MONEY, DEREGULATION, AND THE BUSINESS CYCLE

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In this article, I examine the burgeoning literature on the behavior of unregulated banking systems. The 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.[1] 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, that make the legal restrictions theory both stimulating and worth further consideration.

In what follows, I first explicate the new view on banking and consider implications of that 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.[2]

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[1]This conclusion is, however, one that the legal restrictions theory shares with modern advocates of free banking. The reasoning of the two theories is quite different, however. For a cogent exposition of the free banking position, see White (1984a).

[2]Although I refer to the legal restrictions theory as the "new view," Cowen and Kroszner (1985) argue that it is anything but new. They contend that it has a long history, which begins in the 18th century. Although not entirely unrelated, the "new view" referred to herein is not Tobin's "new view" of the 1960s.

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, Neil 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.[3] 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 donomination, negotiable bonds (that is, 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 the crucial legal restriction

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

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 1 percent. If, as an approximation, one ignores the cost then either interest rates on bonds should be driven to zero or currency should disappear.

Another way of stating the conclusion is that money would not exist as a distinct financial asset. This restatement brings into sharper relief the clear connection between Wallace's statement of the legal restrictions theory and Fischer Black's (1970) 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. Banks derive their income 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 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." In other words, having merged money and other financial assets, Black cannot readily quantify the former separately.

[4]Wallace (1983, p.1, n.2) 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, and Wallace. The following discussion of Black's views draws from O'Driscoll (1985a, pp. 6–7).

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 in a laissez-faire system there are no macroeconomic effects of banks issuing their own liabilities to purchase financial assets.[5] This conclusion, which holds for central banks and private issuers alike, is in startling contrast to conventional wisdom and constitutes the most important policy conclusion of the legal restrictions theory. That contention will be the focus of most of the rest of this article.

Economists have traditionally modeled 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 restriction theorists concentrate. In this view, however, banks as creators of a distinctive financial asset, 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 Eugene 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.

[5]Wallace invokes the Modigliani-Miller theorem to justify the conclusion that central bank intermediation has no macroeconomic consequences. On this point, see also Fama (1980, pp. 45–47).

It is now possible to restate the legal restrictions theory as a set of five interrelated propositions:[6]

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.

The next section focuses on proposition four of the legal restrictions 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. Robert Greenfield and Leland 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."[7] 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 bank. 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. Instead, banks adjust their portfolios

[6]Cowen and Kroszner (1985, pp. 2–4) adduce seven propositions characterizing the theory.

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

to the depositors' tastes and productive opportunities available (Fama 1980, pp. 45–46). In this sense, then, banks are passive agents, whose portfolios are determined by the nonfinancial sector.

If Fama's argument is correct, then banks are passive in another important sense: they exert no independent force on prices or real activity. The quantity and composition of their 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. 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 (Fama 1980, pp. 45–46).

In Fama's analysis, a real good functions as the *numéraire*. There is no price level as such to be determined, but only an equilibrium relative-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 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 (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 (cf. Keynes 1964, pp. 234–36). 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" (p. 305). Simply put, there is no monetary disequilibrium in their system because there is no money (cf. Greenfield and Yeager, p. 303). 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 effect to that of monetary *disequilibrium*.

At this point, we need to focus on a more basic question, namely: can market prices be determined in the Greenfield-Yeager system? This is the operative question because, as Greenfield and Yeager (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 *crude* 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 accepted sense in which the term "barter" is used other than to cover situations in which goods trade directly for goods.[8] Second, I know of no theory of "sophisticated" barter; Greenfield and Yeager do not present a theory of sophisticated barter but depend 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, which would appear to suffer from all the textbook problems of barter. Although Yeager and Greenfield (p. 303) really only assert the contrary, their 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.

[8]See Clower (1969, pp. 202–11). 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.

