

Daniel L. Thornton

Daniel L. Thornton is an assistant vice president at the Federal Reserve Bank of St. Louis. Kevin White provided research assistance.

Financial Innovation, Deregulation and the "Credit View" of Monetary Policy

IT IS GENERALLY ACKNOWLEDGED that monetary policy affects real economic activity in the short run and inflation or the price level in the long run, but much less of a consensus exists on exactly how monetary policy affects output and prices. The possibility that monetary policy affects the economy through credit channels has received considerable attention lately.

Two distinct credit channels for monetary policy have been described.¹ Both of these channels are based on lending problems associated with asymmetric information and control.² The cost of acquiring information and controlling borrower's behavior drives a wedge between the cost of internal and external finance. For

some borrowers the premium for external finance is so large that it is impractical for them to obtain funds in impersonal financial markets. Depository financial intermediaries (hereafter, banks), reduce the wedge by specializing in acquiring information about and assessing the risk characteristics of such borrowers.³

One broad credit channel has been called the "excess sensitivity hypothesis" by Gertler and Gilchrist (1993b). According to this hypothesis, monetary policy actions induce changes in interest rates and prices that are propagated through their effect on borrowers' balance sheets.⁴ For example, restrictive monetary policy may reduce the net worth of borrowers, causing the premi-

¹These channels have been discussed by a number of writers. Bernanke (1993) and Gertler and Gilchrist (1993b) are two of the more accessible.

²Information asymmetry gives rise to two important principal-agent problems, adverse selection and moral hazard.

³For evidence that banks and other financial intermediaries mitigate the problems associated with asymmetric information, see James (1987); Gilson, Stuart and Lang (1990); Hoshi, Kashyap and Scharfstein (1990, 1991); and Slovin, Sushka and Polonchek (1993). For evidence that shocks to bank capital are due to changes in regulations or adverse changes in the economy, see Baer and McElravey (1993) and Calomiris (1993).

Unless it is explicitly stated otherwise, the word bank is used in this article to denote the four traditional depository financial intermediaries: commercial banks, savings and loan associations, mutual savings banks and credit unions. The last three are jointly referred to as "thrifts."

⁴Monetary policy is propagated through changes in net worth or cash flow that alter the size of the external finance premium. For evidence that investment is sensitive to balance sheet and cash flow consideration, see Fazzari, Hubbard and Peterson (1988); Oliner and Rudebusch (1992); and Calomiris and Hubbard (1993).

ums that small borrowers must pay for external finance to rise. Gertler and Gilchrist point out that this credit channel is operative "even if the central bank has no direct leverage over the flow of bank credit."⁵ An alternative credit channel, called the "credit view" of monetary policy by Bernanke and Blinder (1988), Bernanke (1993) and Gertler and Gilchrist (1993b), requires monetary policy actions to have a direct effect on bank lending.

This article outlines the credit view of monetary policy and points out that the conditions that are necessary for it are stringent. Consequently, there is reason to doubt whether the bank lending channel of monetary policy has ever been empirically significant. This article, however, does not attempt to evaluate whether the bank credit channel of monetary policy ever existed. Rather, it points out that financial innovation and deregulation have altered the structure of financial markets in ways that should have weakened the bank credit channel of monetary policy over time. In addition, it points out that the bank credit channel of monetary policy should have been further diminished by the Monetary Control Act of 1980 and subsequent changes in the structure of Federal Reserve reserve requirements that have significantly weakened the link between monetary policy actions and bank lending. Finally, the article presents evidence which suggests a weak and deteriorating relationship between Federal Reserve actions and the supply of bank credit.

WHAT IS "THE CREDIT VIEW?"

The credit view of monetary policy is part of a much broader literature on the role of credit in the macroeconomy. Several recent papers

(Bernanke and Blinder, 1988; Bernanke 1993; Gertler and Gilchrist, 1993b; and Kashyap, Stein and Wilcox, 1993) have defined the credit view more precisely within this broader framework. It is now generally understood that the credit view is the idea that monetary policy actions not only affect the economy through their effect on the liability side of banks' balance sheets, that is, by affecting the quantity of money, but also through their direct effect on bank lending.

In this literature, the "monetary view" of monetary policy tends to be rather narrowly focused on interest rates.⁶ Proponents of the credit view argue that even under extreme conditions where either interest rates do not respond to monetary policy actions or where spending is unresponsive to changes in interest rates, monetary policy actions affect the economy because of their direct effect on bank loans.⁷

Consequently, proponents of the credit view believe that the effects of monetary policy actions on the economy are larger than those that can be attributed to the effect of monetary policy actions on interest rates alone. For a separate bank credit channel for monetary policy to exist, it is generally acknowledged that two necessary conditions must be satisfied: Bank lending must be special and monetary policy actions must affect bank lending.⁸

Bank Lending Must Be "Special"

For bank lending to be special, banks must play a special role in the credit market, in that they make loans to a particular class of borrowers who find it difficult (very costly) or impossible (prohibitively costly) to obtain credit from other sources.⁹ This has been characterized

⁵Gertler and Gilchrist (1993b, p. 7), emphasis added.

⁶More generally, the monetary view of monetary policy is associated with the effects of policy actions on the supply of money and the subsequent effect of the change in the supply of money on the economy through a number of channels. Two important papers on the monetary transmission mechanism are Brunner and Meltzer (1976) and Stein (1976).

⁷The clearest statement of this is Bernanke (1993, pp. 55-57). Bernanke summarizes the distinction between the credit and monetary views by stating, "In a nutshell, the credit view asserts that in addition to affecting short-term interest rates, monetary policy affects aggregate demand by affecting the availability or terms of new bank loans" (p. 56).

⁸For example, see Bernanke (1993), Gertler and Gilchrist (1993b), and Kashyap and Stein (1993).

⁹The credit view should not be confused with "credit rationing," the idea that banks limit the availability of credit regardless of price. Several authors (for example, Bernanke, 1993; Bernanke and Blinder, 1988; Gertler and Gilchrist, 1993b; Kashyap and Stein, 1993; and Friedman and Kuttner, 1993) have pointed out that credit rationing is not essential for the credit view. In credit rationing models, individuals who are willing and able to pay the market interest rate are constrained from obtaining credit. In credit view models, this is not necessarily the case. All markets may clear. Friedman and Kuttner (1993, p. 14) note, "The fact that credit view models *can* encompass market non-clearing does mean that they necessarily do so, however, and on this point, too, substantial confusion exists."

(Bernanke and Blinder, 1988; and Bernanke, 1993) as the condition that bank loans and other credit are not perfect substitutes to either borrowers or lenders. That lenders are unwilling to make the same loans to all borrowers is plausible.¹⁰ Discontinuities associated with the size of transactions, costs associated with monitoring and controlling the behavior of borrowers, information costs and reputation may make it difficult, if not impossible, for some borrowers to raise funds in the open markets.¹¹ Indeed, it can be argued that banks and other nonbank financial intermediaries exist because of such credit market "imperfections." Banks have traditionally filled this void by specializing in gathering information and assessing the risk characteristics of such borrowers. They close the intermediation process by obtaining funds from individuals (bank depositors), some of whom have imperfect access to market-based liquid forms of savings.

Policy Actions Affect Bank Lending

The second necessary condition is that monetary policy actions have a direct effect on the supply of bank loans. The potential for a direct relationship between bank lending and policy actions arises from the fact that the Federal Reserve imposes legal reserve requirements on bank deposits.¹² Consequently, an open market operation that increases the quantity of reserves and bank deposits means that, other things being the same, banks have more funds to make more loans.

