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**DEFINING THE MONETARY BASE IN
A DEREGULATED FINANCIAL SYSTEM**

by E.J. Stevens

E.J. Stevens is a consultant and economist at the Federal Reserve Bank of Cleveland. He thanks Ann Dombrosky, Julie Powell, and Cheryl Edwards for past help in penetrating the intricacies of reserve and clearing-balance accounting, and Jerry Jordan for useful comments on earlier drafts of this paper. However, he claims sole responsibility for any remaining errors.

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Abstract

The monetary base typically is defined as a measure of the money-supply “impulse” originating from the stock of high-powered, central-bank money. In addition to nonbanks’ demand for hand-to-hand currency, banks have demanded base money in the United States since 1913 to satisfy two needs. One is a reserve need, to fulfill a Federal Reserve regulatory requirement. The other is an operational need, to protect against teller shortages of coin and currency and against daylight and overnight overdrafts of banks’ accounts at Reserve Banks. As the level of reserve requirements declines, the aggregate demand for base money originating from banks reflects reserve requirements less and less, and reflects operating needs more and more. Moreover, the *adjusted* measure of the monetary base, combining the quantity of base money with an adjustment for changes in reserve requirements, becomes unreliable. It includes adjustments for banks that are, in fact, unaffected by changes in reserve requirements.

A definition is something fundamental, something that precedes the application of a logical model. Defining the monetary base, therefore, might seem to be no different in a deregulated than in a regulated monetary system.¹ However, the problem is to identify what kind of monetary system would exist in a deregulated world in order to know what institutional form the monetary base might assume. Without agreement about a monetary system, it is difficult to distinguish between expendable regulation and the indispensable legal framework of an unregulated market system.

This is not a normative matter, but a positive question about what kinds of monetary arrangements a truly free market system would produce. According to Selgin and White (1994),

at least three strands of literature...can be distinguished according to the different sorts of payment media each predicts would predominate under laissez faire...

- ...a modern free banking literature that...proposes that an unregulated money and banking system would have a single distinct base money, possibly, but not necessarily a precious metal, and private-bank-issued monies in the traditional forms of banknotes and transferable deposits made redeemable in base money;
- a small but influential group of works that associate the competitive supply of money with parallel private fiat-type monies, that is, plural brands of non-commodity base money issued by private firms;
- related literatures known as the “new monetary economics” and the “legal restrictions theory” that envision competitive payments systems without any base money, with common media of exchange consisting entirely of claims, paying competitive rates of return, on banks or money market mutual funds.

One approach would be to jump into the middle of this apocalyptic tangle and define the monetary base along each strand, or along the “right” strand. This paper takes a more pedestrian approach. It addresses the question of how successive stages of piecemeal deregulation affect the construction of an empirical counterpart to the a priori definition of monetary base. The first step is where we are today in the United States--in the midst of effectively eliminating reserve requirement regulations. Future steps might

¹ Two matters of semantics: First, many people use the phrase “monetary base” to refer to the adjusted base. However, for present purposes, “monetary base” or simply “base” will always mean *unadjusted*; the adjusted base measures of St. Louis and the Board will be designated as “adjusted base” and “break-adjusted base,” respectively. Second, I use the word “bank” to mean “depository financial institution.”

involve investigating the redefinitions needed to incorporate the effects of eliminating central bank clearing services and then eliminating central bank interbank-settlement services. All three steps would still fall short of the place where Selgin and White begin--the disestablishment of government-fiat currency.

The subject is largely institutional, focused as it is on the probable outcome of market competitors driving regulation out of business, and the probable effect of deregulation on the appropriate measure of the monetary base. The approach is to examine the economic implications of changes in the financial sector for the proper measure of the monetary base.

To explore these matters it is necessary to know what a monetary base is, how it is measured today, and what deregulation means. The first section of the paper considers these background questions. The next section investigates the already diminishing role of reserve requirements in the banking system, as the first of what seem to me to be plausible stages of deregulation. Two major conclusions emerge. First, as a simple matter of accuracy, the existing time series of the monetary base and its components needs to be tuned up to account for modern banking and central banking practices. Second, as a matter of logic and institutional fact, the two publicly available data series measuring the adjusted monetary base are becoming obsolete because the role of reserve requirements in the banking system is diminishing.² Whether these assertions can be verified empirically, and, if so, what to do about it, are matters for future research.

The Concept of the Monetary Base

Karl Brunner seems to have coined the term “monetary base” no later than his 1961 article, “A Schema for the Supply Theory of Money.” His intent there was to develop a supply function of money, starting from the microfoundation of an individual bank managing its cash position in the context of settling customers’ payments. The result was an aggregate theoretical relationship in which, as he summarized it, “[t]he money stock is explained in terms of some component of the public’s demand functions for currency and time deposits, *the monetary base adjusted for the cumulated reserve*

² One of these data series is published by the Federal Reserve Board, the other by the Federal Reserve Bank of St. Louis.

liberations, the interbank deposit structure, and a specific component of the banks' demand for Federal Reserve Money" (italics added). That is, the money stock was a function of the monetary base (adjusted for changes in the effective reserve requirement) and of certain demand factors determined by institutional practices, preferences, and market conditions.

