

CAN MONETARY DISEQUILIBRIUM BE ELIMINATED?

Leland B. Yeager and Robert L. Greenfield

Macro Disequilibrium

“Real” factors, such as the oil shocks of 1973–74 and 1979, can play some role in macroeconomic fluctuations (see Hamilton 1988, Strongin 1988, and writings cited there). Yet even such shocks have a monetary aspect. Our task, however, is to focus on monetary disturbances to business activity and on their possible elimination through private-enterprise-oriented reform.

The monetarist diagnosis of price inflation is too compelling to require further mention here, but the diagnosis of business slumps may be worth reviewing. (On booms, see Birch, Rabin, and Yeager 1982.) People produce their own particular goods and services to exchange them for the outputs of other specialists, currently or later. These exchanges occur not by barter but through the intermediary of money or of claims ultimately to be settled in money. Money routinely circulates to accomplish these transactions, and people (and firms) hold it in amounts related to their receipts and payments. Desired money balances depend, in large part, on the physical volume of transactions contemplated and on the prices at which goods and services change hands. Actual money balances add up to the money supply, and if it equals the total of desired money balances, the flow of transactions continues without monetary impediment.

If the actual money supply somehow falls short of desired money balances, people act to build up their money holdings by displaying reduced eagerness to buy and increased eagerness to sell on the markets for goods and services and securities (Wicksell [1898] 1965, pp. 39–41). On these markets, by and large, quantities demanded

Cato Journal, Vol. 9, No. 2 (Fall 1989). Copyright © Cato Institute. All rights reserved.
Leland B. Yeager is Ludwig von Mises Distinguished Professor of Economics at Auburn University, and Robert L. Greenfield is Professor of Economics and Finance at Fairleigh Dickinson University.

fall short of quantities supplied at the old pattern of prices. Since transactions are voluntary, the short side of each market prevails: Actual transactions fall off. Frustration of exchanges discourages production of goods destined for exchange and discourages purchases of labor and other inputs: The business decline feeds on itself. At some reduced volume of employment and production and transactions, people would no longer effectively desire money balances totaling more than the actual money supply: A monetary quasi-equilibrium—an unpleasantly suppressed disequilibrium—would be reached.

In principle, any actual quantity of money, however small, would suffice for full equilibrium, if prices of goods and services would fall far enough to make an otherwise insufficient nominal quantity suffice to satisfy the demand for real money balances at full employment. It takes time, however, for prices fully to achieve this position. Many prices (and wages) are sticky, with the consequence that markets for many goods and services fail to clear quickly.

By “stickiness,” we do not mean rigidity; we do not mean that prices are unresponsive to market imbalances (Leijonhufvud 1981, pp. 59–60, 110–12, *et passim*). Different prices (and wages), however, are responsive in different degrees. Because prices are interdependent, yet necessarily are set in a decentralized and piecemeal manner, it takes time for them to achieve a new equilibrium pattern after a pervasive disturbance.

Stickiness in this sense is a fact of reality. It presupposes no irrationality. Reasons for it are readily understandable, including those set forth by Okun (1981) and Akerlof and Yellen (1985). Stickiness *would* suggest irrational behavior on the part of one benevolent and omniscient auctioneer capable of simultaneously adjusting all prices and wages to their new general-equilibrium values, but it suggests no irrationality on the part of the many decentralized price-setters and wage-negotiators of the real world. It is a misconception to blame these people for irrationally throwing away gains from trade by leaving prices at nonmarket-clearing levels (compare Yeager 1986). We do not think it is helpful, by the way, to maintain the thesis of cleared markets and continuous equilibrium by redefining the terms involved.

In recent years, “advanced” thinkers have disparaged recognition of price stickiness. Supposedly, the alleged phenomenon is unexplained by any theory (Barro 1979). The disparagement seems to rest on two notions: first, that belief in stickiness is distinctively Keynesian—which is a gross misreading of the history of thought

(compare Yeager 1986; Mises [1912] 1981, pp. 133–36)—and, second, that Keynesianism is discredited and out of fashion.

Abolition of price stickiness, even if it were possible, contrary to fact, would hardly dispel the problem of monetary disturbances in a system of decentralized decisionmaking. Great volatility of the price level would undercut the rationale of money itself (Lerner 1952) and could even aggravate miscoordination, as through expectations and debt burdens (Driskell and Sheffrin 1986, De Long and Summers 1986, Caskey and Fazzari 1987, Fisher 1933). An economy beset by monetary disturbances faces a Catch-22: It is damned whether or not it exhibits great flexibility of wages and prices.

Ample evidence justifies emphasis on the question of balance or imbalance between actual and demanded quantities of money. The pervasiveness of brisk or depressed business conditions throughout most sectors of an economy, together with the persistence of such conditions for many months or even years, testifies to some pervasive and not quickly remedied condition. For over 200 years, monetarist writers have pointed to associations between money-supply and business fluctuations and to apparent leads of the one over the other. Many episodes of money supplies' being changed by causes independent of income and price levels discredit the "reverse causation" argument concerning the alleged low evidential value of the observed associations.

Recent experience is widely said to discredit monetarism. The evident lack of any tight, dependable relation between money supplies and prices and nominal and real incomes—notably, the puzzling decline of money's velocity since about 1981—helps vindicate, once again, the insistence of "Austrian" economists that economic life exhibits no quantitative relations comparable to the constants of the natural sciences. In particular, the old monetarist proposal for steady monetary growth looks like a dubious idea.

But we must distinguish between policy prescriptions on the one hand and theory and evidence on the other. Doubts about the money-growth rule in no way discredit the theory and historical experience that justify insisting on the monetary aspects of business fluctuations.