Care must be taken, however, to avoid the credit-view tautology. Other things being the same, an open market purchase of securities by

the Federal Reserve must raise bank assets and liabilities by an equal amount.¹³ If bank loans rise proportionately with other bank assets, the effect of policy actions on the supply of bank loans is tautological. The issue of whether bank credit is a separate channel for monetary policy deals with the broader question of whether policy actions induce a larger change in the *total* quantity of credit than that associated with the open market operation alone. Alternatively, the credit view deals with the question of whether Federal Reserve actions can alter the spread between the bank lending rate and open market interest rates.

An Illustration of the Role of the Specialness of Bank Lending to the Credit View of Monetary Policy

The credit view of monetary policy is made clear by two cases: one in which there is no separate credit channel for monetary policy because borrowers are free to obtain credit either from banks or in the open market, and one in which the access of bank borrowers to the open market is limited.

Figure 1 illustrates the effect of Federal Reserve actions on the supplies of bank and nonbank credit when lenders are indifferent to whom they supply credit. The banks' credit supply curve is vertical under the assumption that the supply of bank credit is totally determined by their deposit liabilities which, in turn, are assumed to be determined by the quantity of reserves supplied by the Federal Reserve.

Under these assumptions, an open market sale of government securities by the Federal Reserve reduces the supply of bank credit and, thereby,

¹⁰There is evidence that many small and medium-size firms do not have the same access to credit markets as large, well-known firms. This does not necessarily imply that the credit view is correct, however. For example, much of the empirical evidence—Gertler and Gilchrist (1993a, b), Bernanke and Lown (1992), and Oliner and Rudebusch (1993)—suggests that the important distinction is between "large" and "small" firms rather than between bank-dependent and nonbank-dependent firms. Consequently, while monetary policy may not operate directly through the credit channel, for a variety of reasons, small firms may be affected more by monetary policy actions than large firms.

¹¹For these, and perhaps others, the loan market is not completely impersonal. For example, borrowers may not be indifferent from whom they borrow—even under identical terms—if they believe that establishing a relationship with a particular lender will reduce their future search costs.

¹²The relationship is pointed out in Bernanke and Blinder (1992), Gertler and Gilchrist (1993b), Kashyap and Stein (1993), Romer and Romer (1990) and Lebow (1993). In the absence of deposit insurance, banks would hold "reserves" in the form of cash and highly liquid assets even if there were no statutory reserve requirements. The extent of the relationship between policy actions and bank lending under such a voluntary reserve system is an empirical issue.

¹³Assuming, of course, no immediate effect on bank capital.

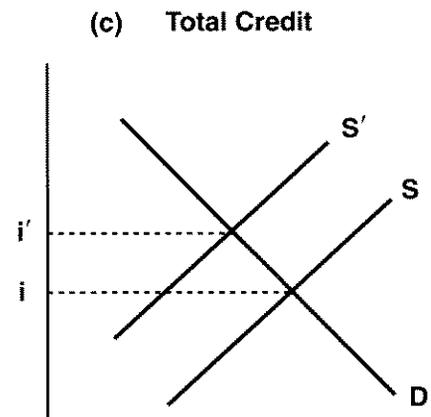
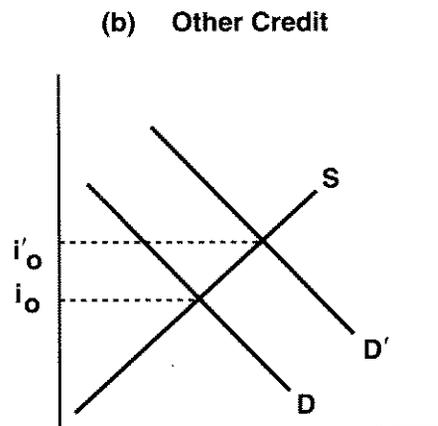
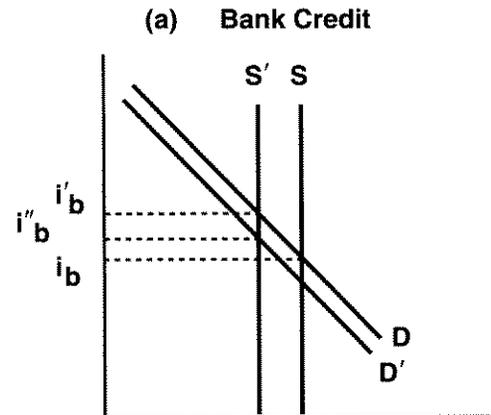
total credit. This is shown as a leftward shift in the banks' credit and total credit supply curves in Figure 1, panels a and c, respectively. The reduction in the supply of bank credit initially raises banks' lending rate relative to the rate on alternative sources of credit, from i_b to i'_b . As some borrowers go elsewhere, the demand for other credit increases and the demand for bank credit falls. This is illustrated by a rightward shift in the other credit demand curve in Figure 1, panel b, and a leftward shift in the demand for bank credit in panel a. Eventually, a new equilibrium is achieved, where once again bank rates and other rates are equal.

Federal Reserve actions fell disproportionately on bank credit, as the rise in interest rates resulted in an increase in the equilibrium level of other credit. Nevertheless, there was no separate bank credit channel for monetary policy. The decline in the supply of bank credit merely induced bank borrowers to go elsewhere.¹⁴ The change in the total quantity of credit is equal to the decrease in bank credit plus the increase in private credit induced by the rise in interest rates.

Imperfect Substitution

Now assume that some bank borrowers do not have access to alternative forms of credit. The fact that bank credit and other credit are not perfect substitutes requires this illustration to begin from an equilibrium in which the rate on bank loans is above the rate on other credit.¹⁵ In this case, the same policy-induced decline in

Figure 1



¹⁴Kashyap, Stein and Wilcox (1993) claim that the identification problem that arises in this literature can be circumvented by seeing whether policy actions affect the credit MIX, the ratio of bank loans to commercial paper. The idea is that if monetary policy affects the market in general and does not operate through the credit channel, there should be no correlation between the policy variables and the MIX variable. On the other hand, if monetary policy works through this credit channel, there should be a positive correlation between these variables. This illustration, however, shows an example in which there is no unique role for monetary policy through its effect on bank credit, yet monetary policy actions and the MIX variable are positively correlated.

¹⁵The fact that the rates on bank loans are generally higher than the rates on government securities and other credit is not sufficient for the credit view. Loans, securities, bank debt and other debt are not equally risky, so neither banks nor the market will be indifferent about their portfolio structures. The rates paid on each form of debt will differ by a risk premium that reflects both the banks' and the market's perception of their respective risk characteristics, including differences in the liquidity characteristics of the various assets.

the quantity of bank credit is associated with a smaller increase in the demand for other credit, as illustrated in Figure 2, as not all bank borrowers can obtain credit in the market. Consequently, when the new equilibrium is established, the bank loan rate will have risen relative to the rate on other credit.

