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Asset-Base: New Reserve Requirements for a New Banking Industry

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Asset Base: New Reserve Requirements

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James Robert Bryans

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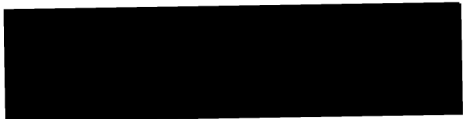FOR THE DEGREE OF

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Asset-Base: New Reserve Requirements

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James Robert Bryans

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Abstract

This paper discusses a regulatory plan known as asset-based reserve requirements. By examining the history of reserve requirements in the United States and of current regulatory proposals and practices, I argue that a system of asset-based reserve requirements may provide a useful, though not often considered alternative to the current structures of liability based reserve requirements and capital requirements. Required reserves based on assets provide the Federal Reserve with a powerful, versatile, and adaptable policy tool for monetary policy. Additionally, they ensure risk-assessment, reduce the moral hazard problem associated with deposit insurance, and when applied to all financial institutions create a level playing field in the desegregated financial sector. Asset-based reserve requirements do all those things without burdening depositors as liability based reserve requirements do, and without the pro-cyclical characteristics inherent in capital requirements. The work of Thomas Palley (2000 & 2001), Frederic Mishkin (1998), Alan Greenspan (1998), Henry Kaufman (1994), Joshua Feinman (1993), and Paul Bennett (1997 & 2001) was relied upon to reach this conclusion.

Asset-Base: New Reserve Requirements

for a New Banking Industry

Reserve requirements have changed very little since their creation by the

National Bank Act of 1863 (Feinman, 1993). With the creation of deposit

insurance in 1933 the need for reserve requirements to safeguard to the public

interest was diminished. In more recent years, the banking industry and financial

sector of the economy have changed dramatically, primarily through financial

innovations like sweep accounts and derivatives, and deregulation like the

Gramm-Leach-Bliley Act of 1999. Mergers have also played a significant role.

With the loss of segregated markets, banks are exposed to competition for deposits

from other financial institutions. Because of reserve requirements, depository

institutions, such as banks and savings and loans face competitive disadvantages

relative to other financial institutions. In light of these developments, the role of

reserve requirements has changed. Should required reserves be kept as a

regulatory structure in light of changing financial system? If so, what structure

should they take?

The changing financial system has led to debate about the future of the

current reserve requirement system. I will discuss some possible proposals

including eliminating required reserves altogether and encouraging the Federal

Reserve (Fed) to pay interest on reserve balances. I will also discuss the current

system for measuring and safeguarding risk that many consider an alternative to

reserve requirements. The system of capital requirements for banks is an international program to require banks to take adequate steps to control risk. Does a regulatory structure exist that would combine the risk measurement of capital requirements with the monetary policy tool of reserve requirements? Could this regulatory structure also create more equal competition in the financial sector?

Asset-based reserve requirements would provide the Federal Reserve with such a regulatory structure. I assert that a system of reserve requirements based on the assets a financial institution holds would provide long-term stability in the economy while ensuring adequate risk precaution. If imposed on all financial institutions, it would create a level playing field for banks and other financial institutions.

By researching the history of reserve requirements, recent changes in the quantity of reserves, deregulation and financial innovation in the financial sector, and comparing recent proposals to reform reserve requirements and capital requirements, I found that asset-based reserve requirements are a superior regulatory system. They provide the Federal Reserve with many possible benefits as a policy tool. Required reserves based on assets have the potential to allow the Fed to target specific interest rates for specific asset classes. The system also encourages financial institutions to evaluate the risks they take, and reduces the moral hazard problem associated with deposit insurance. Aside from monetary control, risk-assessment, and moral hazard reduction, asset-based reserve

requirements create a versatile system that can easily adapt to financial innovation and deregulation, while helping to bring stability to the economy. While not every aspect of asset-based reserve requirements may be considered useful in the long-term, its overall stability and adaptability make it a superior alternative to the current systems of liability-based reserve requirements and capital requirements.

The Fractional Reserve Banking System

The banking industry is vital to the modern economy. Most people are familiar with banks making loans from the deposits of others (Edwards & Mishkin, 1995). In addition to acting as intermediary between borrowers and lenders, commercial banks in a fractional reserve banking system are also capable of expanding and contracting the money supply through the money multiplier (Mishkin, 1998). The ability of banks to influence the money supply may be best described with a simple example.

In fractional reserve banking, individual customers deposit money into personal demand deposit accounts (checking accounts). Because the average daily demand for cash withdrawals is substantially less than the sum of all deposits made, commercial banks do not have to keep all the cash deposited in their vaults on hand. Instead, bank managers may loan some portion of the deposits and charge interest on the resulting loan. These loans are the primary source of profit in commercial banking.

One question quickly arises: How much of those initial deposits can be loaned by the bank? Because a bank must satisfy the needs of its customers for daily withdrawals of cash, some quantity of the initial deposits must be held as reserves. Being motivated by profit, bank managers desire to loan at interest all the deposits until they reach the minimum necessary reserves. In an ideal world, banks would always hold the necessary minimum reserves. This method of loaning excess reserves at interest to make money is known as the fractional reserve system of commercial banking.

The primary dangers of the fractional reserve system of banking include the possibility of bank panics and over-expansion of the money supply. If depositors lose faith in the banking system, they can easily outstrip the minimum reserves available at the bank at any given time. If this crisis spreads to other banks, the banks will begin to call in loans in an attempt to satisfy depositor demands. On the other hand, commercial banks, in their pursuit of profit, can over-expand the money supply by supplying too much credit to borrowers for risky projects. If these borrowers default, the quantity of bad or under-performing loans increases, and a contraction of credit and bankruptcy may ensue. In both circumstances, a collapse of the banking system is the most extreme possible result.

History of Reserve Requirements

Because commercial banks pursue profit by extending loans, a process that expands the money supply, the goals of profit and stability can be contradictory.

Consequently, reserve requirements were created by the National Bank Act of

1863 to ensure the liquidity of banks (Feinman, 1993). At their inception, required

reserves were 25% against both bank notes and deposits (Feinman, 1993).

Balances had to be held in the vault of the bank, and up to 60% could be held in

interest bearing accounts in banks in "redemption" cities (Feinman, 1993).

Reserve requirements were lifted on bank notes in 1873 (Feinman, 1993). As a

result of legislation passed in the late 1950s, reserve requirements may now be

held either as vault cash or in non-interest-bearing accounts with the Federal

Reserve (Feinman, 1993).

In addition to reducing risk by helping ensure a bank's liquidity, required

reserves serve as an important policy tool for the Federal Reserve, which was

created in 1913. One way monetary policy influences economic activity is through

the reserves market, which consists of the supply and demand for reserves (Board

of Governors, 1994). The Fed controls the supply of reserves, that is, money

available for banks to borrow through the discount window. Reserves are also

created and managed through open market operations when the Fed buys

government securities (Board of Governors, 1994). Reserve requirements allow

the Fed to control more accurately the demand for reserves, which is the sum of

required reserves and excess reserves (Board of Governors, 1994). Banks will

usually try to have the fewest reserves possible. This fact can be seen historically

in Graph A1 in Appendix A, which shows how closely related required reserves

and total reserves are. With more control over the demand for reserves, the Fed

can better anticipate how to manipulate the supply of reserves to bring a desired

equilibrium to the reserves market.

Declining Significance of Reserve Requirements

The significance of reserve requirements has been declining for several

years. Since 1913, the reserve requirement structure has been changed several

times, the most recent in 1992, when the required reserve ratio was lowered.

Additionally, the reserves market that the Fed monitors has changed due to

deregulation and financial innovation. Because of the declining size of reserves,

the Fed's ability to influence the money supply may be declining, but this does not

seem to be the case.

The significance of reserve requirements was reduced by the adoption of

the Federal Reserve System in 1913, because the Fed was required to act as a

lender of last resort (Feinman, 1993). The Fed acts as "lender of last resort" when

they loan funds to banks that have no other sources of credit, especially in cases of

bank panics or financial crises (Mishkin, 1998). The Fed became a source of

liquidity for banks, decreasing the role reserve requirements played in ensuring the

stability of the banking system. Required reserves on deposits were lowered by

the Fed at its creation to 18% in central reserve city banks, 15% in reserve city

banks, and 12% for country banks (Feinman, 1993). Time deposits (certificates of

deposit) were subject to a 5% reserve requirement (Feinman, 1993). Reserve

requirement changes from 1913 through 1980 are summarized in Charts 1, 2, and 3.

The charts are divided by major changes in the structure of reserve requirements. Before 1962, the Fed classified banks by their location in or near central reserve cities (Feinman, 1993). The next change came in 1966 when a graduated system based on location was developed (Feinman, 1993). In 1973, reserve requirements were no longer based on location at all.

Prior to 1980, only member banks were required by the Fed to hold a portion of their deposits in reserve (Board of Governors, 1994). Member banks include all nationally chartered banks, and state banks that voluntarily joined the Federal Reserve System (Board of Governors, 1994). In 1998, about 33% of commercial banks were members of the Fed, down from a peak of 49% in 1947 (Mishkin, 1998). The Monetary Control Act of 1980 made all depository institutions—commercial banks, savings banks, savings and loans, and credit unions—subject to reserve requirements whether or not they were members of the Federal Reserve System (Board of Governors, 1994). One reason for the passage of the act was to counteract declining membership in the Fed System (Mishkin, 1998). Changes in reserve requirements since the passage of the Monetary Control Act can be found in Chart 4.

Before 1984, the Federal Reserve targeted M1 (Board of Governors, 1994). The reserve base was used for short-term control of M1 (Feinman, 1993). After

1984, due to the development of NOW accounts and deregulation in deposit

interest rates, interest rates in M1 became more volatile, and M1 was deemed an

unfit target for the Federal Reserve to conduct monetary policy (Board of

Governors, 1994). The Fed began concentrating on M2, believing M2 targeting

was more closely linked to monetary policy objectives than M1 (Feinman, 1993).

After shifting to M2, "the basic structure of reserve requirements, which had been

meticulously designed to facilitate control of M1 through a reserves-oriented

targeting procedure," was suddenly obsolete (Feinman, 1993). Table A2 in

Appendix A details the components of M1, M2, and other money aggregates.

Graph A2 shows the changes in M1, M2, and M3 since 1980.

Required reserves have declined for other reasons. The Fed lowered reserve

requirements in 1990 and in 1992 (Bennett & Peristiani, 2001) to a level of zero

for nonpersonal time deposits and 10% for transactions deposits (Board of

Governors, 1994). The Fed explained the cuts as a means of putting banks in a

better position to extend credit (Board of Governors, 1994). Also, cutting reserve

requirements provided a way to expand the money supply. Another factor,

probably as important as deregulation, reducing the reserve requirements is the

financial innovation known as the "sweep account" (Bennett & Peristiani, 2001).

A sweep account is a special savings account into which checking deposits at a

bank are "swept" at the end of the business day (Bennett & Hilton, 1997). "Since

January 1994, hundreds of banks and other depository financial institutions have

initiated sweep programs to avoid statutory reserve requirements on transactions

deposits" (Anderson, 1997).

What are the effects of reductions in reserve requirements or their

circumvention through financial innovations? Lowering the reserve requirement

allows the money supply to expand through the money multiplier (Mishkin, 1998).