At about the time Brunner was writing, Gurley and Shaw (1960) coined the phrase "outside money" to fit a similar definition. As the phrase implies, their focus was on nonmarket control of the money-supply impulse of the monetary base. They specifically excluded from outside money any funds that the monetary authority loaned directly to banks. For the same concept, James Tobin (1961) used the more cumbersome name "net non-interest-bearing government debt." Distinguishing between gross and net monetary base sometimes has been a significant issue. In the United States, the difference arises from the discount window at which the Federal Reserve Banks will lend base money, essentially on demand in the very short run. As a result, the gross volume of the monetary base, while entirely high-powered, may not be entirely within the precise control of the monetary authority.

Within two years of Brunner's article, Friedman and Schwartz published their *Monetary History* (1963), emphasizing the monetary-base concept as one of the proximate determinants of the money stock. What's more, they provided an actual time-series measure of the stock of base money in the United States covering almost an entire century, albeit without adjusting for changes in reserve requirements. Instead of calling their measure the "monetary base," however, they used the old-fashioned designation, "high-powered money." They traced this phrase back to the 1936 second edition of *The Reserve Banks and the Money Market*, by W. Randolph Burgess, a long-time officer of the Federal Reserve Bank of New York and brother-in-law of Leonard P. Ayres, the celebrated prewar economic guru of the Cleveland Trust Company (Friedman and Schwartz [1963]; Boone [1944]). The concept of high-powered money, with associated multiple expansion and contraction of bank deposits, was not new in 1936, however. Tom Humphrey (1992) has traced the notion back another 110 years, through

C. A. Phillips, Davenport, Marshall, Joplin, and Torrens, locating its first use by James Pennington in 1826.

Within seven years of Brunner's article, Leonall Anderson and Jerry L. Jordan (1968) devised a time-series measure of the monetary base adjusted for changes in reserve requirements. They emphasized the need to define a single, unified measure for tracking the monetary policy impulse of the central bank, observing that "the Federal Reserve, by varying the supply of the monetary base, causes commercial banks and the nonbank public to adjust their spending on real and financial assets so as to bring the amount demanded of the base into equilibrium with the amount supplied. In the course of these adjustments, the path of economic activity is affected." The St. Louis Federal Reserve Bank has been publishing this measure for 27 years, with occasional revisions because of changes in data availability and monetary institutions.

It was not until eighteen years after Brunner's article, eleven years after Anderson and Jordan, and after some prodding by the blue-ribbon Advisory Committee on Monetary Statistics, that statistical tables in the Federal Reserve *Bulletin* began including a monetary-base measure, slightly different from the St. Louis measure.³ If the Fed's only influence were as the source of base money, a time series measured at the source would record that influence. Karl Brunner, Anderson and Jordan, and the Board all reasoned, however, that changes in reserve requirements would alter the monetary impulse of a given quantity of base money. A time series would give more useful, direct readings of the monetary impulse if it were corrected for changes in reserve requirements.

Initially, the Board's base had no adjustments for changes in levels of reserve requirements or methods of computation and maintenance, but as the months went by, footnotes appeared, containing data with which users might adjust for such changes. Then, in January 1981, again without comment, the current "break adjusted" monetary-

³ Members of the committee, appointed by the Board in 1974, included George Leland Bach (Stanford), Phillip D. Cagan (Columbia), Milton Friedman (Chicago), Clifford G. Hildreth (Minnesota), Franco Modigliani (MIT) and Arthur Okun (Brookings). See "Improving the Monetary Aggregates," *Report of the Advisory Committee on Monetary Statistics*, Washington, D.C., Board of Governors of the Federal Reserve System, June 1976. For an explanation of the Board of Governors' monetary base series, see "Reserves of Depository Institutions," Board of Governors of the Federal Reserve System (mimeo), March 1995.

base series appeared in the regular *Bulletin* tables. That is, like both the St. Louis measure and Karl Brunner's original concept, the Board's version of the base was adjusted for changes in the structure of reserve requirements.⁴

These four concepts--monetary base, outside money, net non-interest-bearing government debt, and high-powered money--all represent variants of the same core idea. The Federal Open Market Committee controls the volume of central-bank money in the fiat money regime of the modern United States. This is high-powered money that can be used as reserve assets backing reservable bank deposits. It is also outside money, the liability of an institution outside the private sector. Until 1980, high-powered, outside monetary base was the non-interest-bearing debt of the federal government, because the Federal Reserve Banks paid no explicit interest on either their currency or deposit liabilities. Since the Monetary Control Act of 1980, however, some of the deposit portion of the high-powered, outside monetary base explicitly yields interest in the form of credits that can be used to pay for Reserve Bank services. No longer is it true that the high-powered, outside monetary base is the equivalent of non-interest-bearing federal government debt.

Degree of control has been another matter of interest in isolating an outside monetary impulse that is exogenous to, or determined independently of, market forces. The Federal Reserve's willingness to lend means that the monetary base can be an endogenous variable. For example, as market interest rates rise relative to the discount rate, banks can be expected to overcome some of their bashfulness about being in debt to the authorities. This has suggested that only the *nonborrowed* base should be viewed as the exogenous variable, an indicator of the outside control exercised by the monetary authority.

⁴ I was an imperfectly informed participant-observer of the Federal Reserve System at that time, but my recollection is that the Board staff's apparent reluctance to produce a measure of the monetary base was more than sour grapes. True, there might have been some reaction to the success of the St. Louis research department in popularizing an implementable form of monetarism. However, the real reluctance was more a reflection of the Board's growing involvement in large-scale, aggregate econometric models of the economy and the application of control theory to the policy process. A single summary time series index of the money supply impulse simply was out of place in the more elegant system of demand and supply equations.