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.[9] Rather than choosing a single good (as in Fama's analysis) or securities (as in Black's model), Greenfield and Yeager (p. 305) suggest a composite bundle of commodities.[10]

> 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 (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 their proposal.

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 again Greenfield and Yeager (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."

[9]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.

[10]Greenfield and Yeager (1983, p. 305) cite 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.

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 the 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 *numéraire*. They (pp. 313–14) mention but do not solve the calculational problem:[11]

> Suppose that the . . . bundle were defined as 1 apple + 1 banana + 1 cherry. Prices are to be paid and debts settled in bundles-worths 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?

Greenfield and Yeager (pp. 313–14) are, as it were, hoisted on their own *pétard*. They themselves note that if a fungus attacks apples, the bundle becomes relatively scarcer; deflationary pressure is exerted on other commodities. But this is the very evil from which their nonmonetary exchange system was to deliver us. They note 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 (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.

[11]Greenfield and Yeager (1983, p. 313) also invite misunderstanding by such phrases as "enforcing the unit's definition." They 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" (p. 303). What, then, is to be enforced?

To give some historical-institutional relevance to the argument, the authors observe 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. I am not arguing, of course, that their system would be similar in all respects to a bimetallic or trimetallic system, but am only suggesting that it would involve the problems raised here.[12]

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 (cf. O'Driscoll 1986b). 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.

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 only 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.[13] To facilitate settlement,

[12]Actually, as White pointed out to me, the Greenfield-Yeager proposal is more similar to Marshall's symmetalist proposal. See Marshall (1965, pp. 64–67).

[13]O'Driscoll (1985a, pp. 7–9) examines the issue in more detail; cf. Osborne (1985b, pp. 18–23).

banks may hold interbank deposits. More generally, however, banks will hold reserves 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.[14]

Indeed, these considerations lead Dale 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:

> 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 at 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. John Bryant and Neil 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.

Taken together, these assumptions preclude any nonpecuniary yield from holding money.[15] Since currency yields no explicit return, there is 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,

[14]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.

[15]Cf. White (1986, p. 5). The first assumption explicitly precludes a nonpecuniary yield on money. But the second and third assumptions separately exclude the possibility, since they eliminate the reason for money's yield.

Bryant and Wallace have done a good job of modeling the problem, but the assumptions underlying the legal restrictions theory should not go unchallenged.

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, W. H. 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 many 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's 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 John 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). Böhm-Bawerk assured us that "money is by nature incapable of bearing fruit" (p. 203), and Wicksell described money as "sterile" (p. 204).

Perhaps the most puzzling of all is Keynes. His statement denying that money has a yield is the more remarkable, since it appears in the section of the *General Theory* in which he analyzes the liquidity premium on money. If we take him literally, then economic agents exhibit a preference for an asset with no yield.[16]

The confusion is even clearer in Marshall than in Keynes. Alfred Marshall (1965, pp. 38–39) explicitly recognized that some capital assets yield an implicit or nonpecuniary return but denied that money is one of these assets:

> Currency held in hand yields no income: therefore, everyone balances (more or less automatically and instinctively) the benefits, which he would get by enlarging his stock of currency in hand, against those which he would get by investing some of it either in a commodity—say a coat or piano—from which he would derive a direct benefit; or in some business plant or stock exchange security, which would yield him a money income.

[16]Keynes's 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."

Likewise, Marshall (1965, p. 45) averred that holding resources in the form of noninterest-bearing 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." So, in modern terms, Marshall recognized that assets can yield a money income, output that can be sold for money, an income in kind that may lead to a capital gain, or a nonpecuniary yield. Though money has benefits, Marshall felt constrained to repeat that money, nonetheless, has no yield of its own. Even when great minds like Marshall had all the elements of a theory of money as an asset with nonpecuniary yield, the dead hand of the past reached out and prevented them from forming the elements into a coherent whole.