The basis for this argument comes from the equation $M = m * MB$, where M is the

money supply, m is the multiplier, in which the required reserve ratio, the

percentage of deposits that must be held in reserve, is in the denominator, and MB

is the monetary base, which consists of currency in circulation and reserves at the

Fed, which includes required reserves and excess reserves (Mishkin, 1998). Since

1980, the level of reserves has fluctuated between $35 billion and $60 billion, but

has been falling since 1994, while the monetary base has grown rapidly. When

required reserves fall, the money multiplier increases, which could cause an

increase in the money supply. On the other hand, when the required reserves fall,

the monetary base may also fall, which could cause a decrease in the money

supply. Required reserves as a percentage of the monetary base has been falling

since 1980. An illustration of this is in Graph A3 in Appendix A. Graph A4 shows

that the growth in the monetary base as a percentage of money aggregates has

been increasing, meaning that the monetary base is growing along with, or more

rapidly than the money supply, even though falling reserves should cause the

monetary base to fall. That discrepancy means that the Fed has more than

compensated for the fall in reserves by increasing the level of currency in the economy, to raise the monetary base and the money supply. It also shows that the multiplier (money supply/monetary base) has not been growing rapidly and the Fed has been able to control the growth of the money supply.

The role of reserve requirements has changed a great deal over the years. Are required reserves still necessary or useful? Would a new reserve requirements structure increase the stability of the American financial system and reduce the cost of regulatory compliance?

Because of deregulation and the large number of bank mergers and acquisitions, the structure of the banking industry has been changing rapidly during the 1990's. How have such mergers changed the flexibility and security of the financial system, in size and in scope?

The response of the policy analysts to these questions has been varied. Many believe mergers have had no impact on the security of the financial system, and have promoted legislation that continues to remove restrictions on financial practices. In keeping with this perspective, they have proposed regulatory schemes eliminating reserve requirements or requiring the Federal Reserve to pay interest on deposits held with the Fed (Feinman, 1993). The merits of these proposals will be evaluated. Other analysts are less convinced that financial sector desegregation does not undermine its security. I will also analyze a regulatory plan that addresses their concerns. This reserve requirement system is based on the specific

assets a financial institution holds (Palley, 2000). This asset-based concept is substantially different from the current reserve requirement system where reserves are based on liabilities.

The Banking Industry and Legislation

Banks, or depository institutions, were divided into categories based on what assets (loans) they held and what sort of liabilities (deposits) they incurred. This segregation in the industry occurred mainly due to two pieces of legislation, The Banking Act of 1933 (called Glass-Steagall) and The Banking Act of 1935 (Mishkin, 1998). For each institution, the dollar value of certain deposits determined the required quantity of reserves. Deposits traditionally subject to reserve requirements were interest bearing and non-interest bearing checking accounts and large, nonpersonal time deposits (Board of Governors, 1994). The main types of depository institutions included savings and loans, commercial banks, mutual savings banks, and credit unions. Each of these banks held certain types of assets and liabilities. For example, depository institutions held deposits and made various types of business loans, consumer loans, and mortgages (Mishkin, 2001). Investment banks, another classification of financial institution, possessed assets like loans, stocks, and bonds, and issued liabilities such as stocks, bonds, commercial paper, and shares in mutual funds (Mishkin, 2001). A complete breakdown of institutions and their associated assets and liabilities is presented in Table A2 of the Appendix.

Prior to the Great Depression, commercial banks could engage in investment bank activities like underwriting, a fact often considered as one cause of bank failure (Mishkin, 1997). The Glass-Steagall Act of 1933 required that commercial banks sell off investment bank operations (Mishkin, 1997). It may also have been that bank failures had less to do with the specific activities of the banks (like underwriting), but rather the quality of assets they held during the middle and late 1920s (Friedman & Schwartz, 1967).

The government, through such legislation as the McFadden Act of 1927, which prohibited interstate banking, and the Glass Steagall Act, heavily regulated the banking system (Dymski, 2000). Legislators designed Glass-Steagall to reduce small depositories' exposure to risk. For example, depositor funds could not be used to buy stocks in a company, but rather to extend loans, which are less risky than stocks.

Deregulation in the 1980s led to more market-based deposit rates and to more freedom for banks to acquire and use funds as they desired (Dymski, 2000). The McFadden Act was rendered void by the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 (Stiroh & Poole, 2000). The 1994 act allowed bank holding companies to acquire banks in any state, and permitted banks to branch across state lines (Mishkin, 1998). Less stringent enforcement of legislation like Glass-Steagall continued into the 1990s when several bank mergers were allowed between commercial and investment banks (Dymski, 2000).

With the passage of the Gramm-Leach-Bliley Act in 1999, Glass-Steagall was dead. Commercial banks can now hold equity in securities and insurance through the more extensive use of Bank Holding Companies (Furlong, 2000). The idea of creating a more competitive banking sector may benefit customers with better loan rates, better deposit rates, and increased services. The removal of regulatory safeguards originally conceived to protect consumers from banks overextending themselves was a fundamental component of Gramm-Leach-Bliley.

Because of deregulation, financial institutions are no longer neatly segregated according to assets and liabilities. For example, banks may now create accounts that mimic money market mutual funds, once reserved only for investment banks.

Financial Innovation and Declining Reserve Balances

For years, banks have sought ways of circumventing regulations. New forms of bank liabilities were developed, like NOW accounts (Feinman, 1993). This drive for profit has led to a decreasing importance in traditional checking account deposits (Edwards & Mishkin, 1995). In order to compete with other financial institutions in the deregulated financial sector, banks have been forced to develop new activities to attract and maintain customers (Edwards & Mishkin, 1995).

Around 1995, banks increasingly began taking advantage of a financial innovation called "sweep accounts" (Bennett & Hilton, 1997). Since required

reserves are calculated based on an average of end-of-day balances over two weeks, banks would be required to hold fewer reserves if somehow, they had low demand deposit balances at the end of the day (Bennett & Hilton, 1997). Sweep accounts allow bank managers to avoid reserve requirements by moving money from one type of account to another. At the end of a day's business, money in customer's checking accounts (subject to reserve requirements) are "swept" into savings accounts (not subject to reserve requirements) overnight, and back in the morning (Bennett & Hilton, 1997). This activity has had a negative impact on reserve balances, both for required and total reserves. The estimated reduction in reserves has been $18 billion (Bennett & Hilton, 1997). To the extent reserves are designed to ensure banks can meet the liquidity needs of its customers, this circumvention of reserve requirements defeats that purpose. The creation of sweep accounts provides an excellent example of how persistently banks will try to circumvent regulatory control. Graph A5 in the appendix shows the growing use of sweep accounts. Also, looking at Graph A1 shows how reserves, both required and total, have fallen steadily since 1995, with some growth in the early years of this decade.

Another financial innovation of interest in relation to reserves has been derivatives. Financial derivatives were created to facilitate better risk management, in response to interest rate swings and stock and bond market volatility (Mishkin, 1998). "Derivatives are financial securities whose value is

derived from another 'underlying' financial security" (Financial Pipeline, 2002).

The underlying cash instruments can be things like stocks, commodities, or

foreign currency (Financial Pipeline, 2002). Examples of derivatives are forward

contracts, financial futures, options, and swaps (Mishkin, 1998).

While derivatives were designed to hedge, or counter-act, risk, some

characteristics of derivatives actually enhance the risk to financial institutions.

One example of an increase in risk is the ability of financial institutions to

leverage their positions since large dollar-value assets can be purchased with

relatively little money down (Mishkin, 1998). Another example is the huge

notional values (the amount on which interest is paid) of derivative contracts that

are often significantly greater than the total capital of the institutions holding them

(Mishkin, 1998). These two dangers may lead to problems such as exposure to

credit risks, or not being able to have an open position covered (Kaufman, H.,

1994). The other side of this argument is that derivatives, when used in inverse to

existing risk, can greatly reduce total risk. Regulatory guidelines, some of which

came from the Federal Deposit Insurance Corporation Improvement Act (FDICIA)

of 1991, require banks to develop risk-management strategies and carefully

monitor their risk exposure (Mishkin, 1998).

Whether or not derivatives are actually substantially riskier than other bank

assets is subject to debate. Financial institutions may implement safeguards like

credit limits on swap transactions, which terminate a swap agreement if the credit

rating of one party falls below a specified level (Edwards & Mishkin, 1995).

Despite arguments to the contrary, most agree that financial derivatives do contain

risk for which banks and other financial institutions, though required to manage

and monitor their risk, are not required by law to adequately compensate through

reserve requirements.

Deregulation's Effect on Consolidation

Financial innovation is not the only cause of a newly structured banking

industry. The erosion of banking regulation led to an increase in bank mergers.

Some of the main deregulatory acts like Riegle-Neal and Gramm-Leach-Bliley

were discussed earlier. Throughout the history of the banking sector, mergers have

mostly occurred in waves, the most recent began in the middle 1980s and

continued until the late 1990s (Soper, 2001). During this time period, regulations

were being relaxed or repealed altogether. From 1980 to 2000, 1.75 banks

disappeared per business day (Dymski, 2000), a decline of 40% (Soper, 2001). In

1998 alone, four of the ten largest mergers, based on market value, occurred in the

banking industry (Stiroh & Poole, 2000). Firms in the once segregated banking

industry now cross over into, and merge with other firms in, other sectors of the

industry.

With deregulation and desegregation of the industry, the mere ability to

expand into other markets and increase total revenues provides a strong incentive

for banks and financial institutions to merge. Additionally, the desire to diversify

the asset base may entice many institutions to merge. Economist Donald Dewey expounded another reason for mergers. He argued that mergers were primarily an alternative to bankruptcy, so as to avoid the loss of assets (as cited in Manne, 1965). As banks near bankruptcy, either other banks will desire to purchase their remaining assets more inexpensively, or the failing bank may desire to be purchased to avoid the loss of assets and/or jobs. Manne suggests mergers are one of the most efficient methods for changing control of a firm because it lessens wasteful bankruptcies and leads to more efficient management of a firm (Manne, 1965). Manne seems to have been correct about avoiding the loss of assets. While the number of banks fell by a third in the 1990s, bank assets rose 30% (Stiroh & Poole, 2000). Some frequently cited reasons for engaging in bank mergers include: revenue growth from a large customer base; efficiencies in operations; ability to spread fixed costs over a larger customer base; diversification of income from both products and geographic area; stabilization of asset quality; optimal deployment of excess capital; and the search for higher value of common shares (as cited in Soper, 2001).

To summarize, the homogenization in the financial industry in deregulatory times is often justified with arguments of economies of scale and scope, and increased efficiency and profitability, as well as with the notion that merger activity in the absence of regulation is the market's way of reacting to a poorly constructed banking system (Dymski, 2000). It is impossible to know what the

U.S. financial system would look like if there had been no regulatory safeguards, but it seems highly unlikely that the United States banking system was poorly constructed. While it may have been far from perfect it seems very peculiar that a poorly devised scheme could have survived for several decades and not, at least apparently, hurt the growth of the economy (Dymski, 2000).

Despite arguments to the contrary, several studies, including Dymski, have shown that larger banks are neither more efficient nor more profitable. Economies of scale have been found in middle-sized banks, with the very smallest and very largest performing poorly in relation to profits. Using cost analysis, banks with assets between $100 million and $200 million are most efficient, compared to the 10 largest United States banks, which have assets in excess of $100 billion (Dymski, 2000). In light of this evidence, the urge to merge cannot be explained solely on the grounds of efficiency.

