

Does regulation drive innovation?

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Proposals to expand the permissible activities of banks and bank holding companies invariably begin with the observation that recent capital market innovations have made households and businesses more willing to hold assets directly (e.g., FDIC, 1987; Huertas, 1987; Corrigan, 1987). These innovations, it is argued, have led to declines in bank profitability and market share and to rapid growth in the investment banking industry. According to this view, banks will become an increasingly less important part of the financial system. Thus, it is argued, the preservation of a safe and profitable banking system makes it necessary to expand bank or bank holding company powers.

The purpose of this paper is to determine the validity of this argument. Two important questions are addressed. Have banks indeed become less competitive providers of financial intermediation services? And, if so, is their weakened competitive position a consequence of fundamental changes in the structure of the financial intermediation process, or is it merely a reflection of inappropriate regulation?

The first section of the paper analyzes the banking system's role in providing financial intermediation services to households and corporations. The second examines the changing magnitude and composition of regulatory taxes which create cost disadvantages for banks that serve low-risk customers. The final part of the paper examines the proposition that changes in these regulatory taxes have affected the role banks are willing and able to play in the financial intermediation process.

We find that financial intermediaries have not become less important. However, banking's role has shifted from funding loans to issuing guarantees.

We present evidence that at least some of the change in bank products are a result of attempts by regulators to increase banks' equity capital requirements. This policy has offset many of the gains that reductions in reserve requirements were supposed to generate. This suggests that, if regulators permitted banks to substitute subordinated debt for equity, some

of the reduction in banks' role in supplying funds to large corporate borrowers could be recovered.

Intermediation services: deposits and other claims on assets

Financial intermediaries issue claims on diversified pools of assets; these claims are held by corporations and households with funds to invest. The claims include liabilities of depository institutions, such as demand deposits, time deposits, bankers acceptances, and repurchase agreements, as well as the liabilities of nondepository financial firms, such as commercial paper issued by finance companies, mutual fund shares, reserves of life insurance companies, and pension fund reserves.

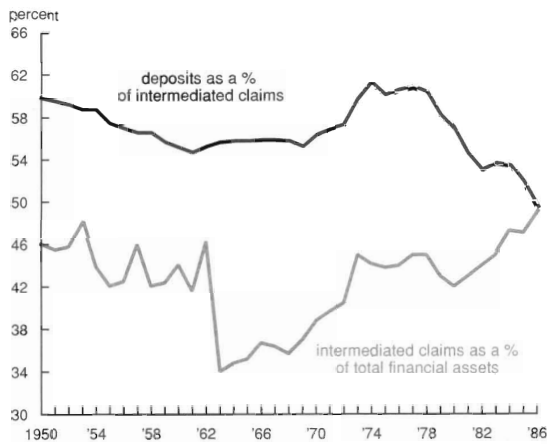
Financial intermediaries can be directly involved in creating the assets that make up these pools. This is the case with banks and finance companies, which typically originate and service a large portion of the loans in their asset portfolios.

In the United States, household holdings of intermediated assets increased slightly, from 46 percent of financial assets in 1950 to 49 percent of total financial assets in 1986 (Figure 1). However, as Figure 1 indicates, depository institutions' share of total intermediated assets held by households has declined more or less steadily since 1975. This decline has occurred despite the elimination of interest-rate ceilings on retail deposits during the 1980s.

Corporate holdings of intermediated claims have been declining in importance during the 1980s, but they remain more important today than in 1950. Figure 2 shows how corporations have altered their reliance on intermediated assets during the post-war period. In 1950, 65 percent of liquid assets at nonfinancial corporations were intermediated assets. From 1950 to 1973 intermediated assets as a proportion of total liquid assets grew to 87 percent. Since 1973, however, corporate intermediated

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Figure 1
**Consumers: intermediated claims up,
 bank deposits down**



assets have fallen to 77 percent of total liquid assets, the lowest level since 1966.

The role of banks as suppliers of intermediated claims to nonfinancial corporations has decreased since 1950, but banking's role has been varied since 1970. In 1970, the holdings of bank liabilities by nonfinancial corporations was about 92 percent of their total intermediated claims; in 1982 this ratio had fallen to 86 percent but since that time has risen slightly.

The role of banks in intermediating claims to the nation's largest manufacturing corporations, however, has increased since 1973. At that time bank deposits comprised 43 percent of all liquid assets of U.S. manufacturing corporations with assets in excess of \$1 billion. By 1981 they accounted for more than 58 percent of their liquid assets, and although this ratio has dropped since then, bank deposits still comprise over 50 percent of the liquid assets of large U.S. corporations.

Intermediation services: lending

The importance of financial intermediaries can also be measured in terms of their debt origination activities. Lending to nonfinancial corporations is an important part of the intermediation process. Banks are actually making strong gains in certain segments of this market. Data published by the Federal Trade Commission indicate that, in 1975, banks provided 37 percent of funds borrowed by manufacturing firms with assets under \$1 billion. By

1986 banks provided over 50 percent of funds borrowed by these firms.