Marshall was quite modern 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 forgone interest as the cost of holding money, but is more ambiguous by far on the benefits derived from cash holdings. Following William 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 James Tobin, a second tradition focuses on liquidity preference as behavior toward risk. The latter approach 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 incorporates an 18th-century view, which treats productivity in entirely physical terms: an asset is productive if it yields a return in kind, that is, 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 generally 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.[17]

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

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

money, the legal restrictions theory may be the only consistent resolution of the conundrum.

Money yields a nonpecuniary return, just as does furniture, paintings, or wine collections. In deciding whether to hold more or less money, an individual compares, at the margin, 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.[18]

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 peculiar property or characteristic is money's liquidity. J. R. 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.' " 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.[19]

[18]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). O'Driscoll (1985b) discusses the origins of the tradition presented here. Also, see O'Driscoll and Rizzo (1985, pp. 191–98).

[19]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

Money is not merely highly liquid, but that asset which is perfectly liquid (see O'Driscoll 1985a, p. 11). It trades in every market and need never be sold at a discount.[20] Even highly liquid, nonmonetary assets are subject to the risk of price fluctuations. People are therefore willing to forgo substantial pecuniary returns in order to hold money balances yielding a nonpecuniary return. In highly regulated and substantially unregulated monetary systems alike, individuals have demanded absolutely liquid assets.

The previous analysis addresss the demand for liquidity. The legal restriction 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 forgo a pecuniary return does not imply that they need to 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 supplying low-turnover deposits (money market mutual fund shares) and high-turnover currency. White (1986) 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: historical evidence on currency issues in the Scottish free banking system; evidence about current practice with respect to traveler's checks; and a "back-of-the-envelope" calculation.

With respect to the first type of evidence, White (1986, p. 3) 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

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as soon as they wrote down their assumptions. The analysis of liquidity draws on O'Driscoll (1985a, p. 11).

[20]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.

interest-yielding bearer bonds backed by those same securities." In the free banking era (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 (1986, pp. 4–5) notes the nonpayment of interest on traveler's checks today. Moreover, it would surely be computationally easier to pay interest on traveler's checks than on currency. Like deposits and unlike currency, traveler's checks are returned to their issuer after once being spent. There appear to be no restrictions on paying interest on traveler's 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 noninterest-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 1986, pp. 6–10).

In substance, White's analysis parallels that offered in Fama (1983) on the question of interest-bearing currency. White's historical presentation and institutional analysis are more developed and specific than Fama's. Nonetheless, White's reasoning clearly supports the major conclusion reached in Fama (1983, p. 14): "Indeed, what is striking about currency history is that it seems impossible to find instances of a currency that survives as a generally accepted medium of exchange which is not denominated in fixed quantities of a unit of account and does not trade at face value."

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

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 an interest-yielding currency. 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, the return on holding money would be supranormal. 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 to take. It clearly is beyond the scope of this article to deal directly with that debate (but see O'Driscoll and Rizzo 1985). 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 restriction theorists. Indeed, historically, unregulated banking has borne 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. 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 restriction theorists will have made a lasting contribution.

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Issues Concerning the Nonpecuniary Yield of Money

Bennett T. McCallum

Most of the main conclusions in Gerald O'Driscoll's (1986) paper are ones with which I can wholeheartedly agree. Thus I too doubt that bank deregulation would make currency worthless or put an end to business cycle fluctuations. And I could not agree more with the idea that it is important for monetary analysis to keep in mind the nonpecuniary yield—that is, the transaction-facilitating services—provided by holdings of the medium of exchange. Indeed, in several papers I have detailed ways in which the neglect of these services has led various writers into serious analytical error.[1] But while most of O'Driscoll's conclusions seem correct, his paper contains several statements and arguments that do not bear close scrutiny. It is important that these be clearly identified and corrected, so that they will not detract from the predominantly useful message of his paper.