The meaning of exogeneity has evolved over the years. At about the time Anderson and Jordan published the first St. Louis adjusted-base series, Patric Hendershot published estimates of what he called the “neutralized money stock.” His idea was to measure the central bank’s monetary impulse purified of the influence of shifts in demand, whether from changes in reserve requirements or from cyclical income variations. The neutralized money stock would measure the extent to which the monetary authority was raising or lowering the trend growth rate of money. Since that time, with the development and estimation of large structural and multiplier models of the economy, and later of rational expectations models, measuring exogenous actions of the monetary authority has moved to the residuals from a rationally perceived reaction function, far from the simple nonborrowed adjusted monetary base.

Deregulation

The American economy teems with regulations. In searching for those regulations whose extinction would be relevant to the monetary base, it is helpful to differentiate between the Reserve Banks as sources of assets held by the banking and nonbanking public, and the reserve accounting regulatory framework that governs the uses of the base. Interest in reconstructing the base comes on both fronts. New sources, for example, might come from the unregulated emergence of stored-value cards. Suppose that software providers, brokerage houses, or travel- and entertainment-card companies were to act as warehouses of funds stored on their branded cards but not yet spent at the many merchants who would accept them. Unless these warehouse facilities maintained 100 percent reserves in central-bank money, stored value might be considered another type of base money, fully commensurate with high-powered bank reserves. After all, they might be better than deposits at the Fed in being generally acceptable, and better than Federal Reserve notes in being electronically transferable in making anonymous payments.

However, concerns about deregulation are more often based on new uses. This is the realm in which the probability of movement toward a deregulated monetary system seems very high. Actually, this would be “further movement,” for it would simply

continue the trend toward deregulation that followed the regulatory high tide of the 1930s and World War II.

Interest-rate controls are gone. The prohibition of interest on demand deposits remains on the books, but has been rendered largely ineffective by the long-standing banking practice of implicit interest payments on compensating balances and by the more recent introduction of sweep accounts and interest-bearing NOW accounts.

As to the future, consider the following:

- Current efforts to repeal Glass-Steagall restrictions on bank powers involve serious debate about how significant a role the Federal Reserve Banks should retain in supervising and examining financial institutions, one of their long-standing functions.
- Repeated efforts have been made to eliminate the role of Federal Reserve Bank presidents on the Federal Open Market Committee. These efforts surely will continue.
- The Monetary Control Act of 1980 requires the Federal Reserve Banks to price their services to recover full cost, including imputations for interest on long- and short-term funding and return on capital at levels comparable to those of private competitors. The imperative to cover costs, plus technological changes such as securities depositories and regulatory changes such as nationwide branching, raise serious questions about the continued viability of the traditional check, ACH, Fedwire, and noncash-collection product lines offered by the Federal Reserve Banks. Without vigorous new approaches to serving the needs of present and potential customers, the decline of Reserve Banks' market share in payment services seems unlikely to stop.
- Pressure from private suppliers poses a similar competitive threat to the Reserve Banks as fiscal agents for the United States government.

Traditionalists seem to assume that the Treasury is somehow required to use the Reserve Banks for all services, but this is not so. Price competition for the government's business is intense, and, as the recent episode involving bidding for electronic funds-transfer of tax payments may demonstrate, products

associated with new payment technologies may be off-limits for the Reserve Banks, regardless of price.

These forces suggest that the Federal Reserve Banks, and therefore the central-bank balance sheet, are not necessarily permanent features on the financial landscape, no matter how enduring the Federal Reserve Act might seem. Erosion of each of the Reserve Banks' four basic functions--banking supervision, monetary policy, payments services, and fiscal agent--is more than conceivable; it is the default mode in which Reserve Banks already operate. Moreover, a good case can be made that erosion in any one of the four areas would increase the likelihood of erosion in the others. Therefore, it is productive to focus discussions of deregulation on stages in the process of statutory or competitive elimination of the bankers' banks.

Reserve Requirement Deregulation

Deregulation is worth thinking about because it has been happening and is likely to continue. One of its aspects has been the erosion of reserve requirements as a factor constraining the behavior of banks, accompanied by a decline in the percentage of the monetary base needed by banks to satisfy reserve requirements.

The dominant source of base money in the United States today is the balance sheet of the Federal Reserve Banks, whose purchases of assets in large part create monetary liabilities of two sorts--banks' deposits at the Fed and Federal Reserve notes held both by banks and by the nonbank public. Twenty years ago, this central-bank money was only used as currency in the hands of the public and as reserve assets of the banking system (vault cash and deposits at Reserve Banks). Over the intervening years, reserve assets have shrunk from 37 percent to 14 percent of the monetary base, reflecting both the growth of foreign holdings of U.S. currency and the decline of reserve requirements (figure 1). Moreover, with growing use of currency and vault cash, reserve deposits, taken alone, have declined from 30 percent of the base to less than 6 percent today.

Meanwhile, two additional uses of central-bank money have emerged (figure 2).

- Surplus vault cash now amounts to about 10 percent of total vault cash. This is vault cash that is not applied to meeting reserve requirements by those banks that meet the entire requirement with vault cash.