The experience with lending to large manufacturing corporations—those with more than \$1 billion in assets—has been much different. Because these firms are larger, they find it easier to access capital markets directly. As Figure 3 indicates, the track record for all types of lending by banks to such firms has been mixed. But banks have clearly become less important suppliers of short-term debt. Between 1975 and 1986 banking's share of short-term borrowings by the large corporations fell from 48 percent to 27 percent. Most of this decline is directly attributable to the growing importance of commercial paper. It appears to have been borne disproportionately by the New York money center banks (Estrella, 1987). It is also generally accepted that companies that are turning to the commercial paper market are among the lowest-risk borrowers.

New approaches to credit: guarantees

The last decade has witnessed an important shift in *how* banks provide credit services. So the preceding estimates of the role of banks as suppliers of credit to nonfinancial firms fail to convey adequately their position in the process. In the traditional credit process, banks identified potential borrowers, made a credit evaluation, funded the loan with bank deposits, and serviced the loan. In the last decade, several innovations have made it possible to

Figure 2
**Nonfinancial corporations: intermediated claims
 and deposits both down**

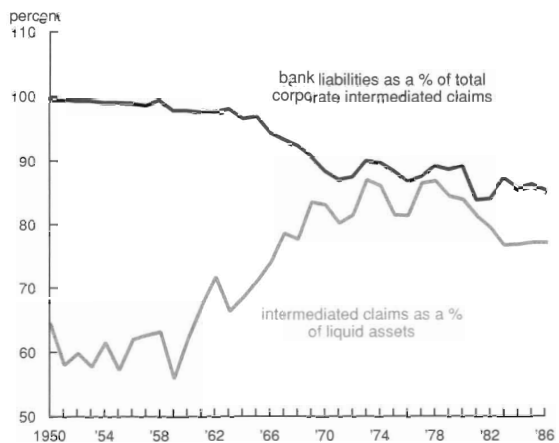
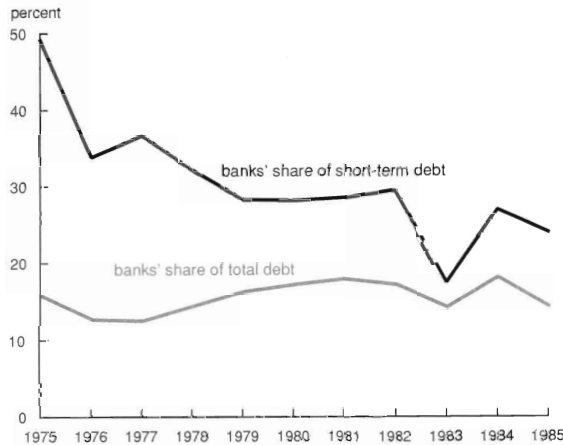


Figure 3
Lending to big manufacturers:
banks' share is down



“unbundle” this process. Loan commitments and standby letters of credit permit nonbanks to originate, fund, and service loans while banks bear a portion of the risk associated with the loan. Securitization and loan sales permit banks to continue originating and servicing loans while others supply funding and bear at least a portion of the credit risk. Call report data for 1986 indicate that these activities are concentrated in the nation’s largest banks.

Of the guarantee activities, standby letters of credit and formal loan commitments have had the most significant impact on the estimates of banks’ importance as suppliers of credit. So far, the growth of securitization and loan sales has not had an important impact on banks’ role as suppliers of credit to nonfinancial corporations. Securitization has dealt primarily with consumer loans, while most whole loan sales have occurred between banks.

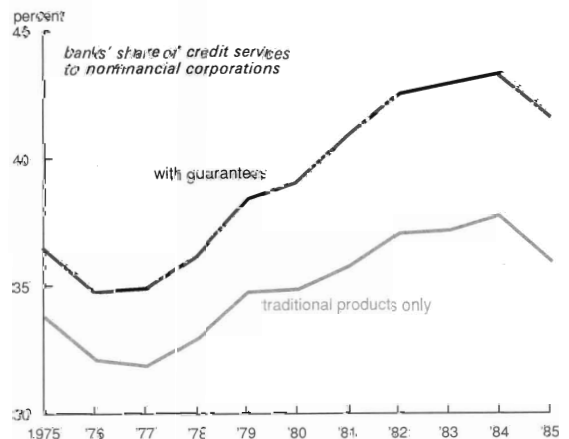
Standby letters of credit require the issuing bank to fulfill a customer’s obligation if the customer is unable to do so. Standbys are often used to guarantee performance of debt contracts. Conservative estimates based on a 1985 survey by the Federal Reserve indicate that standbys backed at least 0.2 percent of debt issued by nonfinancial corporations in 1980 and 1.8 percent in 1985.

Formalized loan commitments give a customer the option to borrow from the bank in the future at a specified rate. However, the option can only be exercised if the borrower meets certain financial requirements. These require-

ments substantially reduce the bank’s risk exposure. As a proportion of total credit market debt of nonfinancial corporations, unused lines of credit under formal commitments have risen from 8.5 percent in 1975, to 12.2 percent in 1980, to 16 percent in 1985. *Confirmed lines of credit* are statements of intention to lend to a corporation without specifically stating the terms under which lending will occur. They have declined in importance over the past 10 years.

