

would call the instrumental or evolutionary theory of value. In other words, they are not convinced that Galbraith genuinely shares with them the view of Dewey-Ayres-Commons and others that any behavior or instrument is valued in context according to its capacity to cope with the problem to which it is addressed. Value is thus not intrinsic, or judged by fixed standards, but arises from process.

These matters are not to be expanded here. They surface only in trying to understand a general—and one's own—response to Galbraith's work on developmental economics, and to his other contributions. *Das Galbraithproblem* may never be satisfactorily resolved and may linger to plague historians of thought in the decades ahead; but trying to probe its nature and origins is fundamental to any assessment of his work and life.

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Contemporaneous reserve accounting: can reserves be quantity-constrained?

Introduction

The Board of Governors of the Federal Reserve System recently (February 1984) introduced a version of contemporaneous reserve accounting (CRA) for all depository institutions under its purview. The timing of reserve accounting under the new system is complicated, reflecting the attempt to strengthen the relationship between reserve growth and money growth by creating a more nearly contemporaneous link between transaction deposit liabilities and required reserves, while at the same time making allowance for the difficulties depository institutions have in measuring deposits and holding reserves on a contemporaneous basis.¹

The Council of Economic Advisers (CEA) has endorsed the mainstream view that, by switching to CRA from lagged reserve accounting (LRA), the Federal Reserve would be able to exercise greater control over the monetary aggregates (CEA, 1982, pp. 67-68). Their The author is Professor of Economics at Wesleyan University and Sir John Cass Fellow, City of London Polytechnic.

The new system is not exactly contemporaneous. The current two week lag will be reduced to two days, and the reserve computation and maintenance periods will each be increased to 14 days. For transaction deposits, required reserves in the current 14 day reserve maintenance period will be held against the average level of transactions deposits over 14 days ending *two days before* the end of the current maintenance period. Required reserves against liabilities other than transactions deposits will be based on average liabilities over 14 days ending *30 days before* the end of the current maintenance period. Vault cash held in the 14 day period ending *30 days before* the current maintenance period will be counted as reserves in the current maintenance period. The 2 percent carry-over allowance, to be set initially at 3 percent, will now be applied to two-week periods. See Cliftner and Trebing (1982).

(unstated) premise appears to be that LRA essentially delays the banks' reaction to Federal Reserve control, since the Fed is forced to validate portfolio and loan decisions already made by the commercial banks.² They also state that CRA would "permit greater flexibility in the discount rate," but do not explain how this conclusion was reached.

The Federal Reserve has announced that the new reserve requirements would potentially permit somewhat closer control of M1 in particular. Its position had previously been that tighter short-run control over monetary aggregates was neither possible nor desirable, given the low signal-to-noise ratio in weekly and monthly data resulting from the various stochastic features of the financial system.³ Emphasis was placed on the size and costs of interest rate volatility likely to accompany tightened control, and the minimal effects of short-lived deviations of monetary growth from target paths on prices and real output (Walllich, 1980; Federal Reserve Staff Study, 1981).

Federal Reserve defenders point to the instability in money demand, and unpredictable shifts in the relation between reserve growth and monetary growth (Bryant, 1982). Its critics point to the procyclical gyrations in reserve growth, and conclude that the Federal Reserve has not really freed itself from concern over movements in the Federal Funds Rate (Poole, 1982).⁴

Critics have attempted to resolve issues with an appropriate set of empirical tests, and cannot understand why the Fed refuses to guide policy with their models (Johannes and Rasche, 1979; 1981; Lombra, 1980).⁵ Federal Reserve officials in turn wonder why researchers persist in framing the problem so naively, and in overselling the robustness of their models. The CEA concluded that at present the Fed is a passive supplier of reserves and came close to admitting that all the Fed can do currently is determine the composition of the reserves to be supplied. "During any two week period the total reserve requirement is predetermined by deposits two weeks earlier. This means that reserves must be supplied within the period, either borrowed or unborrowed" (Council of Economic Advisers, 1982, p. 68, italics provided).

The Bach Committee estimated that the standard deviation of monthly monetary growth rates due to transitory fluctuations was 2.5 percent, a figure which dwarfs the underlying growth rate of any target aggregate (Bach, 1976). Poole has insisted that the real significance of the change in operating procedures since October 6, 1979, in spite of the stated goal to place more emphasis on controlling reserves directly, has been primarily to allow the Federal Funds rate to vary more widely than had previously been the case (Poole, 1982).

The critics' position is essentially that the costs associated with controlling a "suboptimal" aggregate are less than the costs of emphasizing deficiencies from the viewpoint of optimal control theory and as a result abrogating control entirely and permitting procyclical variations in reserve growth. "We must not, in this area as in others, let the best be the enemy of the good" (Friedman, 1976).

of their results (Simpson and Porter, 1980). Neither appear to have recognized sufficiently that the disagreement is not primarily empirical, but rather reflects a fundamental analytical misunderstanding of the process of determination of the money stock.