- Clearing balances at times have amounted to as much as 20 percent of banks' total deposits at Federal Reserve Banks. These are balances maintained in addition to required reserves to support operational needs. The Federal Reserve calls them "service-related balances" or "required clearing balances."

Banks use their surplus vault cash to meet operational needs during the day and at ATM machines at night. Investing the surplus overnight is either impossible or unprofitable. Clearing balances are a different story. Although readily available for overnight investment, they are not invested in the market. Instead, a bank contracts with a Reserve Bank to maintain a specified average overnight clearing balance during a reserve-maintenance period. This balance is not segregated in a unique account, but supplements whatever average reserve deposit balance the bank is required to maintain in a unified account over the same period. The result is a combined balance with a target level that the bank deliberately has set higher than reserve-requirement regulations specify.

A contractual clearing balance has two benefits for a bank. One is that the Reserve Bank pays interest on clearing balances--at the level of the federal funds rate--in the form of earnings credits a bank can use (instead of hard dollars) to pay for Reserve Bank services. This feature alone does not explain why banks would use this roundabout method to pay for services. Clearly, however, earnings credits do make a clearing balance more palatable.

The real benefit of a clearing balance is that it reduces the cost of operating in an uncertain transactions environment (Stevens, 1993a, b). A bank doing a significant volume of business with its Reserve Bank could find it costly to target a zero overnight balance in its account, or a balance low enough to avoid wasting reserves. The Reserve Banks penalize overnight overdrafts and charge fees for excessive daylight overdrafts. Uncertainty, however, prevents a bank from controlling its overnight balance precisely, and from predicting the intraday sequence of debits and credits to its account.⁵ The

⁵ Until the mid-1980s, the intraday sequence of debits and credits was of little practical concern. The Reserve Banks had to permit unlimited daylight overdrafts because their deposit-accounting system made tracking intraday positions almost impossible. Over the past decade, however, the Reserve Banks have upgraded their accounting systems and now monitor the daylight overdrafts of each bank (ex post, in most cases) relative to a ceiling above which fees are assessed.

higher the positive overnight balance a bank targets, the less likely it is to exceed its daylight overdraft limit during the day, to be overdrawn at the close of business or forced into last-resort borrowing.

The American banking system is in the midst of a massive migration of banks from a regulatory to an operational demand for balances at the Reserve Banks. The large deposit balances demanded by high reserve requirements reduce the risk of daylight and overnight overdrafts. Meeting a very high reserve requirement may involve more than enough cash to cover operational needs. A low reserve requirement, on the other hand, can make a required reserve balance objective redundant. Maintaining an operational balance sufficient to ensure against overdrafts may involve more than enough cash to meet reserve requirements.

The growing significance of banks' operational demands for base money relative to the demands imposed by reserve requirements is consistent with the downward trend of required reserve ratios from their peak levels shortly after World War II, before banks were allowed to use vault cash to satisfy requirements. Requirements today are both lower and less complex than in days past (table 1). In 1995, the required reserve ratio was zero on all of a bank's liabilities except transactions deposits in excess of \$4.2 million, was only 3 percent on the next \$50 million of transactions deposits, and only 10 percent on amounts above \$54.2 million.⁶

Even among large depository institutions (the 7,500 that report data to the Fed weekly), 68 percent either operated below the \$4.2 million floor or met their entire requirement with the cash they held at teller stations, in automated teller machines, and in their vaults (table 2). Another 20 percent had such low reserve requirements that they contracted to hold clearing balances in addition to the vault cash and deposits they needed to meet reserve requirements. Only about 900 banks, representing just 12 percent of those reporting weekly (but 38 percent of deposits at large banks), actually seemed to be constrained by reserve requirements. This relatively small group of banks met

⁶ These dollar amounts are not fixed. Law requires that both the zero and the 3 percent ceilings be adjusted annually by 80 percent of the prior year percentage increase in total reservable liabilities of all depository institutions.

requirements with vault cash and required reserve deposit balances, without apparent need for additional operating balances.

Monetary-Base Data

Basic Data Contractual clearing balances are reducing the precision of monetary-base data. Published Federal Reserve estimates of the monetary base do not distinguish entirely between reserves, both total and excess, and clearing balances. This occurs because the deviation of any bank's clearing balance from the contractual level, whether above or below it, is included in excess reserves, rather than added to or subtracted from contractual clearing balances.⁷

Measured excess reserves today might better be called "odds and ends." Conceptually, under current reserve accounting regulations and in the absence of a contractual clearing balance, the excess reserves of a single bank might be thought of as wasted balances, that is, balances in excess of the sum of the amounts used to meet the current period requirement, to carry forward to meet next period's requirement, and to carry back to offset a reserve deficiency in the previous period. In fact, however, not only do excess reserves include wasted reserves, but also the amount of balances some banks carried back to the last period, net of the amount that other banks carried forward from the last period, plus the amount of balances some banks carried forward to the next period, net of the amount that other banks carried back from the next period.