How might the actual quantity of money come to fall short of demanded holdings? (For brevity, we hasten over the more readily understandable case of an excess supply of money.) Most obviously, an actual shrinkage could leave money in excess demand. A policy blunder might be the cause; or, under an international gold standard, a drop in foreign demand for the home country's exports, bringing loss of base money through a balance-of-payments deficit, could cause the shrinkage. An excess demand for money can result from

a mere slowdown in nominal growth as money demanded at the prevailing price level continues growing because of normal growth in population and productivity and in the full-employment volume of transactions. (Warburton [1966] places emphasis on this case.) Erratic monetary growth can cause periods of stagflation, when nominal demands for money associated with the catching-up of wages and prices to earlier rapid monetary growth now impinge on reduced nominal growth.

Our existing monetary system is absurd in having a unit of account the size (purchasing power) of which is the supply-and-demand-determined value of a fiat medium of exchange. (Woolsey [1987] describes what he calls unit-of-account and medium-of-exchange problems. They involve, respectively, a unit of account that is away from its equilibrium value—a disequilibrium price level—and an excess demand for or supply of the medium of exchange. Under a system of our existing type, of course, the two problems go hand in hand.)

Most of us employ or think in terms of the dollar at least as often each day as we employ units of length and weight. Yet the size of this essential unit is whatever value the scruffy dollar bill happens to possess; its size is defined poorly if at all and is maintained precariously. Its undependability impairs the meeting of minds between borrowers and lenders and other transactors; it impairs economic calculation and coordination.

A related absurdity of our existing system concerns the *manner* in which the supply of and demand for money interact in determining and altering the dollar's value. They do not meet on a single, specific market and determine a single, specific price (like, say, the market for and price of copper). Since monetary disequilibrium cannot be corrected by straightforward adjustment of a single price on a single market, its correction requires adjusting myriads of separate but interdependent prices on myriads of separate markets, a process that can be drawn out and painful.

Disequilibrium between the supply of and demand for money can persist as long as it sometimes does because, for one thing, nominal supply does not adjust "automatically" to meet the nominal demand. (*Real* supply does tend to meet real demand, but only through the roundabout, protracted, and possibly painful price-level process.) The nominal quantity of money in the United States nowadays is determined predominantly on the supply side in the manner the textbooks describe in terms of the quantity of base money and the money-multiplier formula. (Using this formula does not, of course,

imply belief that the parameters in it are fixed in some nonsubjective manner.)

Monetary Reform

An ideal reform would presumably accommodate nominal supply to nominal demand—not, however, in the determinacy-robbing sense of the real-bills doctrine but rather in the sense of accommodating the nominal quantity of money to the quantity demanded at full employment *and* at the existing, independently determinate, price level. Conceivably, of course, the central bank could practice a policy of always deliberately adjusting the supply of fiat money to the full-employment demand for it at the existing price level, and much scope does remain for instructive discussion of the old proposal for a price-level-stabilization rule. So far, however, we have not had such a policy; and we have reason to consider ways of getting its result in a manner that would be durably independent of governmental blunders.

We ourselves have a proposal, which we call (admittedly somewhat unsatisfactorily) the BFH system to acknowledge some ideas borrowed, modified, and recombined from the writings of Fischer Black, Eugene Fama, and Robert Hall (compare Greenfield and Yeager 1983; incidentally, we cringe at being associated with some other ideas these writers may have been advocating.)

Government would be banished from any role in the monetary system other than that of defining a unit of account or numéraire. We envisage a unit defined by a bundle of goods and services comprehensive enough for the general level of prices quoted in it to be practically steady. Merely by conducting its own accounting and transactions in this Unit—we tentatively so name it, with a capital *U*—the government would give private parties a strong incentive to adopt the same Unit.

Freed from any special regulation, financial institutions would meet demands for media of exchange by supplying bank notes and checking deposits denominated in the bundle-defined Unit. They would quite probably also offer equity shares in mutual funds lacking fixed nominal values, funds on which shareholders could draw checks, much as shareholders can draw checks on money market mutual funds nowadays. By holding assets including loans, bonds, stocks, and possibly even real estate and other investments and by issuing note and deposit liabilities and checkable equity claims, these institutions would in effect be repackaging their loans and investments into media of exchange.

No longer would the size of the numéraire, our Unit, be determined by the supply of and demand for any medium of exchange. The Unit would be defined by goods and services having supplies and demands of an almost entirely *nonmonetary* character.

For customers to take its banknotes and deposits seriously, each issuing institution would have to keep them redeemable. Because redemption in the actual bundles of goods and services defining the Unit would be inconvenient for customers and banks alike, redemption would very probably be promised and accepted in some convenient redemption medium, say gold, in amounts actually worth, at prevailing market prices, as many standard bundles as the Unit denominations of the banknotes and deposits being redeemed. A 100-Unit note, for example, would be redeemed in property actually worth 100 standard bundles.

The great bulk of such redemptions would probably take place in settlement of net balances due at clearinghouses, where each bank would routinely present notes issued by and checks drawn on other banks acquired from its own depositors. As a medium of settlement among themselves, banks might conceivably use gold (transferring it in amounts valued in Units rather than in prespecified physical amounts); but they would probably find it more advantageous to use interest- and dividend-bearing securities or shares in mutual funds operated by the clearinghouses for just such use in settlements. Clearinghouse members would transfer these settlement media among themselves in amounts worth, at actual market prices, as many standard bundles as the Unit-denominated sizes of the net balances being settled. If Bank A owed Bank B 100 Units, for example, Bank A would transfer to Bank B interest-bearing securities actually worth 100 standard bundles.

