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Federal Reserve Bank of Dallas

Financial Derivatives:
Are New Regulations Warranted?

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What Determines Businesses' Borrowing from Banks?

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Contents

(Continued on the next page)

Contents

(Continued from the previous page)

Financial Derivatives:

Are New Regulations Warranted?

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The development, evolution, and growth of financial derivatives constitute one of the most dramatic stories in modern economic history. In less than twenty-five years, financial derivatives have sprung from conception to global prominence, spanning the world's financial markets and institutions and integrating the global financial system.

Are bankers and corporations rolling the dice and gambling away their future by using derivatives? Or, do derivatives offer new ways for banks to better manage risk exposures and assist customers in managing their risks?

What follows is a brief history of financial derivatives activities, an overview of financial derivatives products, and a demonstration of why (and how) a bank might use simple financial derivatives. I will then discuss current regulatory issues and proposed legislative changes involving financial derivatives.

The article concludes with the view that financial derivatives are complex tools that banks and corporations can use—indeed, should use—to better manage risk exposures. Any regulation of financial derivatives markets should emphasize the use of market-oriented incentives to manage risk as opposed to government-mandated rules designed to eliminate the use of derivatives because of their potential riskiness. Laws that restrict derivatives' usage could undermine market efficiency in transferring financial risks and destroy the economic benefits provided by derivatives.

Dealing with Volatility

In general terms, a derivatives transaction is a contract whose value depends on, or derives from, the value of an underlying security, commodity, reference rate, or index. The most common derivatives include swaps, futures, and options based upon interest rates, currencies, equities, and commodities.[1]

The tremendous growth of financial derivatives products was brought about by three primary forces: increasingly volatile markets, deregulation, and new technologies. The turning point seems to have occurred in the early 1970s with the breakdown of the Bretton Woods agreement, after which currencies floated freely, and the gradual removal of interest rate ceilings when Regulation Q interest rate restrictions were phased out. Not long afterward came inflationary oil price shocks and wild fluctuations in interest rates. Thus, as shown in Charts 1, 2, and 3, financial markets became far more volatile.

Chart 1 shows the quarterly change in yield for the ten-year U.S. Treasury bond. Interest rate volatility increased during the late 1960s and again in the late 1970s and early 1980s. Exchange rate volatility is shown in Chart 2. As shown, the breakdown of the Bretton Woods agreement in 1971–72 led to increased volatility of the U.S. dollar against the currencies of the other G–10 countries.[2] Chart 3 presents

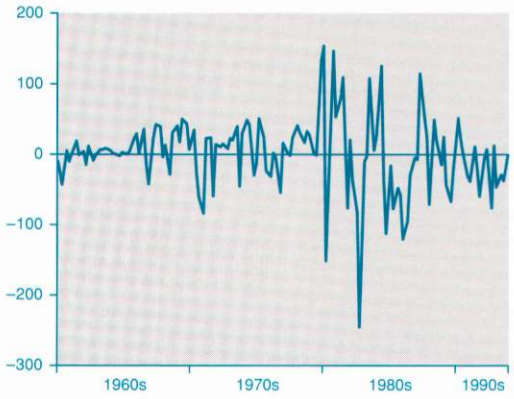
I wish to thank Robert Hankins, Kenneth Robinson, Jeffery Gunther, and Robert Moore for helpful comments on earlier drafts. Any remaining errors are solely my responsibility.

[1] See Kapner and Marshall (1990) for an excellent reference work for understanding financial derivatives products and Federal Reserve Bank of Atlanta (1993) for a collection of articles about financial derivative instruments and markets.

[2] The countries in the G–10 group are the United States, United Kingdom, Germany, Japan, France, Canada, Italy, Netherlands, Belgium, Sweden, and Switzerland.

Chart 1
Interest Rate Volatility

Ten-year Treasury bond
Quarterly change, basis points



DATA SOURCE: CITIBASE, Citibank Economic Database.

energy market volatility by showing the quarterly change in the spot price of crude oil. The chart highlights the periods of major disruptions in the supply of oil.

A host of new competitors accompanied the deregulation of financial markets in the early 1980s, and the arrival of powerful computing machines ushered in new ways to analyze information and break down risk into component parts. Banks, which are in the business of managing financial risks, quickly learned that it was far more difficult to control risk in this new environment. They responded by developing new risk management products designed to better control financial risks.

Few markets have grown or evolved as rapidly as the financial derivatives markets. But what makes derivatives important is not so much the size of the activity as the role they play in fostering new ways to understand, measure, and manage financial risks. Through derivatives, risks can be efficiently unbundled and managed independently. Users can keep the risks they are most comfortable managing and transfer those they do not want to others more willing to accept those risks. From a risk management perspective, derivatives offer efficient and effective methods for reducing certain risks and enhancing returns through hedging. From a market-oriented perspective, derivatives allow for the free trading of financial risks.