In addition to the inclusion of balances used to meet requirements by carryover, measured excess reserves also include some nonreserve factors. This occurs because of the inclusion of the aggregate difference between each bank's actual and contractual clearing balance. Some of these difference are within the plus or minus 2 percent range that is a bank's allowable, penalty-free band for maintenance of its clearing balance. While allowable as a clearing balance, this difference is included in aggregate excess reserves. A difference larger than plus or minus 2 percent is not allowable, being

⁷ Banks contract to hold a specific amount of clearing balances over and above their required reserves during a reserve maintenance period. The reserve-accounting system defines *required reserve balances* as the difference between required reserves and predetermined applied vault cash. *Actual* reserve balances are defined as total balances (from the Reserve Banks' balance sheet), minus contractual clearing balances. *Excess reserves* are derived as the difference between actual and required reserve balances.

non-interest-bearing if positive, and penalized if negative. While not allowable, all such excesses and deficiencies of actual from contractual clearing balances are included in measured excess reserves.

Constructing more precise aggregate data series would not involve any change in the micro data gathered from banks. These already allow the Reserve Banks to make an exact calculation of each depositing bank's average position over a maintenance period, to administer reserve requirements, calculate earnings credits, and, when necessary, assess penalties. The total amount allocated between reserve and clearing balances includes each bank's total position during a maintenance period, consisting of applied vault cash plus deposit balance at the Reserve Bank.⁸ It also includes all deficiencies or surpluses in surrounding periods that are carried forward or back one period to offset excesses or deficiencies in a bank's reserve position.

Allocating positions between reserve and clearing balances must begin with an assumption about priority. That is, if a bank's total position is inadequate after adjusting for carryover, should the bank be penalized for a reserve deficiency or for a clearing-balance deficiency? Current Reserve Bank practice gives first priority to meeting reserve requirements, so that deficiencies are first attributed to clearing balances. No deficiency in a reserve position can occur as long as a bank maintains the least portion of a clearing-balance contract.

In the alternative case, where a bank's total position exceeds its required reserves, that required amount can be included in the reserves component of the base. The excess of a bank's position above required reserves, up to the interest-bearing maximum of 102 percent of its contractual clearing balance, can be included in the clearing-balance component of the base. When a bank's position exceeds required reserves plus 102 percent of its contractual clearing balance, however, another priority assumption must be invoked. The redundant balance could be included in the bank's reserve position (especially for banks without contractual clearing balances), or in its clearing balance

⁸ I pass over the distinction between the source base (current-period Reserve Bank assets minus nonmonetary liabilities and capital) and the use base (essentially, current-period currency in the hands of the nonbank public, surplus vault cash, bank deposits at the Reserve Banks, plus applied vault cash). For a detailed examination of the construction of the St. Louis and Board measures, see Garfinkel and Thornton (1991).

(especially for banks without a required reserve), or prorated between the two.⁹ Or, instead of making an arbitrary allocation, the redundant position might be aggregated and reported as surplus balances, analogous to the current treatment of surplus vault cash.

Reserve Adjustments The Board of Governors' monetary base data series, which is not break-adjusted, includes actual clearing balances, although these are not identified separately. The Board's break-adjusted base series includes an estimate of how much lower the monetary base would have been, had today's low reserve requirements been in force in the past. However, clearing balances are excluded from the break-adjusted measure. This does not seem appropriate. Some of the impact on reserve demand of the secular decline in reserve requirements to today's low level has been offset by an increased demand for clearing balances to meet operational needs that formerly were met with reserve deposits. The Board's procedure makes the break adjustment too large when comparing present values of the adjusted base with values at dates prior to the introduction of current clearing-balance arrangements.

The Federal Reserve Bank of St. Louis excludes contractual clearing balances from its unadjusted ("source") base, as well as from the adjusted base. The difference between the adjusted and unadjusted series--the reserve adjustment magnitude--includes the difference between the current level of required reserves and what the current level would have been, had the reserve requirements of a past base period been in force. This adjustment also is not entirely appropriate. It is too large, failing to account for the fact that today's required reserve should include an allowance for clearing balances that have been substituted for reserve deposits.

In both cases, adjustments to the raw monetary base may do a fine job of indicating what required reserves would have been in the past, had today's reserve requirements been in place (Board), or what today's required reserve would be today, had past reserve requirements been in place (St. Louis). However, these adjustments seem less and less likely to produce an adjusted monetary base that is a consistent time-series

⁹ The staff of the Board of Governors regularly prepares a report for internal use that uses these definitions and then prorates each bank's redundant position between reserve balances and clearing balances on the basis of the relative amounts of each deposit required.

indicator of the money-supply impulse, or thrust of policy. Yet this impulse or thrust is the defining reason for measuring the monetary base. At one time, the impact of changing a reserve ratio might have been limited to changes in the reserve constraint on the expansion of reservable deposits. Increasingly, however, the reserve requirement is not the operative constraint on the expansion of deposits.

Defining the Monetary Base

The possibility that reserve requirements are not a significant constraint for most of the country's large banks suggests the nature of the immediate problem with empirical representations of the monetary base: The base is intended to gauge the money-supply impulse, which comes from the supply of base money relative to its demand. It matters not whether demand is created by regulation through reserve requirements, or through business needs for operational balances--only that there be a demand.

Measures of adjusted monetary base are designed to combine readings of two policy tools into a single money-supply indicator. A cut in a required reserve ratio can be thought of as reducing the immediate need for reserve assets (or, in Karl Brunner's phrase, "liberating" reserve deposits). The extra reserve deposits would have to be soaked up to avoid the money-supply stimulus of this liberation.