First, it is not appropriate to treat Neil Wallace's (1983) "legal restrictions" paper as if it took the same position as those of Fischer Black (1970), Eugene Fama (1980), Robert Hall (1982), and Robert Greenfield and Leland Yeager (1983). Indeed, there are significant differences among those writers, as I have detailed in a review of that literature (McCallum 1985). For example, the basic position regarding monetary analysis expressed in Fama (1980) is, initial appearances notwithstanding, quite consistent with neoclassical orthodoxy as represented by, say, Don Patinkin (1965) and Harry Johnson (1969).

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[1]The main line of argument is spelled out extensively in McCallum (1983a). Applications to the Sargent-Wallace (1983) model of commodity money and the Sargent-Wallace (1982) analysis of the real-bills doctrine are developed in McCallum (1983b and 1986, respectively).

In particular, it is not at all clear that Wallace's legal restrictions paper pertains to a nonmonetary economy, as O'Driscoll implies. Other papers of Wallace's are of this type, but there is nothing in the legal restrictions paper that rules out the presence of a medium of exchange. Its basic contention is only that if small denomination bearer-bills were issued by the U.S. Treasury then these might be used for transactions in the same way as currency. And if they were, they would have to yield the same interest rate as currency for both to continue to be held. But this does not imply that there is no money; it could be that these bills and currency are both used as the medium of exchange. If so, they could both yield lower rates of interest than other paper assets and, nevertheless, continue to be willingly held. Indeed, this interest rate could be zero. Wallace just does not say. He merely states one condition necessary for equilibrium.

That condition is, of course, that if two assets have the same risk characteristics then their yields must be equal (if they are both to be willingly held). O'Driscoll emphasizes that nonpecuniary as well as pecuniary yields must be included in this equality and his emphasis is highly desirable. I would add a reminder, however, that it is the *marginal* yield that matters. This detail is apparently overlooked by O'Driscoll when, in concluding, he states that "the interest rate earned on money must always be *less* than that earned on nonmoney assets." That statement fails to recognize the possibility that policy could in principle be conducted so as to satiate agents with money, driving the marginal nonpecuniary yield to zero. This would occur if the money stock were managed so as to generate a deflation equal in magnitude to the real yield on capital. Such a situation reflects, of course, the policy recommended in Milton Friedman's famous essay "The Optimum Quantity of Money" (1969). As stressed by Johnson (1969), the *average* nonpecuniary yield would remain positive.

My (1983a) interpretation of Wallace's equilibrium condition suggests, incidentally, that there is nothing very interesting about the absence of any effect on the price level of an open-market operation of the type he describes. Under his hypothesis such an operation is simply a swap of one type of money for another, no more dramatic than exchanging a $10 bill for two $5 bills. If either of these two types of money were (by contrast) exchanged for another asset that does not serve as part of the medium of exchange, then price level effects would occur in the usual way.

Readers of my (1985) paper will know that I share O'Driscoll's uneasiness about several aspects of the Greenfield-Yeager (1983) analysis. But they will also know that I think he is wrong to dispute their claim that there is a significant conceptual distinction between

sophisticated and crude barter. The difference in question is that between barter economies in which there does and does not exist an economywide accounting system for keeping track of wealth transfers. Both of these barter systems are properly regarded as nonmonetary economies, but to suggest that there is no interesting distinction seems unwarranted. Furthermore, it seems that O'Driscoll gives a somewhat misleading impression of the Greenfield-Yeager system by continually referring to it as a nonmonetary system. While those authors begin their discussion with such a system, their desire for practical applicability leads them eventually to recognize the existence of at least some positive quantity of hand-to-hand currency (1983, p. 307), which amounts to the introduction of a medium of exchange.