The money multiplier approach

The conventional view of money stock determination begins by formally recognizing the joint influence of the Federal Reserve, the banks, and the public (Cagan, 1965; Jordan, 1969). This approach is summarized by the following familiar expression:

$$(1) \quad M = mR$$

where M = a particular monetary aggregate ($M1, M2, M3$)

R = a particular reserve aggregate (the monetary base, total reserves, or nonborrowed reserves)

m = a particular money multiplier.

With R as exogenous, i.e., under the potential control of the Fed, controlling the monetary aggregate turns on the central banks' ability to forecast m , which is jointly determined by the actions of the banks (excess reserves, float, borrowings, etc.) and the actions of the public and the Treasury (currency demand, composition of deposits, etc.).⁶ Empirical applications of the reserve multiplier approach tend to abstract from the short-term dynamics of adjustment by banks and the public, and so leave the role of interest rates implicit rather than explicit. Such empirical work uses time series methods to estimate the multiplier or its components directly (Bomhoff, 1977; Johannes and Rasche, 1979).

The results of such work typically conclude that the multiplier can be forecast one month ahead, for alternative reserve aggregates, with very low and unbiased mean squared forecast errors (Johannes and Rasche, 1981). Given that R is assumed exogenous, controlling M is viewed as a comparatively simple task, so that the Federal Reserve Open Market Committee [FOMC] should be able to achieve short-run monetary control within a band of 1 or 2 percent around its target midrange growth path (Poole, 1976; Johannes and Rasche, 1981). One

⁶In large scale econometric models, a sophisticated and expanded version of equation (1) is treated as a money supply function. Non-borrowed reserves are assumed to be determined exogenously, and the banks' excess reserves and borrowed reserves equation (free reserves) are combined with a money demand equation to yield the equilibrium money stock and market clearing interest rate (Lombra, 1980).

may wonder why CRA is necessary.

In the literature, equation (1) is conventionally treated as a supply function, rather than as a reduced form equilibrium relationship. Open market operations determine the size of the Federal Reserve's security portfolio and presumably can be used to offset movements from all other sources (Burger, 1971). The control mechanism implied is that deposit expansion of the banking system is quantity-constrained through the Federal Reserve's control over the sources of bank reserves (Lombra, 1980).

The Post Keynesian view

It has only recently been recognized that the conventional view, that the growth of monetary aggregated can be "controlled" through a quantity-constrained process over the sources of bank reserves, represents a fundamental analytical misunderstanding of the nature of the money supply process. In credit-money as distinct from commodity-money economies, the money stock is determined basically by the demand for bank credit, which governs the volume of bank intermediation (Hicks, 1977; Kaldor, 1982; Moore 1984). Banks are price-setters and quantity-takers in both their retail loan and deposit markets, and they use the wholesale markets, where they are price-takers and quantity-setters, to lend or borrow any net excess sources of funds (Willis, 1982). As a result bank earning asset decisions are largely independent of their reserve positions.

Bank loans are determined by borrower demand for credit, much like debit balances outstanding on consumer credit cards, a total over which banks in the short run have little or no control. More than half of all loans are made under lines of credit arrangements, and the utilization rate of lines of credit is characteristically about 50 percent. Similarly banks stand ready at all times to receive deposits on demand at their administered deposit rates. The supply of money schedule must be viewed as horizontal in every short-run period, essentially at whatever short-term interest rate the central bank chooses to supply liquidity (Kaldor, 1982).

The central bank's primary obligation is to ensure the liquidity of the financial system, by standing ever ready to provide lender-of-last-resort facilities. Consequently it can never quantity-constrain bank reserves or the money stock in the short run, without by so doing abrogating its fundamental role as the financial system's provider of ultimate liquidity (Moore, 1979; 1984). As a result, as central bankers

themselves recognize,⁷ so long as the supply of deposits is horizontal, the quantity of money can only be controlled indirectly, by regulating the level of short-term interest rates, and so the quantity of loans and deposits demanded. Movements in monetary aggregates are primarily credit-driven. Changes in the demand for bank credit are in turn determined primarily by business working capital needs, of which the single most important component is the behavior of the wages bill (Moore and Threadgold, 1980; Moore, 1983).

The direction of causality implied by the conventional multiplier model is more like the reverse of what actually occurs. Reserves are the result, rather than the cause, of movements in deposits. Feige and McGee (1977) report convincing evidence that since 1968 money has "Granger-caused" reserves with a two-week lag. Total reserves are endogenous and are never quantity-constrained, whatever reserve accounting system is in force. In spite of the fact that, *ex post*, the multiplier formulation will always appear stable, there is in actuality no simple direct causal link between the supply of nonborrowed reserves and the money stock. The causal dynamics of monetary control actually works through borrowed and excess reserves and short-term interest rates.⁸ Yet these variables are entirely suppressed in the multiplier (reduced form) relationship.

