Is There Any Rationale for Reserve Requirements?

by E.J. Stevens

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Introduction

Reserve requirements have been part of the regulatory apparatus of banking in the United States for more than a century and a half. No matter what their original purpose may have been, maintaining the burden of reserve requirements needs a contemporary rationale that can justify the problems they create.

The problems attributed to reserve requirements are woven into the fabric of financial markets. The burden of meeting the regulation appears to vary unfairly among banks of comparable size. Financial institutions not subject to the regulation engage in many of the same activities as those required to hold reserves. Legislative efforts to overhaul the nation's banking and financial system would be easier if reserve requirements could be eliminated from the set of issues to be considered. Financial reform aside, reducing or eliminating these requirements might be a way to improve the profitability of banking and the willingness of banks to extend credit while under pressure to improve capital. Moreover, even if problem loan and inadequate capital matters were resolved, many analysts believe that reserve requirements still would impair the international competitiveness of U.S. banks.

Two obvious approaches to removing the burden of reserve requirements are to eliminate them altogether or to pay a market rate of interest on reserve balances. This article deals only with the first approach, exploring various rationales for reserve requirements on the premise that there would be no point in paying a market rate of interest on reserves if there were no rationale for requiring reserves in the first place. Perhaps because the requirements have been part of the structure of depository institution markets for so long, their rationale seems obscure and the effect of their elimination even more so. Recent elimination of a portion of reserve requirements has sharpened the issue.[1] If a partial elimination was good, would not complete elimination be better?

After a brief description of the reserve requirements now in place, the discussion is organized around their three traditional rationales: taxation,

■ 1 In December 1990, the reserve requirement on nonpersonal time deposits of less than one and a half years' maturity and on Eurocurrency liabilities was reduced from 3 percent to zero. In all, the change was estimated to have reduced required reserves by almost $14 billion.

TABLE 1

Reserve Requirement Coverage, Fall 1990

Estimated number of depository institutions	34,200
Below $3.4 million exemption	19,300
Nonreporting	12,100
Reporting annually	6,600
Reporting quarterly	600
Not exempt	14,900
Reporting quarterly	5,700
Reporting weekly	9,200

SOURCE: Board of Governors of the Federal Reserve System.

monetary policy, and liquidity.[2] The Federal Reserve transfers most of its net earnings to the Treasury, amounting to about $23 billion in 1990. The portion of the transfer that can be attributed to the reserve requirement "tax," though only a trivial source of Treasury revenue, has had nontrivial distorting effects on financial markets.

The second rationale, monetary policy, became the explicit and only statutory justification for reserve requirements in 1980, although without the requirements, policy could continue to operate just as it does today. Only if monetary policy were to operate in a way in which it has never operated in the past could reserve requirements be rationalized as a way to improve the short-run accuracy of policy implementation.

Finally, and contrary to traditional assertions, modern reserve requirements serve a short-run liquidity function by ensuring a pool of balances for daily private-market distribution to creditworthy illiquid institutions. This liquidity function can be used as a rationale for reserve requirements, however, only if there is reason to avoid relying solely upon the alternatives of daily open market operations and discount window lending to meet the banking system's liquidity needs.

I. The Facts about Current Reserve Requirements

Federal Reserve Regulation D governs reserve requirements, defining assets eligible to be counted as reserves and liabilities subject to the requirement. The Monetary Control Act of 1980 made these requirements applicable to all commercial banks, mutual savings banks, savings and loan associations, credit unions, agencies and branches of foreign banks, and Edge Act corporations operating in the United States.

Reservable liabilities include transactions deposits (that is, accounts that allow unlimited nonautomatic third-party payments), nonpersonal time deposits, and Eurocurrency liabilities. However, in December 1990 the required reserve ratio was set at zero for all but transactions deposits. Eligible assets include vault cash and reserve deposits held at Federal Reserve Banks. Box 1 provides a more-detailed description of the current reserve requirement accounting system.

More than 34,000 institutions now fall within the purview of Regulation D (see table 1). However, over 19,000 small institutions are essentially unaffected because the Garn–St Germain Depository Institutions Act of 1982 mandates a zero reserve ratio for the first $3.4 million of reservable liabilities of any kind.[3] As a result, many of these small institutions need only complete an annual request for data, which allows the Federal Reserve to monitor compliance and to update estimates of the monetary aggregates.

The remaining 14,900 institutions must comply with reserve requirements on a quarterly or biweekly basis, submitting quarterly or weekly accounting records to the Federal Reserve Banks so that compliance with the regulation can be monitored on an ongoing basis. In addition, these same records provide much of the raw data used in compiling weekly and monthly estimates of the monetary aggregates, including the monetary base, M1, M2, and M3. This information is important both for the Federal Reserve's conduct of monetary policy and for other users' efforts to track Fed policy and the economy. Supervisory authorities monitor reporting accuracy as part of the normal examination process.

■ 2 Goodfriend and Hargraves (1983) present a thorough examination of the evolution of the liquidity and monetary policy rationales, and of the revenue aspects of the tax rationale. My assessment of the various rationales differs from theirs in that I place more emphasis on short-run liquidity considerations and view the tax rationale from a broader perspective than revenue. Revenue is both smaller than might be inferred from their discussion and difficult to defend from avoidance.

■ 3 Initially, the Act set the 0 percent reserve requirement at $2 million of reservable liabilities for each institution, with a provision for annual adjustment. See Board of Governors of the Federal Reserve System (1990), table 1.15, footnote 2.

BOX 1

The Details of Required Reserves Accounting

The Monetary Control Act of 1980 stipulates that only transactions and nonpersonal time deposits are reservable, and mandates a further distinction on the basis of an institution's size. Reserve requirements are different for nonpersonal time deposits than for transactions deposits.

The reserve ratio for nonpersonal time deposits (including Eurocurrency liabilities) may be set within the range of 0 to 9 percent and may vary by the maturity of a deposit.[a] Prior to December 1990, the regulation specified a ratio of 3 percent for deposits with an original maturity of less than one and a half years, and zero for longer maturities; now the ratio is zero for all maturities.

The required reserve ratio for transactions deposits depends on the amount of these deposits on an institution's books: 3 percent of the first $40.4 million (of which up to $3.4 million is exempted) and 12 percent of the amount in excess of the $40.4 million break point.[b] The 3 percent ratio and the break point are determined by law, but the Board of Governors has statutory authority to set the higher ratio within a range of 8 percent to 14 percent.

The transactions deposit reserve required for a weekly reporting institution is computed from the average level of transactions deposits during a two-week computation period that ends every other Monday. Reserve assets eligible to satisfy this requirement are drawn from two sources: 1) the average amount of vault cash held during the two-week period ended 28 days prior to the end of the computation period and 2) the average amount of reserve deposits held during the two-week maintenance period ending on the Wednesday two days after the end of the computation period. This arrangement, with the reserve computation and the reserve deposit maintenance periods overlapping on 12 out of 14 days, is referred to as a "contemporaneous reserve requirement."