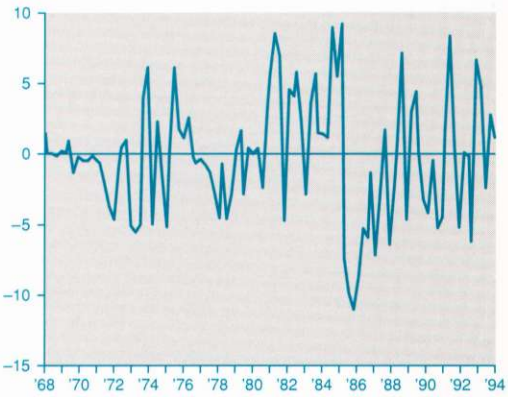
Financial Derivative Products: Forwards, Futures, and Beyond

When the financial derivatives boom began in the early 1970s, the first products were simple foreign exchange forwards that obligated one counterparty to buy, and the other to sell, a fixed amount of currency at an agreed date in the future. Next came futures contracts. Futures are similar to forwards, except that futures are standardized on exchange clearinghouses, which facilitates anonymous trading in an active and liquid market.

Around 1980, the first swaps were developed. A swap transaction is another forward-based derivative that obligates two counterparties to exchange a series of cash flows at specified settlement dates. Swaps, like forwards, are entered into through private negotiations to meet the specific

Chart 2
Exchange Rate Volatility
Index of Weighted-Average Exchange Value of U.S. Dollar Against Currencies of Other G–10 Countries

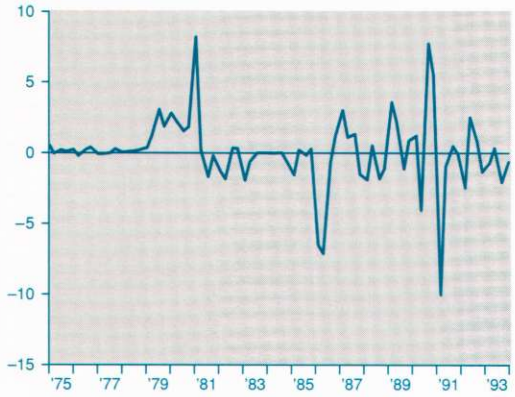
Quarterly change, percent



DATA SOURCE: CITIBASE, Citibank Economic Database.

Chart 3
Energy Market Volatility

Quarterly change, percent
Crude oil spot price (dollars per barrel)



DATA SOURCE: CITIBASE, Citibank Economic Database.

risk management objectives of each counterparty. The other basic derivatives product is the options contract. In exchange for a premium, an option contract gives the option holder the right, but not the obligation, to buy or sell the underlying asset for a specified time for a specified price.

From these basic derivatives—forwards, futures, options, and swaps—a plethora of complex new risk management instruments has taken financial markets by storm. These include caps, floors, collars, swaptions, and a host of others (see the box entitled "A Brief Derivatives Lexicon" on page 12). But modern-day financial derivatives are not fundamentally different from those used throughout history. The basic principle remains the same: to spread risk and reward so that uncertainty does not inhibit commerce.

Aristotle described the first known options contract. In Book I of *Politics*, he tells the story of the philosopher Thales who developed a "financial device which involves a principle of universal application." Thales had great skill in forecasting and predicted that the next autumn olive harvest would be exceptionally good. So Thales made agreements with owners of area olive presses by placing small deposits with each of them to guarantee him first claim on the use of their presses when fall arrived. Thales successfully negotiated low prices because the harvest was in the distant future and no one knew whether or not the next harvest would be plentiful.

Nine months later, Thales became a wealthy man. "When the harvest-time came, and many [presses] were wanted all at once and of a sudden, he let them out at any rate which he pleased, and made a quantity of money," Aristotle wrote.

Using Derivatives Today

Today, bankers and corporations use financial derivatives in similar ways. Like the olive press owners, bankers and corporations can use derivatives to hedge against future uncertainties. Or, like Thales, they can use derivatives to speculate, by taking positions in anticipation of expected market movements.

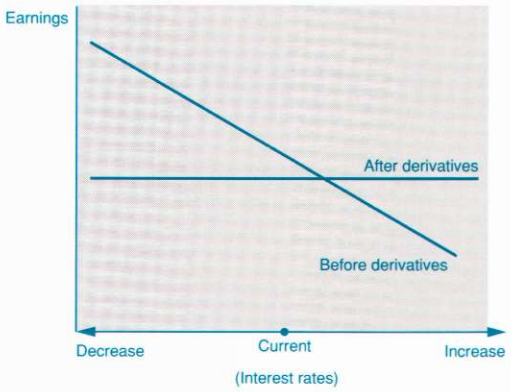
To understand how (and why) a bank might use derivatives today, consider the following example.[3] Small Regional Bank (SRB) has total assets of $5 million. The assets of the bank include a $3 million loan portfolio primarily composed of fixed-rate mortgages and $1 million in government securities. SRB's liabilities include $3 million in interest-bearing deposits that are often repriced (*Chart 4*).

Chart 4
Small Regional Bank (SRB) Balance Sheet

Assets		Liabilities	
Loans	$3 million	Deposits	
Securities	$1 million	Interest-bearing	$3 million
Cash and Premises	$1 million	Noninterest-bearing	$1 million
		Equity	$1 million
Total Assets	$5 million	Total Liabilities and Equity	$5 million

[3] This example is based on Wilson (1993).

