Control of a Credit Aggregate

In the debate about which financial aggregates the Federal Reserve should target, a key question is how the Federal Reserve would go about controlling a credit aggregate. While the Federal Reserve can limit the supply of reserves, it is difficult to see a close connection between reserves and a broad financial aggregate, much (or all) of which is not reservable. Admittedly, some nations' central banks directly restrict the quantity of credit that their banking system may lend. And, in the United States under the special credit restraint program of 1980, guidelines were set for permissable expansion in loans and credit. Nevertheless, in this country, direct restrictions on the quantity of credit, particularly for extended periods of time, have not generally been regarded as either a desirable or a feasible way to operate.[1]

How, then, could a credit aggregate target be achieved in the United States? One approach, advocated by some Wall Street economists, is to impose a high capital requirement on banks. (This capital requirement would be set above the level demanded for prudential purposes by the bank supervisor.) The additional need for capital to support bank credit expansion could, according to the proponents, act as a substantial brake on both bank lending and total credit. A second approach is to impose reserve requirements on credit expansion, making it more costly for firms and households to borrow. A third possibility is use of a "shadow" reserve requirement with some broad measure of credit; the implicit "reserves" calculated in this fashion could be used to guide the actual amount of reserves provided by the Federal Reserve.

In this article, I examine the effectiveness of capital ratios as well as these alternatives as control devices. The analysis indicates that

- Capital ratios on bank assets (above the prudential level that banks would maintain to satisfy the supervisors or their equity holders) would curb domestic bank lending. But much of any increase in credit demand would be accommodated in other markets.

- To the extent that credit needs were easily met elsewhere, capital ratios would put little pressure on the general level of interest rates and would have little effect on spending and on a broad credit measure.

- Reserve requirements on bank credit suffer from some of the same problems as capital requirements.

- Shadow reserve requirements on a broad credit aggregate, however, might be an effective mechanism to influence both spending and credit in the economy.

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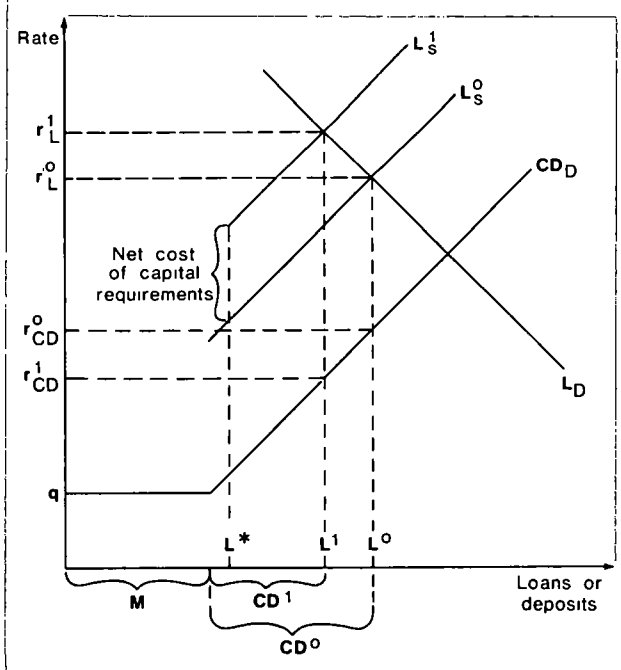
[1] Irving Auerbach has suggested that such limits on credit expansion be adopted to replace the present system whereby reserves must be maintained against liabilities According to his proposal, banks would be able to buy or sell their allocations

Diagram

Market for Bank Loans and Certificates of Deposit



Assume banks have core deposits on which they pay an average rate of interest q Banks raise additional funds through certificates of deposit (CDs) In turn, banks make loans, basically charging a rate of interest that is a constant markup over the CD rate Thus, L_S^0, the supply function for bank loans before capital requirements, is represented in the diagram as parallel to the demand for CDs (CD_D) L_D is loan demand In equilibrium, loan volume will be L^0, and the interest rate charged on loans will be r_L^0 Part of L^0 will be funded with deposits (M) and the remainder with CDs, in quantity CD^0

With the imposition of capital requirements, the banks' required return on loans jumps, shown by the L_S^1 curve L^* is the level of loans above which marginal capital requirements take effect In the new equilibrium, the interest rate charged on loans increases to r_L^1, and loan volume falls to L^1 A smaller volume of CDs is thus necessary (CD^1), causing the CD rate to fall to r_{CD}^1 from r_{CD}^0

Loan volume and capital requirements

Suppose there is an increase in the demand for loans stemming from a planned increase in spending. How would the results differ if expansions of bank credit beyond some point were subject to high marginal capital ratios?

To examine the effect of capital ratios, some background assumptions about monetary policy must be specified. For simplicity, assume that capital ratios would be superimposed on a system in which there is still a monetary target, implemented through reserve provisions.