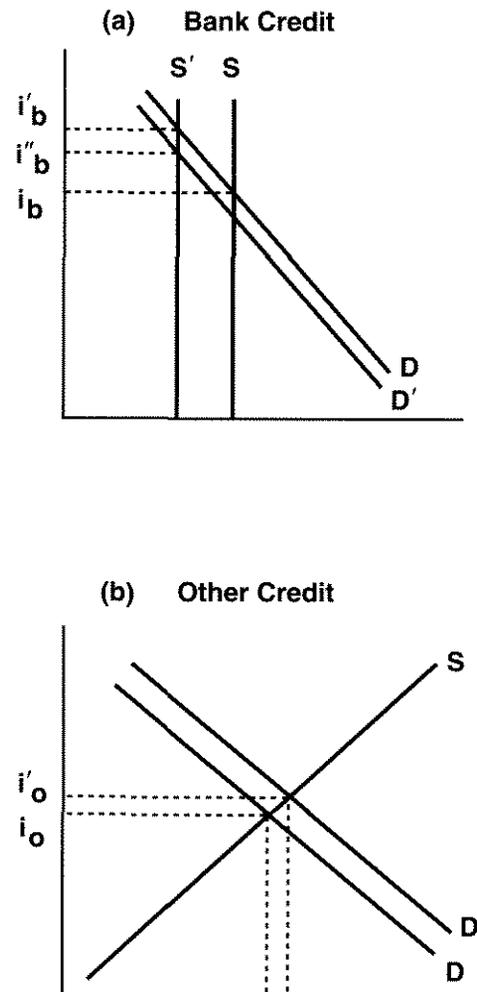
The effects of monetary policy in this case differ from the previous one in two critical respects. First, the restrictive policy action causes the equilibrium bank rate to rise relative to other rates. This means that if there is a separate credit channel for monetary policy, monetary policy actions would affect the spread between bank lending rates and rates on other forms of credit.¹⁶

Second, the change in the total quantity of credit is larger than in the previous case. This is most easily seen by noting that in the extreme case where none of the banks' customers can access the other credit market, there would be no mitigating effect of the open market operation on total credit resulting from a rise in the interest rate in the other credit market.¹⁷ Note that the effect of monetary policy actions on total credit will be larger, the smaller the proportion of bank borrowers who have access to other credit sources.

Arbitrage

In the above analysis, the Fed's ability to alter the spread between bank lending rates and other rates depended critically on the assumption that some bank borrowers were unable to obtain credit in the open market. Less obvious is the results' dependence on the implicit re-

Figure 2



¹⁶This implication of the credit view is widely recognized in the literature, for example, Bernanke (1993), Kuttner (1992) and Romer and Romer (1993). Bernanke (1993) argues that this approach to testing for the empirical significance of the credit view has not been pursued widely because of problems associated with measuring the "true" price of bank loans. Nonetheless, Kuttner (1992) and Romer and Romer (1993) have looked at this issue using the spread between the prime rate and the commercial paper rate. Kuttner finds that the evidence does not support the credit view, while Romer and Romer find evidence supporting the credit view.

¹⁷The outcome is actually more complicated than this simple illustration suggests because in reality it is the banks' depositors, not the bank, who are making the loan to the banks' loan customers. The bank is simply an intermediary to the transaction. This means that some of the depositors of banks are forced to move funds into other assets. Hence, eventually the effect of an open market operation on the total supply of credit must be limited to the extent of the open-market operation.

striction that banks themselves cannot arbitrage the spread between the bank loan rate and market interest rates.

It is important to recognize that banks do not create credit, they merely allocate it. Banks are financial intermediaries. They acquire funds, primarily from depositors, and lend these funds to others in such a way as to maximize profits. Consequently, as the bank loan rate rises relative to other rates banks have an incentive to arbitrage the larger rate differential by inducing

more depositors to, in effect, make more bank loans.

Suppose that the banking industry is competitive so that individual banks are powerless to influence the rates paid on either bank loans or other earning assets like government securities.¹⁸ Further assume that banks can access other credit markets by issuing debt (that is, deposits) against themselves that is a substitute for other market debt. Now assume that restrictive monetary policy actions reduce the supply of bank credit, causing the rate on bank loans to rise relative to other rates as before. Individually, banks would have an incentive to borrow more from the private credit market to make more bank loans. Banks would raise the rates that they pay depositors to induce more private creditors to intermediate credit through banks.

Generally speaking, if the banking system is competitive and banks are as creditworthy as other debtors, the supply of bank credit will rise and the supply of other credit will fall until the rate differentials once again reflect the banks' and the market's perception of the differential risk. Consequently, if banks are free to arbitrage the interest rate differential, monetary policy actions will not be able to alter the spread between bank loan rates and open market interest rates, and there will be no separate bank credit channel for monetary policy.¹⁹

Monetary Policy Actions and the Supply of Bank Credit

The critical issue is whether the banking system as a whole will be able to arbitrage the wider rate differential if the Federal Reserve controls the total quantity of reserves and, hence, bank loans, as was assumed in Figures 1 and 2. The credit view of monetary policy depends critically on the relationship between monetary policy actions and bank lending, and is weakened by the extent to which banks have

access to funds that are not affected by the Fed's actions. This section considers the extent to which Federal Reserve actions influence bank lending and how financial innovation, deregulation and changes in the structure of reserve requirements have altered the Fed's ability to influence bank lending.

The Federal Reserve directly influences the supply of bank loans through its system of reserve requirements. The relationship is identical to that which allows the Federal Reserve to exercise direct control over the supply of money.²⁰ An open market sale of government securities by the Fed reduces the supply of reserves. Because of reserve requirements, banks as a whole are forced to reduce their deposit liabilities. As banks' liabilities contract, other things being the same, so too do bank assets, including loans. The crucial issue, however, is the extent to which reserve requirements impose limits on the ability of banks to make loans.

The Federal Reserve can completely control the supply of bank loans, as assumed in Figures 1 and 2, only if uniform reserve requirements are imposed on all sources of bank funds. If this were the case, an open market purchase of government securities would cause banks to reduce both their liabilities and assets equally. If banks reduced their loans, loan rates would rise relative to open market rates. Individually, banks would have an incentive to arbitrage this interest rate differential by creating deposit liabilities against themselves. Banks as a whole, however, would not be able to increase their deposit liabilities because of the Federal Reserve's control over the total quantity of reserves.

In reality, reserve requirements have never been this stringent. Reserve requirements have never applied to all bank sources of funds, nor have they been uniform across all banks or all deposit liabilities. The fact that reserve requirements have varied across classes of deposits and

¹⁸That banks have some degree of market power does not alter this conclusion.

¹⁹This does not, however, rule out the possibility that monetary policy actions have an *indirect* effect on the rate differential. For example, if monetary policy actions affect economic activity, this could raise the rate on bank loans relative to open market rates by increasing the likelihood of default by bank-dependent borrowers relative to other borrowers. This effect might be considered as part of a broader role for credit in the propagation mechanism of monetary policy influences to the economy. For example, see Gertler and Gilchrist (1993b, c) and Bernanke (1993).

²⁰For recent discussions of this process, see Garfinkel and Thornton (1991) and Thornton (1992).

institutions means that the effect of a given open market operation on total bank loans can vary, perhaps widely, with the distribution of deposits.²¹

In addition, there is the possibility of substitution on the asset side of banks' balance sheets. Banks may choose to alter loans and securities proportionately or may simply absorb the entire effect of policy actions in their holdings of securities. Indeed, banks would tend to substitute away from government securities to bank loans as bank loan rates rise relative to the rates on securities, dampening the effect of restrictive monetary policy actions on bank loans. The magnitude of this effect, however, is uncertain. Moreover, if restrictive policy actions affect output, they could increase the default risk of bank borrowers relative to that of the government, inducing banks to shift their portfolios in the direction of government securities.²²

Nevertheless, the ability of banks to alter their asset portfolios may be particularly relevant for counter-cyclical monetary policy. For example, if reserve growth accelerates sharply after the economy is already in recession and loan demand is weak, as in the early 1990s, banks may be content merely to increase their holdings of securities; policy actions may have little effect on the quantity of bank loans.²³

Finally, as the differential between bank lending rates and other open market rates widens, banks would have an incentive to seek funds that are not subject to reserve requirements. In addition, nonbank financial intermediaries would have an incentive to increase their loans to traditional, bank-dependent borrowers. The extent to which these possibilities have led to financial innovation and deregulation is difficult to say. Nevertheless, financial innovation and deregulation appear to have lessened the extent to which bank lending is special and have sig-

nificantly weakened the Federal Reserve's ability to influence bank lending through open market operations.