Chart 5
Effect of Interest Rates on SRB's Securities Earnings



If SRB were concerned that a rise in interest rates would negatively affect prices in its securities portfolio, it could hedge against this interest rate risk by selling short a $1 million Treasury bond futures contract. Or, it could buy a put option that, in effect, would manage this same risk.

If rates rose, SRB would be hurt by a drop in value in its securities portfolio, but this loss would be offset by a gain in its derivative contract. Similarly, if rates fell, the bank would gain from the increase in value from its securities portfolio, but would record a loss from its derivative contract (*Chart 5*).[4]

Additionally, because of the bank's mismatch in repricing its assets and liabilities, SRB may also wish to enter into a $3 million swap contract to guard against rising interest rates. Chart 6 shows SRB's interest flows before a swap transaction. Obviously, rising interest rates will harm SRB because it receives fixed cash flows and pays variable cash flows. But SRB can hedge against this interest rate risk by entering into a swap contract with a dealer to make fixed payments and to receive floating payments.

Assume that SRB currently receives 7 percent fixed from its loan portfolio and pays a variable rate for its deposits that proxies the three-month Treasury-bill rate. The bank negotiates with a swaps dealer to pay 4.5 percent fixed in exchange for receiving T-bill minus 0.5 percent (*Chart 7*). Now the bank knows more precisely what its interest flows will be. With the swap, the bank effectively receives 7 percent fixed and pays 5 percent fixed, a guaranteed 200 basis point spread, no matter what happens to interest rates.

Table 1 shows an interest rate sensitivity analysis on the net interest margin before and after this swap transaction under three different interest rate scenarios: rates fall 300 basis points, rates are unchanged, and rates rise 300 basis points. Without the swap, the spread, or net interest margin, would be 300 basis points, assuming that T-bill rates are currently at 4 percent. But if T-bill rates rose, the spread would become progressively more narrow (*Chart 8*). At T-bill rates above 5 percent, the 200 basis point spread guaranteed by the swap will always exceed the spread in the absence of a swap. In fact, without a swap, SRB could record a substantial loss from rising interest rates. Note that through the swap transaction, the bank has taken on other risks, such as counterparty credit risk and basis risk (that is, the risk that the T-bill repricings might not occur simultaneously). However, with the swap, SRB has considerably reduced its interest rate sensitivity.

Financial derivatives are useful risk management tools that allow for the efficient unbundling of risks into component pieces that can be sold and managed indepen-

[4] The hedge in Chart 5 is shown using a futures contract. If an option contract were used as a hedge, the "after derivatives" line would have a different shape.

The "loss" in the case of the option contract comes from the premium paid for the option, which is never exercised.

Chart 6
SRB's Interest Flows *Before* Swap

dently. The financial derivatives market has grown rapidly because of the economic benefits that derivatives provide institutions in effectively controlling risk exposures.

The Evolving Market: The Changing Roles of Derivatives Players

Financial derivatives participants can be divided into two groups: end-users and dealers. End-users typically are corporations, government entities, institutional investors, and financial institutions. Dealers are mainly banks and securities firms. Financial derivatives are utilized by end-users to lower funding costs, enhance yields, diversify sources of funding, hedge, and speculate by taking positions in anticipation of expected market movements.

In the early years of financial derivatives, dealers, for the most part, acted as brokers, finding counterparties with offsetting requirements. Then, dealers themselves began to act as counterparties to intermediate customers' requirements. Once a position was taken, a dealer immediately either matched (hedged) it by entering into an opposing transaction, or "warehoused" it until a match could be found by temporarily using the futures market to hedge unwanted risks.

Today, dealers manage a portfolio of derivatives and oversee the net, or residual, risk of their overall position. This development has changed the focus of risk management from individual transactions to total portfolio exposures and has substantially improved dealers' ability to accommodate a broader spectrum of customer transactions. It has also provided a new way for banks to serve in their roles as financial intermediaries.

Chart 7
Effect of Interest Rate Swap on SRB

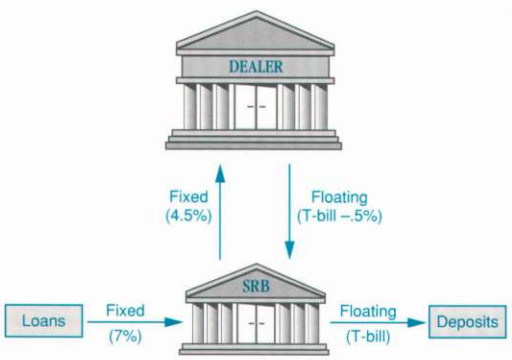
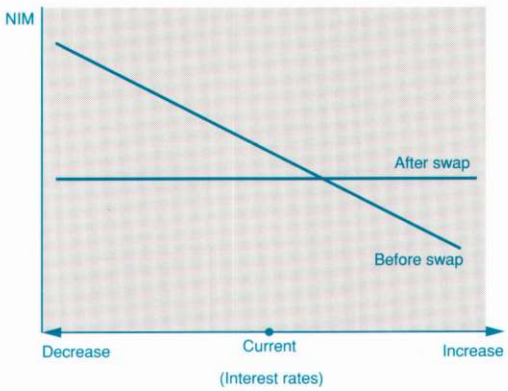


Chart 8
Effect of Interest Rates on SRB's Net Interest Margin



Players in the financial derivatives market do not have to join one particular group: they can act as both end-users and dealers. For example, a bank acts as an end-user when it uses derivatives to take positions as part of its proprietary trading, or for hedging as part of its asset/liability management. A bank acts as a dealer when it quotes bids and offers and commits capital to satisfy customers' needs for derivatives.