In order to measure the relative importance of standby letters of credit and loan commitments, it is clearly important to employ some sort of weighting scheme to reflect their risk relative to a direct loan. The Federal Reserve Board’s proposal for risk-adjusted capital assumes that standby letters of credit are as risky as a loan. Confirmed lines of credit are assigned a risk weight of 10 percent. Most formal loan commitments would be assigned a risk weight of 25 percent (Avery and Berger, 1987). If we employ this weighting scheme, we find that banks’ share of total credit services to nonfinancial corporations grew between 1975 and 1985 (see Figure 4). We also find that market share measures based solely on balance sheet data underestimate banks’ role in financial intermediation by roughly 6 percentage points. These findings suggest that banks have become more important as suppliers of credit services to nonfinancial corporations. However, their role as suppliers of funds has not grown as rapidly as their role as suppliers of guarantees.

Figure 4
The impact of off-balance-sheet guarantees



Traditional banking activities and regulation

Many observers believe that regulation has been instrumental in moving commercial banks away from the traditional banking activities of lending and deposit taking and toward providing financial guarantees. They argue that banks have a comparative advantage in originating loans but a disadvantage in warehousing them, or keeping them on their books. This disadvantage stems from the "regulatory taxes" banks must pay in the form of federal deposit insurance premiums that do not vary with risk, required reserves that do not bear interest, and mandatory capital requirements that exceed those that banks would maintain in the absence of regulation.

Against these costs are balanced the benefits of a bank charter: federal deposit insurance and access to the discount window. These two advantages, especially deposit insurance, allow banks to attract deposits at a lower rate than would otherwise be possible, given the risks they are taking. However, for low-risk assets, this lower rate still may not be sufficiently low to compensate banks for the regulatory taxes.

Attempts by banks to avoid regulatory taxes are not new. In the 1970s, the Federal Reserve System found its membership shrinking as banks sought to escape the competitive disadvantages created by the combination of burdensome reserve requirements and high interest rates. Congress responded to the membership problem by passing the Depository Institutions Deregulation and Monetary Control Act (DIDMCA) of 1980, which drastically lowered reserve requirements.

With the reduction in reserve requirements, banks should have found themselves in a stronger position relative to nondepository firms in providing traditional financial intermediary services. This, however, does not appear to be the case. From 1980 to 1986, commercial paper issuance grew rapidly, and banks' share of total lending to large manufacturing corporations decreased sharply after 1982. Over the same period, banks' off-balance-sheet activities have increased tremendously. One possible reason is that the composition of total regulatory taxes has changed; that is, the capital requirement, an asset-based tax, has increased in importance

relative to reserve requirements, a domestic liability-based tax.

In contrast to most industries, the debt-equity mix in banking has been influenced strongly by changes in regulatory policy. However, capital requirements were not prescribed explicitly until 1981, when the federal banking agencies moved to establish minimum capital standards. Initially the minimum was set at 6 percent for community banks and bank holding companies and 5 percent for regional organizations. In June 1983 the minimum primary capital ratio for regional organizations was extended to multinational organizations. In 1985, the minimum primary capital ratio for regional and multinational organizations was raised from 5 to 5.5 percent, while the ratio for community banking organizations was lowered to 5.5 percent.

These minimum capital ratios did not take explicit account of off-balance-sheet items although regulators certainly had the freedom to take these claims into account on an *ad hoc* basis. Concern about the growing importance of off-balance-sheet activity led federal agencies to propose risk-based capital standards in early 1986. Under the Federal Reserve's new proposal, minimum capital requirements would be the *greater* of either 6 percent of assets or the weighted "risk-based" capital requirement.

The burden that capital requirements place on banks has two components. The first occurs because debt and equity are treated differently for tax purposes. Payments to debt holders are treated as expenses and are therefore tax deductible, whereas returns to equity holders are treated as income and are therefore taxable.

The second component in any attempt to measure the burden of capital regulation is the amount of capital that a bank would desire to hold in the absence of regulation and deposit insurance. In general, this can be approximated by balancing the tax savings generated by additional holdings of debt against the savings of lower bankruptcy costs generated by an additional dollar of equity capital. However, the purpose of this study is simply to measure the impact of regulation on the profitability of intermediating low-risk assets. The fact that money market funds choose to offer claims that are redeemable on demand backed by commercial paper, bank certificates of deposit, and treasury securities suggests that in

the absence of regulation the capital requirements for these types of securities are minimal.

Regulatory taxes over time

The combination of rising market capitalization due to tighter capital requirements and less favorable tax treatment (due to changes in the tax treatment of municipal securities) has dramatically reduced the incentives for banks to hold low-risk assets. Figure 5 summarizes the movements in the various regulatory taxes over time.

Reserve requirements have become an increasingly less important component of total regulatory taxes, declining from 6 percent of deposits in 1976 to 1.8 percent of deposits in 1986. Assuming an interest rate of 10 percent, the reserve requirement tax would have fallen from 60 basis points to 18 basis points in 1985.