The increase in risk associated with deregulation is often overlooked. At first, it may seem counter-intuitive that allowing banks to enter various markets poses an increased risk. Allowing a bank to enter into different geographic areas, but still perform the same function, should eliminate risk by diversifying the bank's portfolio of assets. The problem arises when a bank, once regulated to handle only customer deposits and mortgages and loans begins handling riskier assets and liabilities like mutual fund accounts and stocks and bonds. A moral hazard problem, where one party in a transaction engages in behavior deemed too

risky by the other party, results from this change in asset types in banks (Mishkin, 1998). Banks will want to funnel depositor funds into assets likely to earn the highest possible interest rate in an attempt to maximize profit. Many additionally argue this moral hazard problem is exacerbated by deposit insurance, in that banks with insured deposits may engage in behavior riskier than depositors might think is necessary.

Moral Hazard and Deposit Insurance

At first, deposit insurance may not appear to be relevant to reserve requirements. In many ways, the two are not directly related. However, both are examples of regulations imposed on banks, and currently, both are applied to deposit liabilities of banks. Additionally, both are instituted to provide liquidity, stability, and risk insurance to banks during bank panics or financial crises.

Deposit insurance, by its very nature, creates a moral hazard problem (Hane, 1999). If banks engage in risky behavior, the owners will reap the profits. In fact, studies have shown that prior to the Great Depression, states that enacted deposit insurance had higher failure rates of insured banks compared to uninsured banks (Wheelock, 1992). However, when a bank fails, the burden of paying off depositors falls to the insurance company, namely, the Federal Deposit Insurance Corporation (FDIC) or the federal government (Hane, 1999).

The moral hazard problem noted above may already be in the process of being rectified, at least partially. The Federal Deposit Insurance Corporation has

been slightly revamped by new legislation that would make the deposit insurance system privately, rather than publicly, funded. The Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991 and the Deposit Insurance Funds Act (DIFA) of 1996 shifted the liability from taxpayers to the banks themselves in the event of bank failures and changed the FDIC premium structure, respectively (Kaufman, G., 2001).

The first piece of legislation, FDICIA, requires that the FDIC maintain reserves of at least 1.25% on insured deposits (Kaufman, G., 2001). If a bank failure, or run of bank failures, pushes this number down, then as reserves are depleted, insurance premiums on banks must be raised to return the FDIC to the 1.25% level (Kaufman, G., 2001). Before this act, premiums did not have to be raised, and no level of reserve ratio existed, and so when banking crises would occur, the government was often forced to handle the problem (Kaufman, G., 2001). Additionally, the premiums have been designed to be risk-sensitive (Stern, 1992) by basing insurance premiums on capital ratios and risk ratings (Calem & Rob, 1996). The idea of this legislation was to make the FDIC privately funded by the banks themselves, rather than by the taxpayers. The FDICIA also makes it more difficult for the FDIC to bail out large, uninsured institutions, often called "too big to fail" (Kaufman, G., 2001).

The DIFA made the 1.25% ratio level a relative constant (Kaufman, G., 2001). This means that the FDIC cannot accumulate excess funds. The idea of this

act was to require premium payments by only the banks classified as undercapitalized, the ones considered most likely to fail (Kaufman, G., 2001). The result is that less than 10% of all insured banking institutions are paying premiums to the FDIC (Kaufman, G., 2001).

These two pieces of legislation, the FDICIA and the DIFA, have helped to make banks more responsible for their own insurance. This will provide encouragement for banks to adequately protect their deposits. Reserve requirements in their current structure also act as a safeguard on deposits. It is possible to argue that reserve requirements are simply another form of regulated insurance on bank liabilities. However, banks incur risk by purchasing assets with depositor funds. For that reason, it makes sense to require reserve requirements according to bank assets in proportion to risk.

This brief history of the current structure of banking shows that changes in regulations, bank mergers, and financial innovations have caused reserve requirements to decrease substantially. The next section of the paper deals with proposals to address the question: What role should the Federal Reserve play in banking regulation? As noted by Henry Kaufman: "...the primary objective of a central bank should be to maintain the financial well-being of society in the broadest sense" (Kaufman, H., 1994). At issue is whether or not a regulatory plan including reserve requirements is necessary. If yes, how should that reserve system be implemented?

Proposal: No Reserve Requirements

Some groups, including persons believing in the efficiency of markets and bank managers who do not like being regulated, would like to see reserve requirements eliminated. The primary arguments for terminating reserve requirements are the so-called "reserve tax" and the declining relevance of required reserves in banking supervision.

The money banks hold as required reserves either at the Fed or as vault cash is not available for loans, and may be seen as a tax equal to the amount of interest not earned by holding the money (Feinman, 1993). The more reserves required, the higher this tax. The only way to eliminate this tax on the private sector would be to completely get rid of reserve requirements (Feinman, 1993). In recent years, New Zealand, Canada, and the United Kingdom have stopped relying on reserve requirements (Sellon & Weiner, 1997).

As noted earlier, required reserve balances have been declining in recent years both in total and in relation to financial sector assets. A possible conclusion is that required reserves are no longer relevant (Bennett & Peristiani, 2001). However, certain problems could arise from completely eliminating reserve requirements. First of all, without some level of required reserves, the Fed would have a much less accurate picture of the demand for reserves. The demand for excess reserves may fluctuate greatly over the short term, making open market operations in the absence of required reserves a much less precise as a policy tool

(Board of Governors, 1994). The Fed would no longer have the ability to implement an effective, reserves-oriented procedure to control the growth of the money supply (Feinman, 1993). It should be noted that in recent years, the Fed has used the level of currency in circulation to control the money supply. Coupled with this problem is the potential for interest rate volatility, especially for short-term rates because of the inability of the Fed to accurately determine the demand for reserves in the setting of the discount rate (Sellon & Weiner, 1997). Finally, a mathematical examination of the necessity of reserve requirements can be found in Cothren and Waud (1994). Their argument is based on the idea that the utility of depositors is larger under a reserve requirement scheme, since some portion of their money is safe from shocks, and that banks will desire to loan nearly all deposits, i.e., have very small levels of reserves. Both banks and depositors can be better off if reserves are held. However, in the absence of a central authority requiring reserves, the individual bank not holding reserves will make more profit. Reserve requirements are necessary for sound banking practices (Cothren & Waud, 1994).

Proposal: The Federal Reserve Pay Interest

Another policy plan to reform reserve requirements would not get rid of them completely. Rather, this plan focuses on reducing the reserve tax by the Federal Reserve paying interest on deposits held at the Fed. Historical evidence does provide support for this idea, since prior to the creation of the Federal

Reserve System, banks required to hold reserves could hold a portion in interest-bearing accounts.

If the Fed were to pay interest on reserve balances, the "artificially imposed incentive" to channel money away from depository institutions would be eliminated (Feinman, 1993). If a market-based interest rate was paid on reserves then the Fed could raise reserve requirements allowing bank flexibility in managing their reserves, reducing volatility in money and interest rate markets, simplifying open market operations, and eliminating the desire for banks to try to avoid regulation (Feinman, 1993). An alternative version of an interest-paying scheme is that reserve requirements be raised and interest be paid only on the higher, marginal balances banks would be required to hold (cited in Feinman, 1993).

There are problems with the idea of the Federal Reserve paying interest on reserves. First of all, some of the Fed's earnings each year are turned over to the U.S. Treasury (Feinman, 1993). If the Fed were to pay interest, its net earnings would fall, meaning less would go to the Treasury. This loss of Treasury revenue may not be very large, since reserve balances have been falling, meaning interest payments would be going down as well (Feinman, 1993). However, if banks earned a rate of return on their reserves held at the Fed, the level of reserves might rise, increasing the loss of revenue to the Treasury. The magnitude of this specific problem would be lessened by the alternative plan, since only the marginal

balances would earn interest. Second, most financial institutions that hold reserves meet their requirements with vault cash rather than by holding balances at the Fed (Sellon & Weiner, 1997). This shift towards vault cash may be related to the increase in ATMs since cash held in an ATM can be counted as vault cash (Bennett & Peristiani, 2001).

The notion of required reserves providing an incentive to channel money away from depository institutions may be true. However, if a regulatory plan could be implemented that would provide unilateral rules across the spectrum of financial institutions, the Fed would not need to pay interest. Finally, seeing reserve requirements as a tax is the result of a certain point of view. A different way of looking at reserve requirements is to see them as a sort of payment that depository institutions pay the Fed to insure the soundness of their industry, or payment for services the Fed provides, like the discount window, or interest rate determination.

Capital Requirements: The New Risk Measurement

Separate from the proposals to restructure reserve requirements are capital requirements. A bank's capital is the bank's net worth, which is the difference between assets and liabilities (Mishkin, 1998). If liabilities grow beyond the bank's assets, the bank is bankrupt (Mishkin, 1998). Capital requirements are regulations designed to ensure an appropriate level of capital, that is, an appropriate gap between assets and liabilities. The purpose of capital requirements

is to ensure banks account for market risk inherent in trading activities (Hendricks & Hirtle, 1997). Prior to 1981, no such requirements existed when the Savings and Loan crisis brought attention to the necessity of adequate capital ratios (Estrella, 1998). These requirements have now been implemented at an international level, due to a growing awareness of the integration of the financial industry (Mishkin, 1998).

In 1988, the Basel Committee on Banking Supervision issued the Basel Accord (Estrella, 1998). Central Bank leaders from the Group of Ten countries created the Basel Committee in 1974 (Bank for International Settlements (BIS), 2000). While the committee has no formal power in any of the member countries, its proposed guidelines and plans were created by a multi-national group, and so do carry considerable weight (BIS, 2000). The goals of the committee include eliminating gaps in supervision beyond national boundaries, promoting "sound supervisory standards worldwide," and encouraging cooperation between member and non-member country's central banking authorities (BIS, 2000).

The Basel Accord of 1988 called for the creation and implementation of a credit risk measurement framework (BIS, 2000). The accord created a graduated system to account for risk. First, it divided assets and off-balance-sheet activities (derivatives, options, futures contracts) into four, weighted classes of risk (Mishkin, 1998). The classes are zero for no default risk, 20% for low default risk, 50% for moderate default risk, and 100% for high default risk (Mishkin, 1998).

Each asset and off-balance sheet activity is categorized in one of these four

classes. Figured with their respective weights, the total "risk-adjusted assets" is

computed (Mishkin, 1998). The capital requirements are then set up like this

(Mishkin, 1998):

> "It [the bank] must have 'core' or Tier 1 capital (stockholder equity capital)
>
> of at least 4 percent of total risk-adjusted assets, and total capital (Tier 1
>
> capital plus Tier 2 capital, which is made up of loan loss reserves and
>
> subordinated debt) must come to 8 percent of total risk-adjusted assets.
>
> (Subordinated debt is debt that is paid off only after depositors and other
>
> creditors have been paid.) For regulators to classify a bank as well
>
> capitalized, it must meet an even more stringent total-capital requirement of
>
> 10 percent of risk-adjusted assets and Tier 1 capital of 6 percent of risk-
>
> adjusted assets."

The following exhibit provides an example of this concept.