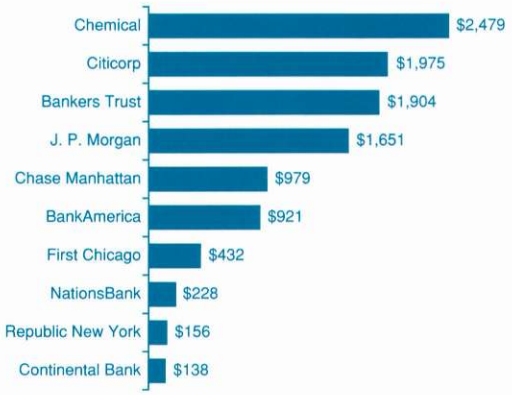
The Main Derivatives Players

The biggest players in the U.S. financial derivatives market are mostly large money center banks (*Chart 9*).[5] In fact, more than

[5] All data were taken from the December 31, 1993, Consolidated Financial Statements for Bank Holding Companies With Total Consolidated Assets of $150 Million or More or With More Than One Subsidiary Bank (FR Y-9C). Total derivatives activity include interest rate contracts; foreign exchange rate transactions; and futures, forwards, and option contracts on other commodities.

Chart 9
Top Ten Derivatives Players

Notional value (billions of dollars)



NOTE: Data as of December 31, 1993.
DATA SOURCE: FR Y-9C Reports.

90 percent of the derivatives usage among bank holding companies is done by ten institutions.

Few other bank holding companies are derivatives players. At year-end 1993, only 19 percent of bank holding companies reported any derivatives activity. But because they are much larger than average, they account for 87 percent of all bank holding company assets.[6]

According to quarterly regulatory reports filed by bank holding companies, the financial derivatives market is at least $11 trillion.[7] The amounts shown in Chart 9 are in billions of dollars, and they are correct: the notional value of Chemical Banking Corporation's derivatives holdings are nearly $2.5 trillion. A word of caution about notional amounts: for derivatives, notional principal is the amount upon which interest and other payments in a transaction are based. Notional principal typically does not change hands; it is simply a quantity that is used to calculate payments and does not give any indication of the underlying risk of the positions.

Derivatives' Credit Exposures

Although notional principal is the most frequently used volume measure in financial derivatives markets, it is not a measure of credit exposure. A useful proxy for credit exposure is the replacement cost credit exposure. This is the cost to replace the contract at current market values should the counterparty default prior to the settlement date.[8]

For the ten largest financial derivatives players among United States bank holding companies, derivative credit exposures average 12 percent of total assets. This compares with an average exposure of 51 percent of assets for the banks' loan portfolios. In other words, if these ten banks were to lose 100 percent of their loans, it would be more than four times as great than if they had to replace all of their derivative contracts (*Chart 10*).

Are New Regulations Warranted?

Fears of the unknown and recent market volatility have raised new concerns among lawmakers regarding the use of financial derivatives products. From January to May 1994, three House bills and one Senate bill regarding financial derivatives have been introduced, and many more are expected.[9] The first bill, introduced in January 1994 by

[6] These figures include eight bank holding companies in the Eleventh Federal Reserve District (Texas, southern New Mexico, and northern Louisiana).

[7] Derivatives players such as securities firms and insurance companies that do not file regulatory reports with the banking agencies make the financial derivatives market even larger.

[8] Bank participation in financial derivatives markets is examined in Board of Governors of the Federal Reserve System and others (1993) and Remolona (1992–93).

[9] In May 1994, the General Accounting Office (1994) released their two-year study of financial derivatives, sounding a call for stiffer government regulation of financial derivatives markets.

Table 1
Effect of Interest Rates on SRB's Net Interest Margin

	Rates drop 300 basis points (Percent)	No change in rates* (Percent)	Rates rise 300 basis points (Percent)
Asset yield (loans)	7.00	7.00	7.00
Liability yield (deposits)	−1.00	−4.00	−7.00
Net margin (without swap)	6.00	3.00	0
Fixed swap outflow	−4.50	−4.50	−4.50
Floating swap outflow	.50	3.50	6.50
Net swap outflow	−4.00	−1.00	2.00
Net margin (with swap)	2.00	2.00	2.00

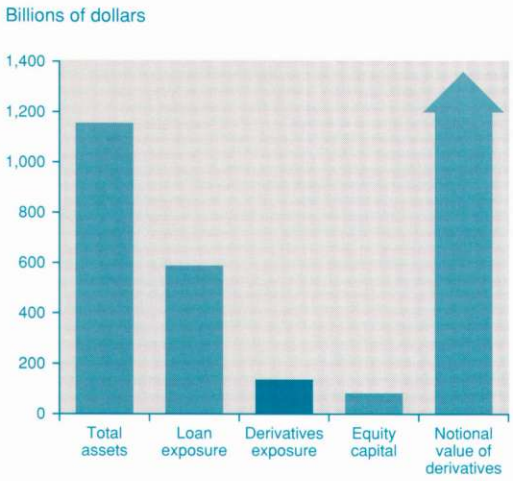
*Assumes the current Treasury-bill rate is 4 percent.