The operation of transactions deposit reserve requirements may be more readily understood from the vantage point of a weekly reporting institution managing its reserve position. The institution enters a two-week reserve maintenance period knowing the amount of vault cash eligible to meet its requirement. After the second day of the computation period, the institution can begin to maintain reserve deposit balances against its accumulating transactions deposit requirement. After the second Tuesday of the maintenance period, the institution knows the full amount of reserves it must hold to meet the transactions deposit requirement, as well as the amount of reserve deposits it has held over the first 12 days of the maintenance period. The institution then has the opportunity to adjust its reserve deposit balance on the remaining two days of the period to make reserves held equal to the requirement (plus or minus any eligible carry-in and any desired carry-out).

Quarterly reporting institutions operate on a lagged reserve accounting basis. Computation is based on deposits held during a single seven-day period beginning the third Tuesday of March, June, September, and December of each year. Vault cash held during that same seven-day period is deducted from required reserves. Any remainder becomes the required reserve deposit balance to be held on a daily average basis throughout 13 weekly maintenance periods beginning the fourth Thursday following the end of the computation period and ending the day before the next set of 13 maintenance periods begins.

a. Eurocurrency liabilities are a measure of the net foreign funding of U.S. creditors through international facilities of U.S. institutions and through U.S. facilities of foreign institutions.

b. The break, originally $25 million, must be adjusted no later than December 31 of each year by 80 percent of the percentage increase or decrease in total transactions accounts of all depository institutions in the calendar year ending the previous June 30.

NOTE: A more complete description of reserve accounting can be found in Meulendyke (1989), pp. 127–36.

TABLE 2

Composition of Vault Cash and Deposits at Federal Reserve Banks, All Depository Institutions, May 1991

	Millions of dollars
Total vault cash and deposits	56,514
Required reserves	48,033
Applied vault cash	26,775
Reserve deposits	21,258
Other	8,481
Clearing balances	3,504
Surplus vault cash	3,949
Excess reserve deposits	1,028

NOTE: Data are monthly averages of biweekly maintenance period averages. Vault cash includes only the amount held by those depository institutions subject to reserve requirements. The maintenance period in which vault cash can be used to satisfy reserve requirements ends 30 days after the close of a biweekly computation period during which the vault cash was actually held.
SOURCE: Board of Governors of the Federal Reserve System.

Accurate record-keeping is important to each institution, and not just to avoid supervisory difficulties. Missing the required reserve target can be costly: Reserve deficiencies are penalized at a rate two percentage points above the discount rate, while excess reserves do not earn interest. Some leeway is provided through a carryover provision, however. This allows a weekly reporting institution to carry over (for one period only) a deficiency of up to 2 percent of its required reserves by holding an equivalent amount of excess reserves in the next reserve maintenance period, or to use excess reserves of up to 2 percent in meeting its reserve requirement in the next period.[4]

Required reserves are far larger than depository institutions' holdings of reserve deposits at Federal Reserve Banks for several reasons. First, more than half of aggregate reserve requirements in a typical maintenance period are satisfied by vault cash holdings (see table 2). In fact, many institutions meet more than 100 percent of their requirement in this way. Less than 90 percent of eligible vault cash is actually applied toward meeting requirements; the remainder is surplus vault cash (not included in measured excess reserves) held by institutions whose portfolios are not bound by reserve requirements. These "unbound" institutions, including some of the largest weekly reporters, voluntarily hold cash inventories for their teller stations and automated teller machines that more than satisfy their reserve requirements.

Second, about 15 percent of depository institutions' aggregate deposit balances at Federal Reserve Banks are not in reserve deposit accounts but in clearing accounts that yield earnings credits used to offset charges for Reserve Bank services. Maintaining a clearing account provides direct access to these services for institutions that do not need reserve accounts, or supplements a required balance in order to reduce the likelihood of daylight or overnight overdraft problems. An institution arrives at the appropriate level of its clearing balance, in consultation with its Reserve Bank, on the basis of size and the volume and intraday pattern of its transactions. Once determined, the agreed-upon balance must be maintained on an average daily basis during a reserve maintenance period in the same way as for required reserves.[5]

Finally, about 4 percent of depository institutions' aggregate deposit balances at Federal Reserve Banks are simply excess reserves. Aggregate excess reserves tend to fluctuate around a relatively stable level that is related not to the level of interest rates, but to the distribution of excess reserves among different kinds of institutions in response to calendar-related regularities in payment flows and balance-sheet "window dressing." In effect, the typical excess reserve level is simply the combined "small change" in the accounts of many institutions.[6] On the last day of a maintenance period, each holder of

■ 4 The 2 percent carryover provision gives a bank considerable leeway in the deposit balance it must maintain at the Fed on any single day of a 14-day maintenance period. A bank entering a period with no carryover, meeting 55 percent of its required reserve with vault cash (the recent aggregate average), and holding the required amount of deposits on a daily average basis for 13 days of the period could allow its deposit balance on the fourteenth day to deviate from the daily average required amount by as much as 62 percent (= { [.02 x 14] / [1 − .55] } x 100) and still not waste excess reserves or be penalized for a reserve deficiency. However, any bank that meets more than 72 percent of its required reserve with vault cash would be unable to take full advantage of this leeway to cover a single-day reserve deficiency because to do so would mean holding a negative balance on that day.

■ 5 Earnings credits are calculated from the average federal funds rate for the maintenance period during which balances are held. Clearing balances are subject to the same 2 percent carryover provisions as required reserves. However, earnings credits on clearing balances that are not used to offset service charges during the maintenance period can be carried forward up to 52 weeks.

■ 6 For a recent explanation of the determinants of excess reserves, see Partlan, Hamdani, and Camilli (1986).

excess reserves apparently is either unsure of its exact position, or finds that the federal funds rate is insufficient to offset the cost of placing its small amount of excess funds in the market.[7]

II. The Tax Rationale for Reserve Requirements

In a sense, banks are taxed when they are required to hold more non-interest-bearing eligible assets than they would maintain in the absence of reserve requirements. As already noted, not all banks are in this situation: Some voluntarily hold more reserve assets than required and thus are not bound by the requirements. Moreover, even for bound institutions, not all reserve assets represent involuntary holdings, because banks would undoubtedly hold inventories of vault cash even in the absence of reserve requirements. Apart from these observed and unobserved voluntary holdings, however, reserve requirements must tax some combination of bank owners, depositors, and borrowers.

One could argue that the level of many banks' reserve deposits is not substantially different from that needed for clearing purposes and that reserve deposits are therefore not a tax, even though overnight holdings of Fed deposits do not earn interest. It is more likely, however, that in the absence of binding reserve requirements and with the interest-rate levels typical of the last 40 years, banks would find it cheaper to alter the mechanisms of clearing and settlement than to continue to bear the opportunity cost of holding non-interest-bearing overnight Fed deposits.