Exhibit 1: Capital Requirement Calculation

Asset	Value	Risk Weight Class
Bank reserves	100	0
Government Securities	150	0
Securities from Government Agencies	200	20
Fully backed Mortgage Bonds	300	20
Municipal Bonds	75	50
Residential Mortgages	400	50
Commercial Paper	50	100
Commercial Loans	450	100
Fixed Assets	500	100
Total Assets	2225	

Risk Adjusted Assets

1337.5

Capital Requirements	Minimum Required	Well-Capitalized
Tier 1	53.5	80.25
Tier 2	53.5	53.5
Total	107	133.75

The asset values have been made up to provide the example. Risk-adjusted assets are calculated by adding the values of the assets multiplied by their respective weights.

Risk-adjusted assets = $0(100 + 150) + 0.2(200 + 300) + 0.5(75 + 400) +$

$1.0(50 + 450 + 500) = 1337.5$

To determine the capital requirements, the bank must hold 4% of risk-adjusted assets as stockholder equity capital; this is Tier 1 capital. Total capital must be 8%

of risk-adjusted assets. This level includes Tier 1 and Tier 2. Tier 2 is comprised of loan loss reserves and subordinated debt. The percentages are higher for an institution to be considered "well capitalized" (Mishkin, 1998). Banks must hold 10% of total risk-adjusted assets, with 6% of risk-adjusted assets in Tier 1 capital (Mishkin, 1998).

If a bank suspects some value of its loans will not be paid back and have to be written off, the bank can set aside some of its earnings (Mishkin, 1998). Because of the zero future value of bad loans, banks need to account for them in the present in some way (Mishkin, 1998). They do that by reducing earnings by the amount of uncollectible loans and adding that value in loan loss reserves (Mishkin, 1998). Since loan loss reserves are not an asset and are not a liability, they are counted as bank capital (Mishkin, 1998).

When companies, including banks and financial institutions, want to raise capital without creating debt through bonds, they may incur subordinate debt. A subordinated debenture is "an unsecured bond that gives bondholders a claim secondary to that of other designated bondholders with respect to both interest payments and assets" (Kapoor, Dlabay, & Hughes, 1999). Since the subordinate debt is secondary to normal corporate bonds, it is not counted explicitly as a liability, and therefore, may count as capital in Tier 2.

Capital requirements are an attempt to make banks more culpable for the risks they incur. Much has changed in the banking industry since the Basel Accord

was created in 1988. The accord did not allow for a changing financial climate, or the rapid expansion of the financial services industry (Greenspan, 1998). In light of those changes, the Basel Committee is working on a new Basel Capital Accord (BIS, 2002). The new document will refine minimum capital requirements from the 1988 accord, provide guidelines for supervisory review of the capital adequacy of institutions, and enhance market discipline to encourage transparency and safe banking practices (BIS, 2002).

Beyond the industry changes, the accord has another significant weakness. In both the old form (Palley, 2000) and the soon to come form of the accord (Carpenter, Whitesell, & Zakrajsek, 2001), pro-cyclical fluctuations in capital are a problem. When the economy experiences a downturn, the value of assets fall and the risk of default may grow (Carpenter et al, 2001). As that happens, the value of capital falls. At the same time the value of capital (the gap between assets and liabilities) is falling, the increased default risk of assets will cause capital requirements to grow as assets are put in higher risk categories (Segoviano & Lowe, 2002). Banks are then forced to find ways to raise capital, whether through increasing their assets or decreasing their liabilities. In recessions, however, banks may have difficulty raising the necessary capital (Palley, 2000). This difficulty stems from the higher risk of assets during a recession, whether that risk is real or perceived (Segoviano & Lowe, 2002). The capital requirements may even worsen the recession by tying up capital for non-performing assets (Palley, 2000).

Carpenter, et al, did not find that the new accord is any more pro-cyclical than the 1988 version (2001).

The pro-cyclical issues of capital requirements are present during expansions as well, but are seen as far less serious. As the riskiness of assets is measured lower during expansions, the capital requirements are lowered even though the actual level of capital increases as more and more assets, deemed less risky than they may actually be, are created (Segoviano & Lowe, 2002). Capital requirements, no matter how complex the risk calculations become, will most likely always have pro-cyclical tendencies due to the pro-cyclical nature of capital itself (Borio, Furfine & Lowe, 2001).

Other problems with capital requirements are subtler. For instance, while problems have been evident in the first Basel Accord, it has been over 10 years and a new accord is forthcoming. While integrating regulatory structures across national boundaries may have several benefits, it cannot be in the best interest of the domestic economy or the central monetary authority to adopt a scheme that cannot be, or will not be, amended as necessary to meet the needs of the nation. Additionally, and not least, capital requirements are placed on banks, not all financial institutions (Palley, 2000). As it stands, capital requirements may be the best way so far used to make banks account for the risks they take.

Does a regulatory framework exist that could combine the benefits of capital requirements for risk and reserve requirements as a potentially powerful policy tool, even in light of financial innovation and deregulation?

Proposal: Asset-Based Reserve Requirements

Deregulation has led to fragility in the financial market, and asset based bank supervision would hold banks accountable for the risks they take (Minsky & Whalen, 1996). The concept of asset-based reserve requirements is one that may become increasingly popular. The idea in theory is quite simple. Financial institutions should hold required reserves that are a function of the type of assets they hold, rather than the type of institution it is. The idea has been around for several years. Goldenweiser (1951) mentions the idea as having been proposed from "time to time." He points out that it is unfamiliar and will receive much opposition, but should be "carefully studied" (Goldenweiser, 1951). Rousseas (1986) called the asset reserve proposal "the most important" and "least considered" of proposed changes in the regulatory structure.

The lack of information regarding asset-based reserve requirements (ABRR) may be seen as an indication that there is some fundamental flaw in its logic. However, it seems that the three main groups that would research the subject are either not interested or have focused their support on other programs. The three groups are bankers, persons with a stake in other financial institutions, and regulators (the Fed). Bankers, while they might be interested in leveling the

playing field with other financial institutions, may not want the additional reserves likely to be required by ABRR. Also, now that banks can enter into the same asset markets as other financial institutions, they would not want to hold reserves on their new activities. For very similar reasons, other financial institutions, never before subject to reserve requirements would not likely support an idea that would impose requirements on them. Finally, the Fed has taken steps to force banks and other financial institutions to account for risk through capital requirements and Gramm-Leach Bliley (Furlong, 2000). Since they have invested the time and expense in these endeavors, ABRR would be an added expense for the Fed to research and implement, which may be why it is not devoting attention to the idea.

I should point out that reserves based on assets, like most other regulatory schemes, is written about relating to banks in Goldenweiser, Rousseas, and Wray. Palley, however, believes that the fairest and most effective way to implement ABRR is to make it apply to all financial institutions.

Banks are currently required to hold reserves against their deposit liability (Palley, 2000). The pace of financial innovation has led many people to hold much less of their wealth as traditional deposits. Palley points out that in 1979, deposits accounted for a full quarter of household financial assets, compared to only 10% in 1999, shown in Table A3 (Palley, 2000). People are shifting where they hold their money, and due to financial innovation and deregulation, they may not have to take their money from the initial depository institution. The result of the shift

away from traditional deposits is an exponentially widening gap between reserve balances and financial sector assets, which is shown in Graph A6 (Palley, 2000).

Converting to a system of asset-based reserve requirements for all financial institutions would reduce this growing gap, and hold institutions accountable for the risks they take. For example, suppose a commercial bank that takes deposits and makes loans begins to use deposits for more than just loans, and begins to enter other markets, once reserved only for investment banks. The bank holds reserves based on the level of deposits. Meanwhile, the security of those deposits is undermined by the higher risks involved in the investment bank assets. Asset based reserve requirements would correct that oversight by requiring banks to hold reserves based on the riskiness of the assets they hold.

In the same example under the current system, the investment bank would be at an inherent advantage relative to the commercial bank. The investment bank would not be holding reserves based on its liabilities, since investment banks do not hold deposits, but instead raise funds (liabilities) through selling commercial paper and issuing stocks and bonds (Mishkin, 1998). The result is that the investment bank would be holding the same assets as the commercial bank, but with no reserves. The investment bank, in theory, could hold more assets of the same type than the commercial bank. If the goal of deregulation like Gramm-Leach-Bliley and reducing reserve requirements was to enhance and encourage

competition, then from this simple example, it is inadequate in achieving that objective.

Before deregulation, when institutions held only certain assets and certain liabilities, a liability based reserve system worked well. In effect, the liability reserves were also asset reserves, since the two were linked. Now that deregulation has homogenized the financial industry, asset based reserve requirements would ensure that all financial institutions are taking adequate measure of the risks they take (which capital requirements do), and to prevent some financial institutions from having advantages over others in the same market (which capital requirements do not do). The financial industry has seen a significant shift in assets over the last 20 years. For example, banks and thrifts held 52% of financial sector assets in 1979, compared to only 22% in 1999 (Palley, 2000). More detail is presented in Table A4 of Appendix A.

Adoption of a system of asset-based reserve requirements could lead to several advantages. The most obvious of these advantages is the increased monetary control. With various assets being separated into categories based on risk, the several different reserve requirements could help the Fed's ability to control short-term interest rates (Palley, 2001). Another aspect of the increased monetary control is the Fed's ability to channel money into depressed sectors of the economy, or divert money away from over-heating sectors by adjusting reserve requirements (Rousseas, 1986).

The Fed also could have the power to more accurately control the growth of the economy. As it is now, the Fed can change the market interest rate (see the Mathematical Appendix). This change in the market rate spills over to every other interest rate in the domestic economy. The result is that investment spending and consumer spending are both affected at the same time, in the same way (Palley, 2001). With ABRR, the Fed can alter the reserve requirements for commercial loans without directly affecting consumer spending, or vice versa.

There are even macroeconomic benefits of asset-based reserve requirements. Giving the Fed several policy instruments in the form of asset reserve requirements will allow them to have more specific targets for the economy (Palley, 2001). For example, if consumption is growing too rapidly, the Fed could raise the reserve requirement on household loans, causing interest rates to rise for consumers. Investment spending would remain largely unaltered, because the investment interest rate would not be affected directly by Fed action. The Fed may have to alter the investment reserve requirement to stop banks from channeling the money for consumer loans into investment loans. The second example in the Mathematical Appendix demonstrates just a couple of the many possible variations that could be opened up for the Fed.

Under the current system of regulation, the Fed's primary target is the money market interest rate, or more specifically, the federal funds rate. Using interest rates to control asset prices can have unwanted spillover effects into other

areas of the economy by affecting investment, consumption, the exchange rate, and net exports. Asset-based reserve requirements would allow the Fed to directly target specific types of assets, like shares of stock with inflated prices, by raising the reserve requirement for equity (Palley, 2001). Raising the cost of holding equity would drive the price of equities down as shown in example 3 in the Mathematical Appendix.

Another benefit of asset-based reserve requirements is more implicit. All interest rates, whether the rate charged on loans, or the rate paid on deposits, is based on the money market rate (Palley, 2001). With the current reserve requirement structure, it is the depositors who face lower rates of return due to reserve requirements (Palley, 2001). Depositors do not create risk for the bank; they are simply lending their money to the bank. In a system of ABRR, the financial institution will pass some of the burden of reserve requirements onto the borrower in the form of higher loan rates (Palley, 2001). The system makes not only banks compensate for the risks they take, but also charges a premium on those entering into potentially risky ventures.