When the demand for loans increases, banks typically raise funds through repurchase agreements on securities in their portfolios or through the issue of more certificates of deposit (CDs); they may also sell some securities or buy fewer than they had planned The additional need for funds, if it is widespread, will cause the CD rate to rise since investors need to be induced to hold a larger volume of CDs. Also, if reduced bank holdings of securities push up the rates on these securities, CD investors will also typically require a higher return. The higher cost of funds will, in turn, induce banks to raise the rates charged on loans.

How would capital requirements affect this process? Capital requirements, if they exceed the capital ratios that banks would otherwise maintain, represent an additional cost attached to expanding a bank's asset portfolio The markup on the cost of funds will therefore probably be greater than in the absence of capital ratios As a consequence, some borrowers who have direct access to funds in the commercial paper market or bond market will elect to raise funds that way instead of through the intermediation of banks In addition, they may seek to borrow from foreign banks or other institutions not subject to the capital requirement

The results of an expansion of loan demand under this regime are:

- The loan rate rises by more than in the unconstrained case,
- Loans may expand but not by as much as in the unconstrained case;
- Domestic bank profits will not rise as much,
- The capital requirement does not act as a complete bar against loan expansion except in the extreme case where banks cannot raise capital at all (even through retained earnings) and they have no securities in their portfolio that they can sell [2]

Quantitative impact of capital requirements

The impact of capital requirements on the volume of loans and the rates charged depend upon a number

[2] A bank may wish not to sell securities whose market value is below par value because, by selling them, they would be forced to show a loss on those securities

of factors including (a) the ease of raising capital (either through equity or long-term subordinated debt) and (b) the level of the capital requirement relative to the capital ratio that would otherwise be maintained.

Suppose, for example, that on bank credit expansion which exceeded the target a bank had to maintain a marginal capital requirement of 2 percent above the capital ratio that banks needed for prudential reasons. Further, suppose capital would be raised in the form of equity rather than subordinated long-term debt and that expected annual earnings of 20 cents per dollar invested would need to be offered to new equity buyers. (In August 1982, the thirty-five large banks included in the Salomon Brothers Inc average had an earnings-price ratio of 19.2 percent.) Since the new equity represents a source of funds which could substitute for liabilities, such as deposits or other forms of borrowing, the net extra cost of the capital acquired would be 20 percent minus the aftertax interest cost on these liabilities. Suppose that the interest rate on these liabilities is 15 percent per year and that, after Federal income taxes, this costs the bank roughly 8 percent (state and local taxes are ignored for this calculation). Then the net cost of financing with equity rather than with debt would be 12 percent. The capital requirement would therefore add 24 basis points (the 0.02 undesired capital requirement multiplied by the 12 percent marginal cost of equity finance) per dollar to the cost of expanding loan volume.

Some of the 24 basis points would be reflected in a higher loan rate, some in a lower CD rate, and some in a reduction of bank profits (diagram). The fewer the alternatives to bank loans, the more willing potential borrowers would be to pay a higher rate and still obtain credit from banks. In this case, where the demand for loans is "inelastic", borrowers will end up paying almost 24 basis points more. In contrast, in the case where borrowers have good alternatives to bank loans, they will pay an increase which is much less than 24 basis points.

Naturally, if the original assumptions were not a good description of the real world, the loan rate could increase by more (or less) than 24 basis points. For example, if the supply curve of equity capital to the bank were upward sloping, so that the bank had to offer successively higher expected returns to shareholders to raise more capital, the effect on the loan rate could be greater. Further, there may be subjective costs involved in raising new capital. For example, a bank may be reluctant to issue new stock if the market price of its stock is below book value. In this case, current earnings would be a key factor in capital expansion: banks with high earnings could retain earnings to finance expansion, while those with lower earnings would not expand their portfolios. Moreover, if capital ratio requirements reduce earnings, banks would have to reduce dividends in order to retain earnings. Aversion to reducing dividends may create a lower desired capital ratio than would be true in the unconstrained case. Thus, the capital requirement could exceed the desired ratio by more than an initial comparison would suggest.

If current earnings were a key factor in capital growth, then the bank's earnings per dollar of equity would provide an upper limit on asset growth. For example, earnings on equity of, say, 20 percent would permit an expansion of capital and assets of something less than 20 percent. Capital growth above this level would then be very "expensive" in terms of stockholders' preferences. At the extreme, the bank would raise the loan rate enough so that loan demand was at or below the point where the marginal capital ratio applied.