Historically, the Federal Reserve could use open-market sales of securities to absorb reserves liberated by cutting reserve requirements. The concept of an adjusted monetary base was designed for this situation. The adjustment is intended to purify a monetary-base time series from the effect of the hypothetical open-market operations that would have sterilized the money supply of the effects of changes in required reserve ratios.

Of course, if there were no money-supply "kick" from changing reserve requirements, then the base adjustment would be inappropriate. And that is where the American banking system has been headed. If reducing reserve requirements induces banks to contract for larger clearing balances, then those extra clearing balances soak up some or all of the "kick" to the money supply. Reducing the required reserve ratio doesn't reduce the demand for balances; it merely changes their classification from "reserve" to "clearing." Under these circumstances, adjusting the monetary base for

“cumulated reserve liberations” will not provide a better gauge of a money-supply impulse.

A perpetual downward trend in required reserve ratios almost guarantees that this second method of soaking up liberated reserves will be employed. Only if banks have absolutely no need for operating balances could an adjusted monetary base continue to be a useful gauge of the money-supply impulse as the downward trend of reserve requirements continues. If there is a positive demand for operating balances, however, reserve requirements eventually will become low enough to be irrelevant. With 88 percent of large banks targeting reserve positions larger than the regulatory requirement, arrival at that point seems imminent.

It is easier to indicate the potential error in these adjusted base measures than it is to suggest a specific, immediate remedy. Unfortunately, factoring clearing balances into a break- or reserve-adjustment magnitude will not be as straightforward as applying today's reserve ratio to yesterday's reservable deposits, or yesterday's reserve ratio to today's reservable deposits. The required ratio of reserve assets to reservable deposits remains constant until an administrative change is announced. The desired ratio of contractual clearing balance to deposits is a behavioral variable. It will evolve over time, much as do the currency/deposit and transaction/nontransaction deposit ratios, and is likely to vary with the level of the funds rate.¹⁰

Conclusion

The monetary base is defined as the money-supply impulse originating from the stock of central-bank money. Deregulation poses a problem for this definition if it eliminates the demand for central-bank money. Likewise, the definition remains useful as long as there remains a demand for central-bank money with sufficient interest and income elasticities to make central bank monetary policy an “important” influence on all other market outcomes in the economy.

Currency in the hands of the public represents the lion's share of the monetary base. This demand is not in obvious peril from deregulation. True, demand for currency

¹⁰ This is to be expected. A balance that earns just enough to pay service charges at low interest rates will earn too much at higher rates.

should continue to suffer competitive erosion from the substitution of checks and ACH, credit, debit, and ATM cards, and (it is predicted) from cybermonies and smart cards. However, more immediately, currency demand has been vastly inflated by foreign users. This is not a definitional problem, but an analytic challenge to distinguish the domestic from the foreign money-supply impulse of the monetary base.

Banks' demand for central-bank money, on the other hand, has eroded substantially because of deregulation in the form of lower reserve requirements. Moderating this decline, demands for vault cash and for clearing balances have emerged as important sources of banks' demands for central-bank money. These demands for central-bank money should not dry up as long as banks and the central bank dominate the payments mechanism, for it is the payments function that creates the demand.

Deregulation may not affect the definition of the monetary base, but it already has exposed deficiencies in current measures of the monetary base. Linkages between demand for base money and broader monetary aggregates can be less rigid. Perhaps the base will be more closely linked to the flow of economic activity, but that is sheer speculation. In any case, the determinants of money multipliers and income multipliers should be expected to change.

In the future, measuring a money-supply impulse from changes in the stock of central-bank money is likely to involve more sophisticated models than the somewhat mechanical reserve-adjustment and break-adjustment magnitudes devised in the past. Both of the available measures employ exaggerated adjustments for changes in reserve requirements. Unfortunately, however, the raw data are collected and presented in an outdated classification framework that precludes the ready estimation of better models.

References

- Anderson, Leonall C., and Jerry L. Jordan, "The Monetary Base--Explanation and Analytical Use," Federal Reserve Bank of St. Louis, *Review*, vol. 50, no. 8 (August 1968).
- Board of Governors of the Federal Reserve System, "Improving the Monetary Aggregates," Report of the Advisory Committee on Monetary Statistics. Washington, D.C., June 1976.
- _____, "Reserves of Depository Institutions," Report of the Advisory Committee on Monetary Statistics. Washington, D.C., March 1995.
- Boone, Henry J., "W. Randolph Burgess," *The Burroughs Clearing House* (October 1944).
- Brunner, Karl, "A Schema for the Supply Theory of Money," *International Economic Review* (January 1961).
- Friedman, Milton, and Anna Jacobson Schwartz, *A Monetary History of the United States, 1867-1960*. Princeton: National Bureau of Economic Research and Princeton University Press, 1963.
- Garfinkel, Michelle, and Daniel L. Thornton, "Alternative Measures of the Monetary Base: What Are the Differences and Are They Important?," Federal Reserve Bank of St. Louis, *Review*, vol. 73, no. 6 (November/December 1991).
- Gurley, John G., and Edward S. Shaw, *Money in a Theory of Finance*. Washington, D.C.: The Brookings Institution, 1960.
- Humphrey, Thomas M., "Derivative Deposit Theory of Banking," in *Palgrave Dictionary of Money and Finance*. London: Macmillan Press, 1992.
- Selgin, George A., and Lawrence H. White, "How Would the Invisible Hand Handle Money?," *Journal of Economic Literature*, vol. 32 (December 1994).
- Stevens, E.J., "Required Clearing Balances," Federal Reserve Bank of Cleveland, *Review*, vol. 29, no. 4 (Q IV 1993a).
- _____, "Replacing Reserve Requirements," Federal Reserve Bank of Cleveland, *Commentary* (December 1, 1993b).
- Tobin, James, "Money, Capital and Other Stores of Value," *American Economic Review*, vol. 51 (May 1961).