Following from the lower rates to depositors comes the reduction of the moral hazard problem created by deposit insurance. If banks and borrowers are forced to take precaution in the form of ABRR for increasingly risky loans, the incentive to engage in risky behavior because of deposit insurance is counteracted by the higher cost of risky loans.

Deregulation would not be an issue for financial fragility under a scheme of ABRR. Since this proposal calls for the reserve requirements to be applicable to the entire financial sector, mergers, acquisitions, or deregulation of industry barriers would not lessen the power of the requirements (Palley, 2000). Financial innovation could still be an obstacle to regulation, but it always has been and will be. If a new asset type is developed, the Fed will determine its level of risk, and assign an appropriate reserve requirement against it. The lag should not be incredibly long, depending on the Fed's knowledge of what is going on in the private sector.

It was noted earlier that capital requirements might possess some pro-cyclical characteristics that might exacerbate an economic downturn or over-inflate an expansion due to risk being overestimated or underestimated, respectfully (Borio et al, 2001). Asset-based reserve requirements do not have the inherent pro-cyclical qualities of capital requirements. If, in the course of a recession, a loan ceases to perform, that is, the person or corporation with the loan defaults, the asset is removed from the balance sheet, freeing up the required reserves held against it (Palley, 2000). The financial institution has money available to it when it needs money to extend credit the most (Palley, 2000).

Some drawbacks of asset-based reserve requirements include the problem of converting to an entirely new system. The Federal Reserve would have more power to control the economy, which some may see as inhibiting free markets.

Some may believe reserve requirements may be too blunt of a policy tool. Also, with that power to control the economy comes greater danger that the Federal Reserve will use their authority incorrectly. Finally, if asset-based reserve requirements are implemented only in one country, it becomes conceivable that financial firms would flee the country to escape the new reserves (Palley, 2001).

Some solutions to this final problem include the adoption of asset-based reserve requirements by major economic countries, as was done with the Basel Accord (Palley, 2001). Palley goes on to point out that for businesses to shift creates high cost, which might prohibit firms from moving, and that the U.S. has characteristics important for businesses: a support services network, large numbers of qualified personnel, and the stability of the government and regulation (2001).

Some discussion of the implementation of a system of asset-based reserve requirements is necessary. First it should be pointed out that ABRR changes the central bank's focus "from money to the structure of assets" (Wray, 1990). For asset-based reserve requirements to be successful, they must be imposed on all financial institutions—that point bears repeating.

Currently, liability reserves can be held either as vault cash or as balances with the Federal Reserve (Board of Governors, 1994). Those options should be preserved. It might be beneficial to allow some portion of reserves to be held as government bonds (Palley, 2001). A possible problem with allowing government bond holdings to meet reserve requirements would be that if required reserves

were lowered, the bonds being sold by financial institutions might create

depressed bond prices, or artificially high bond prices if reserve requirements were

raised, as financial institutions sought to buy bonds. Another option might be to

allow some portion of required reserves to be held in a special type of savings

account with a market-determined interest rate. Either bond holdings or a savings

account would help to lower the "reserve tax" mentioned earlier.

The reserve requirements could be structured in several ways. Two specific

ones stand out as the most practical and understandable. First, adopt a system

similar to the old reserve requirement structure. Each asset type would have a

specific reserve ratio, and that amount would have to be held as vault cash or

Federal Reserve balances, or as government bonds or special savings. The second

scheme would be similar to the capital requirement structure developed by the

Basel Accord. Different asset types would be assigned a risk weight. The weighted

sum of the assets would yield a risk-adjusted total asset quantity, and reserves

would be based on that. In either case, some reserves with no risk would carry a

zero reserve requirement ratio (Palley, 2001). If the Fed believed an asset type to

be too risky, that asset type could be assigned a 100% reserve requirement.

A possible potential benefit of allowing asset reserves to be held in two

forms is the added policy tool. The Fed could impose a maximum interest bearing

allowance (MIBA) on reserves. The MIBA would serve as the maximum

percentage of total required reserves that could be held in the form of government

bonds or in a special reserve savings account (if feasible). The MIBA could be different for different asset types. The rest of the reserves would be held as balances with the Federal Reserve. An analogy of this policy tool is a microscope.

On a microscope, a scientist first chooses a magnification setting to determine how many times the object is to be magnified. This initial step is like the reserve requirement itself for a particular asset. The magnification is related to the relative riskiness of the asset. Once the appropriate level of magnification has been selected, the scientist focuses the object in his sight. The focusing is similar to adjusting the MIBA. The idea of the MIBA is to give the Fed a tool to fine-tune the economy. For example, if the Fed determined that holding required reserves that earned no interest would very negatively impact some asset types like mutual funds, the Board of Governors could conceivably allow 100% of the required reserves on that asset type to be held in the interest-bearing form. While the owners of mutual fund shares might see lower rates of return in expansionary times since reserve requirements would be held in assets earning lower interest (government bonds or in a special savings account), they should also expect smaller losses during recessions since the funds held as reserves would be earning a steady interest payment. Similarly, this fine-tuning characteristic might lessen the broad nature that changing reserve requirements could have on the economy.

The idea of MIBA may not be feasible. The Fed may not wish to have such fine-tuning powers. The public may not want the Fed to have such fine-tuning

powers in the economy. Even if a concept like MIBA is not practical, asset-based reserve requirements might be able to provide a more uniform, more fair regulatory structure for all firms in the financial sector of the United States economy.

Asset-based reserve requirements could be costly to introduce and implement. Banks and other financial institutions may have difficulty raising funds to meet reserve requirements initially. It is conceivable that credit markets might be very tight at first as the financial sector begins to accumulate money for new reserve requirements. For that reason, implementing ABRR at a time of recession could have substantial negative repercussions on our economy. Even if implemented during an expansion, ABRR would reduce the amount of available funds for credit in the economy.

These problems of lessening credit may be surmountable by a very slow implementation of the regulatory structure. If financial companies had advanced warning of what the requirements would be in 5 to 10 years, for example, they would have more time to begin to accumulate the necessary requirements without creating an immediate drain on credit in the economy. The Federal Reserve could then require certain thresholds of required reserves be met each year until the ABRR structure was to be fully in place.

One of the most notable aspects of ABRR is its versatility. Reserve requirements on assets act as a measure of risk, like capital requirements. The

reserves market and open market operations are still under the Fed's control. Also, in theory, ABRR can be tailored to almost any desired level of central bank intervention in the economy.

For example, if the Fed decided to implement ABRR, but set non-zero requirements only on mortgages, consumer loans, and commercial loans, the financial system would actually be changed very little from the current one. Further, all assets could be held at zero reserve requirements, creating a basically unregulated system. These two ideas would make implementing ABRR a moot point since required reserves would be practically useless. They are provided simply as examples of the broad range of possibilities available if ABRR were implemented.

Asset-based reserve requirements as a plan does not require the Fed to frequently change the reserve ratios, but they will have the option. Interest rate targeting is still possible through open market operations. Specific interest rates can be targeted using either the reserve requirements, or the MIBA, if it is used.

When determining the appropriateness and cost of a new plan, the future must be considered. In spite of the short-term drawbacks of ABRR at the time of implementation, the long-term stability, adaptability, and versatility make asset-based reserve requirements a viable option for the American financial sector.

Conclusion

Since their creation in 1863, reserve requirements have been an important aspect of banking regulation. As our nation's financial system has grown and evolved, the role of reserve requirements, including their use, justification, and implementation has grown and evolved as well. All regulatory schemes must be updated from time to time to accommodate the changing nature of our economy.

Reserve requirements have changed because of changes such as deregulation, financial innovation, and mergers. Evidence of this change can be found in legislation like Gramm-Leach Bliley, Riegle-Neal, and the lowering of reserve requirements in 1990 and 1992. Financial innovations like derivatives and sweep accounts have allowed depository institutions to circumvent regulation. Mergers between commercial banks and investment banks have blurred the lines of separation in the once segregated industry. These changes have led to the near obsolescence of reserve requirements in their present form. Required reserves can still play an important policy role in the financial sector of our economy, if appropriate changes are made to the current system. One such change may be the adoption of a system of asset-based reserve requirements.

No regulatory scheme is perfect, including asset-based reserve requirements. Despite the lack of attention to this policy, it has been demonstrated that asset-based reserves are a superior alternative. A system of asset-based reserve requirements that applied to all financial firms and covered all on- and off-

balance sheet activities would give the Federal Reserve much greater scope to conduct and implement monetary policy. Additionally, ABRR address the concerns of structural financial fragility as developed by Dymski, Minsky, and Wray. For those concerned with the implications of policy on firm behavior, ABRR would provide a more level playing field for all financial institutions, unlike the current system where one type, namely banks, are subject to greater restriction and regulation. In addition, any financial institution could enter any financial market under a system of ABRR, so long as adequate compensation for risk is taken.

In comparison to other policy regimes, asset-based reserve requirements combine the policy power of reserve requirements with the risk measurement and accountability of capital requirements. Further, it combines them without the pro-cyclical characteristics of capital requirements and without the burden on depositors of the current liability-based reserve structure. There are many possible forms the ABRR could take, and the optimal one must be determined before such a structure is implemented. For the health of the entire economy, it makes sense to apply asset-based reserve requirements to all firms conducting basically the same function as banks, i.e., the whole financial sector.

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Appendix A:
Tables, Charts & Graphs

Table A1: Money Aggregates

M1 =	Currency
	+ Traveler's Checks
	+ Demand Deposits
	+ Other Checkable Deposits
M2 =	M1
	+ Small-denomination Time Deposits
	+ Savings deposits and Money Market Deposit Accounts
	+ Money Market Mutual Fund Shares (noninstitutional)
M3 =	M2
	+ Large denomination Time Deposits
	+ Money Market Mutual Fund Shares (institutional)
	+ Term Repurchase Agreements
	+ Term Eurodollars
L =	M3
	+ Short-term Treasury Securities
	+ Commercial Paper
	+ Savings Bonds
	+ Banker's Acceptances

Source: Mishkin, 1998, p. 59

Table A2: Primary Assets and Liabilities of Financial Intermediaries

Type of Intermediary	Primary Liabilities	Primary Assets
Depository Institutions		
Commercial Banks	Deposits	Consumer and business loans, mortgages, government securities, municipal bonds
Savings and Loans	Deposits	Mortgages
Mutual Savings Banks	Deposits	Mortgages
Credit Unions	Deposits	Consumer loans
Contractual Savings Institutions		
Life Insurance Cos.	Premiums	Corporate bonds and mortgages
Fire & Casualty Insurance Cos.	Premiums	Municipal bonds, corporate bonds and stocks, government securities
Pension funds	Employer and employee contributions	Corporate bonds and stocks
Investment Intermediaries		
Finance Cos.	Commercial paper, stocks, bonds	Consumer and business loans
Mutual Funds	Shares	Stocks, bonds
Money market mutual funds	Shares	Money market instruments

Source: Mishkin, 1998, p. 38.

Table A3: Composition of Household Financial Assets

Type of Holding	1979	1999
Deposits	25%	10%
Life Insurance Reserves	4%	2%
Pension Fund Reserves	14%	30%
Mutual Fund Shares	1%	11%
Corporate Equities	13%	23%
Equity in Non-corporate Business	30%	13%
Bonds & Notes	8%	6%
Other*	5%	5%

*Includes security credit, bank personal trusts, and miscellaneous
Source: Palley, 2000, p. 4.

