advocated by the legal restrictions theorists. Indeed, historically unregulated banking has born little resemblance to the hypothetical "laissez-faire" systems postulated in various models derived from the legal restrictions theory. In that sense, the theory is a detour in the debate over banking deregulation.

From a different perspective, however, the legal restrictions theory has done a great service by challenging economists to rethink their commitment to monetary regulation. On their own terms, conventional macroeconomic models make no sense. Wallace (1983, p. 6) correctly identifies that, on conventional grounds, the one remaining justification for legal restrictions on money is revenue collection. If economists pursue the suggestion of modeling legal restrictions on money as a species of fiscal policy, then the legal restrictions theorists will have made a lasting contribution.

## NOTES

*Senior Economist and Policy Advisor, Federal Reserve Bank of Dallas. The views expressed in this paper are the author's and should not be construed as representing the official position of any part of the Federal Reserve System. I would like to thank Dale Osborne for his comments on an earlier draft.

1. Although I refer to the legal restrictions theory as the "new view," Cowen and Krosner (1985) argue that theory is anything but new. They contend that it has a long history, which begins in the eighteenth century.

2. A "bond" refers to a dated interest-bearing obligation, while "currency" refers to a noninterest-bearing note callable on demand.

3. Or, as Hall (1982b, p. 1554) puts it, "money is exactly a creature of regulation." The following discussion of Fischer Black's views draws from O'Driscoll (1985a, pp. 6-7).

4. Wallace (1983, pp. 1n) refers the reader to Fama (1980) and Hall (1982) "for other discussions of the legal restrictions theory." He also cites six other articles as applications of the theory, but does not refer to Black (Wallace [1983], p. 3). Black is clearly the intellectual predecessor, however, of Fama, Hall, Wallace, et al.

5. Black does not adhere strictly to a laissez faire assumption. For instance, he specifies that "every bank will be required to have capital equal to a certain fraction of its loans..." (Black [1970], p. 12). His support of capital requirements is particularly odd, given his opposition to reserve requirements.

6. Black later adds that "neither the quantity theory of money nor the liquidity preference theory of money would be applicable." And he further states that: "Traditional monetary theories will be inapplicable; in fact, it will not be possible to define the quantity of money in meaningful terms (Black [1970], pp. 9-10).

7. In a footnote to this passage, Wallace adds that: "The result that central bank intermediation does not matter under laissez-faire also holds for central bank exchange of Federal Reserve notes for other assets -- risky mortgages, risky commercial loans, or common stock. It is a straightforward extension of a well-known finding in corporate finance called the Modigliani-Miller theorem." On the latter point, see Fama (1980, pp. 45-47).

8. Cowen and Krosner (1985, pp. 2-3) adduce 7 propositions characterizing the theory.

9. Yeager and Greenfield (1983) offer their own analysis of the problem, which I examine below.

10. Fama (1980, p. 40). Fama (1980, pp. 45-47) offers two variants of the theorem. Wood and Wood (1985, pp. 477-82) offer a textbook presentation of the theorem.

11. On the crucial role of the supply elasticity of money, Cf. Keynes (1964 [1936], pp. 234-36).

12. Or see Yeager and Greenfield (1980, p. 303), where they state that their system "would indeed lack money as we know it..."

13. See Clower (1970), pp. 202-211. Clower (pp. 207-08) states the following as "the central theme of the theory of a money economy": "Money buys goods and goods buy money; but goods do not buy goods." By contrast, in Greenfield and Yeager (1983), goods buy goods.

14. O'Driscoll (1983) offers a more detailed critique of an earlier presentation of the legal restrictions theory by Yeager (1983).

15. Government plays an ironic role in many of the "laissez-faire" models of the payments mechanism. In Greenfield and Yeager (1983), government defines the unit of value. In Wallace (1983), government imposes laissez faire. In Hall (1982a), government replaces the existing monetary standard by fiat and engages in interest-rate targeting. The use of "laissez-faire" in this class of models appears to be a neologism.

16. Greenfield and Yeager (1983, p. 305) cite Robert Hall's suggestion of a bundle of 50 kilograms of ammonium nitrate plus 40 kilograms of copper plus 35 kilograms of aluminum plus 80 square meters of plywood (of specified grade), but indicate a preference for an even more encompassing composite bundle.