Under such a system, no bank could keep more of its note and deposit liabilities in circulation and of its checkable equity accounts outstanding than the public was willing to hold. A temporarily over-expanded bank would experience adverse clearing balances and the resulting transfer of both assets and liabilities to banks with which the public was more willing to do business.

The country's financial system as a whole, furthermore, would also experience market pressures tending to keep its monetary liabilities (including checkable equity accounts) no larger and no smaller in Unit volume than the public desired to hold at the price level corresponding to the commodity-bundle definition of the Unit. The demand for media of exchange would govern their actual quantity.

The situation would partially resemble that of a small country under an international gold standard. World-market conditions and

its fixed exchange rate would dictate its price level to the gold-standard country; and its gold-based money supply would respond to the demand for money balances. An excess demand for or supply of money tends to be adjusted away by a balance-of-payments surplus or deficit and the associated inflow or outflow of gold.

The situations would not be entirely the same, however, for a gold-standard country could experience money-supply growth or shrinkage caused not only by an increase or decrease in the domestic demand for money but also by some other disturbance to its balance of payments (or some other influence on its monetary gold stock, such as new gold discoveries). The money supply of a country on the BFH system would be determined more nearly completely on the demand side. No base money—nothing comparable to gold or to government fiat money—would exist to serve as the foundation for a total money supply that would contract or expand in the manner described with the aid of a money-multiplier formula. No such supply-side constraint or impetus would control the country's money supply.

In the BFH country, the stock of banknotes, deposits, and checkable equity funds would be the product of business firms engaged in financial intermediation. (Of course, "country" need not be taken literally. We mean a territory or a set of transactors within which the BFH system prevails.) These media of exchange would represent, as we said, the "repackaging" of the earning assets acquired by the intermediary firms. The firms would supply their intermediation services in response to the public's demand for them, neither constrained nor driven by considerations associated with any stock of base money. The firms' inducement, the price paid for their services, would be the excess of the yields they obtained on their earning assets over the interest and dividend rates that competition would require them to pay to the holders of their moneylike liabilities.

Suppose that the public became more liquidity-minded, less willing to hold bonds and stocks and other "primary securities" (to use the terminology of Gurley and Shaw), and more anxious to hold media of exchange. In consequence, yields would tend to rise on primary securities, whereas interest and dividend rates on checkable deposits and equity funds necessary to retain or attract holders would tend to fall. The spread in favor of financial intermediaries, the price of their repackaging services, thus would rise. How small an actual rise would materialize would depend on how price-elastically the intermediaries supplied their services. Anyway, the intermediaries would wind up holding more primary securities than before and

having issued a greater volume of media of exchange, all of which would be appropriate to the postulated change in the public's tastes.

Or suppose, similarly, that growth in population and productivity raised full-employment real income and the associated demand for media of exchange. By that very token, the volume of business available to intermediary firms would expand. Again, they would wind up holding more primary securities and having issued more banknotes and checkable deposits and fund shares.

For a different example, suppose that some development reduced the demand for money. Higher interest rates on deposits would become necessary to retain holders; and thus faced with a shrunken net reward for their services, intermediaries would shrink the volume of their media of exchange supplied, which would befit the shrunken demand for them.

These examples illustrate one channel, that involving the banks' spread of earnings on assets over interest paid on monetary liabilities, which is to say the price of intermediation services, whereby the supply of money would adjust to the demand for money balances. Another channel involves the arbitrage that would occur if the general price level, and particularly the total price of the BFH commodity bundle, should begin to deviate from the one corresponding to the definition of the Unit. We should reemphasize that the real size of the Unit, quite unlike that of the dollar under our existing system, would not derive from the demand for and restricted supply of any base money (the nonexistence of a base money underlies the main advantages of the BFH system). Instead, the Unit's size would derive from its commodity-bundle definition, made operational by the banks' competition-imposed commitment to what might be called indirect convertibility, as explained above.

Suppose, now, contrary to all likelihood, that a drop in the demand for money and eagerness to spend it on commodities should raise the price of the standard bundle above its definitional level of U1.00 to as much as U1.20. Under these conditions, holders of Unit-denominated notes and deposits could do much better than simply spend them on goods and services. Exercising their redemption privileges at the issuing institutions, holders would redeem each one-Unit note and deposit in as much gold or whatever else the redemption medium might be as actually equaled in value, at current market prices, the total of the components of the bundle. In the supposed abnormal situation, holders would take away a quantity of the redemption medium quoted at U1.20. They could sell this medium for notes and deposits denominated at U1.20, redeem these in redemption medium salable for U1.44, and so on.

To engage in such arbitrage, people would try to obtain notes and deposits for redemption by exhibiting reduced eagerness to buy goods and services and increased eagerness to sell them, all of which would put appropriate downward pressure on the general price level and on the total price of the standard bundle. The hypothesized deviation from what corresponded to the definition of the Unit would vanish. At the same time, the volumes of money and intermediation services would shrink, as befitted the shrunken demands for them.

No scramble for the redemption medium would pose a problem; the redemption medium would not be analogous to a base money. It is unlikely, anyway, that one single thing, like gold or like one specific security issue, would have been chosen as the sole redemption medium in the first place. More likely, several widely used suitable commodities or, still more likely, several actively traded investment-grade securities would be chosen as alternative redemption media. These media, furthermore, would probably not be demanded solely or even mainly for this purpose; instead, they would be widely used as industrial materials or, more probably, widely held as investments. Most important, these media would have prices of their own that are free to move in equilibrating their own supplies and demands. In the redemption of Unit-denominated notes and deposits, remember, these media would change hands by *value* and not in prespecified physical amounts. They would serve as mere go-betweens in the process of indirect redemption whereby each one-Unit note or deposit would operationally be kept equal in value to the bundle, and kept equal much more conveniently than by redemption directly in its component goods and services.