Table 1

The Declining Level and Complexity of Reserve Requirements

December 31, 1948		December 31, 1975		June 30, 1995	
<u>Demand Deposits</u>		<u>Demand Deposits</u>		<u>Transactions Deposits</u>	
<i>Location of bank</i>	<i>Required reserve ratio</i>	<i>Amount of deposits: (million)</i>	<i>Required reserve ratio</i>	<i>Amount of deposits: (million)</i>	<i>Required reserve ratio</i>
Central Reserve City	26.0%	> \$400	16.5%	> \$54.2	10.0%
Reserve City	22.0%	> \$100	13.0%	> \$ 4.2	3.0%
Country	16.0%	> \$ 10	12.0%	< \$ 4.2	0
		> \$ 2	10.0%		
		< \$ 2	7.5%		
<u>Time Deposits</u>		<u>Time Deposits</u>		<u>Time Deposits</u>	
<i>All banks</i>	7.5%	Size of deposit and maturity:		<i>All banks</i>	0
		> \$5 million			
		< 180 days		6.0%	
		< 4 years		3.0%	
		> 4 years		1.0%	
		< \$5 million			
		< 4 years		3.0%	
		> 4 years		1.0%	

Source: Board of Governors of the Federal Reserve System.

Table 2

Use of Clearing Balances, May 1995

(percent of weekly reporting banks)

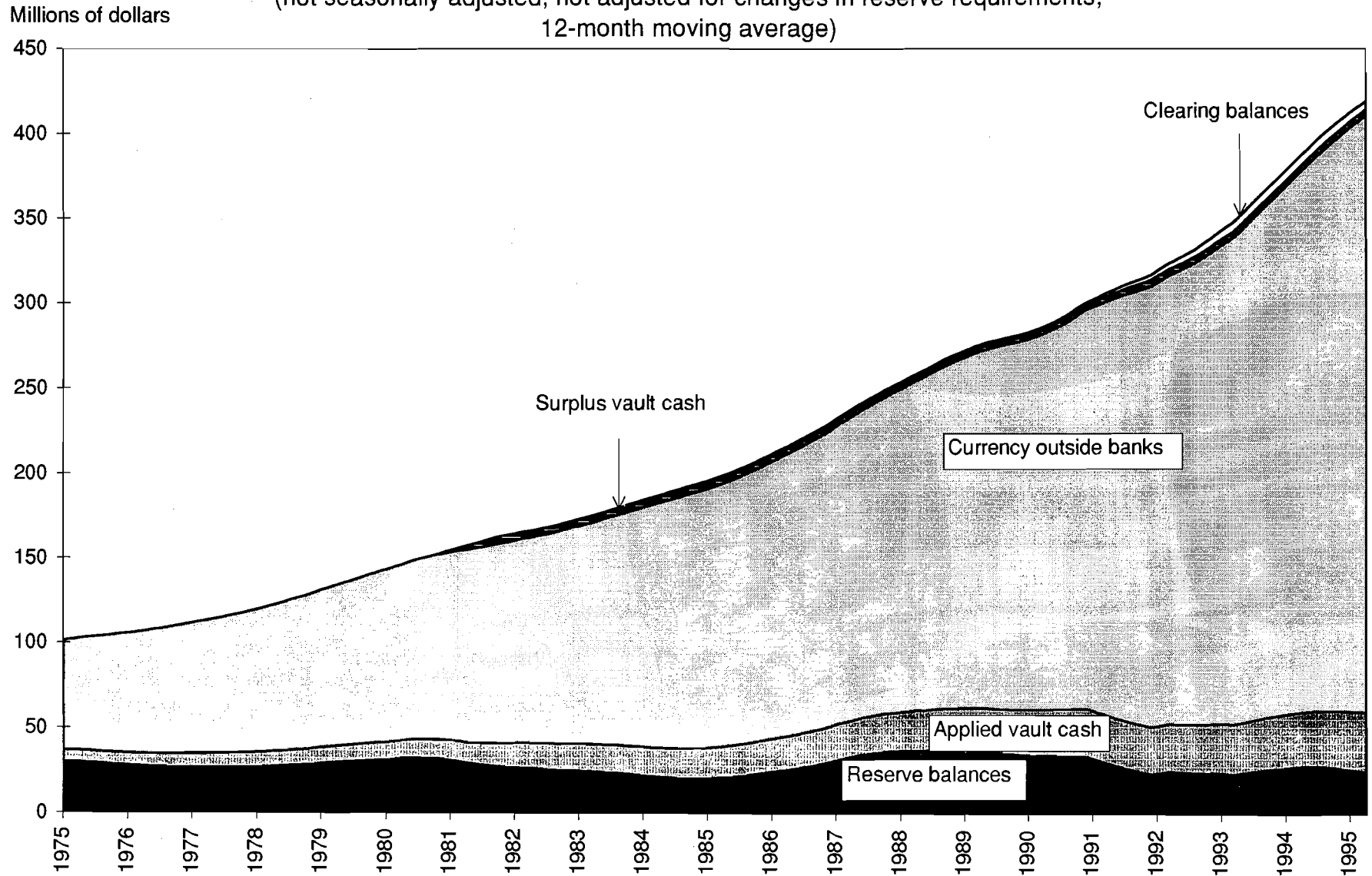
<i>Characteristic</i>	No applied vault cash	No required reserve	Applied vault cash exceeds required reserve	Required reserve exceeds applied vault cash; no clearing balance	Required reserve exceeds applied vault cash; with clearing balance
	<i>(percent of total)</i>				
Number of banks	1.3	8.2	59.6	11.6	19.3
Reservable deposits	1.4	4.0	20.0	37.7	36.8
Required reserves	0.3	0	6.4	52.8	40.6
Contractual clearing balances	1.9	2.2	21.1	0	74.8
Reserve deposits	0.7	0	0.001	58.3	41.0