The repercussions of the tax depend on its incidence, determined by elasticities both of the supply of reservable deposits and of the demand for loans and other services (hereafter referred to simply as "loans"). At one extreme, if financial markets provided perfect substitutes for banks' reservable deposits and loans (perfectly elastic supply and demand, respectively), the tax could not be passed on to customers, and the incidence of the tax would be on the profitability of banking. This would be reflected in the number and value of bank charters. At the other extreme, if banks were sufficiently unique to ensure that financial markets provided no substitutes for reservable deposits or bank loans (perfectly inelastic supply and demand), the whole tax could be passed along to bank customers, and the incidence of the tax would be on them. Phrasing the matter slightly differently, the more elastic the supply of reservable deposits and the demand for bank loans, the more the tax will distort financial flows by diverting bank business to other financial instruments or markets.[8]

Distortions in the Allocation of Funds

Postwar history provides a wealth of financial developments that can be attributed, at least in part, to the distorting effects of reserve requirements.[9] The Monetary Control Act of 1980 may be viewed as one response to several of these distortions. Until the Act was passed, Regulation D applied only to commercial banks that were members of the Federal Reserve System. Membership was mandatory for national banks but voluntary for state-chartered banks. The burden of meeting reserve requirements was one of the factors thought to have contributed to steady erosion in membership of state banks and in chartering of national banks.[10] The Act extended coverage of reserve requirements to all commercial banks, members and nonmembers alike, in effect reducing elasticities of the supply of reservable deposits and of the demand for bank loans at member banks.

The Monetary Control Act also extended coverage of reserve requirements to thrift institutions. Until 1980, thrifts were subject to less burdensome reserve requirements imposed by

■ 7 Every institution always has an incentive to minimize its excess reserves, because excess reserves earn no interest. The carryover provision of the reserve accounting regulation provides one avenue for an interest-rate influence. For example, if an institution foresees higher interest rates in the immediate future, it might try to use excess reserves to prefinance the allowable portion of its next-period reserve requirement. Alternatively, it might hold excess reserves to offset a deliberate reserve deficiency in the previous maintenance period that was induced by expectations of an interest-rate decline. Such deliberate manipulation cannot exert a continuous influence on a single institution's reserves because neither excesses nor deficiencies can be carried over for more than one maintenance period.

■ 8 Recent discussions of a "credit crunch" sometimes reflect differing views about these elasticities. Those arguing that a crunch should not concern policymakers may assume that the elasticities are large enough to ensure that most borrowers not serviced by banks will be accommodated elsewhere. Those recommending that a crunch be offset through monetary policy and supervisory actions may assume that the elasticities are small enough to ensure that many borrowers not serviced by banks will not be serviced at all.

■ 9 The first (unsuccessful) attempt to legislate federal reserve requirements in the United States was motivated by a desire to "distort" the state-chartered "Pet Banks" out of existence and thereby to defeat Andrew Jackson's repudiation of the Second Bank of the United States.(Stevens (forthcoming)).

■ 10 A representative statement of this position can be found in Volcker (1980).

TABLE 3

Allocation of Funds: Secular Growth of Debt Instruments and Lending Sectors, 1952–1990

Debt Instruments	Percentage Change[a]
Credit market debt owed by nonfinancial borrowers in the form of:	
U.S. Treasury and agency securities	6.5
Corporate bonds	8.3
Bank loans	8.8
Consumer credit	8.8
Tax-exempt securities	9.0
Mortgages	10.1
Commercial paper	16.5
Total domestic debt instruments	8.4
Foreign debt instruments	7.8
Domestic plus foreign debt instruments	8.4
Lending Sectors	
Credit market debt claims against nonfinancial sectors held by:	
Commercial banks, including reserves	7.9
Required reserves	2.8
Reserve deposits	1.3
Vault cash	6.7
Commercial banks, excluding reserves	8.3
Private domestic nonfinancial sector	8.3
Insurance and pension funds	8.7
Savings institutions	9.1
U.S. government, agencies, and the Federal Reserve	10.0
Other financial sectors	13.4
Foreign holders	13.7

a. Compound annual rate.
SOURCE: Board of Governors of the Federal Reserve System.

individual states and Federal Home Loan Banks. New England thrifts pioneered in the development of interest-bearing transactions accounts, which were free of member-bank reserve requirements. Member commercial banks, in competition, also devised variations of savings accounts to take advantage both of the lower reserve requirements on savings than on transactions deposits and of the ability to pay interest on savings accounts.[11]

Of course, reserve requirements were not the only force at work in shifting deposits from member banks to nonmember banks and thrift institutions, and from transactions accounts to variants of savings accounts. High nominal interest rates in an inflationary environment certainly stimulated efforts to avoid both the prohibition of interest on demand deposits and the opportunity cost of holding non-interest-bearing required reserves. The increasing power and declining cost of telecommunications technology made it economically feasible to sweep balances back and forth between accounts and institutions in order to minimize reservable balances and to pay interest. But member banks' desire to avoid reserve requirements on particular kinds of deposits was clearly an important factor in the evolving distribution of funds among types of accounts and types of depository institutions, as well as between deposits and safe, liquid securities.

Furthermore, the distorting effect of reserve requirements has not been restricted to the deposit side of intermediaries' balance sheets. In the 1960s, sales of loans to a bank's affiliates, with affiliate financing from nondeposit sources such as commercial paper, assumed substantial scale. One clear advantage of this arrangement was that it enabled a banking organization to avoid the reserve requirement, until the requirement was extended to this source of funding in 1970. The same was true of loans booked at foreign affiliates and funded by offshore dollar deposits, until reserve requirements were expanded to cover this distortion also.[12]

Today, an analogous pattern of financing carried out by unaffiliated foreign banks is cited as evidence that reserve requirements place domestic banks at a disadvantage in competing with foreign banks. Similarly, growth of the commercial paper market and of direct lending by life insurance companies and pension funds, all relative to slower secular growth of bank lending, is cited as evidence of reserve requirements' possible distorting effect on the pattern of financial intermediation and credit flows in the economy.

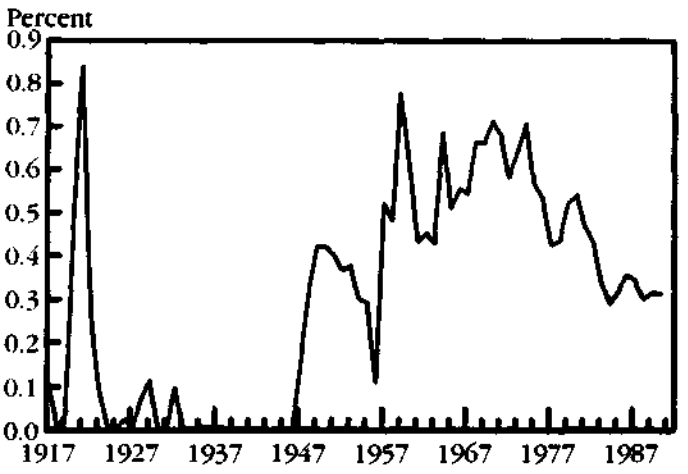
Some suggestion of distortion can be seen in data from the Flow of Funds Accounts, available on a consistent basis since 1952 (table 3). This information can only describe *what has been*, not *what would have been* in the absence of reserve requirements. The trend of bank loan

■ **11** Distortions of this kind were not unique to the postwar period. The low 3 percent reserve requirement against time and savings deposits after 1917 led to cases "... where, to meet the competition of State savings banks, some member banks ... devised a special savings account on which checks [could] be drawn without the presence of the depositor at the bank. These accounts [were] evidenced by savings passbooks in which the bank reserve[d] the right to require 30 days' notice before making payment on a withdrawal. When the account [was] opened, a duplicate passbook [was] left with the bank, which enter[ed] therein the amount of each withdrawal at the time checks on these accounts [were] presented for payment." See Committee on Bank Reserves of the Federal Reserve System (1931), p. 15.