Suppose, now, an opposite but equally improbable discrepancy: A strengthened demand for media of exchange has deflated the price of the bundle to U0.80, with corresponding deflationary pressures on the general price level. Nobody would want to exercise the redemption privilege. On the contrary, banks would hasten to expand their loans and investments and perhaps to buy real estate and other assets at their currently depressed prices, paying with newly issued notes and deposits and knowing that each one Unit of these is redeemable in redemption media currently purchasable for as little as U0.80. Such behavior would reverse the hypothesized downward deviation of the price level and also satisfy the strengthened demand for money.

These examples merely illustrate the possibilities of corrective arbitrage, which would no doubt be multifarious. Much of the arbitrage would no doubt involve the operations of the banks at their clearinghouses. Stabilizing expectations would play a role. The

examples should not call to mind inflationary and deflationary episodes that only subsequently get reversed. They suggest, rather, kinds of market forces that would operate continuously in the first place to nip price-level deviations in the bud and to adjust actual quantities of media of exchange to the demand for them.

Besides pointing out the interest-rate-spread and price-arbitrage channels of "automatic" adjustment of money supply to money demand, we should make one more point. Because deposits and checkable equity accounts would bear interest and dividends at competitive rates (and possibly even banknotes as well, through a lottery feature; compare McCulloch 1986, pp. 74–75), these things would serve not only as media of exchange but also as investment assets. Holders could adjust their holdings of what they consider money not merely by adjusting their total holdings of such assets but also by shifting, in their own minds, the dividing line between what they consider money and what they consider investments. The very concept of a quantity of money would become radically fuzzy in a BFH world. This fuzziness would not spell price-level indeterminacy because, to repeat, the purchasing power of the Unit, instead of being determined by interaction between supply of and demand for money, whether defined broadly or defined narrowly as base money, would be determined by the Unit's commodity definition.

Misconceptions

Next we must deal with several misconceptions that have appeared about the BFH system. They are not all compatible with one another. First comes the notion that since the system would abolish money *as we have known it*, especially base money, and since it would "separate" the medium of exchange and unit of account—which in a certain sense it would do—it must entail the textbook inconveniences of barter (White 1984; O'Driscoll 1986a, 1986b).

Yet "separation" in no way means that people would be making and receiving payments, awkwardly, in miscellaneous commodities and securities with fluctuating values that would have to be translated into numbers of Units on each occasion. Instead, people would be using coins, banknotes, and checking accounts furnished by banks and denominated in Units.

People would also probably be drawing checks on equity accounts offered by some banks as an investment and transactions medium combined, accounts not denominated in Units. (Shares in these accounts, incidentally, would have flexible market-determined prices; and to the extent that these shares constituted part of the total

stock of media of exchange, their price flexibility would contribute to "automatic" equilibration of money's supply and demand.) Checks drawn on these equity accounts, however, instead of being denominated in the miscellaneous shares themselves, would be denominated, like other checks, in Units. (Compare checkable money-market mutual funds nowadays.) When such a check cleared, its writer's account would be reduced by however many shares then had the same market value as the denomination of the check.

Banks would be freed from any special regulation. With competition spurring innovation, the payments system would become more efficient than the one we now know.

People would have a stable Unit, moreover, in which to carry out their pricing, contracting, accounting, and cost/benefit calculations. They would no more need to understand the operations that keep the Unit's purchasing power in correspondence with its commodity-bundle definition, including routine redemption of net balances due among banks on account of notes and deposits presented at the clearinghouses, than they need to understand Federal Reserve operations and other influences on the value of the dollar nowadays.

"Separation" simply means that the Unit would be defined independently of any particular medium of exchange. Various media would hitch onto the Unit. In the United States nowadays, in contrast, the dollar as unit of account is defined in fiat base money issued by the government (Federal Reserve); most concretely, it is defined by the dollar bill, the real size of which depends, rather haphazardly, on supply and demand.

Before 1933 the dollar was defined by 23.22 grains (1.5046 grams) of pure gold. The linkage established by direct convertibility ordinarily forestalled the question whether the unit of account was the government dollar or the gold it "contained." When a government cut the gold content of its money or went off its metallic standard entirely, then people stuck with the government unit and not with the metal as their unit of account. Many historical examples testify to this amply understandable response.

Under the BFH system, the Unit would not be defined by any dominant medium of exchange or base money because none would exist. No particular one of the several or many competing private banknote issues would define it—not the one-Unit notes of this or that or any other particular bank. The Unit would be defined independently of any money issues by the standard commodity bundle. Each bank, to have its coins and notes and the checks drawn on itself taken seriously, would have to denominate its issues in Units and honor validly drawn Unit checks. It would have to maintain its issues

at their full values by restricting their quantity to the quantity the public was willing to hold at the values denominating them and by undertaking indirect redeemability. The great bulk of redemptions would probably take place routinely at the clearinghouses in settlement of net balances due among financial institutions.

If any particular bank should blunder into overissue so badly as to default on fully settling its balances at the clearinghouse, that bank's notes and checks on its deposits would come to be accepted at a discount only, if at all. The overissuing bank could not count on anyone continuing to accept its notes and deposits at their full Unit values, regarding its one-Unit notes as *defining* the unit of account (while the issues of competing banks and the commodity bundle itself came to be quoted at a premium). Not at all. Competition demands prudence and would make the situation of each issuer of media of exchange sharply different from that of government, a monopoly issuer of base or dominant money.