Source: Board of Governors of the Federal Reserve System.

Figure 1

COMPONENTS OF THE MONETARY BASE

(not seasonally adjusted, not adjusted for changes in reserve requirements;
12-month moving average)

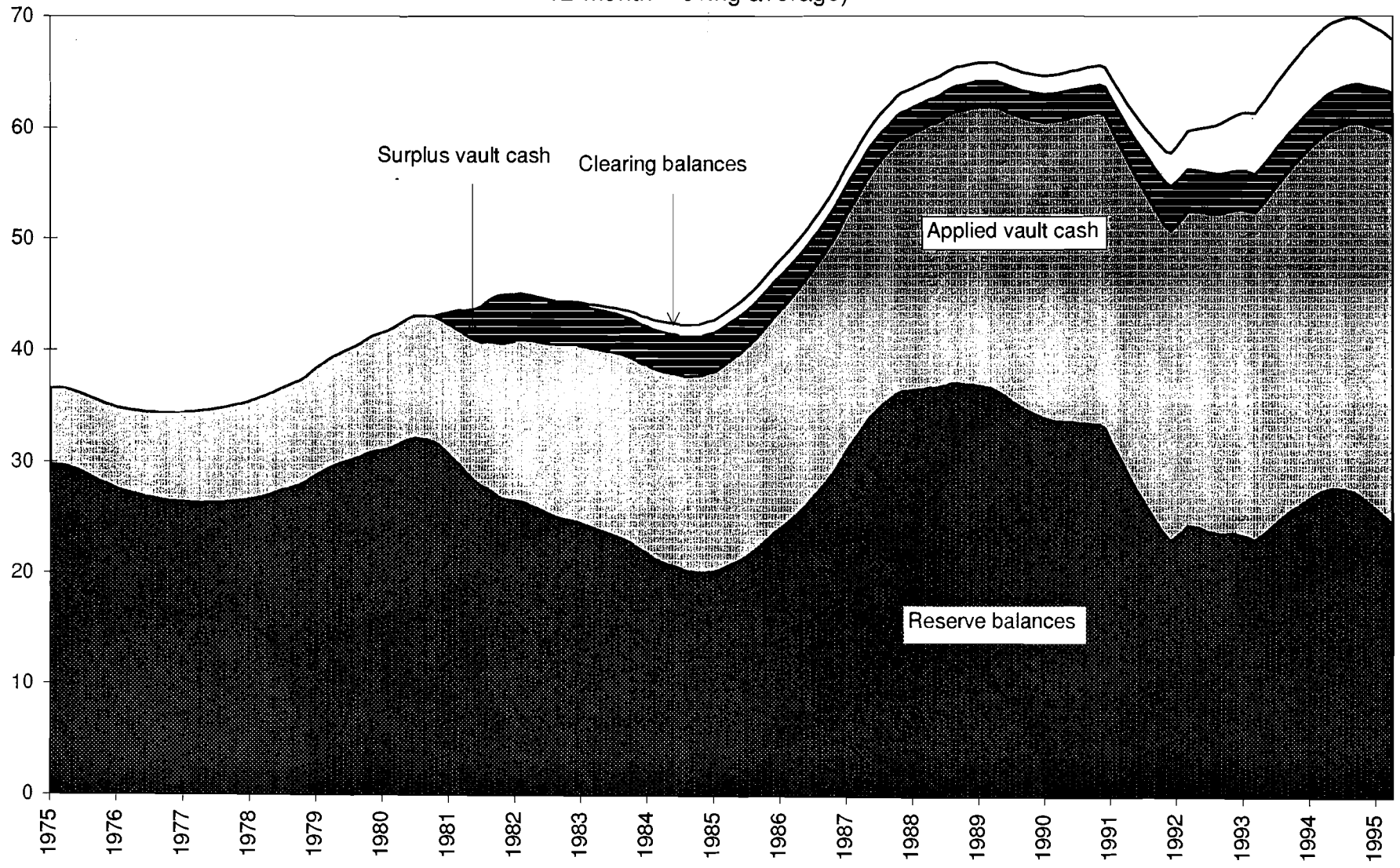


Source: Board of Governors of the Federal Reserve System

Figure 2

COMPONENTS OF THE MONETARY BASE, EXCLUDING CURRENCY
(not seasonally adjusted, not adjusted for changes in reserve requirements;
12-month moving average)

Millions of dollars



Source: Board of Governors of the Federal Reserve System