Congressman James A. Leach of Iowa, calls for the establishment of a Federal Derivatives Commission. This commission would be headed by the chairman of the Federal Reserve Board of Governors and would focus on preventing unexpected large losses by firms that trade in derivatives. The bill calls for the establishment of guidelines for using financial derivatives and limiting active participation in derivatives markets only to those institutions with solid capital and sound management.

The second House bill, introduced in April 1994 by Congressman Henry B. Gonzalez of Texas, is directed at the regulation of bank derivatives activities. His bill calls for banks to disclose more information about their financial derivatives holdings and would boost regulatory oversight of banks' involvement in the derivatives market. Gonzalez' bill also would make "improper management" of derivatives illegal and would mandate a study by the General Accounting Office to examine the feasibility of a transaction tax on "excess speculation."

Congressman Gonzalez also introduced a third House bill in May 1994 that blends provisions of his previous bill and the Leach bill. This latest bill calls for increased oversight of financial derivatives markets to protect the federal deposit insurance system and control financial market risk. According to the bill, this would be accomplished by directing regulators to establish appropriate standards for supervising derivatives trading and increasing regulators' ability in gathering information regarding derivatives activities at financial institutions.

Chart 10
Credit Exposure: The Top Ten



NOTE: Data as of December 31, 1993.
DATA SOURCE: FR Y-9C Reports.

Also in May 1994, Senator Byron L. Dorgan of North Dakota introduced a bill that would require proprietary trading of derivatives to be placed in separately capitalized subsidiaries. The proposal, if enacted, could severely limit banks' use of financial derivatives products because so many banks use the portfolio management method of trading.[10]

Lawmakers' concerns over banks' activity in financial derivatives stems from the potential to speculate in the derivatives market, which allows banks to bet with federally insured deposits and, ultimately, with taxpayers' funds. Although financial derivatives are fairly new, their risks are not. They reflect essentially the same basic risks that banks have always faced: credit risk, settlement risk, operating risk, market risk, and so on.

New laws that curtail derivatives activities could prove harmful to market efficiency because of the economic benefits that derivatives provide in efficiently transferring market risks. Financial derivatives have become a new, sophisticated tool banks can use to accomplish more successfully their risk management objectives. It is important that financial innovation not be discouraged. After all, banking is not intended to be a risk-free activity.

Even so, the elimination of risk in banking seems to be the goal of many regulatory policymakers. It is certainly important that problems arising in financial markets are quickly contained, and that they do not develop into major crises. But regulatory proposals that discourage the use of prudent risk management strategies, create an unlevel playing field for market participants, or that eliminate the discipline provided by the market mechanism should be avoided.

Are Derivatives or Deposit Guarantees the Problem?

In the 1930s, deposit insurance and other banking reforms were introduced to address some of the instabilities associated with systemic risk. The primary objectives of deposit insurance were the protection of small depositors and protection of the circulating medium of exchange. By addressing depositor confidence, the U.S. government hoped to avoid the experience of deposit runs that were characteristic of many earlier banking crises.

The current deposit guarantee structure does, indeed, reduce the probability of large-scale bank panics but has also created new problems. Deposit insurance effectively eliminates the discipline provided by the market mechanism in encouraging banks to maintain appropriate capital levels and restrict unnecessary risk-taking.[11] This decline in market discipline provided through an incentive for depositors to monitor banks may encourage banks to pursue higher risk strategies.[12]

Because of the federal deposit guarantee, some government lawmakers now propose to restrict insured banks' activities in financial derivatives markets. But are derivatives the problem, or is the current federal deposit guarantee structure the problem? Without federal deposit guarantees, banks' activities would be disciplined by depositors and the banks would take only calculated risks because uninsured depositors, concerned about the safety of their deposits, would provide the discipline necessary to guide financial institutions in maintaining adequate capital and limiting risky strategies.[13]

Further, the presence of federal deposit guarantees may encourage banks to use

[10] Using this trading scheme, an institution manages the net, or residual, risk, thereby changing the focus of risk management from individual transactions to portfolio exposures.

[11] See Short (1991) for a discussion of the role deposit insurance has played in bank risk-taking. An empirical investigation of the impact of moral hazard on bank risk-taking during the 1980s can be found in Gunther and Robinson (1990).

[12] See Short (1987) and Short and O'Driscoll (1983).