FINANCIAL INNOVATION

Increasingly, banks have had to compete with nonbank financial intermediaries for loan customers. Moreover, banks' access to financial markets has increased significantly, resulting in an increasing proportion of bank funds coming from sources that are not affected directly by Federal Reserve actions. In addition, the phasing out and eventual elimination of Regulation Q interest rate ceilings in 1986 enabled banks to compete with nonbank financial intermediaries for such funds. An analysis of such changes in the structure of financial markets, coupled with changes in the structure of reserve requirements, suggests that the so-called bank credit channel of monetary policy may no longer be relevant empirically, if it ever was.

The Specialness of Bank Credit

Financial innovation and deregulation have widened the array of financing options available to many small and medium-size firms, reducing their dependency on banks. Changes in technology and the structure of financial markets have reduced the information and monitoring costs associated with making loans to many businesses, increasing many firms' direct access to financial markets and nonbank sources of funds.

Access of a wider array of firms to the commercial paper market and the rise in business lending by domestic finance companies have significantly reduced the specialness of bank credit.²⁴ Meanwhile, financial innovation has all but eliminated the specialness of bank credit for a wide array of other types of bank borrowers. Banks now face stiff competition from nonbank

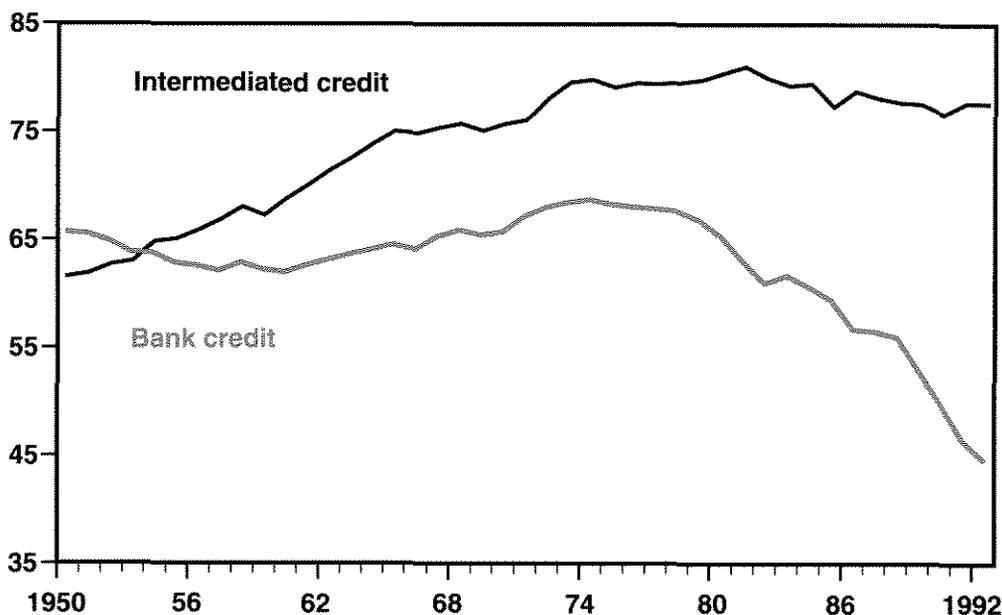
²¹Such slippage has been long recognized as a problem for monetary control. Indeed, one objective of the Monetary Control Act of 1980 was to reduce the sources of slippage between Federal Reserve actions and the M1 monetary aggregate (see Garfinkel and Thornton, 1989, for a discussion of these changes). While the Monetary Control Act strengthened the relationship between policy actions and M1, it significantly weakened the relationship between policy actions and M2 [see Thornton (1992)] and the supply of bank loans. The reasons for this will be apparent later.

²²This could bias empirical tests in favor of finding a significantly positive relationship between monetary policy actions and bank loans.

²³Bernanke and Lown (1991) suggest that if banks respond to an easier monetary policy by simply holding more government securities, "the 'credit channel' of monetary policy will be shut down, and the real effects of a given monetary expansion will be smaller." This assumes, of course, that those desiring bank loans will be unable to obtain credit elsewhere.

²⁴See Wheelock (1993) for a discussion of these and other developments.

Figure 3
Credit Issued by Financial Intermediaries as a Percent of Total Domestic Credit, and Credit of Banks as a Percent of Credit of Financial Intermediaries



intermediaries in consumer finance and both residential and commercial real estate finance.²⁵

Moreover, loans are frequently securitized. That is, they are combined with similar loans from a wide variety of such borrowers to diversify the default risk. Shares in such pools of loans are sold as securities in financial markets. In effect, such borrowers have direct access to the credit market. Banks often facilitate the process by initiating the loans and servicing the loan contracts, but they are not the source of the credit.

That such financial market innovations have reduced the role of financial intermediaries in the allocation of credit is illustrated in Figure 3, which shows that the proportion of total domes-

tic non-financial credit on the balance sheets of financial intermediaries has declined since the early 1980s.²⁶ This decline roughly coincides with the sharp rise in the commercial paper market.²⁷

More important for the credit view, however, has been the decline in the proportion of intermediated credit accounted for by banks. The banks' proportion of intermediated credit generally rose until the mid-1970s, to a peak near 70 percent. Since then, it has declined dramatically—nearly 25 percentage points—and now accounts for only about 45 percent of the total intermediated credit.

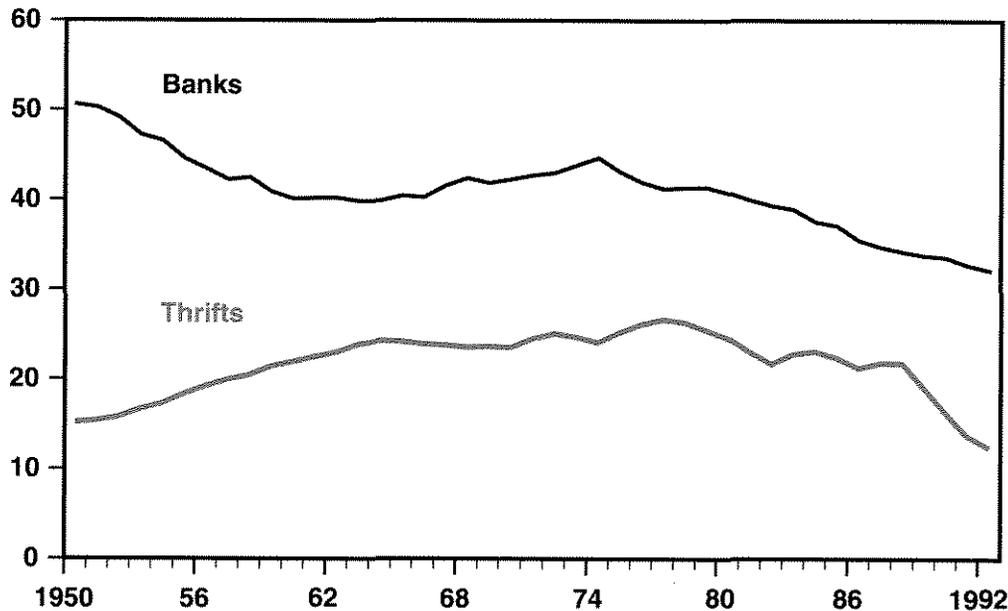
The proportions of intermediated credit supplied by commercial banks and thrifts is shown

²⁵For evidence on the changing role of finance companies and banks in the allocation of credit, and for an analysis of the importance of costly information in lending, see Remolona and Wulfekuhler (1992).

²⁶Financial intermediaries include the four depository institutions plus finance companies, pension funds and life insurance companies.

²⁷In addition, there has been increased competition from foreign banks. By 1989, foreign commercial banks accounted for about 20 percent of total U.S. commercial bank assets.