Table A4: Shares of Financial Sector Assets

Industry Segment	1979	1999
Banks & Thrifts	52%	22%
Insurance Companies	11%	8%
Pension Funds	17%	26%
Mutual Funds	3%	18%
Nonbank Lenders	5%	3%
GSEs & Federally Regulated Mortgage Pools	6%	12%
Other*	6%	11%

* Includes bank personal trusts, security brokers & dealers, ABS issues, REITs and funding corporations

Source: Palley, 2000, p. 5.

Chart A1: Reserve Requirements based on geographic distinctions among member banks, 1913-66

End of year reserve requirement, as a percentage of deposits

Year	Net Demand Deposits			Time Deposits (all classes of banks)
	Central reserve city banks	reserve city banks	country banks	
1913	18	15	12	5
1917	13	10	7	3
1936	19.5	15	10.5	4.5
1937	26	20	14	6
1938	22.75	17.5	12	5
1941	26	20	14	6
1942	20	20	14	6
1948	26	22	16	7.5
1949	22	18	12	5
1951	24	20	14	6
1953	22	19	13	6
1954	20	18	12	5
1958	18	16.5	11	5
1960	16.5	16.54	12	5
1962	16.5	16.5	12	4

Source: Feinman, 1993, p. 587

This chart displays different reserve requirement ratios from 1913 to 1962.

The years are significant in that in 1913, the Federal Reserve System was

established, and in 1962, the Fed lost the authority to classify banks by their

proximity to reserve cities (Feinman, 1993).

Chart A2: Reserve Requirements based on geographic distinctions among member banks and on the level of deposits, 1966-72

End of year reserve requirements, as a percentage of deposits

Year	Net Demand Deposits				Time Deposits		
	Reserve city banks		Country banks		Savings	Other time deposits	
	0-5*	Over 5*	0-5*	Over 5*		0-5*	Over 5*
1966	16.5	16.5	12	12	4	4	6
1967	16.5	16.5	12	12	3	3	6
1968	16.5	17	12	12.5	3	3	6
1969	17	17.5	12.5	13	3	3	6
1970	17	17.5	12.5	13	3	3	5

* Deposit intervals in millions of dollars
Source: Feinman, 1993, p. 588

In 1966, the Federal Reserve began to implement a graduated reserve system, based on where the banks were located (Feinman, 1993). This system was adapted through 1972, when a new system of graduated reserves was implemented, without regard to reserve city or country designations (Feinman, 1993).

Chart 3 on the following page shows the reserve requirement ratios for the years of the graduated reserve system until the passage of the Monetary Control Act of 1980.

Chart A3: Graduated reserve schedule for member banks, 1972-80

End of year reserve requirements, as a percentage of deposits

Year	Net Demand Deposits					Time and Savings Deposits						
							0-5*, by maturity			Over 5*, by maturity		
	0-2*	2-10*	10-100*	100-400*	Over 400*	Savings	30-179 days	180 days to 4 months	Over 4 years	30-179 days	180 days to 4 years	Over 4 years
1972	8	10	12	13	17.5	3	3	3	3	5	5	5
1973	8	10	12.5	13.5	18	3	3	3	3	5	5	5
1974	8	10.5	12.5	13.5	17.5	3	3	3	3	6	3	3
1975	7.5	10	12	13	16.5	3	3	3	1	6	3	1
1976	7	9.5	11.75	12.75	16.25	3	3	2.5	1	6	2.5	1

* Deposit intervals in millions of dollars

Source: Feinman, 1993, p. 588

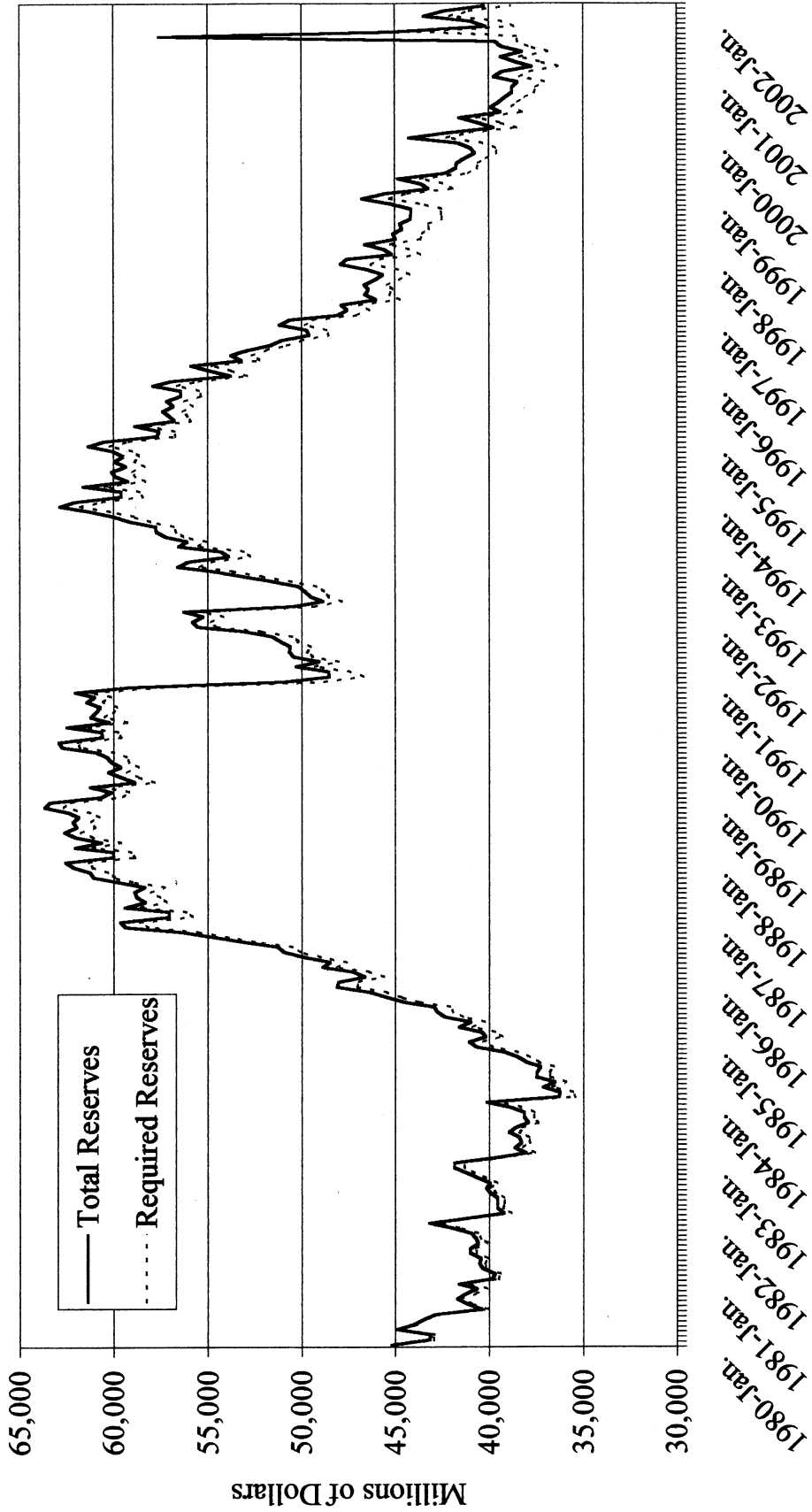**Chart A4: Reserve Requirements since passage of Monetary Control Act of 1980**

End of year reserve requirements, as a percentage of deposits

Year	Net transactions accounts	Nontransactions accounts
1980	12	3
1990	12	0
1992	10	0

Source: Feinman, 1993, p. 589

The above chart shows reserve requirements from the passage of the Monetary Control Act of 1980 through the present. The most recent time requirements were changed was 1992 (Feinman, 1993).

Graph A1: Total Reserves and Required Reserves

Millions of Dollars

65,000   60,000   55,000   50,000   45,000   40,000   35,000   30,000

— Total Reserves
····· Required Reserves

1980-Jan 1981-Jan 1982-Jan 1983-Jan 1984-Jan 1985-Jan 1986-Jan 1987-Jan 1988-Jan 1989-Jan 1990-Jan 1991-Jan 1992-Jan 1993-Jan 1994-Jan 1995-Jan 1996-Jan 1997-Jan 1998-Jan 1999-Jan 2000-Jan 2001-Jan 2002-Jan

Source: Federal Reserve
http://www.federalreserve.gov/releases/h3/hist/h3hist2.txt

Graph A2: Monetary Aggregates and the Monetary Base

Millions of Dollars (Monetary Base)

900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0

Monetary Base

M1

M2

M3

1980-Jan.
1981-Jan.
1982-Jan.
1983-Jan.
1984-Jan.
1985-Jan.
1986-Jan.
1987-Jan.
1988-Jan.
1989-Jan.
1990-Jan.
1991-Jan.
1992-Jan.
1993-Jan.
1994-Jan.
1995-Jan.
1996-Jan.
1997-Jan.
1998-Jan.
1999-Jan.
2000-Jan.
2001-Jan.
2002-Jan.

Billions of Dollars (M1, M2, M3)

9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0

Source: Federal Reserve
http://www.federalreserve.gov/releases/h6/hist/h6hist1.txt
http://www.federalreserve.gov/releases/h3/hist/h3hist2.txt

Graph A3: Reserves as a Percentage of the Monetary Base
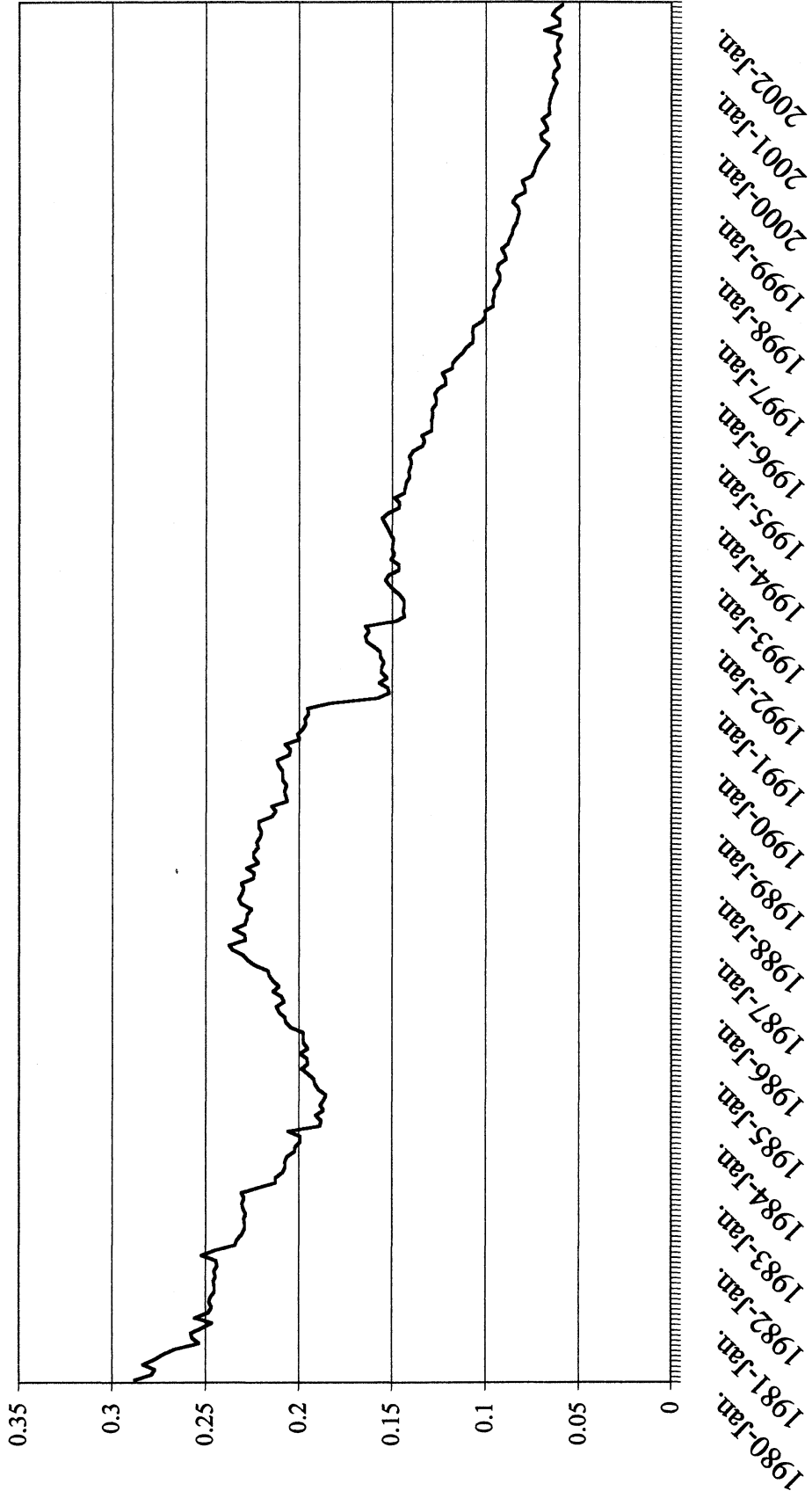
Graph A4: The Monetary Base as a Percentage of Money Aggregates