In any event, the loan rate would tend to rise and some customers of banks would then try alternative, cheaper ways of raising funds. Those that could issue commercial paper or bonds might do so. Others would seek to borrow from foreign banks located abroad. Still others would make financing arrangements with either suppliers or customers who had access to the commercial paper market In addition, if bank guarantees were not subject to reserve requirements, banks could insure credit extended by other parties to businesses with which the banks are familiar. Letters of credit are one way the banks could provide such guarantees. In this fashion, banks could, in principle, continue to perform the role of rating customers not known to the general public and putting themselves as guarantors between the public and those customers. In this way, they would continue to facilitate the expansion of credit.

The higher the capital ratio imposed, the more would loan demanders seek these alternative routes. Thus, the reduction of domestic bank loans would be offset, at least in part, by expansion in other sources of credit. Twenty years ago when many of these alternative markets were either undeveloped or completely nonexistent, the demand for bank loans was less elastic. Then the imposition of capital ratios would have raised loan rates more substantially and the reduction of loans would have been offset only to a small extent by other credit sources. Today, however, because of the availability of substitutes, the rise in the loan rate is likely to be small and the offset to bank credit provided by the alternatives is likely to be sizable.

Effects of capital ratios on credit and spending growth

Marginal capital ratios would presumably be applied to banks when credit expansion was above a specified target range. (These special marginal capital ratios would have to be set above the level that would be maintained otherwise to have an effect on interest rates.) Bank asset growth which is subject to the marginal capital ratio would be accommodated by banks only at a higher interest rate. And higher interest rates—if they occur—are likely to influence the spending decisions of households and firms. Then, as spending responds and credit needs change, total credit as well as bank credit would be reduced.

The train of events, however, might not follow this pattern. First, if a sufficient number of borrowers had low-cost alternative sources of credit, these borrowers would not be willing to pay higher rates to banks. Instead, they would take their funding needs elsewhere, leaving banks with no expansion in assets that was subject to the capital ratio. Interest rates would differ little from what they would be without capital ratios, and spending decisions that depend upon interest rates would also be little affected.

Another problem with the simple system of marginal capital ratios is that it works only when credit growth is rapid. When credit growth is low or negative, such as during a recession, the capital ratio would not work to lower interest rates more than they would fall naturally: a marginal capital ratio *below* the prudential level will not change the capital ratio that banks maintain and therefore will not change their costs.

Other noteworthy effects of capital ratios

Capital ratios could have relatively little effect on the *general level* of interest rates and on *total* credit. But they could nevertheless have a large impact on the banking industry, and related industries, as well as on the financial markets. The banking system's profits, in aggregate, would probably be reduced somewhat and the banking system would have a smaller relative asset volume as potential borrowers shift to alternative sources of funds.

Another effect of a high marginal capital requirement is to reduce a bank's leverage. Lower leverage means a lower average return on equity and a greater degree of safety. Both factors will tend to induce banks to increase risk and raise return by altering their portfolios away from investments and toward loans and by making loans to riskier borrowers. Indeed, Koehn and Santomero[3] have argued that constraints such as capital ratios can actually increase the probability of bank failures. On balance, though, capital ratio requirements are likely to make banks safer institutions.

Capital ratios will affect different banks to different extents. One factor is the relationship between the height of the marginal capital ratio and the capital ratio a bank would otherwise seek to maintain: a bank with a relatively low initial capital ratio would tend to be affected more than a bank with a higher capital ratio. Another problem with marginal capital ratios on rapid expansion in bank credit is that they penalize banks in regions where there is rapid economic growth; at the same time, they have no effect on banks in areas which are growing slowly or contracting. It is possible, however, that banks in growing areas would induce others to do loan participations or that banks in growing areas would concentrate on loans, reducing their securities holdings.

Another effect of capital ratios might be to change the relationship between various *interest rates.* Compared with the situation that could prevail without such capital ratios, commercial paper rates would probably be higher as more firms seek nonbank financing. CD rates would be lower because there would be less need to issue CDs.

Reserve requirements

In principle, reserve requirements could be imposed on bank assets or even on other types of domestic credit such as finance company credit or bonds issued in the United States. Marginal reserve requirements were, in fact, imposed upon certain types of consumer loans during 1980.

Reserve requirements on bank assets, or marginal reserve requirements on expansions in bank assets, would have effects very similar to those of capital ratios. A reserve requirement on the increases in asset volume would make it more expensive to expand loans, just as did a marginal capital ratio. For example, a marginal reserve requirement of 2 percent would mean that the bank would have to raise $1.02 for each $1 it lent out. Thus, its borrowing cost would effectively be raised 2 percent. At an interest rate of 15 percent, say, this cost is 30 basis points. As a consequence of the greater effective cost, loan rates would tend to be higher and the loan volume smaller than in the absence of the reserve requirement.