Note that we refer to monopoly issue of *base or dominant money*. Of course we do not deny David Meiselman's contention (1987, esp. p. 259) that already, today, the bulk of the U.S. money supply, namely checking-account money, is issued competitively by thousands of private banks. We merely do not find that fact as reassuring as Meiselman seems to find it. Competition determines the quantities of these various bank-issued dollars *relative* to one another. Their subordination to the dominant Federal Reserve dollar, however, means that their *total* quantity gets determined predominantly on the supply side and in the manner described by the money-multiplier analysis of the textbooks.

Nonanalytical sloganeering against "a governmental money monopoly" and in favor of "free banking" (e.g., Lavoie 1988), besides conveying the erroneous impression that merely dropping reserve requirements and allowing private banks to issue banknotes would eliminate monetary disequilibrium, invites reactions like Meiselman's. Such a reaction skirts the question of how the *total* money stock gets determined. Our existing system determines the quantity of money on the supply side rather than in response to the demand for money balances. This condition would remain even if private banks were allowed to determine their own reserve ratios and to issue notes, provided a dominant or base money continued to exist on which bank money was pyramided and in which it was redeemable.

Another misconception is that the BFH system amounts to hardly anything different from a privatized composite-commodity standard (McCallum 1985, p. 37n.). That proposed standard is an instructive but nevertheless old idea that reformers have been independently

inventing for many decades. It is a particular proposal for the regulation of government currency, which would continue to be the base money, in which banks and other financial intermediaries denominated their notes (if any) and their deposits and onto which they pyramided these monetary liabilities.

The BFH system, in radical contrast, would abolish base money, governmental or otherwise. Its commodity bundle, far from constituting a base money or serving in its regulation, would merely define the unit of account, and define it independently of any particular medium of exchange. Absence of any base money and thus of any particular reserve medium would radically change the problem of bank runs and the supposed necessity of a central bank as lender of last resort. Absence of any particular base money and reserve medium that banks and their depositors might scramble for in times of distrust would get rid of this kind of contagion of runs. (No scrambles for assets used as redemption media and clearinghouse settlement media would cause problems, either; for, as explained above, they would change hands in value amounts rather than in physically specified amounts; and their own flexible prices, furthermore, would work to equilibrate their supplies and demand.)

Still another misconception (McCallum 1985, pp. 34–35) is that prices and the price level would be indeterminate under the BFH system (and even that its advocates consider this supposed indeterminacy an advantage). Such a notion may partly derive from quantity-theory thinking and from recognition that the quantity of BFH money would not be pinned down either by a link to gold (which exists only in definite amounts and is costly to produce) or by deliberate regulation. As Joseph Schumpeter explained around 1930 (Schumpeter 1970), anticipating the equivalent of Don Patinkin's analysis (1956 [1965], 1961), some "critical figure," some nominal magnitude determined otherwise than by ordinary market processes, is necessary for the determinacy of a monetary system. The most familiar examples of setting such a critical figure are specification of some price (such as the dollar price of gold, made operational by two-way convertibility) or control of some nominal quantity (such as the quantity of government fiat money; control of nominal GNP, if feasible, would also do the trick). The BFH system would provide determinacy by defining the unit of account with a commodity bundle, by setting the bundle's total price at 1 Unit. This definition would be made operational by indirect convertibility of notes, deposits, and checks.

Even so, at least one critic (Hoover 1988) has questioned whether merely *indirect* convertibility would suffice for determinacy. Sup-

posedly, holders of notes and deposits would have to have the right to require their direct redemption in the actual goods and services composing the bundle. In reply, we might insist on the inconvenience for all concerned and on the extreme unlikelihood that anyone would want all those commodities, and want them in the exact proportions in which they entered the bundle. We might point out that the rare money-presenter who did so want them could obtain them, if not by simply spending his money on them in the first place, then by selling the redemption medium he initially received and buying the commodities with the proceeds, leaving open the question of whether he or the money-issuer should cover his transactions costs. Or we might modify our description of the BFH system by postulating that competition would compel money-issuers to offer the option of actual direct redemption in commodities, even though hardly anyone would exercise that option. We do not want, however, to take this cop out. We want to face the analytical issue: Would merely *indirect* redeemability of notes and deposits denominated in the BFH Unit suffice to give them definite purchasing powers? Notes and deposits thus kept equal in value to an amount of redemption property in turn worth 1,000 (say) bundles would themselves be worth that many bundles; if A and C are each equal to B, then A and C are equal to each other—is that not true?

We may develop our argument by considering Irving Fisher's compensated dollar (1920). That dollar would always be redeemable in a definite amount of gold. The amount, however, would be subject to adjustment every two months or so in view of a price index. Adjustability surely would not keep the dollar from having a determinate value corresponding to its gold content at each time. Now consider a privatized and decentralized and otherwise modified version of the compensated dollar: The amount of gold in which the dollar is redeemable would be adjustable not just every two months but, say, every hour of each business day; and the adjustment would take account not only of the market prices of the goods and services entering into the calculation of the price index but also of the price of gold itself. Although the dollar would have a changeable gold content, the content would be definite at each instant; and the dollar's purchasing power should be correspondingly determinate.

So far as determinacy is concerned, there seems to be no essential difference between the compensated dollar as described by Fisher himself and the modification described here, which is the BFH system. Neither in Fisher's system nor in the BFH system would it matter whether the redemption medium is gold itself or some other convenient asset.