■ **12** These provisions are discussed in Board of Governors of the Federal Reserve System (1971), p. 19.

FIGURE 1

Reserve Requirement Tax as a Percentage of Government Receipts



NOTE: For further explanation of the estimates plotted here, see appendix.
SOURCES: U.S. Treasury Department: Office of Management and Budget; and Board of Governors of the Federal Reserve System.

growth has been lower than the growth trends of mortgages, tax-exempt securities, commercial paper, and other miscellaneous instruments; only the lower growth trend of government and agency securities allowed bank loan growth to be slightly higher than for all debt instruments combined. Commercial bank holdings of claims on all nonfinancial borrowers — a rough measure of the size of the banking system from the asset side of the balance sheet — have grown somewhat more slowly than the holdings of any other intermediary group. More striking is evidence of successful efforts to minimize the reserve requirement tax: The combined reserve deposits and vault cash assets of commercial banks have grown at only about one-third the rates of growth of bank loans and, indeed, of the banking system, largely because the growth rate of reserve deposits has averaged only 1.3 percent since 1952.

The Nature of the Tax

A pure revenue, "seigniorage" rationale for the reserve requirement tax seems weak. Congress has not shown a strong interest in using reserve requirements as a deliberate means of raising revenue. As noted in the preceding section, erosion of the tax base, reflecting the competitive ingenuity that is characteristic of private markets, was repaired by the Monetary Control Act of 1980. However, because this repair was accompanied by reduced tax rates (required reserve ratios), revenues attributable to reserve requirements have not kept pace with other Treasury revenues. As a percentage of Treasury revenue, the tax has never yielded as much as 1 percent and has fallen by more than half since 1974, averaging slightly less than four-tenths of 1 percent in the 1980s (figure 1).[13]

Calling reserve requirements a tax may be something of a misnomer because their rationale may not be revenue, but an implicit license, or user, fee. Just as trucks pay taxes to use the nation's highways, so too may banks (more properly, *depository institutions* since 1980) pay a reserve requirement tax to use unique government services. These include the Federal Reserve services of settlement, same-day irrevocable wire transfer of balances (allowing direct access to the federal funds market), and access to the discount window.[14]

Meeting reserve requirements, however, has not been closely related to use of the nation's central bank services. Nonpersonal time deposit liabilities were one basis for setting the user fee prior to December 1990, but those financial instruments are little different from some of the instruments used in financing nonbanks, which are not subject to the fee. In this sense, institutions subject to the user fee obtained nothing that was not available to institutions not subject to the fee. Since December 1990, the relationship has been closer. A depository institution's corporate charter includes the right to issue transactions deposits; money market mutual funds and credit card services offer closely competing products that limit banks' ability to transfer the tax to holders of transactions deposits. With the ability to issue taxed deposits come associated rights to Federal Reserve services, although there is no necessary connection between the amount of central bank services a bank uses and its tax payment.

■ **13** These same tax estimates have been in an 8.5 percent to 10.5 percent range of after-tax bank profits since 1982 (using actual losses and recoveries rather than provisions for loan losses as the relevant expense item in calculating profit).

■ **14** This view is made explicit in the suggestion that reserve requirements be based not on the level of deposits, but on activity in deposit accounts (Jacoby [1963]). Mayer (1966) presents a different argument: Reserve requirements are an excise tax on the implicit return to holders of non-interest-bearing deposits. He suggests that the tax is a "second-best" way to avoid distorting resource allocation in a world replete with sales and excise taxes on the explicit prices of other items. This assumes, however, that the incidence of the tax is on depositors, which need not be the case if good substitutes are available.

If reserve requirements are indeed an implicit user fee, they are for access only. With few exceptions, explicit fees for Reserve Bank payment services cover the full cost of their provision. Stripping away these services, if the reserve requirement tax is to be considered a user fee, it must be a fee paid for the right to use a Federal Reserve deposit account to settle transactions and for access to the discount window as the lender of last resort.

The tax rationale for reserve requirements is weak. While the requirements have some of the characteristics of a tax, they are neither a dependable and important source of revenue nor a user fee that relates the quantity of services used to the payment made.

III. The Monetary Policy Rationale for Reserve Requirements

Monetary policy has the unique function of controlling the supply of "outside money." In the United States, it is the Federal Reserve that decides how much outside money to make available to the private sector, in the form of currency held by the nonbank public and banks' holdings of vault cash and deposit balances at Reserve Banks. These assets are created, for the most part, by Federal Reserve open market purchases of U.S. government securities and by discount window lending.

Binding reserve requirements introduce an artificial demand for outside money on the part of banks. Two questions arise in looking for a monetary policy rationale for requirements.[15] One is whether they are necessary for monetary control to function, and the other (irrespective of necessity) is whether they improve monetary control by reducing deviations from policy objectives.

Are Reserve Requirements Necessary for Monetary Control?

Reserve requirements are not necessary for monetary control to function as long as, in their absence, there is a demand for the outside money the central bank supplies. With outside money demanded for its own sake, control of its supply provides the "anchor" to money, credit, and prices that defines the role of monetary policy in the economy. For the foreseeable future, the public can be expected to demand currency and the banks to demand vault cash. Managing the supply of one or the other, or the combination of the two assets, should ensure that monetary control can function.[16]

A more mundane question concerns traditional monetary policy operating procedures used in guiding open market operations and discount window lending. Might reserve requirements be necessary because it would be impossible to carry on monetary policy in these familiar forms if vault cash were banks' sole outside money asset?

Here again the answer is no. Controlling the supply of currency assets need not operate any differently than monetary policy operates today. Banks' demand for outside money would consist exclusively of their demand for vault cash, and banks' Fed deposit accounts would retain their utility for making and receiving payments, including the payments involved in open market operations. The only difference would be that the daily target balance of each bank at the close of business would be zero, rather than today's positive amount related to a required reserve. No bank would voluntarily hold deposits that do not pay interest when it could earn interest simply by selling the funds for immediate delivery in the overnight market (unless the overnight rate were zero).[17]

The trillion dollars or so of *private* dollar payments settled directly or indirectly on the books of the Federal Reserve Banks each day provide no basis for banks to demand non-interest-

■ **15** The title and language of the Monetary Control Act of 1980 make clear that reserve requirements were rationalized as a monetary policy device at that time. Depository institutions were instructed to maintain reserves "... as the Board may prescribe by regulation solely for the purpose of implementing monetary policy." See Board of Governors of the Federal Reserve System (1988)

■ **16** A classic discussion of this point may be found in Fama (1980). Sargent and Wallace (1985) examine a related question: whether and how the price level is determined if the monetary base bears a market rate of interest. Fama's discussion is the relevant one here, where currency, including vault cash, does not carry explicit interest and where monetary policy does not seem likely to target or to achieve the deflation rate required to approximate a real, market rate of interest on currency. See also the discussion of clearing balances in section IV.