Source: Federal Reserve
http://www.federalreserve.gov/releases/h6/hist/h6hist1.txt
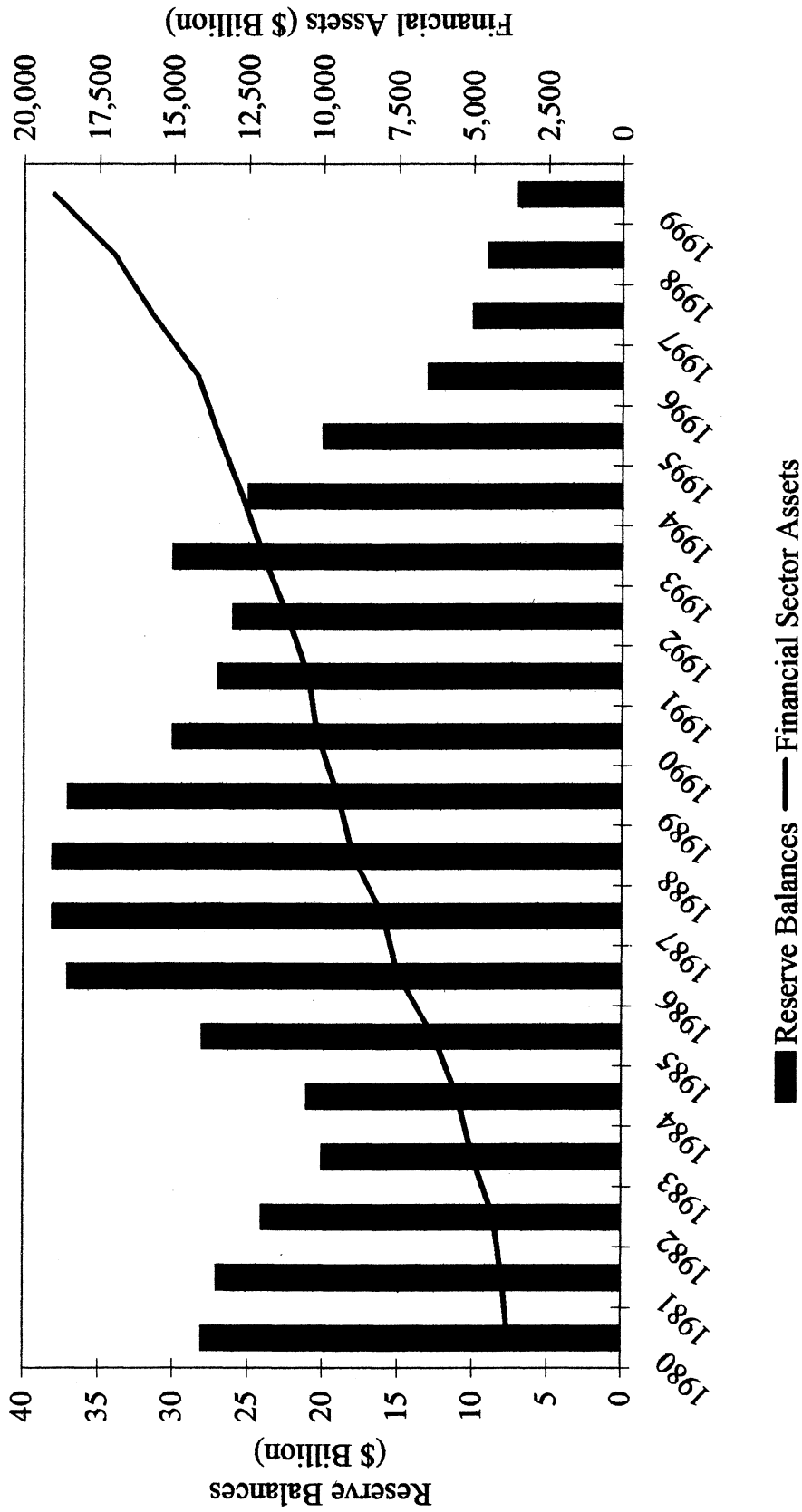http://www.federalreserve.gov/releases/h3/hist/h3hist2.txt
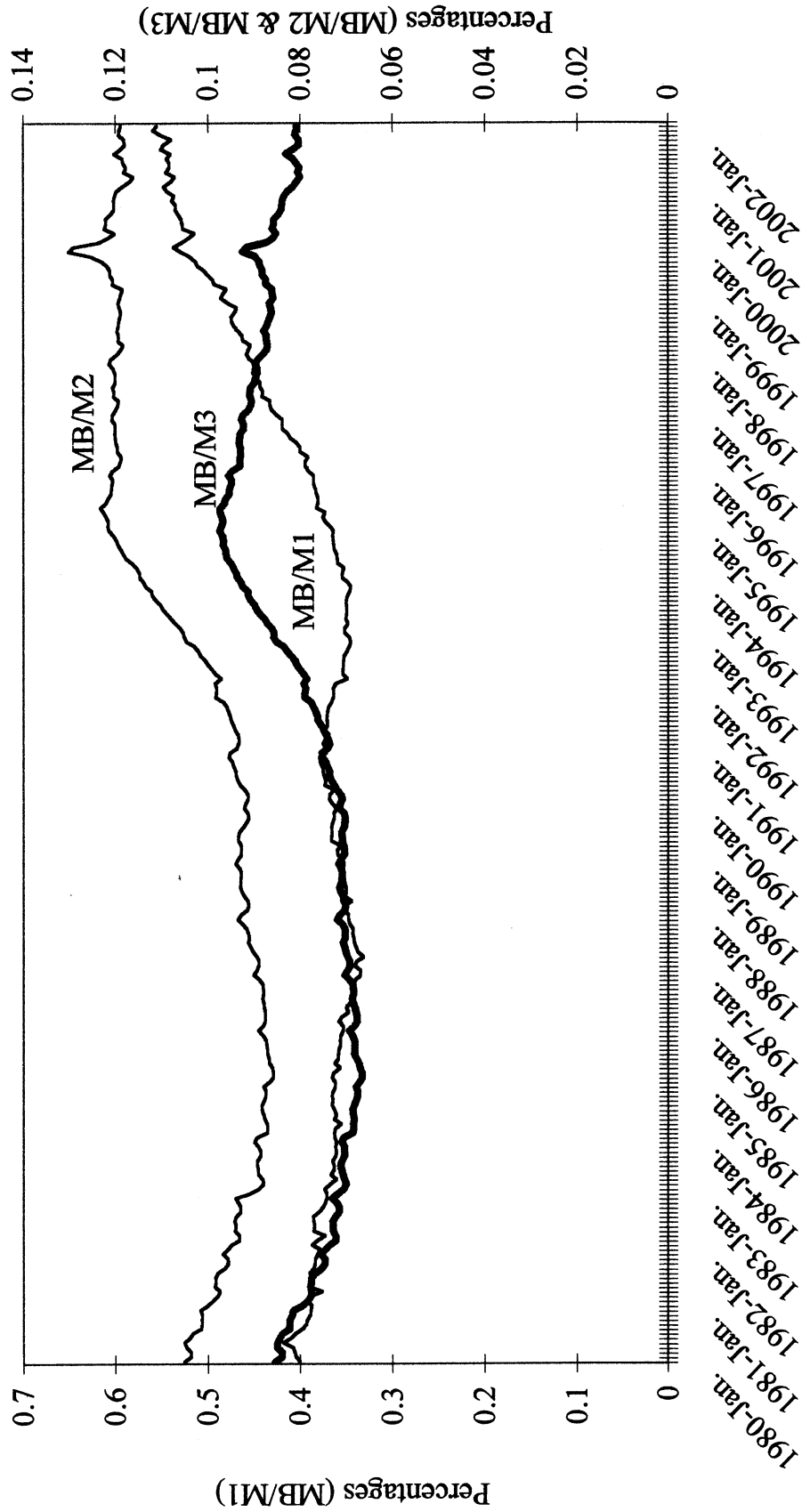
Graph A5: Sweeps of Retail Transaction Deposits into Savings Deposits
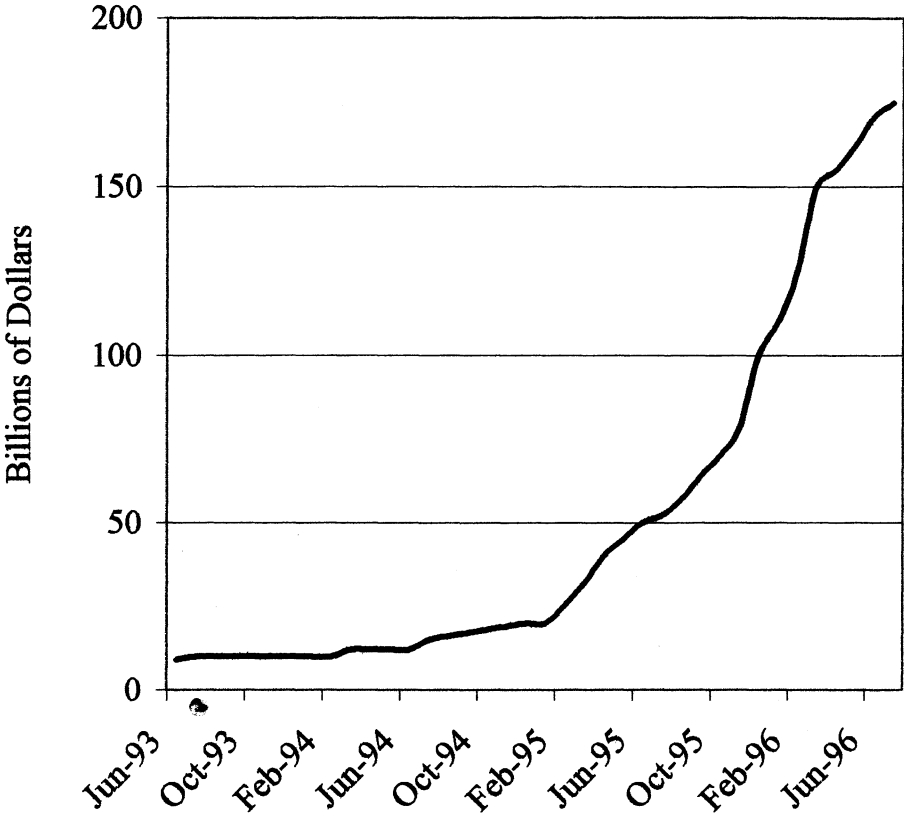
Adapted from Bennet Hilton, 1997, p.3.