Fisher's idea applied to government base money is still worth considering as a live option because of transitional difficulties involved in moving to a completely privatized and decentralized system. (In particular, getting rid of government base money would either require its repudiation, perhaps through inflation, expropriating its holders, or else require its replacement by interest-bearing, burdensome government debt.) Two modifications to Fisher's own proposal for compensated government base money seem worth recommending: Adjustments in the dollar's gold content should be made in view not only of incipient changes in the target price index but also of changes in the price of gold itself; and adjustments should be made not just every month or two but almost continuously, perhaps several or many times each day. High-tech communications and data-processing capabilities not available in Fisher's day would make continuous compensation technically feasible. The International Market Index of 50 foreign stocks traded in the United States, for example, is recalculated every *15 seconds* during the U.S. trading day (*Wall Street Journal*, 16 December 1988, p. C11). The same point about technology also would apply, of course, to the BFH system.

The continuously compensated dollar, resting on a commodity- or index-defined unit of account and two-way interconvertibility between unit-of-account worths of a convenient redemption medium, would bypass the difficulties commonly cited as objections to a price-level-stabilization rule for monetary management. Or so it seems to us. Admittedly, however, this solution seems suspiciously simple, and we await instruction on just what may be wrong with it.

Conclusion

The full-fledged BFH system, complete with privatization and decentralization, would offer advantages beyond those we have had space to explain here. It would bypass, for example, two actual or supposed disadvantages of a monetary system of the ordinary type—the anti-capital-formation effect of money, which concerns Maurice Allais and James Tobin, and the waste of real resources in tight cash-balance management, which concerns Milton Friedman (compare Yeager 1989). Apart from the puzzle of how to get rid of government base money gracefully, we can answer “yes” to the question that our title poses: Through institution of a privatized system under which the supply of money responds to the demand for it, and at a stable price level, monetary disequilibrium can indeed be eliminated.

References

- Akerlof, George, and Yellen, Janet L. "A Near-Rational Model of the Business Cycle with Wage and Price Inertia." *Quarterly Journal of Economics* 100 (Supplement 1985): 823-38.
- Barro, Robert J. "Second Thoughts on Keynesian Economics." *American Economic Review* 69 (May 1979): 54-59.
- Birch, Dan E.; Rabin, Alan A.; and Yeager, Leland B. "Inflation, Output, and Employment: Some Clarifications." *Economic Inquiry* 20 (April 1982): 209-21.
- Caskey, John, and Fazzari, Steve. "Aggregate Demand Contractions with Nominal Debt Commitments: Is Wage Flexibility Stabilizing?" *Economic Inquiry* 25 (October 1987): 583-97.
- De Long, J. Bradford, and Summers, Lawrence H. "Is Increased Price Flexibility Stabilizing?" *American Economic Review* 76 (December 1986): 1031-44.
- Driskill, Robert, and Sheffrin, Steven. "Is Price Flexibility Destablizing?" *American Economic Review* 76 (September 1986): 802-7.
- Fisher, Irving. *Stabilizing the Dollar*. New York: Macmillan, 1920.
- Fisher, Irving. "The Debt-Deflation Theory of Great Depressions." *Econometrica* 1 (October 1933): 337-57.
- 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.
- Hamilton, James D. "A Neoclassical Model of Unemployment and the Business Cycle." *Journal of Political Economy* 96 (June 1988): 593-617.
- Hoover, Kevin D. "Money, Prices and Finance in the New Monetary Economics." *Oxford Economic Papers* 40 (March 1988): 150-67.
- Lavoie, Don. "Introductory Notes." *Market Process* (George Mason University, Spring 1988).
- Leijonhufvud, Axel. *Information and Coordination*. New York: Oxford University Press, 1981.
- Lerner, Abba P. "The Essential Properties of Interest and Money." *Quarterly Journal of Economics* 66 (May 1952): 172-93.
- McCallum, Bennett T. "Bank Deregulation, Accounting Systems of Exchange, and the Unit of Account: A Critical Review." *Carnegie-Rochester Conference Series on Public Policy* 23 (1985): 13-45.
- McCulloch, J. Huston. "Beyond the Historical Gold Standard." In *Alternative Monetary Regimes*, pp. 73-81. Edited by Colin D. Campbell and William R. Dougan. Baltimore: Johns Hopkins University Press, 1986.
- Meiselman, David I. "Is Gold the Answer?" Revised from *Cato Journal* 3, (Spring 1983); in *The Search for Stable Money*, pp. 257-60. Edited by James A. Dorn and Anna J. Schwartz. Chicago: University of Chicago Press, 1987.
- Mises, Ludwig von. *The Theory of Money and Credit*. Published in German in 1912; translated by H. E. Batson. Indianapolis: Liberty Classics, 1981.
- O'Driscoll, Gerald P., Jr. "Deregulation and Monetary Reform." *Federal Reserve Bank of Dallas Economic Review* (July 1986a): 19-23.
- O'Driscoll, Gerald P., Jr. "Money, Deregulation, and the Business Cycle." *Cato Journal* 6 (Fall 1986b): 587-605.

MONETARY DISEQUILIBRIUM

- Okun, Arthur. *Prices and Quantities*. Washington: Brookings Institution, 1981.
- Patinkin, Don. *Money, Interest, and Prices*. New York: Harper & Row, 1956 (2d ed., 1965).
- Patinkin, Don. "Financial Intermediaries and the Logical Structure of Monetary Policy." *American Economic Review* 51 (March 1961): 95-116.
- Schumpeter, Joseph. *Das Wesen des Geldes*. Edited from manuscript (mostly drafted by around 1930) and with an introduction by Fritz Karl Mann. Göttingen: Vandenhoeck & Ruprecht, 1970.
- Strongin, Steven. "Real Boats Rock: Monetary Policy and Real Business Cycles." Federal Reserve Bank of Chicago *Economic Perspectives* 12 (November/December 1988): 21-28.
- Warburton, Clark. *Depression, Inflation, and Monetary Policy*. Baltimore: The Johns Hopkins Press, 1966.
- White, Lawrence H. "Competitive Payments Systems and the Unit of Account." *American Economic Review* 74 (September 1984): 619-712.
- Wicksell, Knut. *Interest and Prices*. Published in German in 1898; translated by R. F. Kahn. New York: Kelley, 1965.
- Woolsey, Warren William. Ph.D. dissertation, George Mason University, 1987.
- Yeager, Leland B. "The Significance of Monetary Disequilibrium." *Cato Journal* 6 (Fall 1986): 369-99.
- Yeager, Leland B. "A Competitive Payments System: Some Objections Considered." *Journal of Post Keynesian Economics* 11 (Spring 1989): 370-77.