Figure 4
Credit Issued by Commercial Banks and by Thrifts as a Percent of All Credit Issued by Financial Intermediaries



in Figure 4. Both have declined in the last decade or so, with the proportion of intermediated credit supplied by commercial banks reaching its peak in the mid-1970s and that of the thrifts peaking in the late 1970s. The latter peak coincides with a sharp acceleration in the growth of money market mutual funds (MMMFs) in the late 1970s.

The increased prominence of nonbank financial intermediaries relative to banks in supplying credit and the increased reliance on obtaining funds directly in the markets, rather than through traditional financial intermediaries, point to a decline in the specialness of bank lending.²⁸

The Supply of Bank Credit

If banks merely satisfied their loan demand by issuing publicly held debt, there would be nothing

unique about bank credit. Nothing would be fundamentally different from a bank making a loan with funds obtained from the sale of large, negotiable certificates of deposit, and a finance company making a loan with funds obtained from the sale of commercial paper. Monetary policy actions would have a similar effect on bank and other credit—there would be no separate bank lending channel for monetary policy.

The credit view of monetary policy is weakened by financial innovation and deregulation that have significantly increased banks' access to financial markets and reduced their dependence on sources of funds that are subject to the reserve requirements of the Federal Reserve.²⁹ Two important innovations were the introduction of large, negotiable certificates of deposit and the development of the Eurodollar market.

²⁸The trend toward increased competition with banks for business loans is likely to continue. See Goodwin (1992) and *American Banker* (1993).

²⁹The increasing recognition of this fact is one reason why some have turned their attention from the credit view *per*

se to the role of credit market "frictions" in propagating monetary policy impulses. For example, this type of analysis forms the foundation of what Gertler and Gilchrist (1993b, c) call the "excess sensitivity hypothesis."

Negotiable Certificates of Deposit

Citibank introduced the first negotiable certificate of deposit in 1961, to make CDs more liquid and, thus, more attractive to investors. Because of their large denomination—\$100,000 or more—they were frequently purchased by money market investors who otherwise would not have maintained large savings balances with banks. As the popularity of these instruments increased, they became a major source of funds for banks.

These deposits are part of banks' so-called managed liabilities, which banks can tap during periods of increasing loan demand or restrictive monetary policy actions. At such times, banks raised the rate that they paid on large CDs, circumventing the Regulation Q interest rate ceiling on other deposit sources of funds.

Eurodollar Borrowing

The development of the Eurodollar market also provided banks with a new source of non-traditional funds. Eurodollars, dollar-denominated deposits in foreign branches of U.S. banks, initially were not subject to the reserve requirements of the Federal Reserve. Consequently, banks discovered they could obtain funds that were free from reserve requirements and simultaneously circumvent the Fed's Regulation Q interest rate ceilings by borrowing Eurodollars from their foreign branches. Of course, the Fed realized that banks' Eurodollar borrowing circumvented reserve requirements and extended reserve requirements to these liabilities.³⁰

Since Eurodollars and large CDs were subject to reserve requirements, it can be argued that

the total amount of these liabilities were constrained by the Federal Reserve. This conclusion, however, need not be valid. It ignores the possibility that banks change the relative prices of their deposit liabilities in response to changes in credit market conditions. The "price" of deposits includes service fees, minimum and/or average balance requirements and other incentives and inducements, as well as the explicit interest paid.³¹ Because checkable deposits had a higher percentage reserve requirement than that of savings-type deposits, including large CDs and Eurodollar deposits, banks could effectively increase the supply of loans for a given level of reserves by raising the cost of checkable deposits relative to noncheckable deposits. In this way, the total supply of loans could increase without an increase in the supply of reserves.

If the bank loan rate were to rise relative to other rates, individually banks would attempt to attract more funds by making their deposits more attractive. In so doing, they would have an incentive to make savings deposits somewhat more attractive than transaction deposits since they would not only attract new depositors, but also induce existing depositors to switch from checking to savings accounts.

Unfortunately, information about banks' pricing of deposits is scarce, so there is no evidence that banks followed such pricing practices.³² In any event, the possibility that banks could change the relative price of high-reserve-requirement and low-reserve-requirement liabilities could be part of the explanation for the apparent, historically weak association between bank lending and policy actions presented later.

³⁰Banks that were part of a bank holding company found that they could avoid the reserve tax on funds by having the holding company borrow funds directly in the market by issuing commercial paper and by borrowing the funds so obtained from the bank holding company. The Fed saw this loophole and imposed reserve requirements on such funds at the same time it imposed reserve requirements on Eurodollar liabilities.

³¹For a discussion of some of these elements of the pricing of deposits, see Carraro and Thornton (1986).

³²There is evidence that the lack of uniformity of reserve requirements resulted in some considerable slippage between Federal Reserve actions and the monetary aggregates M1 and M2 (for example, see Garfinkel and Thornton, 1989, and Thornton, 1992). Since the argument that Federal Reserve actions exert considerable influence over the supply of bank loans is directly related to the existence of such reserve requirements, the slippage must

be about the same as the slippage between Federal Reserve actions and M2. The fact that about 10 percent of M2 is composed of assets that are not the liabilities of banks makes it difficult to make a stronger statement. If these deposit liabilities are ignored, the slippage between Federal Reserve actions and bank loans must be at least as large as that between Federal Reserve actions and M2. This is so because the fact that banks can also adjust their asset portfolios—and would have an incentive to do so in the way described in the text—means that there is an additional source of slippage in the relationship between Federal Reserve actions and bank loans that is not present in the relationship between Fed actions and M2.

The Rise of Money Market Mutual Funds

A financial innovation that had an even more profound effect on the empirical relevance of the credit view was money market mutual funds (MMMFs).³³ Two factors gave impetus to the creation of MMMFs: the high inflation of the 1970s, which became embedded in market expectations, and the rise of market interest rates to levels much higher than those permitted by Regulation Q interest rate ceilings. The resulting outflow of deposits from banks into MMMFs had two consequences for the credit view.

The first was the decision to eliminate Regulation Q interest rate ceilings on bank deposits. As the high inflation of the 1970s pushed nominal interest rates significantly above those that banks could pay to depositors under Regulation Q interest rate ceilings, banks confronted increased competition for funds by nonbank financial intermediaries, especially MMMFs. As a result, Regulation Q interest rate ceilings were phased out and eventually eliminated (for all but demand deposits) in March 1986. During the phasing out of Regulation Q, several new deposits were introduced, such as all-savers certificates and money market deposit accounts, to permit banks to compete more effectively with nonbank financial intermediaries for funds.³⁴ This meant that an increasing number of banks were now able to compete directly in the market for funds. Previously, only large banks could compete effectively in the large CD, Eurodollar and commercial paper markets.

The increased competition between banks and nonbanks for "traditional" bank sources of funds gave rise to a second change that has had an even more important consequence for the credit view—the elimination of required reserves on sources of funds by which banks were in direct competition with nonbank intermediaries.

The fact that banks were required to hold a percentage of such deposits in non-interest bearing reserves—either vault cash or deposit balances with Federal Reserve Banks—placed them at a competitive disadvantage relative to other, nonbank intermediaries.³⁵ Pressure to eliminate the reserve requirements gave rise to changes in the structure of reserve requirements that have significantly reduced the ability of the Federal Reserve to influence bank credit through open market operations. The discussion of these changes begins with the Monetary Control Act of 1980 (MCA).

The MCA, Changes in Reserve Requirements and the Supply of Bank Credit

The MCA made two changes to the structure of reserve requirements that had opposite effects on the Fed's ability to influence bank lending. On the one hand, the MCA extended the System's reserve requirements to all depository intermediaries, instead of just member commercial banks. This increased the Fed's ability to influence the availability of funds to all banks. On the other hand, the MCA eliminated reserve requirements (on all but demand deposits) on a broad category of time and savings deposits, significantly increasing the proportion of bank deposit liabilities that are not influenced directly by Federal Reserve actions.