Graph A6: Reserve Balances and Financial Sector Assets

■ Reserve Balances ——Financial Sector Assets

Source: Palley, 2000
Note: Financial sector assets excludes assets held by monetary authority.

Appendix B

Mathematical Appendix

The following mathematical examples were adapted from Palley, 2001.

They are meant to provide a more concrete example of how asset-based reserve

requirements (ABRR) differs from the current system of liability-based reserve

requirements (LBRR).

The models provided are meant to apply to a "generic financial firm"

(Palley, 2001). They could apply to either a traditional bank, or other financial

institutions (Palley, 2001). Constant marginal costs are assumed in all models,

implying that the size of the individual firm is indeterminate (Palley, 2001). For

the ABRR scenarios presented, it is assumed that the regulatory framework applies

to all financial institutions in the economy (Palley, 2001).

Example B1: Interest Rate Determination

The following calculations will demonstrate how interest for different asset

and liability types are determined in both a system of LBRR and a system of

ABRR. Regardless of regulatory regime, profit is calculated by subtracting the

liabilities of the bank (deposits), any money market borrowing, and the costs

associated with bank assets (loans) from the income flow of the loans. This is

maximized subject to a balance sheet constraint regarding how much may be

loaned from the deposits and money market balances.

$L \equiv$ investment loans

$H \equiv$ consumer loans

$D \equiv$ short-term deposits

$T \equiv$ long-term deposits

$F \equiv$ money market borrowings $(F > 0)$ or lending $(F < 0)$

$i_j \equiv$ interest rate $(j = L, H, D, T, F)$

$a_j \equiv$ constant marginal cost per dollar of administering loans and liabilities

$(j = L, H, D, T, F)$

$p_j \equiv$ probability per dollar of default on loans $(j = L, H)$

$k_j \equiv$ reserve requirement ratio $(j = D, T$ in LBRR, $j = L, H$ in ABRR)

$\Pi \equiv$ total profit of the financial institution

In LBRR,

(1)   Max $\Pi = i_L L + i_H H - (a_L + p_L)L - (a_H + p_H)H - (i_D + a_D)D - (i_T + a_T)T$

$- (i_F + a_F)F$

Subject to,

(1.1) $L + H = (1 - k_D)D + (1 - k_T)T + F$

Rearranging (1.1) by solving for F yields:

(1.12) $F = L + H - (1 - k_D)D - (1 - k_T)T$

Substituting (1.12) into (1), results in:

(2)   Max $\Pi = i_L L + i_H H - (a_L + p_L)L - (a_H + p_H)H - (i_D + a_D)D - (i_T + a_T)T$

$- (i_F + a_F)[L + H - (1 - k_D)D - (1 - k_T)T]$

Taking the first-order partial derivative with respect to L, H, T, and D, the interest rates on investment and consumer loans, and short- and long-term deposits are calculated.

(2.1) $\partial\Pi/\partial L = i_L - a_L - p_L - i_F - a_F$

(2.2) $\partial\Pi/\partial H = i_H - a_H - p_H - i_F - a_F$

(2.3) $\partial\Pi/\partial T = - i_T - a_T + (i_F + a_F)(1 - k_T)$

(2.4) $\partial\Pi/\partial D = - i_D - a_D + (i_F + a_F)(1 - k_D)$

Solving for the specific interest rates yields:

(2.11) $i_L = i_F + a_F + a_L + p_L$

(2.12) $i_H = i_H + a_F + a_H + p_H$

(2.13) $i_T = (1 - k_T)(i_F + a_F) - a_T$

(2.14) $i_D = (1 - k_D)(i_F + a_F) - a_D$

The monetary authority determines i_F. Banks seek to establish an efficient portfolio of liabilities, where the marginal cost (MC) of each liability is equal, i.e., $MC_F = MC_D = MC_T$. Looking at (2.11) through (2.14), it can be seen that reserve requirements on liabilities, k_D and k_T, lowers i_D and i_T respectively, and therefore, raise MC_D and MC_T. Under this system, banks clearly have an incentive to seek funds in the form of liabilities that would not have reserve requirements. Incidentally, the reserve requirements may be seen as a burden on the depositors.

In ABRR, the profit function is the same:

(3)   Max $\Pi = i_L L + i_H H - (a_L + p_L)L - (a_H + p_H)H - (i_D + a_D)D - (i_T + a_T)T$

$- (i_F + a_F)F$

The balance sheet constraint under ABRR is different since the reserve requirements are associated with the bank's assets.

(3.1) $(1 + k_L)L + (1 + k_H)H = D + T + F$

Rearranging by solving for F yields:

(3.12) $F = (1 + k_L)L + (1 + k_H)H - D - T$

This form of the equation is substituted into (3):

(4)   Max $\Pi = i_L L + i_H H - (a_L + p_L)L - (a_H + p_H)H - (i_D + a_D)D - (i_T + a_T)T$

$- (i_F + a_F)[(1 + k_L)L + (1 + k_H)H - D - T]$

Once again, the first-order partial derivatives are taken to show the interest rates.

(4.1) $\partial\Pi/\partial L = i_L - a_L - p_L - (i_F + a_F)(1 + k_L)$

(4.2) $\partial\Pi/\partial H = i_H - a_H - p_H - (i_F + a_F)(1 + k_H)$

(4.3) $\partial\Pi/\partial T = - i_T - a_T + i_F + a_F$

(4.4) $\partial\Pi/\partial D = - i_D - a_D + i_F + a_F$

Solving for the specific interest rates results in:

(4.11) $i_L = (i_F + a_F)(1 + k_L) + a_L + p_L$

(4.12) $i_H = (i_F + a_F)(1 + k_H) + a_H + p_H$

(4.13) $i_T = i_F + a_F - a_T$

(4.14) $i_D = i_F + a_F - a_D$

Under ABRR, interest rates are still determined in relation to the money market rate. Reserve requirements raise the costs associated with holding loans. Also, having reserve requirements related to assets clearly gives the central monetary authority the ability to control which types of financial institution assets by changing the respective reserve requirements.

Example B2: Macroeconomic Policies

In this macroeconomic example using the ISLM model, all quantities are assumed to be real. Previous variable definitions still apply. In these scenarios, Y, NX, and e are endogenous variables. The policy variables are G, t, i_F, k_D, and k_T. Monetary policy is all that will be used to demonstrate the effect of the two reserve requirement schemes.

$Y \equiv$ output

$C \equiv$ consumption

$I \equiv$ investment

$G \equiv$ government spending

$NX \equiv$ net exports

$t \equiv$ taxes

$e \equiv$ exchange rate

$i_{F*} \equiv$ foreign money market rate

(5) $Y = C(i_H, i_D, i_T, (1-t)Y) + I(i_L) + G + NX$

(6) $NX = NX(e, Y)$

(7) $e = e(i_F/i_{F^*})$

In LBRR, substituting the interest rate equations (2.11) – (2.14) into (5) yields:

(5.1) $Y = C(iF + aF + aH + pH, (1 - kT)(iF + aF) - aT, (1-t)Y)$

   $+ I(iF + aF + aL + pL) + G + NX$

Suppose consumption has been growing. The Federal Reserve wants to slow consumption and slow output in the process. Under the current system, the Fed will most likely accomplish this end by raising the money market interest rate.

$i_F\uparrow \quad \Rightarrow i_D \uparrow$ and $i_T\uparrow \Rightarrow$ saving $\uparrow \Rightarrow C\downarrow \Rightarrow Y \downarrow$

$\Rightarrow i_L \uparrow \Rightarrow I \downarrow \Rightarrow Y \downarrow$

$\Rightarrow e \uparrow \Rightarrow NX \downarrow \Rightarrow Y \downarrow$

Clearly, output has fallen, as has consumption, but as a result, so have investment spending and net exports.

In a system using ABRR, the same goals can be achieved with very different side effects. Substituting (4.11) – (4.14) into equation (5) will give the following output function:

(5.2) $Y = C([i_F + a_F][1 + k_H] + a_H + p_H, i_F + a_F - a_D, i_F + a_F - a_T, (1-t)Y)$

   $+ I([i_F + a_F][1 + k_L] + a_L + p_L) + G + NX$

Once again, the Fed wants to slow consumption and output. Under ABRR, the Fed can accomplish this by raising the reserve requirement on household loans.

$k_H \uparrow \Rightarrow C \downarrow \Rightarrow Y \downarrow$

Since i_F was not changed, investment spending remains constant, the exchange rate does not fall. Net exports may fall to some degree due to the new, lower level of output, but not as far as it fell when both the exchange rate and output fell in the LBRR scenario.

Asset-based reserve requirements give the Federal Reserve much more room to maneuver the economy by using multiple policy tools at once. For example, suppose the Fed would like to improve the U.S. current account by increasing exports and investment, while keeping consumer consumption relatively constant.

$$i_F \downarrow \quad \Rightarrow e \downarrow \Rightarrow NX \uparrow$$

$$\Rightarrow i_L \downarrow \Rightarrow I \uparrow$$

$$\Rightarrow i_H \downarrow \Rightarrow C \uparrow \text{ (under LBRR)}$$

Under ABRR k_H can be raised to discourage consumer loans, which should help keep consumption relatively constant. This example shows how the Fed can use multiple policy tools to achieve very specific monetary policy goals.

Example B3: Asset Price Inflation

This example deals with the problem of asset price inflation, particularly equity. Inflated asset prices often produce a large wealth effect on consumption (cited in Palley, 2001).

$q \equiv$ equity prices

$\Pi_q \equiv$ profits from equities

$i_q \equiv$ rate of return on equities

$z \equiv$ equity premium

$k_q \equiv$ reserve requirement on equity

(5.3) $Y = C([i_F + a_F][1 + k_H] + a_H + p_H, i_F + a_F - a_D, i_F + a_F - a_T, (1-t)Y, q)$

$+ I([i_F + a_F][1 + k_L] + a_L + p_L) + G + NX$

(8) $q = \Pi_q/i_q$

Equation (8) shows that the price of a share of equity should be the profits

expected to be earned discounted by the rate of return. Further, a rational

consumer would not purchase equities beyond the point where the risk-adjusted

rate of return on equity equaled the safe return on deposits.

(9) $i_q/(1 + k_q) = i_D + z$

If equity prices inflate dramatically, the Fed could raise the reserve requirement on

equity, lowering the rate of return on equity, which should then bring equity prices

back down to acceptable levels.