■ **17** This is the extreme case. It abstracts from any clearing balances banks might want to maintain with the Fed in return for earnings credits used to offset charges for priced services. Only about $3.2 billion of clearing balances were held in July 1991, which would earn about $180 million at a 5.75 percent funds rate, or roughly 20 percent of 1990 total fees for priced services. It also ignores the possibility of requiring clearing balances with no (or wasted) earnings credits to reduce Reserve Bank risk exposure through daylight and overnight overdrafts.

bearing deposit balances overnight.[18] By definition, all of these payments net to zero. Of course, on any particular day some banks will find themselves in a net credit position, receiving more payments than they make, while others will find themselves in an equal and offsetting net debit position. Banks with net credits (or their customers) can lend the needed funds to banks with net debits, with same-day delivery.

Payments do not net to zero for transactions between the private sector and the Fed, the Treasury, or any other institution able to operate outside the private banking system because it holds accounts directly with a Federal Reserve Bank. However, as long as there is no monetary policy reason to change the supply of outside money, the Federal Reserve can be expected to engage in defensive open market operations to offset the net debit or credit created by payments between the private banking system and these other institutions. Inevitable errors in forecasting reserve availability, however, will produce days of oversupply, when banks are left holding some unwanted reserve deposits, or of undersupply, when banks are forced to borrow from the discount window to avoid overdrafts.[19]

Errors in reserve supply should be more noticeable when the target is a zero aggregate stock of reserves rather than a positive stock. The federal funds rate and discount window borrowing would be more volatile, both during a day and day to day, unless the operating procedure for implementing policy were made more continuously rate sensitive, or market forces developed new ways to smooth the rate.

Today, the need for reserve deposits to satisfy reserve requirements provides a market basis for arbitrage that smooths the funds rate in the face of supply errors. If reserves are short in the aggregate and the rate starts to rise relative to the expected level, banks can lend by postponing the accumulation of required reserve deposits; conversely, they can accelerate the accumulation if reserves are oversupplied and the rate starts to fall. The rate tends to spike or to plunge only at the end of a day, when most potential counterparties have closed, and on settlement day (the last day of a maintenance period), when carryover provides the only leeway for banks to postpone or to accelerate reserve accumulation.

Every day would be a settlement day if there were no reserve requirements and therefore limited possibilities for arbitrage. Every bank would want zero Fed deposits every night. An aggregate oversupply would lead borrowers away from the discount window and, if that were not sufficient to correct the oversupply, would drive the rate immediately to zero. An aggregate undersupply would drive the rate high enough to lead banks to the discount window to avoid overdrafts. It is unlikely that new market mechanisms would develop to smooth the rate, given current institutional arrangements. (This issue is discussed more fully in section IV.)

Policy actions (nondefensive open market operations) would have the same immediate effect as errors in reserve supply and might be more difficult for the public to identify in the context of wider daily volatility of the funds rate and of borrowing. Persistence of the visible effects of easing or restraining reserves would eventually distinguish a policy move from the transitory effect of one or more defensive errors. Another likely difference is that, as policy restraint intensified or relaxed, banks would seek new ways to influence the public's holdings of currency. This would allow banks to escape complete reliance on the discount window in avoiding overdrafts and wasted non-interest-bearing reserve deposit balances.

Do Reserve Requirements Improve Monetary Control?

The essence of monetary control lies in supplying the amount of outside money most likely to achieve the policy objective. Although reserve requirements are unnecessary, they might improve monetary control by ensuring a more predictable relationship between a policy objective and the policy instrument used in seeking that objective. Investigating two dominant approaches to policy implementation suggests that even though this rationale cannot be ruled out altogether, it is weak.

■ **18** Banks could still initiate payments at the opening of business, even with zero overnight balances, as long as Reserve Banks continued to permit daylight overdrafts. If daylight overdrafts were prevented, zero overnight balances would preclude banks from initiating same-day payments from their Reserve Bank accounts at the opening of business. However, even in this case, banks would likely find it cheaper to alter the mechanisms of clearing and settlement than to bear the opportunity cost of non-interest-bearing overnight balances. All payments could be processed on private clearing networks, with simultaneous net settlements at a common hour, or with settlement in some medium other than Reserve Bank accounts. For a discussion of the trade-offs among overnight Reserve Bank balances, daylight overdrafts, and private payments innovations, see Stevens (1991); for a discussion of alternative settlement media, see Stevens (1978).

■ **19** Occasional estimates of reserve supply errors can be found (Meek and Levin [1981]; Dewald and Gibson [1967]). However, these are for average levels over a maintenance period, not for the single days relevant to defensive open market operations in the absence of reserve requirements.

One approach to defining the objective/instrument relationship in monetary policy would rely on reserve targeting based on the multiplier concept.[20] Reserve requirements can improve monetary control by making the reserves multiplier more predictable. This can be illustrated within a simple monetarist policy framework. Suppose that 1) the ultimate policy objective is a stable price level, 2) the most reliable route to this objective is to maintain steady growth of an intermediate target for the transactions deposits supplied by banks, and 3) those deposits tend to be a multiple of vault cash, where the predicted multiple is subject to a normally distributed error. Without a reserve requirement, banks will hold no Fed deposits, and assuming no reserve supply errors, deviations from the predicted multiplier will reflect variations in banks' demand for vault cash relative to their deposit liabilities.

Imposing a binding reserve requirement under these circumstances will create an artificial demand for reserve deposits and will constrain variations in the multiplier. Variations in demand for vault cash relative to deposit liabilities will not affect the demand for reserve assets relative to deposit liabilities, which remains a constant, required fraction of bank deposits. All else equal, reserve requirements might improve monetary control by reducing deviations of money from the policy target guiding the supply of reserve assets.

Two matters diminish the persuasiveness of this rationale. One is that, in the absence of reserve requirements, the "noise" introduced into the multiplier by variations in the demand for vault cash is likely to be short run around a stable trend value. Introducing a reserve requirement might produce a multiplier that is more predictable in the short term, but at the cost of introducing longer-run changes in the trend value as banks and their competitors devise substitutes for reservable deposits to avoid the reserve requirement tax.

The other matter is that the Federal Reserve has never used a consistent multiplier procedure.[21] Unless the System were expected to adopt such an approach in the future, improving monetary control by increasing the short-run predictability of a reserves multiplier would represent an irrelevant monetary policy rationale for reserve requirements.[22]

Interest-rate targeting is the alternative approach to monetary policy implementation. As long as the intended interest rate is not set in a vacuum but in the context of a reliable feedback mechanism for controlling a monetary aggregate, nominal GNP, or the price level, the procedure amounts to an indirect method of reserve targeting. The target amount of reserves is the quantity that must actually be supplied in order to maintain the intended interest-rate level for a short period within the feedback process.

Interest-rate targeting in the absence of reserve requirements should not involve the same short-run noise associated with the reserves multiplier approach. Open market operations that seek to stabilize a money market interest rate would tend to accommodate unpredictable short-run variations in the demand for vault cash relative to deposits.[23]

In sum, improving monetary control provides scant rationale for reserve requirements. Only if the Federal Reserve were to adopt a reserves targeting approach to policy implementation, contrary to long-standing practice, could reserve requirements be expected to make the effects of policy actions more predictable in the short run.