Finally, there are some questionable assertions in O'Driscoll's historical discussion of the "doctrine that money is barren." After some quotes from a paper by W. H. Hutt, O'Driscoll states that "[p]erhaps the most puzzling of all is Keynes," that is, Keynes's assertion that the yield of money is "nil." My own view is that there is no reason whatsoever to be surprised that Keynes would make unsatisfactory statements about the services of money. Keynes consistently downplayed the medium-of-exchange function of money. Indeed, his views concerning the essential properties of money are extremely unorthodox. While most economists of his day would have said that money serves three functions—as a medium of exchange, store of value, and unit of account—Keynes usually mentions only the last two.[2] The point, of course, is that someone who does not consider the medium-of-exchange role as essential is apt to neglect the services that money yields as a medium of exchange.

Arguably, there is also some reason to object to the passage regarding Marshall, and in particular the claim that Marshall "denied that money has a yield of either kind," that is, pecuniary or nonpecuniary. One piece of O'Driscoll's evidence is provided by a quote from Marshall's *Money, Credit, and Commerce* (1923), but only half of the sentence is quoted. And the missing half is devoted to a description of some of the advantages—the nonpecuniary services—obtained by holding money.[3] My conjecture is that Marshall's use of the word "barren" simply means "no pecuniary yield," rather than the absence

[2]This striking tendency shows up clearly right at the outset of Keynes's (1930, p. 3) *Treatise on Money* and also in Keynes (1937).

[3]The other half of Marshall's (1923, p. 45) sentence recognizes that "a large command of resources in the form of currency renders [peoples'] business easy and smooth, and puts them at an advantage in bargaining."

of both types of yield. In fact, it may be that other writers used the term in that way.

In conclusion, I would reiterate my strong agreement with O'Driscoll that analysis regarding monetary issues is apt to go astray unless it clearly recognizes the existence of the nonpecuniary, transaction-facilitating services obtained from holdings of money—that is, the medium of exchange.

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The Relevance of Legal Restrictions Theory

Neil Wallace

Gerald O'Driscoll's (1986) paper is a far-ranging discussion of monetary theory directed mainly at the question: What would a financial system in which there was laissez-faire (LF) in intermediation look like? He summarizes a view called the legal restrictions theory (LRT), and provides something of a critique of it. I will comment on his summary and critique and end with my own view of its limitations.

First, some comments on the question are in order. LF in intermediation means allowing private agents to deal in any asset market and to issue liabilities in any form. In particular, it means allowing financial intermediaries to issue liabilities intended to compete with *government currency—liabilities* that we may want to think of as resembling historically issued private bank notes. Curiosity about the consequences of LF in intermediation is natural, in part, because most countries do not permit it. I suspect that most countries have in place laws that resemble the following Canadian statute: "Every bank or other person who issues or reissues, makes, draws or endorses any bill, bond, note, or cheque or other instrument, intended to circulate as money, or to be used as a substitute for money, is guilty of an offense against this act" (Banks and Banking Law Revision Act, 1980, 29 Eliz. 2, c. 40, s.311.1). In addition, of course, many countries severely constrain financial dealings in other ways. Understanding the consequences of LF seems a prerequisite for understanding the role of such restrictions and for understanding the role of other aspects of government policy such as open-market operations.

The LRT as I have exposited it is a particular and in some ways extreme view of the consequences of LF in intermediation. As O'Driscoll says, the theory rests on arbitrage, arbitrage which drives the difference between the yield on any existing currency and that

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on default-free titles to the currency down to the cost of engaging in such arbitrage. Since the nature of this arbitrage is relevant to O'Driscoll's critique of the theory, I will spell it out in some detail using terms relevant to the current U.S. economy.