In contrast, the tax on low-risk domestic assets resulting from the deposit insurance premiums has risen steadily. Deposit insurance premiums for commercial banks more than doubled since 1975, from three to eight basis points. While the FDIC had always levied a fee of eight basis points per dollar of domestic deposits, it traditionally rebated up to half the charge at the end of the year. Under financial pressure due to a mounting number of failing banks, this practice was terminated in 1985.

If banks holding low-risk assets are forced to raise their equity-to-debt ratios, then their cost of funds will rise by the amount of the ad-

ditional taxes paid. The burden of the capital requirements tax has become increasingly important as regulators have attempted to increase bank equity ratios and tax law changes have altered banks' ability to shelter income. Efforts to raise capital have led to a steady increase in equity capital ratios at banking organizations with assets in excess of \$10 billion. The ratio of the book value of equity to the book value of assets grew from 3.75 percent in 1978 to 5.5 percent in 1986, an increase of 45 percent. For our purposes, however, trends in the market value of equity may be more important than trends in the book value. Under current regulatory accounting practices, book value measures of equity ignore franchise value and likely, but as yet unbooked, losses on assets due either to movements in interest rates or credit problems.

As Figure 6 indicates, the ratio of market value of equity to assets at banking organizations with more than \$10 billion in assets has increased from about 2.5 percent in 1978 to about 5.5 percent in 1986, an increase of 120 percent.

The burden of capital requirements has also been affected by the changing ability of banks to shelter income. Important factors affecting this ability include changes in the relative yields of taxable and tax-exempt securities, provisions concerning the deductibility of interest expense incurred to hold tax-exempt securities, and the personal tax rate on capital gains and interest income.

Figure 5
The burden of regulation

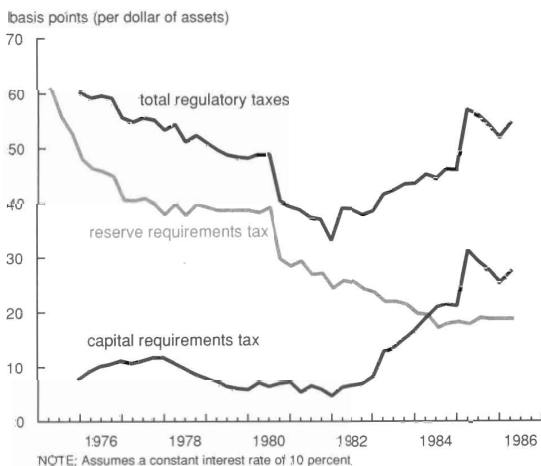
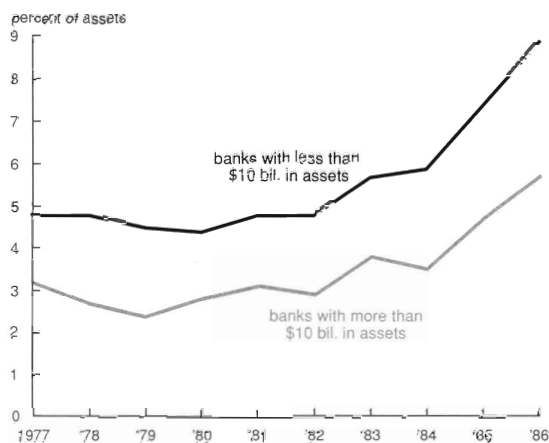


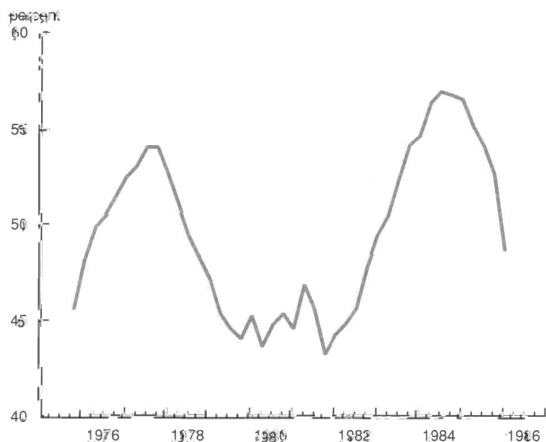
Figure 6
Rising market capitalization of banks
(equity/assets)



Until 1986, banks had a clear tax advantage over other corporate entities in that the tax rate they actually faced on equity income could be sheltered by holding municipal bonds. This tax shelter arose because banks, unlike other types of corporations, were permitted to deduct a portion of the costs of financing tax-exempt assets from taxable income. Until 1982 they were able to deduct 100 percent of this expense. (See box for a discussion of the implicit tax rate for bank equity.) Figure 7 illustrates how the tax disadvantage of bank equity has changed over time. It assumes that banks employ tax-exempt securities with a remaining maturity of five years and make no use of other tax shields.