[13] See Short (1991).

derivatives to pursue higher risk strategies, such as speculating on the direction of interest rates or exchange rate differentials, instead of using derivatives for hedging to improve their management of financial risks. Federal deposit insurance discourages market discipline, so regulators are forced to exert pressure on banks to ensure that they are managed in a safe and sound manner.

If the current federal deposit guarantee structure is to remain intact, regulatory proposals involving financial derivatives should focus on market-oriented reforms as opposed to laws that eliminate the usefulness of derivatives in managing risk. Such reform proposals include emphasizing more disclosure of derivative holdings and their accompanying risks, appropriate capital adequacy standards, and guidelines that foster sound risk management practices.

This does not imply that derivatives activities should be forced into separately capitalized subsidiaries of bank holding companies. The risks associated with proprietary trading are not inherently greater than those associated with other banking activities. As Federal Reserve Chairman Alan Greenspan (1994) said in recent testimony to a House Subcommittee:

> Some derivative contracts, notably options products, are quite complex, but a complex, difficult-to-manage option is imbedded in every fixed-rate home mortgage. As is the case for home mortgage lending or any other banking activity, whether proprietary trading places the deposit insurance fund at risk depends on the bank's capital, the degree of concentration in its risk exposures, the strength of its risk management systems and internal controls, and the expertise of its personnel, including senior management and risk managers as well as traders.

Indeed, implementing and monitoring a segregated proprietary trading function would be extremely difficult because such functions are difficult to define in principle and difficult in practice to distinguish from market-making and other customer accommodation activities of banks.

Systemic Risk: The Domino Effect

For banking supervisors, probably the most important question they face concerning financial derivatives is, What could go wrong to engender systemic risk, the danger that disruptions or difficulties at one institution could have a significant impact on other financial institutions and through them on the overall economy? In other words, what safeguards exist to prevent a domino effect, precipitating a banking crisis?

Individual financial derivative contracts, by their nature, allow risk to be distributed throughout the entire financial system. Derivatives allow different components of risk to be segregated, isolated, and passed around the financial system to those who are willing and able to bear each risk component at least cost. This activity reduces the overall cost of risk-bearing and enhances economic efficiency.

Thus, a major shock that would jolt financial markets in the absence of derivatives would also have an impact on financial markets in which the use of derivatives was widespread. But because the holders of various risks would be different, the impact would be different and presumably not as great because the holders of the risks should be better able to absorb potential losses. Note that this presumption holds only in a market where bank risk-taking is disciplined by depositors. In a market with deposit guarantees, banks may be more willing to adopt risky strategies and speculate with derivatives.[14]

[14] The link between deposit insurance and risk-taking behavior is not unique to derivatives. The point is, the present deposit guarantee structure could create incentives for banks to take on higher risk strategies, whether using derivatives or through a bank's loan portfolio.

What Should Regulators Do?

Banking regulators should emphasize more disclosure of derivatives positions in financial statements and also require that institutions trading huge derivatives portfolios have adequate capital. Additionally, because derivatives could have implications for the stability of the financial system as a whole, it is important that users maintain sound risk management practices. To this end, regulators have issued guidelines that banks with substantial trading or derivatives activity should follow. These include

(1) active board and senior management oversight of trading activities,
(2) the establishment of an internal risk management audit function that is independent of the trading function,
(3) thorough and timely audits to identify internal control weaknesses, and
(4) risk measurement and management information systems that include stress testing, simulations, and contingency planning for adverse market movements.

It is the responsibility of a bank's senior management to ensure that risks are effectively controlled and limited to levels that do not pose a significant threat to its capital position. In addition to the guidelines mentioned above, the Group of Thirty (1993)[15] recently published a set of sound risk management principles for users and dealers of financial derivatives products in the form of twenty recommendations (see the box entitled "Summary of Recommendations: The Group of Thirty Global Derivatives Study"). These recommendations address issues associated with the measurement, control, accounting, and disclosure of derivatives activities.[16] This is a step in the right direction for practitioners and responds to many public policy concerns surrounding the management of financial derivatives products. Sound risk management practices at the individual firm level are the most important factor in preventing systemic disturbances.[17]

Derivatives are here to stay. Both financial institutions and regulators have made substantial progress in meeting the challenges posed by financial derivatives. But greater challenges remain. Like it or not, we are well on our way toward truly global financial markets that will continue to develop new financial innovations designed to improve risk management practices.

Conclusion

In conclusion, financial derivatives products are useful risk management tools for breaking risk into components that can be managed independently. The viability of financial derivatives rests on the principle of comparative advantage. Whenever comparative advantages exist, there can be benefits to all parties from trade. And financial derivatives allow for the free trading of individual risk components.

In addition, regulation is an ineffective substitute for sound risk management at the individual firm level. Increased disclosure requirements, capital adequacy standards, and guidelines that foster sound risk management practices are prudent regulatory strategies. The overall health of the financial system depends on the adoption of sound risk management practices at the individual firm level.

Furthermore, the safety and soundness of financial markets depends more on the effective monitoring and molding of bank risk-taking through market forces than

[15] The Group of Thirty is an international financial policy organization made up of representatives of central banks, international banks, securities firms, and academia.

[16] See McDonough (1993) for additional comments regarding the Group of Thirty (1993) study.