Continued pressure to increase the competitive position of banks caused the Fed to eliminate required reserves on the remaining categories of time and savings deposits in December 1990. Today, reserve requirements apply to less than 25 percent of banks' deposit liabilities and less than 20 percent of banks' total sources of loanable funds. Consequently, it should not be too surprising to find that current bank lending is relatively unresponsive to changes in the supply of reserves.

³³MMMFs were introduced in 1970. Their growth, however, was modest until interest rates rose to historically high levels in the late 1970s.

³⁴See Gilbert (1986) for a more detailed discussion of the effects of Regulation Q interest rate ceilings and for a chronology of their eventual elimination.

³⁵It should be pointed out that banks also get various government subsidies in the form of deposit insurance, access to the Fed's discount window, and government regulated oligopoly power in their franchise to issue trans-

action deposits. It is not clear whether the combination of these taxes and subsidies result in a net tax or a net subsidy to banks relative to their nonbank competitors.

EVIDENCE OF THE EFFECT OF FEDERAL RESERVE ACTIONS ON THE SUPPLY OF BANK CREDIT

The credit view of monetary policy is based on a chain of causation from the supply of reserves to the supply of bank loans. The literature on the credit view, however, has not examined the link between the supply of reserves and the supply of bank loans closely. This section investigates the association between bank loans and total reserves adjusted for reserve requirement changes.

Whatever its immediate or long-run objectives, the Fed pursues them through open market operations, changes in reserve requirements and changes in the discount rate. These actions are directly reflected in total reserves. Because of reserve requirements, bank lending and total reserves should be positively related, regardless of whether changes in total reserves represent an exogenous change in monetary policy or whether the Fed is merely accommodating shifts in the demand for deposits subject to reserve requirements.³⁶ Other commonly used measures of monetary policy, like the federal funds rate or policy indicators based upon an examination of Federal Reserve documents, are not necessarily closely related to Federal Reserve actions that affect the availability of bank loans.³⁷ Consequently, they cannot necessarily provide evidence about the relationship between the supply of reserves and bank lending.

The availability of reserves can be affected by the actions of the public, however. For example, if the demand for currency were to rise, other things being the same, the availability of reserves to the banking system would decline. Consequently, an increase in the public's demand for currency would have the same effect on bank

liabilities and lending as an equivalent sale of government securities by the Federal Reserve.

The Federal Reserve's operating procedures, however, have tended to automatically accommodate such shifts.³⁸ The Fed supplies additional reserves to offset the reserve drain when the demand for currency increases. The reverse is true when the demand for currency decreases. Total reserves change only when the Fed takes actions other than those required to accommodate swings in currency demand. Thus, total reserves adjusted for changes in reserve requirements is a good indicator of Federal Reserve actions that affect banks' balance sheets.

Interpreting the Relationship Between Total Reserves and Bank Lending

Finding that reserves and bank lending are unrelated would suggest that there is no credit channel for monetary policy. Finding that reserves and bank lending are highly and positively associated, on the other hand, does not ipso facto mean the credit view is valid. The problem is that bank loans and total reserves may respond endogenously to the same shocks. For example, suppose there is a decline in economic activity and with it, a decline in the demand for liquid deposits, nominal interest rates and credit demand. If the Fed accommodates the decline in the demand for liquid deposits by reducing the growth of reserves, reserve growth and loan growth would be positively associated even if there was no direct association between reserves and loans.³⁹

This problem is particularly acute for total reserves because total reserves consist of both borrowed and nonborrowed reserves. Borrowed reserves have tended to respond endogenously

³⁶Some analysts would associate the stance of monetary policy with reserve growth, but this would certainly not be true of all. For example, some believe that the Fed controls the federal funds rate and associate changes in monetary policy with changes in the federal funds rate despite the fact that the funds rate can fall (monetary policy becomes easier) when reserves are declining, for example, the period from April through June 1989. Others prefer to gauge the thrust of monetary policy from the behavior of M2. For example, Friedman (1992) and Buchanan and Fand (1992) argued that monetary policy was excessively tight in 1991-92 because M2 growth was slow and decelerating, despite the fact that reserve growth accelerated sharply during this period and increased at double-digit rates.

³⁷Garfinkel and Thornton (1994) argue that there is no monetary information in the federal funds rate that is not contained in other short-term interest rates.

³⁸This is the case if the Fed is targeting the federal funds rate, nonborrowed reserves or borrowed reserves.

³⁹The Fed's preoccupation with interest rate targeting [see Goodfriend (1991)] would tend to exacerbate this tendency, as the Fed would attempt to put downward pressure on the federal funds rate by reducing the growth of reserves.

to changes in the spread between the federal funds and discount rates. Consequently, borrowed reserves and, hence, total reserves will tend to rise and fall when market interest rates are rising and falling, respectively. Because of this, some have argued that nonborrowed reserves is a better indicator of monetary policy actions than are total reserves.⁴⁰

If the objective is merely to measure the degree of association between reserves and bank loans that results from the existence of reserve requirements, this distinction is unimportant.⁴¹ However, if the objective is to determine whether monetary policy works through the bank lending channel, the distinction is critical. A statistically significant, positive association between total reserves and loans does not necessarily imply that policy actions affect bank loans in the manner suggested by the credit view of monetary policy. A positive association between reserves and bank loans could result from the effect of monetary policy on the economy through the standard monetary channel. For example, an increase in reserve growth could stimulate economic activity through the monetary channel, increasing the demand for credit and, consequently, the quantity of bank loans.

Kashyap, Stein and Wilcox (1993) try to deal with this identification problem by using a MIX variable, the ratio of bank loans to the sum of bank loans and commercial paper outstanding. They argue that if monetary policy works through the bank credit channel, a restrictive monetary policy action should be associated with a decline in bank loans relative to commercial paper, that is, the MIX variable should decline.⁴² Alternatively, if monetary policy works through the standard monetary channel, both

bank loans and commercial paper should be affected more or less equally so that the credit MIX should be unaffected by policy actions.

If Federal Reserve actions affect bank credit with a lag, however, it will be particularly difficult to distinguish the monetary channel from the credit channel. When the Fed increases the supply of reserves, banks have an incentive to expand their deposit liabilities quickly because the Federal Reserve does not pay interest on reserves. Consequently, an increase in the supply of reserves will be associated with an immediate increase in the supply of money. If bank credit responds with a lag, there will be little or no immediate change in the supply of bank credit. Thus, it will appear as though monetary policy works solely through the monetary channel even though the bank lending channel may be operative as well.⁴³

The Contractual Nature of Loans Made Under Commitment

The fact that loans are contractual obligations not quickly changed and that many loans are made under commitment (for example, a line of credit) suggests that policy actions may affect bank loans with a lag. For example, if the Fed reduces the supply of reserves, banks will have an incentive to reduce loans and not issue new ones. Given such rigidities, however, banks may initially reduce their holdings of government securities and later reduce their quantity of outstanding loans.

Policy actions that result in a decrease in total reserves are fairly extreme. Reserves tend to grow over time, with policy actions characterized by changes in the growth rate of reserves. Because of the contractual nature of loans and

⁴⁰For example, see Christiano and Eichenbaum (1991, 1992). This proposition that nonborrowed reserves is a better policy indicator has been challenged by Gilles, Coleman and Labadie (1993).

⁴¹For example, borrowed reserves increased dramatically in May-June of 1984, when Continental Bank made heavy use of the Federal Reserve's discount window. As a result, there was a sharp drop in nonborrowed reserves, with virtually no change in total reserves. There was no need for banks to contract loans despite the drop in nonborrowed reserves.