Figure 5 plots the changes in the burden of the capital requirement, assuming that even a bank holding low-risk assets would have to maintain its current market capitalization. The figure assumes a constant 10 percent taxable riskless rate of interest, ignores the existence of all tax shields except tax-exempt securities, and employs annual means of the ratio of market value of equity to assets for bank holding companies with assets in excess of \$10 billion. Our estimates suggest that the capital requirement burden has increased from a low of 10 basis points in 1977 to a high of 27 basis points in 1985. This change is a result of changes in the implicit marginal tax rate paid by banks as well as increases in banks' equity ratios that were a result of stiffer regulatory capital requirements.

Figure 7
The implicit tax rate
on bank equity



The regulatory tax on low-risk domestic assets is the sum of the reserve requirement tax, the deposit insurance tax, and the burden of the capital requirement. Assuming a constant 10 percent interest rate, the total regulatory tax on holdings of low-risk domestic assets fell sharply between 1977 and 1982 (Figure 5). During this period reserve requirements fell steadily. At the same time, the burden of capital requirements remained roughly constant. After 1981 this trend was reversed, largely as a consequence of rising capital requirements. By 1985, the total regulatory tax was either the same or slightly higher than it was in 1977, depending on the measure of capital used. In 1977, capital requirements accounted for 20 percent of the regulatory tax on low-risk assets. By 1985 they accounted for over 50 percent of the tax.

In calculating the regulatory tax on foreign assets, only the capital requirement matters. Using either measure of capital, the tax on low-risk assets rose sharply after 1981 (Figure 8).

Regulatory taxes and bank competitiveness

Do changes in regulatory taxes explain changes in bank market shares? Figure 8 plots banks' share of total debt of large manufacturing corporations and total regulatory taxes. Total regulatory taxes declined steadily from 1977 to 1982. They began rising in 1983. Banks' share of total debt at large manufacturing firms rose steadily from 1977 to 1981. Beginning in 1982, banks' share of debt began to fall while regulatory taxes began to rise.

The decline in market share that began in 1982 was interrupted in 1984 by a sharp upward spike. The cause of the spike is unclear; however, it was probably the result of wild gyrations in the growth of total borrowings between 1983 and 1984. During 1983, total borrowings by large manufacturing firms actually *declined* by 7 percent. In 1984 total borrowing increased by 17 percent. This change in growth rate is 2.5 times larger than any other observed in the sample. Bank borrowing may have simply acted as a shock absorber, declining more rapidly than total borrowing in 1983 and expanding more rapidly than total borrowing in 1984. If this explana-

A measure of the capital requirement tax

The burden created by capital requirements has two components. The first arises because debt and equity are treated differently for tax purposes. Payments to debt holders are treated as expenses and therefore tax deductible. Returns to equity holders, however, are treated as income and therefore taxable.

The tax rate that banks actually face on equity income is a function of their ability to shelter that income. Municipal bonds have provided the main tax shelter for the banking industry. The tax shelter arose because banks, unlike other types of corporations, were permitted to deduct a portion of the costs of financing tax exempt assets from taxable income. This tax advantage ended in 1986 when the deductibility of interest paid on funds used by banks to purchase additional tax-exempt bonds was eliminated.

Let r_A be the rate of return on taxable assets, r_{TE} be the rate of return on tax-exempt assets, a be the proportion of interest expense that cannot be deducted and d be the cost of deposits. Then, the implicit tax rate faced by banks is given by

$$t_E = 1 - \frac{r_{TE} - ad}{r_A - ad}$$

The second element in any attempt to measure the burden of capital regulation is the amount of capital that a bank would desire to hold in the absence of regulation and deposit insurance. The fact that money market mutual funds choose to offer deposits redeemable on demand backed by commercial paper, bank CDs, and treasury securities suggests that in the absence of regulation the capital requirements for these types of securities are minimal. Given the relatively low capitalization of MMMFs, it seems that

the difference between the capital ratio the market would require of a bank holding low-risk assets and the actual capital ratio can be approximated by the actual capital ratio of the bank.

If t_E is the effective corporate tax rate, MV denotes the actual market value of equity, and PMV denotes the pre-tax market value of the bank then

$$MV = (1 - t_E) * PMV.$$

This means that the effective tax is

$$t_E * PMV = \frac{t_E}{(1 - t_E)} MV$$

Equity income is also taxed at the personal level at the rate t_{EP} for a total tax of

$$\frac{t_E}{(1 - t_E)} MV + t_{EP} * MV$$

If on the other hand equity income were simply taxed at the rate applied to interest payments, then total taxes would be

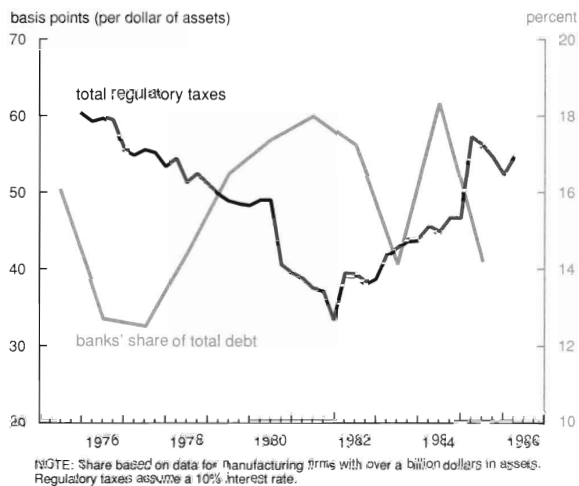
$$\frac{t_D * MV}{1 - t_D}$$

Therefore, the tax burden associated with holding equity is given by

$$\frac{t_E - t_D}{(1 - t_E)} MV + t_{EP} * MV$$

In developing our estimates of the capital tax, we employed the rates on 5-year newly issued tax-exempt securities and 5-year Treasury securities. The deposit rate was assumed to be 90 percent of the Treasury rate. Corporate and personal tax rates were obtained from Pechman (1987).