IV. The Liquidity Rationale for Reserve Requirements

A third rationale sometimes suggested for reserve requirements is that they serve as a regulatory measure to ensure that banks, individually or in the aggregate, will be able to meet demands

■ 20 A full treatment of the multiplier approach to policy control of the monetary aggregates can be found in Rasche and Johannes (1987).

■ 21 See Goodfriend and Hargraves (1983). Perhaps the closest approximation to the multiplier model was the procedure for controlling M1 used from October 1979 through late 1982. Reserve paths guided open market operations, but the paths were adjusted at and between Federal Open Market Committee (FOMC) meetings to reflect independent judgments about the appropriate federal funds-rate level.

■ 22 Increased predictability was a major goal of the wholesale reform of reserve requirements recommended by members of the Committee on Bank Reserves of the Federal Reserve System in 1931. With hindsight, their rationale was no more relevant then—after the late-1920s explosion of debits/deposit accounts (to which they pointed) and in the midst of the 1929–1933 collapse of the banking system (to which they appeared oblivious)—than now. The Committee apparently had no conception of using defensive open market operations to offset variations in a multiplier. Unfortunately, theirs was the prevailing view within the System after the death of Benjamin Strong in 1928 (see Friedman and Schwartz [1963], especially pp. 407–19). Instead, they recommended legislation (never enacted) to make the required reserve ratio vary with the debits/deposits multiplier.

■ 23 Both reserves and interest-rate targeting are susceptible to the daily implementation errors discussed earlier. Inaccurate estimates of market factors affecting the stock of reserves will produce quantity errors; inaccurate estimates of the needed size or market interpretation of open market operations will produce interest-rate errors.

for payment without delay. Regulators have twin concerns of ensuring banks' solvency (capital adequacy) and banks' liquidity (cash adequacy). The concept of requiring banks to maintain at least a minimum capital/asset ratio to ensure solvency remains in the bedrock of bank supervision; the concept of requiring banks to maintain at least a minimum cash/deposit ratio to ensure liquidity, on the other hand, has long been discounted, but deserves some reconsideration.[24]

Method of Enforcement

Reserve requirements cannot provide a meaningful source of liquidity for an individual bank or for the banking system as long as the requirement is enforced continuously. After all, if a bank were required to keep a 10 percent reserve every day, then it would have only 10 cents available to meet each dollar of deposit withdrawn. A reserve regulation that is continuously enforced can guarantee adequate liquidity only with a 100 percent requirement.

Reserve requirements *can* provide a meaningful source of liquidity as long as they are not enforced continuously. The entire pool of required balances can be used to cover an immediate cash drain and can then be replenished either from asset sales or borrowing or from a return flow of deposits, as time allows. Early proponents of a reserve requirement recognized the inadequacy of continuous enforcement. Their intention was not to prevent a bank from using all of its cash as a source of liquidity when necessary, but to have each bank husband cash in normal times.

Reserve requirements under the National Bank Act (1863), for example, were not enforced daily. A bank whose reserve fell below the requirement was prohibited both from expanding its liabilities through new lending and from paying dividends. When aware of deficient reserves, the Comptroller of the Currency was empowered, but not required, to give a bank 30 days' notice to come into compliance. Failing compliance, the Comptroller was then authorized, but not required, to close the bank.[25]

The same prohibition on new lending and dividend payments appeared in the original Federal Reserve Act. More stringent enforcement developed after 1913, so that by 1935, member banks had little scope to use required reserve deposits even as a short-run source of liquidity. They were expected to maintain required reserve deposits (vault cash was not eligible) for semiweekly, weekly, or semimonthly averaging periods, depending on the bank's size and location (see Board of Governors of the Federal Reserve System [1935], p. 837). Deficiencies were penalized at a rate 2 percent above the discount rate, and while same-day wire service was available for transfers of reserve deposits, daylight overdrafts were not permitted.

After 1935, the scope for relying on required reserves as a short-run source of liquidity gradually increased. In the mid-1950s, averaging had broadened to one- or two-week periods, and the practice of allowing a 2 percent carryover was in place (see American Bankers Association [1957], p. 9). Since 1984, averaging has been permitted within two-week periods for all banks. This enforcement mechanism still prevents banks from relying on required reserves as a source of liquidity for longer than a portion of a reserve maintenance period or, with carryover, for two adjacent periods. Sustained needs for liquidity require secondary reserves and access to the money and interbank-loan markets or, if all else fails, to the discount window. However, within a reserve maintenance period, reserve requirements can enhance banks' liquidity by guaranteeing a pool of deposits from which to fund imbalances, such as those arising from clearing and settlement of checks and electronic payments.

Reserve requirements do not provide this source of liquidity for banks that use only vault cash to cover their entire required reserve position. For institutions in or near this unbound condition, the daily target for a reserve deposit account must be zero; averaging from day to day is not feasible because overnight overdrafts of Fed deposit accounts are penalized.[26] This is

■ **24** As long ago as 1931, the Committee on Bank Reserves of the Federal Reserve System (1931, p. 5) took the position that it was no longer the primary function of legal reserve requirements to ensure or to preserve the liquidity of individual member banks. In 1957, the Economic Policy Commission of the American Bankers Association (1957, p. 14) concluded that " ... those who cling to the old liquidity approach to reserve requirements will therefore be in disagreement with many of the Commission's conclusions. They are also likely to find themselves in disagreement among themselves, because the liquidity approach is not only basically illogical, but inevitably leads into a maze of complicated side issues on which no clear-cut answers are possible."

■ **25** Rodkey (1934) provides a detailed discussion of reserve requirements under the National Bank Act.

■ **26** Overnight overdrafts are costly in that, in addition to the cost of financing a "makeup" balance on a subsequent day, the overdraft is penalized at a rate 2 percent above the effective federal funds rate on the day the overdraft occurred. The ability to run significant daylight overdrafts in Federal Reserve deposit accounts allows banks to cover payments during a day without the need for positive reserve deposit balances at the beginning and end of the day. For a discussion of daylight overdrafts, see Stevens (1991).

one reason why banks enter into clearing balance agreements with their Reserve Banks. By targeting a positive clearing balance, they reduce the chances that unexpected events, especially those late in the day, will result in costly overnight overdrafts or wasted earnings opportunities. Clearing accounts make sense only for institutions that can use the earnings credits from clearing balances. Others may prefer to operate through a correspondent bank rather than through targeting a zero balance in their reserve deposit accounts.