⁷ At any given point, bank reserves depend on the volume of deposits outstanding and the consequent need for required reserves. If the growth in private deposits and reserve demand appear to be more rapid than desired, the Desk holds back on the provision of nonborrowed reserves. This forces banks to seek out sources of reserves and, on the margin, to turn to the system discount window. In the first instance . . . the Desk's action does not reduce the flow of total reserves; it only changes the mix between nonborrowed and borrowed reserves. The sequence of relationships in this process is clear: "The Desk holds back on the provision of nonborrowed reserves, forcing banks into debt at the discount window. This raises money market rates. Higher interest rates lead the public to economize on deposits, and demands for reserves are lowered. In the last analysis, while the reserve-lightening process starts with the Desk holding back on the provision of nonborrowed reserves, the actual attainment of slower growth in total reserves and the aggregates reflects a lagged response of money demand to higher interest rates" (Federal Reserve Open Market Committee, 1975 p. 31). See also Porter, Linsay, and Luehrberg (1975) p. 4, and Bank of England (1980).

⁸ Under present operating procedures, since required reserves are predetermined by the quantity of deposits existing two weeks previously, changes in nonborrowed reserves can in the reserve period only affect the volume of free reserves.

Since $TR = RR + ER$, and $TR = MBR + BR$, rearranging, we find that

$$MBR = RR + ER - BR = RR + FR$$

where TR = total reserves

RR = required reserves (predetermined by deposits two weeks earlier)

Contemporaneous reserve accounting

If bank reserves cannot be quantity-constrained without disrupting the liquidity of the financial system, what is to be gained from a change toward CRA? The use of CRA cannot alter the central fact that reserves must be made available to the banking system on demand so as to permit it to meet its reserve requirements. If the banks cannot obtain their needed reserves in the Federal Funds market, whether calculated on LRA or CRA principles, they must turn to the Fed and borrow at its discount window. As the banking system's ultimate source of reserves, the Fed cannot avoid satisfying banks' need for required reserves, irrespective of whether an LRA or a CRA regime is imposed.

The main effect of CRA will be confined to any effect it may have on bank lending and deposit creating activity *during* the reserve maintenance period.⁹ Lagged accounting for vault cash in the new system will enable the Fed to know the exact amount to count as reserves in the current period. But it will also permit depository institutions to adjust their current reserve position by depositing or withdrawing vault cash, thus adversely affecting Federal Reserve control of total reserves

ER = excess reserves

NBR = nonborrowed reserves

BR = borrowed reserves

FR = free reserves = $(ER - BR)$.

⁹When introduced in 1968, LRA's were expected to moderate fluctuations in short-term interest rates near the end of settlement weeks, since both the Federal Reserve and individual banks would know with certainty the required reserve balances each week. But since required reserves are entirely predetermined, LRA does not allow the banking system to adjust within the week to a change in total reserves by changing total required reserves. A number of studies have shown that Federal Reserve defensive open market operations increased after LRA, and the variability of short-term interest rates also increased, just the opposite of the expected outcome (Brutzer, 1971; Poole, 1976; Coats, 1976; Laubenberg, 1976). Random changes in total reserves, owing to misprojection of short or other stochastic market factors, lead to excess or deficiency of reserves in the current week, regardless of concurrent actions by banks, since their required reserves are predetermined. The main problem for the conduct of monetary policy under LRA is that the Federal Reserve has created reserve balances each week based on deposit liabilities that banks created two weeks earlier; in essence it has supplied reserves to accommodate the growth of bank credit (Gilbert, 1980). Nevertheless a recent study concluded that there was no significant change in the week-to-week variability of M1 as a result of LRA (Thornton, 1983).

(Coats, 1973).¹⁰ Increasing the reserve maintenance period from one to two weeks will create the potential for larger gaps to develop between actual and required reserves, unless depository institutions adjust their actual reserves to anticipated levels of required reserves throughout the maintenance period. A depository institution's decision to make additional loans and investments need not be closely related to its current holdings of reserves. In the short run it can obtain additional revenues by borrowing from the Federal Reserve, purchasing federal funds, managing its liabilities, holding fewer excess reserves, or selling short-term securities.¹¹

CRA can have an effect only to the extent it induces depository institutions to alter their loan and investment positions from those they would have held otherwise. If depository institutions wait until the end of each maintenance period to adjust their reserve positions, the Federal Reserve will then either have to adjust the supply of reserves to accommodate the levels of transaction deposits created (as under LRA), or allow larger fluctuations in the Federal Funds rate near the end of maintenance periods so as to force transaction balances to the Fed's target levels.