Figure 8
Regulatory taxes and banks' share
of big business lending



tion is correct, then it would appear that increases in regulatory taxes do lead to decreases in banks' share of borrowing by large manufacturing corporations.

Regulatory taxes and bank innovation

Regulatory taxes are frequently cited as a major factor in understanding a number of important financial innovations including commercial paper (Judd, 1979), loan sales (Pennacchi, 1987; and Pavel and Phillis, 1987), standby letters of credit (Benveniste and Berger, 1986; Koppenhaver, 1987; and Koppenhaver and Stover, 1987), loan commitments (Koppenhaver, 1986), and Eurodollar deposits. While there have been several attempts to test the regulatory tax hypothesis (Benveniste and Berger, 1986; Koppenhaver, 1987; Koppenhaver and Stover, 1987; and Pavel and Phillis, 1987), all of these studies have been based on cross sectional data sets for banks for a particular year. The results of such exercises can be suggestive, but their ability to shed any light on the importance of regulatory taxes is limited because the most important innovators have been the large commercial banks. Cross-sectional variations in regulatory taxes at these banks are small relative to the variation over time. In the remainder of this paper, we take measures of regulatory taxes

following the methodology of the previous section and incorporate them into an empirical model explaining the adoption of two major financial innovations—Eurodollar deposits and standby letters of credit.

Eurodollars

The Eurodollar market first became important in the 1960s as a way to offset disintermediation problems created by Regulation Q and grew most rapidly in the 1970s. Eurodollar deposits are a substitute for domestic uninsured deposits. Several factors were responsible for their continued growth including the continued imposition of Regulation Q ceilings on retail deposits, the attempt to limit capital outflows from U.S. banks, and the more favorable treatment of foreign deposits when calculating reserve requirements. In 1970 overseas deposits of U.S. banks accounted for about 8 percent of total deposits at U.S. banks. By 1980, deposits at overseas branches of U.S. banks accounted for about 25 percent of all deposits at U.S. banks, while for the nine largest U.S. banks they accounted for a little more than half of deposits.

Reliance on Eurodollar deposits should increase when reserve requirements increase because this regulatory tax only applies to domestic deposits. But changes in the relative importance of Eurodollar deposits, in and of themselves, do nothing to mitigate equity capital requirements. However, holders of Eurodollars are clearly more sensitive to price than holders of domestic CDs. Therefore, we would expect that, as the equity capital requirement is increased or the effective tax rate on bank equity increases, Eurodollar deposits would become less attractive relative to commercial paper and CDs of foreign banks. As a result, a bank's reliance on Eurodollar deposits should decline.

Bank risk may also play an important role in explaining changes in a bank's reliance on Eurodollar deposits because these deposits are at least nominally uninsured. There is some evidence that uninsured depositors do view themselves as being at risk (Baer and Brewer, 1986a; Hannan and Hanweck, forthcoming; and James, 1987). Because the holders of Eurodollar deposits are more price sensitive than domestic depositors, we would expect that they would also be more risk sensitive. We

would expect that more risky banks would reduce their reliance on Eurodollar deposits.

Standbys

Standby letters of credit, like Eurodollar deposits, have grown rapidly. But unlike Eurodollar deposits, standbys experienced their fastest growth during the 1980s. Since 1980, standby letters of credit have grown nearly fourfold to \$169 billion in 1986. Several reasons can explain this rapid increase. First, the growth in direct financing using commercial paper and industrial revenue bonds shifted the credit-risk exposure of investors who did not want to bear such risk. Second, overall economic risks increased. Third, regulatory taxes have caused banks to issue standbys in recent years.

Standby letters of credit allow a bank to reduce its regulatory tax burden by providing a way to avoid reserve requirements and deposit insurance premiums while still providing credit to domestic borrowers. Also, to the extent that issuance of standbys required banks to increase capital less than an additional dollar of lending, the issuance of standby letters of credit should actually permit banks to avoid at least a portion of the burden of capital requirements. Such avoidance was clearly a possibility prior to the announcement of the Federal Reserve's risk-based capital proposal. However, we expect that standby letters of credit will be less attractive following the adoption of the risk-based capital proposal because they would be treated the same as loans for capital requirement purposes.