Banks that do use reserve deposits to meet reserve requirements gain liquidity within the immediate confines of a reserve averaging period. Unexpected outflows on a given day can be funded by drawing the reserve deposit balance down as low as zero, as long as this action is offset by holding a large enough balance on future days to maintain the required average balance during a reserve maintenance period. Similarly, unexpected inflows of funds on a particular day do not represent a wasted earnings opportunity if offset by a smaller balance on future days.[27]

The lengthening of reserve averaging periods over the past 50 years has increased the opportunity for banks to use reserve deposits for short-run liquidity management. However, the expanded opportunity has not been fully realized for three reasons. First, as noted earlier, required reserves have grown only one-third as rapidly as the banking system (table 3). Second, reserve deposits have declined from 100 percent to 45 percent of required reserves since 1959, when banks were first permitted to satisfy reserve requirements with vault cash. Third, the value of transactions and, presumably, the potential need for liquidity to cover unexpected imbalances between inflows and outflows of funds have grown far more rapidly than reserve deposits. For example, while banks' reserve deposit balances grew at a 1.3 percent annual rate between 1952 and 1990, the dollar value of payments made from banks' Federal Reserve accounts grew at a 20 percent annual rate.

Development of active same-day reserve account management techniques has supplemented reserve deposit balances in the handling of day-to-day liquidity needs for many banks. Sophisticated computerized systems track movements in reserve deposit accounts during the course of a day; as needs become apparent, same-day transactions are used to fund potential deficits or to lay off surpluses in the money and interbank markets. The extent to which modern reserve requirements have a short-run liquidity rationale depends on the size of the pool of reserve deposits (for an individual bank and in the aggregate) relative to potential liquidity needs, which are heavily influenced by the availability of alternative sources of liquidity.

A Redundant Assurance of Liquidity

Before the Federal Reserve System was established in 1913, the hallmark of adequate liquidity in the banking system was an increase in the ratio of currency to bank deposits without a suspension of specie payments, whether in response to a seasonal increase in currency demand or an incipient banking panic. Typically, this was made possible by running down the cash reserves of banks in Reserve cities, as other banks drew on them. Augmenting the aggregate stock of cash by tapping Treasury and foreign holdings of specie tended to be inadequate.[28]

Since 1913, however, Reserve Banks have been able to augment the aggregate stock of cash in response to increased demand. This provides a choice of regulatory mix in managing short-run liquidity, both in the aggregate and at individual banks. Reserve requirements can be used to ensure a pool of cash in advance of day-to-day potential needs. Reserve averaging and carryover at individual banks can then allow this pool to be redistributed among banks through transactions in the federal funds market and other markets for instruments with same-day payment. Alternatively, the central bank can simply add and absorb cash on a daily basis in response to actual needs. Defensive open market operations and discount window lending can tailor the size and the distribution of the pool to the liquidity needs of the day.

Today, therefore, a liquidity rationale for reserve requirements would need a supporting demonstration of some public benefit connected with retaining a market cash-in-advance facility as an alternative or a supplement to government credit-on-demand in the liquidity mechanism.

■ 27 Some examples may be useful: A bank required to hold an average balance of $100 million can let the balance drop to zero on the first day and then hold $107.7 million on the remaining 13 days. Or, having held $100 million on average over the first seven days, it can let the balance drop to zero on the eighth day and then hold $116.7 million on the remaining six days. Even on the last day, taking carryover into consideration, a bank that has held $100 million on average over the first 13 days and has met 55 percent of its requirement with vault cash could let its balance drop to $38 million on the last day (see footnote 4).

■ 28 A recent review of historical episodes of liquidity strains can be found in Smith (1991).

These public benefits might lie in damping volatility of the federal funds rate and in monitoring credit quality.

As monetary policy and Reserve Bank operations are now structured, reserve requirements have the effect of maintaining a reasonably steady rate signal that is the basic source of short-run information about policy. In the absence of reserve requirements, the federal funds rate would be more volatile from day to day than it is now, all else equal.[29] The nub of the problem is simply that, without the opportunity for arbitrage created by reserve averaging associated with reserve requirements, every bank would want a zero balance overnight (as long as the overnight funds rate were positive) because Fed deposits do not earn interest. Deviations of the daily aggregate supply of Fed deposits from zero, whether from forecasting errors in carrying out defensive open market operations or from deliberate policy adjustments, would cause the rate to spike or to plunge (to the extent that banks were reluctant to use the discount window), because no interday arbitrage would be possible. With greater rate volatility, market participants might have difficulty discerning the funds-rate level intended by policymakers. A more volatile rate may be undesirable if it befogs market perceptions of monetary policy intentions.

Of course, reserve requirements are not the only mechanism for damping funds-rate volatility, and the funds rate is not the only vehicle for conveying monetary policy information. Nonetheless, it is worth considering whether, or what sort of, a rate-smoothing mechanism might develop in the absence of reserve requirements.

- Banks would be unlikely to hold excess reserves in place of today's required reserves. They would need to foresee profits from financing the inventory of non-interest-bearing deposits upon which they would draw for occassional lending when the rate spiked. This would be possible only if the average of expected future overnight funds rates were higher than the permanent cost of financing the inventory. That is, the likelihood of aggregate reserve shortfalls in defensive open market operations and policy adjustments would have to exceed the likelihood of aggregate reserve surpluses. There seems to be no reason to expect such asymmetry.[30]
- For several reasons, clearing balances are an uncertain basis for market arbitrage to smooth the funds rate, even though they pay a market rate of interest as currently administered (see section I and footnote 5). First, because clearing balances are optional, they may be insufficient to support the amount of arbitrage required to smooth the funds rate. Banks now choose this method to pay for only about 20 percent of the $900 million of Reserve Banks' priced services (by holding balances of less than $4 billion). Second, even if antitrust considerations did not preclude making clearing balances the mandatory mode of payment, the volume of balances might be insufficient, being a function of regulatory and competitive forces determining the demand for Reserve Bank services, as well as of the level of interest rates. For example, the entire $870 million of priced services in 1990 would have required balances of $15 billion if the earnings rate were at the mid-1991 5.75 percent level, but only $10.7 billion at the 8.1 percent average funds rate in 1990. Finally, as this example suggests, and as Sargent and Wallace (1985) have pointed out, paying a market rate of interest on reserves may introduce an indeterminacy into the economy that renders moot the whole concern for the funds rate as a policy signal. If the only reason to hold clearing balances is to pay for a fixed value of priced services, then there could be no excess supply or demand for balances because the funds rate would vary inversely with balances to maintain the fixed-dollar value of their yield.
- The discount window is the most likely source of rate smoothing in the absence of interday arbitrage. Aggregate under- and oversupplies of Fed deposits would put pressure on the funds rate, but the degree to which that pressure actually pushed the funds rate up and down would depend on how readily banks approached the window and on how readily Reserve Banks would lend.
- If a clear indication of the policy rate were desirable for policy information purposes, more direct methods could be used. FOMC policy decisions could be announced immediately, rather than after the next regularly scheduled meeting. A more radical change would be to have the Desk make both reserve balances and securities available continuously throughout each day, engaging in repurchase and matched-sale agreements in Treasury securities on demand at announced prices set by the FOMC.

A smoothed policy rate is not a necessity. However, the potential for funds-rate volatility is simply a symptom of deviations between

29 Volatility during the course of a day might also be greater, depending on rules for daylight overdrafts.

30 In Canada, banks are said to hold excess reserves as protection against unexpected net debits, but the Canadian discount rate is market related, with penalties for repeated borrowing (Freedman and Dingle [1986]).

actual supply and zero demand for holding Fed deposits in the absence of the liquidity provided by reserve requirements. Another matter to be considered is that relying exclusively on the central bank to provide day-to-day liquidity would eliminate the role of the funds market in monitoring the credit quality of banks.