ELIMINATING MONETARY DISTURBANCES

Allan H. Meltzer

The Yeager-Greenfield paper continues the authors' work on fundamental aspects of monetary theory. Their work draws attention to such basic issues as the role of money, the conditions for existence of a price level, the limits to the role of government in the monetary process, and the costs of achieving the social benefits provided by a monetary system.

On first reading I missed the main, novel idea in their current paper. Yeager and Greenfield suggest that the social benefits can be achieved in a system of private money. They use the term "private money" to mean a monetary system in which government has a minimal role. The government does not issue base money, produce or specify a medium of exchange, function as lender of last resort, hold inventories of money, set an exchange rate, or maintain convertibility. The role of government in the monetary system is limited to defining a unit of account and conducting its own transactions in that unit. The government does not require others to transact in the unit except when transacting with the government, so legal tender is restricted to government transactions. Convergence to the unit as a basis for accounts and valuation is not imposed. To define the unit, the government specifies a bundle of goods and services that is comprehensive enough to keep stable the general level of prices quoted in the unit of account. Prices would be quoted in units and, if the system worked as the authors intend, goods and services would be priced in the unit. Relative prices would change for the usual reasons.

The advantage claimed for the system is that the price level would be constant or, as the authors suggest, nearly so. More importantly,

Cato Journal, Vol. 9, No. 2 (Fall 1989). Copyright © Cato Institute. All rights reserved.

The author is John M. Olin Professor of Political Economy and Public Policy at Carnegie-Mellon University. He is indebted to Leland B. Yeager and Robert L. Greenfield for discussions and letters that improved his understanding of their contribution. He also wishes to thank Bennett T. McCallum and Georg Rich for their helpful comments.

if the system works as claimed, the anticipated price level would be constant. People would plan on the properly held anticipation that their decisions to invest and save would not be subject to the risk of price-level changes. Relative prices would change as required by changes in tastes, technology, and population. This is, for me, an attractive outcome. We must see what it would cost to achieve and how it might work.

A Money of Real Value (MORV)

The authors introduce a simple, but remarkable, scheme. Conventional monetary systems fix the nominal value of money (and other financial assets) and require real values to adjust. In these systems the government either determines the nominal stock of (base) money or specifies a rule or agency which controls the nominal stock. The public determines the price level at which they willingly hold the outstanding stock. In the Yeager-Greenfield proposal, this is reversed. The government fixes the real value of money by choosing a commodity basket that serves as the unit of account. The stock of (nominal) money is determined by the public's demand.¹

It is best to think of the commodity basket used to value the unit of account as rather comprehensive, say the real GNP of the country or perhaps the domestic component, real GDP. Each unit of money is a claim to a fixed basket of this kind, a fraction of the GDP. No matter what happens to the relative prices of the items in the basket, or the relative prices of items in and out of the basket, a unit of money maintains its real value. By fixing the unit of account, the authors claim to have fixed the real value of money denominated in that unit. Denote the unit by "U."

The authors illustrate the working of the system at times by analogies to the gold standard. This is potentially misleading. If the basket of commodities defining U is not relatively comprehensive, the price of U's relative to non-U's will be subject to greater and more frequent shocks. A more comprehensive basket gets the benefit of diversification—lower risk of fluctuations in its relative price. A very comprehensive basket, however, faces the problem of shifting weights on the items in the basket, disappearance of items from the basket, and introduction of new items. Money that is stable in terms of a U defined as the GDP of 1900 would not have the stability properties

¹The authors confused me, and possibly others, by describing their system as a BFH (Black, Fama, Hall) system. Their proposal is very different. A better name would be real-valued money or, if an acronym is needed, perhaps MORV—money of real value.

relevant for current money holders that the authors stress. The authors do not address issues of this kind.

The government does not issue any money. The medium of exchange is provided by banks, which may choose to use the unit of account defined by the government.² Suppose for the moment that they do. Banks would issue and accept deposits and make loans denominated in U's. Neither banks nor the public would choose to incur the cost of buying, selling, and holding baskets of the GDP commodities, so the value of bank notes and deposits cannot be maintained by exchanging the medium of exchange for fractions of the GDP. Some other mechanism is required to fix the value of money. Yeager and Greenfield introduce clearing drains as the principal means of restricting overissue by a single bank. At one point, they assume that banks use gold (valued in U's) to settle surplus and deficit positions. Since there is an opportunity cost to holding gold, the authors suggest that earning assets would dominate gold in this role.

To understand how the scheme would work and how it differs from conventional schemes, suppose, first, that there is a real shock to productivity. Under conventional arrangements, the price level falls if the shock is positive and rises in the opposite case. The price change adjusts the stock of nominal money until real balances are willingly held. In the Yeager-Greenfield scheme, the price level remains fixed. The change in productivity alters the level of output and, therefore, the demand for money, the volume of borrowing, and the stock of notes and outstanding deposits. If more commodity baskets are produced with the same resources, more money is produced (in response to demand) at an unchanged price level. Each unit of money retains its value in U's.