17. The authors invite misunderstanding by such phrases as "enforcing the unit's definition." Greenfield and Yeager (1983, p. 303) have assured us that the "unit of account does not require 'implementation' through convertibility of any familiar sort, anymore than does maintenance of the defined length of the meter." What, then, is to be enforced?

18. Greenfield and Yeager have, of course, designated their system as nonmonetary. I am not arguing, therefore, that it would be similar in all respects to a trimetallic system, but am only suggesting that it would involve the theoretical and practical problems discussed here.

19. Wallace (1983, p. 6) observes that:

> ...There exist no complete arguments leading to the conclusion that people are on average better off the more stable the price level, given the steps

> that have to be taken to attain greater stability of the price level. On the contrary, as Sargent and Wallace (1982) argue, the restrictions that make greater price level stability possible hurt some people and benefit others, while on average, in a certain sense, making all worse off."

He concludes that, without legal restrictions, "it is no easier to achieve price level stability than it is to achieve stability of some relative price."

20. O'Driscoll (1985, pp. 7-9) examines this issue in more detail; cf. Osborne (1985, pp. 18-23).

21. Recent historiography on the clearinghouse function in a free-banking system includes Gorton (1985) and Timberlake (1984).
White (1984a, pp. 1-22) presents a model of free banking in which banks demand reserves.

22. Cf. White (1985, p. 5). The first assumption explicitly precludes a nonpecuniary yield on money. But the second and third assumptions separately exclude the possibility, since the eliminate the reason for money's yield. (See the textual discussion, infra.)

23. Keynes' point was precisely that money yields a nonpecuniary yield. That he felt compelled to say that money's yield is "nil" indicates, however, that the old view of barren money still held sway over him even as he was engaged in trying to overturn it. As Keynes said in the Preface to the General Theory, "the difficulty lies, not in the new ideas, but in escaping from the old ones, which, ramify, for those brought up as most of us have been, into every corner of our minds."

24. And it can serve to explain the holding of idle resources generally. For an insightful analysis along these lines , see Hutt (1939).

25. One also avoids having to adopt the troublesome modeling strategy adopted in Bryant and Wallace (1980). Bryant and Wallace (1980, p. 6) defend the strategy by arguing that "the reader is not giving up much by entertaining [the three] postulates as a potential basis for a theory of financial systems. By not giving up much, we mean that existing alternative models of financial systems have taught us very little." I am inclined to agree that we would not be giving up much by jettisoning the macroeconomic models examined by Bryant and Wallace (1980, pp. 6-10). I try to indicate this on p. 21, supra. O'Driscoll (1985b) discusses the origins of the tradition presented here. Also, see O'Driscoll and Rizzo (1985, pp. 191-98).

26. The latter point is scarcely original. If accepted, however, it precludes the strategy adopted by Bryant and Wallace (1980). O'Driscoll and Rizzo (1985) argue that uncertainty is the source of many economic processes and institutions, which can be analyzed only by

incorporating uncertainty. Money is, in fact, one of the best examples of a market institution that would not exist in a world with perfect foresight and no transaction costs. At this level of generality, Bryant and Wallace (1980) had their chief result as soon as they wrote down their assumptions.

The analysis of liquidity draws on O'Driscoll (1985a, p. 11).

27. This characterization takes not names but properties seriously (see Bryant and Wallace [1980], pp. 8-9). Choosing the empirical counterpart of the theoretical construct is not an easy task, as Osborne (1984 and 1985a) demonstrates.

28. The issue is taken up in great detail in O'Driscoll and Rizzo (1985).

# BIBLIOGRAPHY

Black, Fischer. "Banking and Interest Rates in a World Without Money." Journal of Bank Research 1 (Autumn 1970): 9-20.

Bryant, John and Wallace, Neil. "The Inefficiency of Interest-bearing National Debt." Journal of Political Economy 87 (April 1979): 365-81.

Bryant, John and Wallace, Neil. "A Suggestion for Further Simplifying the Theory of Money." Minneapolis: Photocopy, 1980.