A more volatile funds rate would reflect the absence of market supply and demand for overnight holdings of Reserve Bank deposits. When open market operations were completed for a day, the discount window would be the only liquidity mechanism available for adjusting the aggregate supply of Fed deposits. Borrowing at the window would be the sole way for banks that were left short to avoid overdrafts caused by inevitable forecasting errors in the carrying out of defensive open market operations, because no pool of reserve deposits would be available to lend; repaying discount window loans would be the only way to avoid the wasted earnings opportunity of holding a non-interest-bearing overnight deposit. Under these circumstances, banks might come to view access to the window as a right, not a privilege, and to borrow or repay whenever a high or low funds rate suggested that the Desk's injection or withdrawal of Fed deposits had failed to accommodate settlement of the day's payments.

Widespread and continuous reliance on the discount window has a by-product: It supplants market judgments about creditworthiness with regulatory judgments. If the deposit insurance system does not guarantee repayment for all of a bank's creditors, a benefit of a liquidity mechanism that relies on a market-financed advance pool of cash is the credit scrutiny of overnight borrowers by overnight lenders. Of course, monitoring would continue in markets for other forms of bank liabilities even if banks were to become more heavily dependent on the discount window for overnight financing. Nonetheless, the diminished importance of the overnight market for unsecured borrowing, coupled with heightened assurance of official lending, should increase the influence of regulatory opinion and reduce the influence of market evaluations in the short-run management of banks. Moreover, Reserve Banks should then be expected to assert their regulatory judgment as providers of substantial amounts of unsecured daylight overdraft credit, because reserve deposits would no longer provide a buffer between them and general creditor status in the event of a bank failure.

In brief, reserve requirements have a short-run liquidity rationale because banks have no other incentive to hold Fed deposits that do not bear interest. Lacking this artificial demand for cash, both accidental and policy-intended deviations of the stock of Fed deposits from zero each day might impart undesirable volatility to the funds rate. In any case, the burden of meeting the banking system's liquidity needs would fall heavily on credit decisions made at the discount window, reducing the role of market judgments about credit risk.

V. Conclusion

Rationalizing reserve requirements is not easy. They have the aura of a tax, but revenue does not seem to be their purpose. Avoidance erodes the tax base, and regulatory efforts to avoid avoidance have had the effect of reducing the tax rate over time, so that reserve requirements now yield less than half of 1 percent of Treasury revenue. The requirements act as a license fee, entitling some depository institutions to issue reservable transactions accounts and to maintain an account at, buy the services of, and borrow from the Federal Reserve Banks. The question at issue is whether there is a compelling rationale for maintaining the burden of a license fee in the form of reserve requirements.

Monetary policy implementation has been the statutory rationale for reserve requirements since 1980, but policy implementation would be little affected by their elimination. With the interest-rate targeting approach that has been typical of Federal Reserve policy implementation, the absence of reserve requirements could make the federal funds rate more volatile in the very short run, perhaps reducing its value as an indicator of policy intentions. However, changes in policy techniques could offset this problem. If the alternative reserve targeting approach to policy implementation were ever adopted, absence of reserve requirements could make reserve targets less predictable, but only in the very short run.

Reserve requirements can have a liquidity rationale, contrary to traditional assertions that have overlooked reserve averaging provisions as the basis for interday arbitrage in the market for Reserve Bank deposits. A liquidity rationale, however, is only as strong as the preference for having private markets rather than the Federal Reserve manage the supply and distribution of outside money each day. This preference may be reinforced by a desire for greater reliance on the federal funds rate than on the discount rate as the dominant policy instrument, and for greater reliance on FOMC guidance of the federal funds rate than on Board of Governors'

control of the discount rate in managing monetary policy in the short run.

Experience with reserve requirements suggests that their rationale is ultimately irrelevant, because they are an unsustainable regulatory intrusion in competitive markets. Repeated market innovations aimed at avoidance, and regulatory relaxation to avoid avoidance, have allowed required reserves to grow at only one-third the rate of growth of the banking system since 1952. Moreover, reserve deposits have been declining as a share of required reserves, with an increasing number of banks satisfying the requirement through voluntary holdings of vault cash. If the trend of the past 30 years continues, reserve deposits will amount to only 10 percent of required reserves within the next 30 years.

Preserving an effective system of reserve requirements will be difficult if built-in incentives for avoidance and voluntary holdings of vault cash continue to reduce both their burden and their effects. But if reserve requirements have no compelling rationale, why not eliminate them?

Appendix

Estimates plotted in figure 1 are based on the assumption that required reserves finance a portion of Reserve Banks' earning assets. Required reserves must be apportioned between an amount that would be held anyway and an amount held solely because of the requirement. Earning assets include Treasury and agency securities, loans to depository institutions, assets denominated in foreign currencies, and other loans. This assumes that all nonearning assets (for example, gold certificates, Special Drawing Rights, and buildings) are financed by all other liabilities and capital (for example, clearing balances, other deposits, excess reserves, surplus vault cash, currency, capital stock, and surplus).

Because all vault cash applied to required reserves is excluded, the estimates plotted here may be understated after 1959, when vault cash became eligible to satisfy reserve requirements. Using reserve deposits alone ignores the possibility that some banks are induced to hold additional vault cash when the opportunity cost of these funds is simply the cost of holding a smaller deposit balance at the Fed. An estimate based on required reserves *including* applied vault cash would nearly double the tax attributed to reserve requirements, but would be overstated: The erroneous implicit assumption would be that banks would hold no vault cash at all were it not for reserve requirements. An intermediate method suggests that the understated estimates involve less error than choosing to overstate. If banks had maintained the same proportion of vault cash to reserve deposits after 1959 as they did in that year, the estimated tax attributable to reserve requirements would have been 16.5 percent higher in 1989, and the contribution of required reserves to Treasury revenue would have been 0.05 percentage point higher.

The intentional understatement is offset by some independent overstatements. One arises from ignoring the possibility that holdings of clearing balances would be larger in the absence of reserve requirements (see section IV). Reserve Banks' fee income would then be smaller, offset by larger interest income, if banks did not change the quantity of services used. However, the quantity would be unchanged only if the interest income that banks forgo when holding a clearing balance were no higher (per unit of service used) than fees *plus* the value of the service a clearing balance provides in avoiding overdrafts and wasted reserves. This value would be created for some banks by the elimination of reserve requirements, so that clearing balances would be expected to increase.

Another overstatement arises because data limitations make it convenient to exclude from earning assets both foreign-currency-denominated assets (for example, those acquired through dollar-support intervention in the foreign exchange market) and other loans (for instance, those made to the Federal Deposit Insurance Corporation when it assumes a failed bank's debt to the discount window).

The estimates presented here differ from related estimates by Barro (1982) and Goodfriend and Hargraves (1983) in that they include only the Treasury revenue attributable to required reserve deposits; the two earlier estimates deal with Treasury revenue attributable to all outside money issued by the Federal Reserve.

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