⁴²In footnote 11, I have noted why a positive association between the MIX variable and Federal Reserve actions does not necessarily mean that the credit view is valid because such a correlation can arise in the situation in which policy actions limit bank lending, but where the bank lending is

not special. Nonetheless, essentially finding no relationship between policy actions and the MIX variable is indicative of policy actions effecting both the banks and the credit markets equally. Consequently, the lack of association between these variables is evidence that there is no unique channel of monetary policy through bank lending.

⁴³This observation has been made by Bernanke and Blinder (1992) and Bernanke (1993) as an argument why evidence by Romer and Romer (1989) and Ramey (1993) that monetary aggregates are more closely linked to economic activity than credit aggregates is not necessarily evidence against the credit view.

the existence of loan commitments, a significant slowing of the growth of reserves may be reflected initially more in banks' holdings of government securities than in loans.⁴⁴ A significant acceleration in reserve growth should be associated with an acceleration in the growth of both banks' holdings of government securities and loans. Consequently, policy actions should affect loans more quickly when the Fed increases the growth rate of reserves. Other things being the same, the contractual nature of loans and the existence of loan commitments suggest that the timing of the effect of policy actions on bank loans should be asymmetric: Open market purchases should be associated with an immediate response in bank lending, while open market sales should affect bank lending with a lag.⁴⁵

The Relationship Between Total Reserves and Bank Loans

Because of reserve requirements, one would expect to find a fairly close association between reserves and bank liabilities prior to the 1980s. There are several caveats, however. First, prior to the MCA, only member commercial banks were required to maintain reserves, so the connection necessarily exists only between total reserves and deposits of member commercial banks. Second, the percentage reserve requirement varied by the size of the member bank and deposit classification. Consequently, the relationship between total deposits and total reserves, even among member commercial banks, might have varied significantly with the distribution of deposit liabilities. Third, financial innovations that were designed to circumvent reserve requirements and Regulation Q interest rate ceilings should have weakened even the longer-run relationship between total reserves and bank liabilities, especially since the late 1970s. Finally, the passage of the MCA and the phasing out and eventual elimination of Regula-

tion Q should have all but eliminated the relationship since the early 1980s.

Reserves, loans and deposits all tend to rise over time. This should not be mistaken as evidence in favor of the credit view, however, since they are all merely expanding with an expanding economy and inflation. Statistical tests of the association between total reserves and bank loans must account for the dominant trends in these data. In the regression analysis that follows, this is done by taking the first difference of these variables.⁴⁶

The reported regression results are from estimates of equations of the general form

$$(1) \Delta y_t = \beta(L)\Delta TR_t + \varepsilon_t,$$

where Δ is the difference operator, that is, $\Delta x_t = x_t - x_{t-1}$, y is the dependent variable, L is the lag operator, that is, $Lx_t = x_{t-1}$, $\beta(L) = \beta_0 + \beta_1 L + \beta_2 L^2 + \dots + \beta_k L^k$, and TR denotes total reserves.

The primary interest is in the contemporaneous and long-run effects, so it is convenient to rewrite equation 1 as

$$(2) \Delta y_t = \theta \Delta TR_{t-k} + R(L)\Delta^2 TR_{t-1} + \varepsilon_t,$$

where $\theta = \beta_0 + \beta_1 + \dots + \beta_k$ and $R_0 = \beta_0$, $R_1 = \beta_0 + \beta_1$, and so on. The coefficient θ

the long-run response of the dependent variable to a permanent change in total reserves. The credit view requires θ to be positive and statistically significant. The coefficient $\beta_0 (=R_0)$ gives the initial response and $\theta - \beta_0$ gives the subsequent response of the dependent variable to changes in total reserves.

The Results

Equation 2 was estimated separately for loans and for deposits of commercial banks, thrifts, and commercial banks and thrifts com-

⁴⁴Indeed, in the short run, loans may actually increase as customers exercise their loan options.

⁴⁵It is interesting to note that this interpretation is at odds with the standard view of the asymmetry of monetary policy and with the empirical evidence (Cover, 1992; DeLong and Summers, 1988; and Rotemberg, 1993) that suggests restrictive monetary policy actions are more effective than expansionary monetary policy actions. The asymmetry of the effects of policy actions on bank credit, suggested by Bernanke and Blinder (1992) and others, that expansionary policy actions should have more immediate—and perhaps larger—effects on bank credit and, consequently, economic activity than restrictive policy actions.

⁴⁶There is always the danger of over-differencing data. To see if the results are robust for the filter used, the equations were also estimated using data obtained from the Hodrick-Prescott (1980) filter. There were no qualitative differences in these results from those reported here.

Table 1
The Relationship Between Bank Deposits and Loans: 1959.1-1979.4

	Commercial banks		Thriffs		Commercial banks and thriffs	
	Deposits	Loans	Deposits	Loans	Deposits	Loans
Constant	13.059* (4.30)	3.949 (1.49)	-.209 (0.17)	-0.082 (0.46)	12.802* (3.82)	6.540* (1.97)
β	12.317* (2.60)	7.232* (2.08)	.024 (0.01)	0.492* (1.71)	9.544* (1.85)	7.599* (1.70)
θ	29.311* (1.76)	23.128* (1.77)	-2.725 (0.48)	0.876 (0.99)	-3.978 (0.24)	9.552 (0.61)
$\theta-\beta$	16.995 (1.07)	15.896 (1.25)	-2.749 (0.52)	.384 (0.45)	-13.522 (0.85)	1.953 (0.13)
\bar{R}^2	.742	.786	.792	.720	.772	.821
S.E.	6.523	4.899	2.712	0.416	7.106	6.178

*Indicates statistically significant at the 5 percent level using a one-tailed test.

bined. These data, taken from the Flow of Funds Accounts, are for the last day of the quarter and are not seasonally adjusted. The estimated equations include a third-order lag of the dependent variable, three quarterly seasonal dummy variables, and contemporaneous and eight lags of ΔTR . Only the estimated constant and estimates of the β_0 , θ and $\theta-\beta_0$ are reported. Garfinkel and Thornton (1989) show that the MCA was essentially phased in by February 1984, when the large member banks were completely phased in. Because of the limited number of quarterly observations, however, the results reported here are for two periods broken at the introduction of the MCA: 1959:4 to 1979:4 and 1980:1 to 1993:2.

As noted previously, unless demand factors are explicitly controlled, a positive association between reserves and bank loans does not necessarily imply that monetary policy works through the bank lending channel. In an attempt to control demand factors, two cyclical variables, the spread between the federal funds rate and the 10-year government securities rate and the growth rate of nominal GDP, were included in the regressions. These variables were generally insignificant and the qualitative results when these variables were included differed little from the results when they were not excluded. Consequently, only the latter results are

presented here. In addition the empirical work was also conducted using nonborrowed reserves. The qualitative conclusions regarding the credit view were the same as those obtained using total reserves, so only the latter results are reported.

Estimates of equation 2 for both periods are presented in Tables 1 and 2, respectively. The estimates show that both deposits and loans were significantly related to total reserves during the first period. Not surprisingly, the statistically significant relationship for deposits is due entirely to commercial banks because deposits at thriffs are essentially unrelated to reserves. The statistically significant relationship for loans is primarily due to commercial banks. While statistically significant, the relationship between reserves and loans at thriffs is not large.

The results for the pre-1980s point to the potential validity of the credit view. Loans and reserves are positively and significantly associated for both banks and thriffs, although the relationship was quite weak for the latter. All of the effect is contemporaneous, however, as the subsequent response of deposits or loans to a changes in total reserves, $\theta-\beta$, is never statistically significant at the 5 percent level.