Clower, Robert W., ed. Monetary Theory: Selected Readings. Baltimore: Penguin, 1969.

Cowen, Tyler and Krosner, Randy. "The Development of the Legal Restrictions Theory of Money." (Cambridge, MA: Photocopy, 1985).

Fama, Eugene. "Banking in the Theory of Finance." Journal of Monetary Economics 6 (January 1980): 39-57.

Friedman, Milton. The Optimum Quantity of Money. Chicago: Aldine, 1969.

Gorton, Gary. "Clearinghouses and the Origin of Central Banking in the United States." Journal of Economic History 45 (June 1985): 277-83.

Greenfield, Robert L. and Yeager, Leland B. "A Laissez-Faire Approach to Monetary Stability." Journal of Money, Credit and Banking 15 (August 1983): 302-15.

Hall, Robert E. "Explorations in the Gold Standard and Related Policies for Stabilizing the Dollar." In Inflation: Causes and Effects, pp. 111-22. Chicago University of Chicago Press, 1982a.

_____ "Monetary Trends in the United States and the United Kingdom: A Review from the Perspective of New Developments in Monetary Economics." Journal of Economic Literature 20 (December 1982b): 1552-56.

Hicks, J.R. The Crisis in Keynesian Economics. New York: Basic Books, 1974.

Hutt, W.H. The Theory of Idle Resources. (1939).

_____ "The Yield from Money Held." In On Freedom and Free Enterprise: Essays in Honor of Ludwig von Mises, pp. 196-223. Edited by Mary Sennholz. Princeton: D. Van Nostrand, 1956.

Keynes, John Maynard. The General Theory of Employment, Interest, and Money. New York: Harcourt, Brace & World, Harbinger Books, 1964 (1936).

Klein, Benjamin. "The Competitive Supply of Money." Journal of Money, Credit, and Banking 6 (November 1974):

Lavoie, Don. Rivalry and Central Planning: The Socialist Calculation Debate Reconsidered. Cambridge, U.K.: Cambridge University Press, 1985.

O'Driscoll, Gerald P. "A Free-Market Money: Comment on Yeager." Cato Journal 3 (Spring 1983): 327-33.

_____. "Money in a Deregulated Financial System." Federal Reserve Bank of Dallas Economic Review (May 1985a): 1-12.

_____. "Money: Menger's Evolutionary Theory." Federal Reserve Bank of Dallas Research Paper No. 8508 (1985b); forthcoming, History of Political Economy (1986).

Osborne, Dale K. "Ten Approaches to the Definition of Money." Federal Reserve Bank of Dallas Economic Review (March 1984): 1-23.

_____. "What is Money Today?" Federal Reserve Bank of Dallas Economic Review (January 1985a): 1-15.

_____. "On the Theory of Laissez-Faire Payments Systems." Dallas: Photocopy, 1985b.

Sargent, Thomas J. and Wallace, Neil. "The Real-bills Doctrine versus the Quantity Theory: A Reconsideration." Journal of Political Economy 90 (December 1982): 1212-36.

Timberlake, Jr., Richard H. "The Central Banking Role of Clearinghouse Associations." Journal of Money, Credit and Banking 16 (February 1984): 1-15.

Wallace, Neil. "A Legal Restrictions Theory of the Demand for "Money" and the Role of Monetary Policy." Federal Reserve Bank of Minneapolis Quarterly Review (Winter 1983): 1-7.

White, Lawrence H. Free Banking in Britain: Theory, Experience, and Debate, 1800-1845. Cambridge: Cambridge University Press, 1984a.

_____. "Competitive Payments Systems and the Unit of Account." American Economic Review 74 (September 1984b): 699-712.

_____. "Accounting for Non-interest-bearing Currency: A Critique of the 'Legal Restrictions' Theory of Money." New York: Photocopy, 1985.

Wood, John H. and Wood, Norma L. Financial Markets. New York: Harcourt Brace Jovanovich, 1985.

Yeager, Leland B. "Essential Properties of the Medium of Exchange." Kyklos 21 (1968): 45-69. Reprinted in Clower (1969), pp. 37-60.