[17] Becketti (1993) concludes with a similar view that banks can safely manage and regulators can effectively supervise bank participation in financial derivatives markets.

through continued regulatory oversight. Laws that destroy derivatives' economic benefits could prove harmful to individual firms and global financial markets. Successful regulations need to emphasize the incentives and self-correcting features found in free-enterprise systems. Efforts should be made to improve the role depositors play in controlling bank risk-taking instead of eliminating the role financial derivatives play in controlling bank risk-taking.

Summary of Recommendations
The Group of Thirty Global Derivatives Study

For end-users and dealers of derivative products:

- Use derivatives in a manner consistent with the firm's overall risk management and capital policies approved by its board of directors. Management at all levels should enforce these policies.
- Mark-to-market derivatives positions, at least on a daily basis, for risk management purposes.
- Quantify market risk under adverse market conditions against limits, perform stress simulations, and forecast cash investment and funding needs.
- Assess credit risk based on frequent measures of current and potential exposure against counterparty limits.
- Reduce credit risk by broadening the use of multiproduct master agreements with close-out netting provisions.
- Establish independent and authoritative credit risk management functions responsible for reviewing and monitoring risk exposures.
- Ensure that only well-trained, responsible professionals are involved in derivatives activities.
- Establish computerized risk management information systems that measure, manage, and report risks in a timely manner.
- Adopt accounting and disclosure practices for international harmonization and greater transparency.

For Regulators:

- Recognize close-out netting arrangements and encourage their use by reflecting them in capital adequacy standards.
- Remove remaining legal and regulatory uncertainties.
- Amend tax laws to remove impediments to the use of derivatives in risk management strategies.
- Provide comprehensive and consistent guidance on accounting and reporting of derivative instruments.

A Brief Derivatives Lexicon

Cap:	An option-like contract that protects the holder against a rise in interest rates or some other underlying beyond a certain level.
Collar:	The simultaneous purchase of a cap and sale of a floor with the objective of maintaining interest rates, or some other underlying, within a defined range.
Dealer:	A counterparty who enters into a swap in order to earn fees or trading profits, serving customers as an intermediary.
Derivative:	A contract whose value depends on (or derives from) the value of an underlying asset, typically a security, commodity, reference rate, or index.
End-user:	A counterparty who engages in a swap to manage its interest rate or currency exposure.
Floor:	An option-like contract that protects the holder against a decline in interest rates or some other underlying beyond a certain level.
Forward:	A contract obligating one counterparty to buy and the other to sell a specific asset for a fixed price at a future date.
Future:	A forward contract traded on an exchange.
Notional Value:	The principal value upon which interest and other payments in a transaction are based.
Option:	A contract giving the holder the right, but not the obligation, to buy (or sell) a specific quantity of an asset for a fixed price during a specified period.
Swap:	An agreement by two parties to exchange a series of cash flows in the future.
Swaption:	An option giving the holder the right to enter (or cancel) a swap transaction.
Underlying:	The asset, reference rate, or index whose price movement determines the value of the derivative.

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What Determines Businesses' Borrowing from Banks?

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Banks have long served as an important source of credit for businesses. Their role as credit providers to businesses has diminished in recent years, however. It is widely recognized that medium to large businesses have been increasingly satisfying their credit needs through nonbank sources, including markets for commercial paper and other types of securities. But even among the small businesses that cannot turn to the securities market, there is a growing reliance on nonbank credit sources.

Firms that use banks as a source of financing do so because bank credit is the most attractive alternative. Banks may hold a comparative advantage in business financing because they possess informational advantages over other types of lenders. For instance, a bank may find it easier than some other types of outside lenders to evaluate and monitor a firm because the bank may have expertise in lending to certain types of firms or an ongoing relationship with the firm seeking credit. This relationship provides the bank with borrower-specific information not readily available to other participants in the financial markets. The bank's greater information on the firm means that it might find a loan to the firm profitable even though other lenders would not.

This article examines the characteristics of a sample of small- to medium-sized businesses to determine what factors are associated with reliance upon bank credit among such borrowers. Awareness of what parts of the credit market are served by banks may help in evaluating policies designed to address concerns about a credit crunch.

Empirical evidence suggests that the relative amount of bank debt a firm holds depends on firm size. The smallest firms in the sample use less bank debt than the medium-sized and large firms. In addition, smaller firms that are not well-known, or that are without well-established reputations, are more likely than larger firms to need to pledge collateral to obtain bank loans. These differences in borrower characteristics suggest that firms face a changing array of borrowing opportunities as they grow and become more established.