As was the case with Eurodollar deposits, increases in reserve requirements should cause a bank's reliance on standby letters of credit to increase. However, in marked contrast with Eurodollar deposits, we would also expect that increases in the burden of capital requirements should also increase a bank's reliance on standbys, at least in the period prior to the introduction of the Federal Reserve's risk-based capital proposal.

The impact of bank risk on a bank's reliance on standby letters of credit is more complicated than it is for Eurodollar deposits. Like Eurodollar deposits, standbys are uninsured liabilities, and as such we would expect them to become less attractive relative to insured do-

mestic liabilities as the bank becomes more risky.

However, standbys differ from uninsured deposits in one important respect: They represent contingent claims on the bank, which are only exercised when the bank's customer fails to perform. The value of a standby is threatened not by the failure of the bank but by the simultaneous failure of the customer and the bank. In this sense, standby letters of credit represent a form of secured lending (Benveniste and Berger, 1987 and James, 1987). As with other firms, banks facing financial stress are going to face pressure to secure their new creditors, in this case by switching to standby letters of credit or some other form of secured lending such as loan sales with formal or informal recourse (James, 1987). The benefits of issuing standbys will be greatest when the bankruptcy probabilities of the customer are not highly correlated with the bankruptcy probabilities of the issuing bank. These arguments suggest that increases in bank risk will cause the issuance of standbys to increase.

Results

To test these hypotheses, we constructed a data base of 33 lead banks for the years 1979 to 1985. All banks are members of holding companies whose stock is actively traded in each of the years studied, i.e., traded on average at least three times per week. Reserve requirements were estimated based on balance sheet data from the Report of Condition. The implicit tax on bank capital was estimated using the techniques outlined above. Data on the market value of equity are from Interactive Data Services, Inc. These data were used in conjunction with the implicit tax rate on bank capital to calculate the burden of regulatory capital requirements. The ratio of the market value of equity to assets was included separately to control for changes in bank risk across time and between banks. (See Pavel, 1988, for an explanation of how the market value of assets was calculated.)

Three other variables were included to control for other sources of variation. Two measures of the importance of commercial lending—the ratio of domestic commercial and industrial loans to domestic deposits and the ratio of foreign commercial and industrial loans to foreign deposits—were included to control for

the customer base of the bank. Total bank assets were included to capture bank size effects.

The ratio of standby letters of credit to total bank assets and the ratio of Eurodollar deposits to uninsured domestic deposits were used as the dependent variables. Table 1 gives mean values of the dependent and independent variables for the banks in the sample as of December 1985. The bank risk variables, the regulatory tax variables and the three control variables were regressed against the dependent variables using ordinary least squares as well as the Fuller-Battese technique for estimating regressions with cross-section time series data. The results presented in Table 2 suggest that these variables are capable of explaining a large portion of the variation in bank reliance on Eurodollar deposits and standby letters of credit across banks and across time. Using ordinary least squares, the variables explain 67 percent of the variation in issuance of standbys and 60 percent of the increase in the issuance of Eurodollar deposits.

The capital tax was found to be important in explaining a bank's reliance on both standbys and Eurodollar deposits. Increases in the capital tax increased a bank's reliance on standbys and decreased its reliance on Eurodollar deposits. This finding is in accord

with expectations and suggests that during much of this period regulatory capital requirements treated standby letters of credit more favorably than loans held on a bank's balance sheet.

The impact of changes in reserve requirements is less clear. Banks with higher reserve ratios—measured as the ratio of required reserves to domestic deposits—relied more heavily on Eurodollar deposits. However, higher reserve requirements were not found to be associated with greater issuance of standby letters of credit. These findings provide partial confirmation of earlier studies that relied only on cross-sectional data. The findings are also consistent with studies indicating that changes in tax rates and reserve requirements have a significant impact on a bank's funding structure (Marcus, 1983; and Gelfand and Hanweck, 1987).

The impact of bank risk as measured by the ratio of market capitalization to holding company assets was also found to be important. Higher levels of bank risk were found to be associated with greater issuance of standby letters of credit and reduced reliance on Eurodollar deposits. These results are consistent because when bank risk increases we would expect that banks would decrease their reliance on price-sensitive, uninsured, unsecured Eurodollar liabilities and increase their reliance on liabilities which provide additional protection against the bank's failure.

Our results suggest that regulatory taxes and changes in bank risk have had an important impact on bank innovation. Earlier in this paper we presented estimates that suggested that regulatory taxes fell sharply between 1977 and 1982 and rose rapidly thereafter (Figure 5). Taken together these results suggest that the decline of traditional banking that has occurred in the 1980s is simply the latest reincarnation of the old Federal Reserve membership problem. During the 1970s, banks tried to avoid regulatory taxes by leaving the Federal Reserve System. In the 1980s, the only solution is for low-risk assets to migrate out of the banking system.