Next, suppose that an improvement in the payments system lowers the demand for money. People are now able to carry out their transactions with smaller average cash balances. In the conventional system, as the demand for money declines, prices rise to reduce real balances. In the Yeager-Greenfield scheme the public buys assets from the banking system, reducing the stock of money. Output, or GDP, as conventionally measured is unchanged, but the stock of money is smaller, so each note or deposit is a claim to a larger U at an unchanged price level.

²To avoid doubts about convergence to a common unit, the authors should let the government impose a legal tender requirement. This would simplify contracting. Since the government does not produce money, there would be no risk of inflation or deflation and no effect on the price level.

As a final exercise, assume that the return to real capital and the productivity growth rate increase permanently to a new level. The demand for real balances increases with output, but since the equilibrium return to real capital has increased, the rate of interest is higher. The quantity of real balances demanded falls with the rise in the rate of interest. The stock of money declines with demand. Again, each unit of money is a claim to a larger real GDP at an unchanged price level. At the new equilibrium, money per unit of output is lower than before, and the productivity of each monetary unit is higher. The nonpecuniary return to money balances is higher—reflecting the higher productivity of monetary and nonmonetary assets.

Some Problems

Any change in the price of items in the basket relative to items not in the basket will change the relative price of assets denominated in U 's. Suppose that the non- U 's are imports. From international finance theory, we know that no general statement can be made about the optimality of either price-level stability or exchange rate stability (the relative price of U and non- U baskets). The authors do not claim that their system would be optimal, but some attention to its welfare properties would be welcome. Consideration of the comparative welfare properties of the authors' proposal relative to proposals to adopt a monetary rule that maintains price stability on average would bring some additional perspective.

In the past, I have proposed a rule that sets base money growth equal to the maintained average rate of output growth minus the growth rate of base velocity. A rule of this kind would keep the anticipated price level constant and, if major countries would adopt rules of this kind, the rule would also reduce fluctuations in exchange rates. Bennett McCallum proposed a similar rule for domestic price stability without the exchange rate feature. Milton Friedman's rule is well known. There is, then, no shortage of proposals for price stability. The proposals just mentioned, like the Yeager-Greenfield proposal, do not address the problem of adoption—the apparent absence of sufficient incentives for the public or government to adopt a rule for price stability. The alternative proposals, however, do not require the radical changes in financial structure required by Yeager and Greenfield's proposal.

To this point, I have maintained the authors' assumption that the system would converge to a common unit of account. It is not obvious that convergence would occur. Suppose that the price of some asset or basket, call it W , has negative covariance with the price of baskets

denominated in U's. Banks or firms can denominate claims in W's. Innovations in the payments system that lower the value of real money balances in U's raise the value of balances in W's and conversely. Money denominated in W's may coexist with money denominated in U's. I do not see that this has been ruled out.

Negative covariance is one example. The more general point is that convergence is not ensured. If the government's role is limited to choosing the unit of account, the public is free to introduce other units and use them as mediums of exchange and units of account.

The authors do not claim that interbank clearing achieves price stability. They introduce the use of a redemption medium with a price expressed in U's. The redemption medium may be a single commodity or a small basket of commodities, presumably commodities with relatively low costs of information, storage, and transactions. Since it is costly to hold the GDP, the authors suggest that banks would pay out or accumulate the redemption medium whenever the actual price level in U's differs from the established norm. This suggestion introduces several complications. One is the possibility of occasional sharp changes in the relative price of the redemption unit and the risks that this might pose for banks and their customers. A second is the possibility that the redemption unit takes on the properties of a monetary base. Suppose bankers find that profits increase if they hold (reserves of) redemption units and denominate assets and liabilities in redemption units, a subset of the basket of U's. Would the public demand that the redemption units remain convertible into U's? Would they pay the marginal cost of maintaining this convertibility?

It is not difficult to see how a monetary base would develop. Banking history gives many examples. Suppose a bank has all of its assets and liabilities denominated in U's, but the assets are illiquid (or can be sold only at a substantial reduction in price). Or, suppose the bank has accumulated a large portfolio of marketable securities with a relatively long term to maturity. To protect against risks of this kind, depositors or noteholders may prefer banks with relatively large holdings of relatively safe assets or assets with known properties such as gold or short-term securities. To reduce risk, smaller banks may contract with larger banks that offer to rediscount. I see nothing in the Yeager-Greenfield proposal that prevents this ubiquitous pattern from emerging or developing a monetary base—an asset used to settle balances between banks, held as a reserve by banks, and used as a medium of exchange by the public.

Yeager and Greenfield say very little about the operating characteristics of their system. They note that erratic monetary growth can

cause stagflation. It is not money growth alone that causes this problem, however. There are also contracts, the difficulties of reading noisy signals, and other causes of sluggish price adjustment. Reducing price variability, if achieved, would raise welfare. However, we do not know whether the variability of relative prices and real output would remain unchanged or increase enough to bring offsetting losses. The authors tell us very little about issues of this kind, so we cannot judge whether their system would increase or reduce the variability of real values.

Finally, let me add a few comments on the title—"Can Monetary Disequilibrium Be Eliminated?" The answer must depend on the meaning of equilibrium. If the issue is one of maintaining approximately zero variance of the absolute price level or, as the authors prefer, of matching nominal demand to nominal supply at a nearly constant price level, I believe they have suggested a way of achieving substantially lower price variability. It does not follow that their proposal reduces fluctuations in consumption and production.

The challenging issue about the design of monetary institutions, as I see it, is how to achieve stability of anticipated prices and minimize the costs and risks to society that accompany the social and private benefits of using a medium of exchange. The authors in their paper and in their previous work earn our gratitude by giving attention to some of these issues and offering a novel and interesting proposal that is worth developing more fully.