In several other respects, too, reserve requirements on bank credit are similar to capital ratios. For example, a marginal reserve requirement on bank credit expansions would encourage borrowers to circumvent the domestic banking system. It would also tend to reduce bank profits. In contrast to capital ratios, however, reserve requirements are unlikely to improve bank safety. In fact, in the effort to improve their aver-

[3] See M. Koehn and A. Santomero, "Regulation of Bank Capital and Bank Portfolio Risk", *Journal of Finance* (December 1980).

age returns, banks would probably choose riskier loans and investments. Reduced safety is thus the likely result.

If reserve requirements were also imposed upon nonbank credit, borrowers would not gain by shifting to nonbank sources of funds. For example, assuming that commercial paper issues were also reservable, borrowers would not shift from bank loans to commercial paper. Nevertheless, such reserve requirements could be circumvented by borrowing abroad or, if only public issues were covered, by arranging private deals.

Shadow reserve requirements

Another way of implementing a credit target would be to utilize a system of shadow reserves. (Indeed, a system of shadow reserves can be used with any aggregate containing nonreservable components.) Assume that reserve requirements remain on deposit liabilities; the tightness in the reserves market, however, depends not on money growth but rather on the growth of a selected credit aggregate.[4] One way of connecting reserves availability to credit growth is to:

- Set a target for the credit aggregate. This credit aggregate could include credit raised from nonbank sources—it would not matter whether the institutions (or the market) were under the purview of the Federal Reserve;
- Calculate the deviation of credit from its target level;
- Apply a shadow reserve requirement to that deviation to obtain the adjustment to the Federal Reserve's objective for nonborrowed reserves;
- Reduce the path for nonborrowed reserves by this amount. (If the adjustment were negative, nonborrowed reserves would be increased.)

For example, if credit moved $10 billion above its target range and the shadow reserve requirement was 5 percent, the nonborrowed reserves path would be lowered by $0.5 billion (equal to 0.05 x $10 billion). Thus, rapid growth of credit would be translated automatically into reserves shortages which would put upward pressure on interest rates.

Because of the generalized effects on interest rates, this shadow reserves mechanism is more likely to affect total credit usage than a system which imposes capital ratios or reserve requirements only on banks—since a mechanism focused on domestic bank lending may have little effect if alternatives to bank loans are readily available.

Of the three mechanisms considered—capital ratios on bank assets, reserve requirements on bank assets, and shadow reserves on total credit—the shadow reserves mechanism has some clear advantages. First, since it is a variant of the reserves targeting mechanism currently in use, a rough estimate of its impact on interest rates could be based upon the experience of the last few years: the typical spread between the Federal funds rate and the discount rate that results from that reserves shortage. In contrast, the impact of capital ratios or reserve requirements on interest rates depends upon the elasticities of loan demand and CD demand whose magnitudes are now well-known. Second, it is a system which discriminates less between credit expansion by banks versus nonbanks.[5]

Fundamentally, though, control of a broad financial aggregate, whether through capital ratios or through shadow reserve requirements, would be quite indirect. The mechanism by which shadow reserve requirements (or for that matter capital ratios) influence the volume of credit is:

- Interest rates are altered by overly rapid (or overly slow) growth of the financial aggregate;
- These interest rate changes affect spending decisions of households and firms and the credit demands that go along with those spending decisions.

Also, the level of shadow reserve requirements is not much easier to set than an actual reserve requirement or a capital ratio. In a general sense, the higher the shadow reserve requirement, the more the Federal funds rate will change when the financial aggregate deviates from the target range. And the shadow requirement would have to be set high enough to ensure that, when the rate of inflation accelerates, interest rates rise by more than the rate of inflation. That is, rapidly expanding credit must produce an increase in real rates of interest or else GNP and credit demands will tend not to recede. Economic models at the present time, however, do not yield a unique answer on exactly how much of an interest rate change is needed to

[4] Tightness in the reserves market could be made to depend upon a combination of money and credit growth. For simplicity of exposition, it is here assumed that only credit affects tightness in the reserves market (*i.e.*, deposit growth is accommodated).

[5] But any rise in short-term interest rates increases the cost of reserves, which yield no interest, and thus affects the institutions that must hold reserves.

produce the credit reduction that is sought The responsiveness of spending decisions and credit usage to interest rates needs to be studied further to design appropriate implementation procedures for credit targets.

Concluding remarks

In this article, I have examined various mechanisms for using a credit measure in monetary policy. Other key issues, such as the potential problems involved in focusing on credit, have not been addressed here. For one thing, pressures for special treatment of one category of credit or another are bound to arise. In addition, changes in the distribution of income or spending or in the tax laws may produce an increased demand for borrowing through the credit markets while total spending is unchanged. (For example, firms doing the bulk of the investment in one year may be those who have poor earnings and as a consequence need to borrow a lot, whereas in other years it could be firms with large profits who are doing most of the investment with retained earnings.) How the monetary authorities would deal with these shifts in demand could develop into an important issue if credit aggregates become the primary focus of monetary policy.

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