The potential arbitrage works as follows. An intermediary buys U.S. Treasury bills and issues small denomination, payable-to-the-bearer notes in maturities that match those of the Treasury bills held. The notes are fixed maturity titles to Federal Reserve notes. Since the notes are not payable on demand, the arbitrage is riskless and does not call for the holding of reserves. The critical question is the following: If non-interest bearing Federal Reserve notes exist and are valued, do the notes issued by our arbitrageur trade at par and are they used interchangeably with Federal Reserve notes even though the issuer does not offer to exchange them on demand for Federal Reserve notes at par? In a discrete time model in which there are markets for securities at all dates, one can prove that the answer must be in the affirmative. Whether the answer is in the affirmative in actual economies can only be surmised. The LRT as I exposit it rests on an affirmative answer. It follows, then, that if Federal Reserve notes exist and are valued, the condition that the above arbitrage not be profitable implies that nominal interest rates on Treasury bills are driven down to where they just cover the costs of such arbitrage. With free entry into this activity and no industry diseconomies of scale, this argument implies an upper bound on nominal interest rates consistent with the existence of valued non-interest bearing Federal Reserve notes.

Given the role played in the theory by the above kind of arbitrage, I find somewhat misleading the fourth of O'Driscoll's five interrelated propositions that are meant as a restatement of the LRT. He says in his fourth proposition, "In a laissez-faire system, the provision of payment services by banks would have no special effects on prices or macroeconomic activity." Starting from a system with legal restrictions, their removal and the consequent arbitrage which involves the issue of private liabilities that compete with government currency would certainly be expected to affect prices (see, for example, Sargent and Wallace 1982). The claim is rather that given a LF equilibrium and given symmetry between private sector and government costs of producing currency-like assets, government open-market operations have no effects—they determine only the composition of currency-like assets between those that are government issued and those that are privately issued.

I now want to consider O'Driscoll's criticisms of the theory. I do not find his discussion in the first part of the section titled "Barren

Money" particularly helpful. The assertion that money is special because it is liquid simply amounts to replacing the undefined term "money" by the undefined term "liquidity." With reference to the kind of arbitrage I outlined above, the question is whether the privately issued notes turn out to be traded and priced differently from Federal Reserve notes. I do not see how O'Driscoll's discussion of liquidity takes us closer to an answer. To put the point differently, according to any reasonable way of defining liquidity, it is endogenous. (Recently, it was reported that packages of Kent cigarettes are liquid in an Eastern European country, while seeming not to be liquid elsewhere.) In some models government currency may end up more liquid than potential privately issued substitutes, while in others not. The task before us would seem to be to describe the two classes of models and to test them vis-à-vis each other. This brings me to O'Driscoll's comments about evidence.

He cites some of Lawrence H. White's work as refuting the LRT. One claim is that the coexistence of non-interest bearing notes issued by Scottish banks during the free banking era and positive nominal interest rates refutes the theory. First of all, it is far from clear that the interest rates cited are rates on safe (default-free) securities. Second, the theory says that nominal interest rates on default-free securities are driven down to the costs of engaging in the intermediation. Those costs may not have been negligible. A more robust prediction of the theory is that nominal interest rates on default-free securities should not vary much over time. Experience under the National Banking System in the United States would seem to be relevant in this regard. One aspect of the Scottish banking experience that is somewhat puzzling from the point of view of the LRT is that the notes issued were payable on demand. With notes payable on demand, all the problems of fractional reserve banking arise, as does a demand for reserves which rules out the extreme form of the LRT I have described.[1]

None of this is to say that one should not have qualms about the LRT. It says that a good approximation to the economy under LF is an economy with well-functioning security markets, so well functioning that individuals and institutions can effectively intermediate and produce assets that can duplicate the properties of objects that allow them to function as media of exchange. This view runs counter to the notion that fruitful monetary theories will emerge from the

[1]For a description of some Scottish experience with notes not payable on demand, see Rockoff's (1986) contribution in this volume. For another bit of purported evidence against the LRT, see Makinen and Woodward (1986).

study of environments which have barriers or difficulties to exchange so that media of exchange have something to do. However, the study of such environments has, so far as I know, not developed to the point where they can be used to address some of the standard monetary theory questions: the desirability of commodity versus fiat monetary systems, the desirability of restrictions on private intermediation, and the role of different compositions of the government's portfolio. Until they can fruitfully address such matters, I will continue to view the LRT as the best model we have for addressing them.

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