The magnitude of the effect is quite small, however. A \$1 billion increase in total reserves

Table 2
The Relationship Between Bank Deposits and Loans: 1980.1-1993.1

	Commercial banks		Thrifts		Commercial banks and thrifts	
	Deposits	Loans	Deposits	Loans	Deposits	Loans
Constant	46.435* (3.97)	8.043 (0.64)	-3.842 (0.51)	-0.342 (0.16)	27.252* (2.37)	-5.044 (0.33)
β	2.350 (0.69)	-0.933 (0.22)	2.813 (0.98)	-0.563 (0.73)	8.642* (2.08)	-1.443 (0.26)
θ	-1.509 (0.26)	4.211 (0.67)	-1.145 (0.25)	0.865 (0.68)	1.707 (0.26)	9.721 (1.11)
$\theta-\beta$	-3.859 (0.68)	5.145 (0.79)	-3.958 (0.87)	1.428 (1.10)	-6.935 (1.04)	11.164 (1.19)
\bar{R}^2	.765	.416	.766	.470	.820	.668
S.E.	13.772	16.254	11.263	3.234	16.836	21.814

* Indicates statistically significant at the 5 percent level using a one-tailed test.

resulted in a estimated \$12 billion long-run increase in banks loans. Since total reserves increased about \$8 billion from 1960 to 1979, policy actions would appear to account for less than \$100 billion of the about \$1,178 billion increase in bank loans during this period. While these estimates should be interpreted cautiously, they suggest that the direct effect of monetary policy actions on bank lending during the period was modest.

The estimates for the second period in Table 2 show that there is no statistically significant relationship between total reserves and loans for commercial banks or thrifts. Consistent with the discussion of the effects of financial innovation and changes to the structure of reserve requirements, it appears that the modest association between Federal Reserve actions and bank loans that was evident prior to 1980 has vanished.

Commercial and Industrial Loans and Reserves

Because the credit view is most likely to apply to businesses that have less access to alternative sources of credit, most of the empirical work to

date has focused on commercial and industrial (C&I) loans. Seasonally adjusted data on C&I loans are available on a monthly basis, but only for commercial banks and only since November 1972. Equation 2 was also estimated with commercial bank holdings of government securities, SEC, as the dependent variable, to test whether any potential lag in the effect of reserves on C&I loans can be attributed to changes in banks' holdings of liquid assets. Finally, the equation was estimated using a Kashyap-and-Stein-type MIX variable, the ratio of C&I loans to commercial paper. Equation 2 was estimated separately for the periods of November 1972 to February 1984, and March 1984 to May 1993, to test whether changes in reserve requirements under the MCA significantly reduced the effect of policy actions on bank loans.⁴⁷ All the estimated equations include three lags of the dependent variable and contemporaneous plus 12 lags of ΔTR .

Estimates for the two periods are presented in Tables 3 and 4, respectively. The results for the first period indicate a statistically significant relationship between total reserves and C&I loans, but not between total reserves and SEC.

⁴⁷In each case, contemporaneous and 12 lags of ΔTR were included along with three lags of the dependent variable.

Table 3

**The Effect of Federal Reserve
Actions on Selected Commercial
Bank Assets: 1972.11-1984.2**

	C&I loans	SEC	Mix
Constant	247 (0.83)	.459* (2.02)	-.000 (0.75)
β_0	1.081 (1.37)	1.218 (1.63)	.002 (1.45)
θ	7.602* (2.66)	-1.124 (0.36)	-.004 (0.87)
$\theta - \beta_0$	6.522* (2.39)	-2.341 (0.81)	-.006 (1.34)
\bar{R}^2	.423	.405	.052
S.E.	1.719	1.566	.003

*Indicates statistically significant at the 5 percent level using a one-tailed test.

Table 4

**The Effect of Federal Reserve
Actions on Selected Commercial
Bank Assets: 1984.3-1993.5**

	C&I loans	SEC	Mix
Constant	0.271 (0.50)	1.179* (1.84)	-.002* (2.98)
β_0	0.903 (1.02)	-0.589 (0.60)	-.000 (0.14)
θ	0.087 (0.06)	0.022 (0.01)	.002 (1.41)
$\theta - \beta_0$	-0.816 (0.55)	0.610 (0.36)	.002 (1.42)
\bar{R}^2	.225	.335	-.038
S.E.	3.040	3.407	.003

*Indicates statistically significant at the 5 percent level using a one-tailed test.

Reserves appear to affect C&I loans with a lag. There is a positive, contemporaneous relationship between reserves and SEC and a negative subsequent relationship; however, neither is statistically significant. Nevertheless, these estimates provide some qualitative support to the finding of Bernanke and Blinder (1992) and others that monetary policy is reflected initially in banks' holdings of securities and subsequently in bank loans.

The results for the second period provide no support for the credit view. None of the coefficients is statistically significant at the 5 percent level, and the qualitative pattern of first expanding SEC and, subsequently, C&I loans that is evident in the first-period results has vanished.

The results for the MIX variable are not supportive of the credit view in either period. The coefficient on the contemporaneous MIX variable is positive in the first period, as the credit view predicts, however, the long-run coefficient is negative and neither coefficient is statistically significant.

Finally, changes in C&I loans made under commitment are regressed on changes in total reserves.⁴⁸ These results appear in Table 5. Because these data are available only from January 1975 to June 1987, the results are reported for a sample ending in February 1984 and for the entire sample period. The relationship between loans made under commitment and total reserves is positive and immediate. Moreover, there is no statistically significant long-run relationship. The results suggest that loan commitments do not account for the failure of the lending channel.

CONCLUSIONS AND COMMENTARY

The empirical results presented here lend little support to the credit view of monetary policy. There was a positive and statistically significant relationship between Federal Reserve actions and both bank lending and bank deposits prior to the early 1980s. The effect, however, was quite small.

⁴⁸The data on loans made under commitment come from a Federal Reserve Survey of about 138 large, weekly reporting commercial banks that account for about 85 percent of all commercial and industrial loans of all weekly reporting banks. The official survey ran from January 1975 to June 1987.

Table 5

Effects of Monetary Policy Actions on Loans Made Under Loan Commitments

	1975.1-1984.2	1975.1-1987.6
Constant	.247 (0.93)	.322 (1.45)
β_0	1.419* (1.92)	2.336* (4.16)
θ	1.691 (0.62)	1.160 (1.14)
$\theta - \beta_0$.272 (0.11)	-1.176 (1.11)
R^2	.233	.258
S.E.	1.488	1.696

*Indicates statistically significant at the 5 percent level using a one-tailed test.

Consistent with financial innovation and changes in reserve requirements under the MCA, the relationship between Federal Reserve actions and bank lending since the early 1980s is nil. Consequently, whatever the nature of the relationship between bank lending and Federal Reserve actions prior to the 1980s, it appears that changes in the structure of reserve requirements under the MCA of 1980 have essentially eliminated it. Indeed, given the existing structure of reserve requirements, it is difficult to see how monetary policy can work through the hypothesized bank credit channel, if it ever did.

These results notwithstanding, there is a growing recognition that the relative position of depository financial intermediaries in allocating credit has diminished over time. It is now generally accepted that banks compete directly with other intermediaries for most of their funds and that they no longer have a unique place in supplying consumer and real estate credit. Moreover, other intermediaries are becoming increasingly competitive with banks in the market once thought to be the bastion of banks—extending credit to small and medium-sized businesses. At the same time, financial innovations have significantly redefined the meaning of small and medium when it comes to the size of firms with direct access to credit markets. Indeed, it is ironic interest in the bank

credit channel of monetary policy has been rejuvenated at a time when justification for it has eroded.

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