Conclusions

Since the early 1970s, commercial paper has been steadily eroding the importance of bank lending to the nation's largest firms and

Table 1
Means of regression variables—December 1985

| | Assets less than \$10 billion | Assets greater than \$10 billion |
|-------------------------------|----------------------------------|-------------------------------------|
| <u>SLOCs</u> | | |
| Assets | .048 | .115 |
| <u>Foreign Branch</u> | | |
| Domestic uninsured deposits | .363 | 2.000 |
| <u>Market value of equity</u> | | |
| Assets | .057 | .040 |
| Capital tax | .031 | .021 |
| <u>Required reserves</u> | | |
| Domestic deposits | .042 | .048 |
| <u>Foreign C&I loans</u> | | |
| Foreign deposits | .392 | .390 |
| <u>Domestic C&I loans</u> | | |
| Domestic deposits | .291 | .400 |
| Total bank assets | \$4.7 billion | \$43.4 billion |

NOTE: SLOC = Standby Letter of Credit

Table 2.
Factors affecting SLOCs and foreign branch deposits
all variables in logarithms
1979 - 1985, 33 banks

| | <u>SLOCs</u> | | <u>Foreign branch deposits</u> | |
|-------------------------------|---------------------------------|-----------------------|------------------------------------|------------------------|
| | <u>Total assets</u> | | <u>Domestic uninsured deposits</u> | |
| | <u>OLS</u> | <u>Fuller-Battese</u> | <u>OLS</u> | <u>Fuller-Battese</u> |
| Intercept | -8.261*** (-10.054) | -5.576*** (-4.759) | -10.199*** (-7.175) | -10.341*** (-5.510) |
| <u>Market value of equity</u> | -.4913*** | -1.003*** | .338 | .649** |
| <u>Total assets</u> | (-3.374) | (-3.305) | (1.275) | (2.452) |
| <u>Capital tax</u> | .548*** (6.406) | .815*** (2.914) | -.546*** (-3.446) | -.661*** (4.945) |
| <u>Required reserves</u> | -.541*** | .146 | .7648*** | .414 |
| <u>Domestic deposits</u> | (-3.316) | (.890) | (2.541) | (1.652) |
| <u>Foreign C&I loans</u> | .095*** | .050** | | |
| <u>Foreign deposits</u> | (3.600) | (2.484) | | |
| <u>Domestic C&I loans</u> | .882*** | .544*** | .797*** | .389* |
| <u>Domestic deposits</u> | (8.375) | (5.020) | (4.086) | (1.722) |
| <u>Total assets</u> | .328*** (10.591) | .222*** (3.892) | .719*** (12.818) | .708*** (6.659) |
| | R ² = .67 N = 231 | N = 231 | R ² = .5988 N = 231 | N = 231 |

*Significant at the 10% level using a two-tailed test.

**Significant at the 5% level using a two-tailed test.

***Significant at the 1% level using a two-tailed test.

commercial finance companies have become increasingly important for smaller firms. Since 1984, banking's share of debt issued by nonfinancial firms has fallen; meanwhile, banks' guarantee activities have become increasingly important. This decline in banks' traditional role has been used by many to argue that banks' array of powers should be expanded so they can continue to play an important role in the financial system.

This line of argument raises several important questions. First, do these numbers accurately portray banking's role in financial intermediation? Second, what part does our system of regulation play in explaining these changes in bank behavior?

The first section of this paper documents the trends and attempts to supplement previous

analyses by incorporating estimates of bank standby letters of credit and loan commitments. The resulting estimates suggest that banks' role in providing financial intermediation services for nonfinancial corporations has grown rapidly over the past decade once off-balance-sheet activities are taken into account. However, even after accounting for the increasing importance of off-balance-sheet guarantees, it appears that corporations have decreased their reliance on banks for financial credit services since 1984.

The second part of this paper presents evidence that changes in bank regulation and bank risk are important in explaining the changing role of banks in the financial intermediation process. An analysis of bank regulation and taxation suggests that the burden of regulation has shifted away from reserve requirements, which tax only certain types of

domestic funding, toward capital requirements, which tax a bank's entire operation, and toward deposit insurance premiums, which tax the bank's entire domestic operations. We then present evidence that indicates that differences in regulatory taxes and risk explain a significant portion of the growth rate of two important financial innovations—standby letters of credit and Eurodollar deposits.

Our findings suggest that many of the problems currently faced by banks result not from fundamental changes in the relative efficiency of bank intermediation but rather from a policy that requires banks to increase their equity-to-asset ratios without regard for the risk of the underlying assets. The additional funding disadvantage created by double taxation of equity income reduces bank competitiveness in the market for low-risk assets.

Expanded powers for bank holding companies are often proposed as the solution to the

competitiveness problem. But these proposals will only make companies that own banks more profitable. It is unlikely that banks themselves will become more profitable or more competitive in the market for low-risk assets. An alternative solution would be to reduce the banks' disadvantage in funding low-risk loans.

One way that regulatory taxes could be reduced without sacrificing bank safety and soundness would be to permit banks to substitute subordinated debt for equity capital. This would permit regulators to increase the capital buffer in the banking system without reducing the banking system's ability to compete in the low-risk loan market. Another solution would be to distinguish between high- and low-risk commercial loans in computing a bank's minimum capital ratio. In either case, the result would be a more effective capital market in which bank competitiveness would be determined more by efficiency than by regulation.

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