If the Fed attempted to take the latter course, it could reduce the tendency of banks to compel the Fed to supply reserves to support credit decisions already made, by forcing them to make sudden asset adjustments. However, if the resulting interest rate volatility were such as to prevent short-term financial instruments from providing banks with secondary reserve protection, bank managements would certainly decide voluntarily to maintain higher levels of excess reserves, thus lowering the Fed's control over monetary aggregates by raising the variability of reserve ratios. Finally, if depository institutions use the wider carry-over allowance to delay adjusting their reserves to their required reserves, this would weaken the short-run relationship between transactions deposits and reserves.

¹⁰Unanticipated reserve supply developments, due to misprojections of changes in currency in circulation, float, or Treasury Balances, could produce more interest rate instability under CRA, to the extent the Fed is less certain of required reserves. But this would be mitigated to the extent depository institutions are induced to adjust their actual reserves to their anticipated required reserves more frequently throughout the reserve maintenance period. The net effect is therefore uncertain (Gilbert, 1980).

¹¹For empirical evidence on the extent banks rely on each of these reserve adjustment mechanisms, see Spindt and Tarhan, 1983.

In conclusion CRA will only produce an improvement in monetary control if it induces members of the banking system to adjust their loans and investments and so their deposits to their required reserves more rapidly, *within* the reserve maintenance period. This will depend on the *ability* of individual banks to estimate their required reserves under CRA, and their *ability* to keep their actual reserves equal to their estimated required reserves throughout the reserve maintenance period by appropriate asset adjustments that change their deposit liabilities. Since bank credit is largely demand determined, it is a mistake to assume that banks can closely control their earning asset positions at their discretion.

Conclusion

Bank reserves cannot meaningfully be quantity-constrained in the manner assumed by the conventional reserve multiplier view of money stock determination. In particular banks have limited ability to *reduce their earning assets at their initiative*. The Federal Reserve has no choice but to provide the *quantity* of reserves to banks as required, so long as it operates to preserve the liquidity of the financial system.

The Federal Reserve does have in its power the ability to decrease the price, and so the level of short-term interest rates, at which it will provide its lender of last liquidity facilities. Since the quantity of bank credit and deposits is always demand-determined, the supply of money schedule is horizontal.—Central banks can control the supply of money only indirectly, by regulating interest rates and so the quantity of loans and deposits demanded. To control the money stock more effectively, the Federal Reserve must devise methods of more flexible price rules to affect bank deposit-creating activities, primarily the volume of bank lending.

The recognition that the bank reserves cannot meaningfully be quantity-constrained by the Federal Reserve does not imply that greater control over the behavior of monetary aggregates is impossible. Rather the conventional multiplier paradigm has diverted informed opinion towards the false issue of the manner in which reserve requirements are calculated, and away from the central key to more effective monetary control—*institutional changes that permit the Fed to initiate greater short-term variations in interest rates, without simultaneously provoking greater financial instability.*

As one simple example, by instituting a tied penalty discount rate, depository institutions would be encouraged to respond sooner in their pricing of their lending activities to Federal Reserve tightening of nonborrowed reserves. The present "escape valve" of being able to obtain administered reserves at the discount window at below market rates would then cease to exist. As is well known, bank borrowings at the discount window are highly interest sensitive (Polakoff, 1960; Higgins and Selton, 1981). If a tied penalty discount rate were instituted, borrowed reserves and the monetary aggregates would still move endogenously in response to changes in the demand for bank credit. But the resulting increased pro-cyclical movements of short-term interest rates would serve to dampen, even though not offset completely, endogenous procyclical movements in bank credit and the money stock.

A more thoroughgoing structural reform would be a move towards widespread adoption of variable-rate financial instruments, both short term and long term. Suppose, for example, that all deposit and loan contracts, short run and long run, were tied, at some differential spread, which need not remain-constant, to, for instance, last month's Treasury Bill rate. This would permit much greater fluctuations in the level of short-term and long-term interest rates, without creating fluctuation in financial asset capital values, with its accompanying portfolio equity instability. If short-term interest rates could be administered to vary over a much wider range, without at the same time creating a major turmoil in financial asset values and financial portfolios, this would permit the Federal Reserve to reduce substantially the pro-cyclical variability in credit and money growth, in spite of the highly inelastic nature of the demand for short-term bank credit. Very high interest rates paid on deposits and charged on loans would severely discourage deficit spending by all economic units, and induce them to move toward surplus spending positions. Similarly very low rates paid on deposits and charged on loans would powerfully discourage surplus spending, and induce all economic units to increase their deficit spending position. As a result cyclical fluctuations in bank credit, the monetary aggregates, aggregate demand, and nominal income would all be reduced.

In market economies less pro-cyclical movement of the money stock and greater stability of the growth of nominal income necessarily require greater pro-cyclical variations in the general level of interest rates.

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