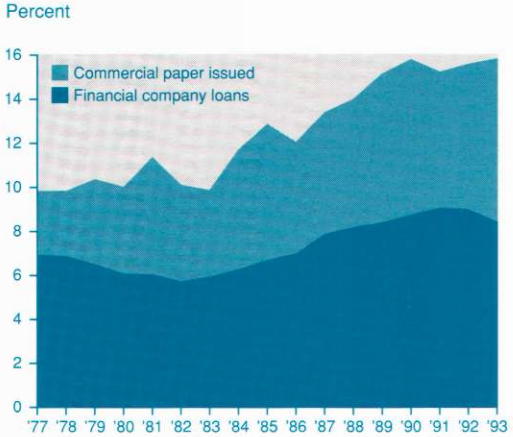
Recent Growth in Business Financing Choices

Banks today face increasing competition for extending credit to businesses. Alternatives to bank loans, such as the commercial paper market, loans from finance companies, and private placements, have made inroads into a territory once dominated by banks. Chart 1 shows the growth in the shares of commercial paper and finance company loans in total short-term business liabilities over the period 1977–93. By the end of 1993, these two sources of financing combined accounted for almost 16 percent of short-term credit in the economy.[1]

Potentially lower costs attract many businesses to these alternative sources of credit. Chart 2 shows that the spread between the banks' prime rate and the commercial paper

[1] The data presented in this section are national amounts and are not from the sample analyzed later in the article.

Chart 1
Nonbank Financing as a Percentage of Total Short-Term Liabilities



DATA SOURCE: FAME Database, Flow of Funds.

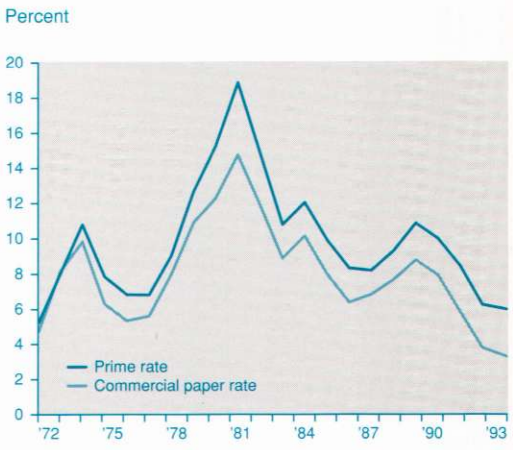
rate widened in the late 1970s and early 1980s and increased again in the early 1990s.[2] The higher cost of credit from banks reflects a number of factors in the financial markets, including regulatory capital requirements and the erosion of a base of core deposits, a traditional source of low-cost funds for banks. Another factor affecting banks' competitiveness is the cost of regulations imposed on the banking industry but not on its competition. A recent study by the Federal Financial Institutions Examination Council (FFIEC) concludes that banks' annual total costs stemming from the array of regulations they operate under equal between 6 and 14 percent of banks' noninterest expenses.

Alternative sources of credit are important for many large firms but often are only a secondary source of credit for smaller firms. Data from the 1989 National Survey of Small Business Financing provide some insight into the importance of bank credit for small businesses, defined as those with fewer than 100 employees. The data show that banks are the source of credit for 81 percent of the small firms that obtain credit. In contrast, only 41 percent of the firms use any nonbank source of credit.[3]

The sources of credit available to small firms may be a factor influencing their growth opportunities. Small firms with easier access to outside credit may be better positioned for growth than firms that must rely solely on internal financing. As Table 1 illustrates, growth through small businesses is important to overall economic growth. Small firms—defined here as those with fewer than 100 employees—were responsible for 44 percent of the net jobs generated in the United States over the 1976–86 period. Similarly, small businesses in Texas generated 43 percent of the new jobs in the state.

Concerns about credit availability, especially for small firms, have led policymakers to consider a number of initiatives to address the issue. On March 10, 1993, the four federal banking agencies announced a number of regulatory changes to enhance the availability of credit, especially to small businesses. One component of the new policy allows banks more freedom in making "character" loans. This initiative recognizes

Chart 2
Prime Rate and Commercial Paper Rate



DATA SOURCE: CITIBASE.

[2] Although banks sometimes offer a discount on their prime rates, the prime rate is useful as a rough indicator of the cost of bank financing.

[3] See Elliehausen and Wolken (1990).

Table 1
Net Jobs Generated by Small Businesses, 1976–86

Industry	Percentage of jobs generated by firms with fewer than 100 employees	
	United States	Texas
Total	44	43
Agriculture	75	59
Construction	102	83
Finance	37	48
Manufacuturing	106	30
Mining	52	35
Retail trade	25	34
Services	37	44
Transportation	30	28
Wholesale trade	65	53

NOTE: Percentages may exceed 100 because the industry experienced a loss of jobs in total, even though small businesses showed a net gain of jobs.

SOURCE: U.S. Small Business Administration, Office of Advocacy, *Handbook of Small Business Data 1988*.

that banks often form special relationships with certain businesses that may enhance credit availability for these enterprises.

Because small businesses contribute significantly to economic growth in the United States, and because banks are their primary source of credit, it is important to understand the factors that influence the relative amount of bank debt held by small businesses. The next section discusses an economic theory of businesses' use of bank loans versus nonbank sources of credit. This theory stresses that banks may have a comparative advantage in providing funds to certain types of businesses and that this advantage allows banks to fulfill credit needs more efficiently than can alternative providers of financing.

The Role of Bank Loans in Business Financing

Information Asymmetry, Reputation, and Bank Lending. The *information asymmetry view* of banks' comparative advantage in business lending relies on the notion that banks are better positioned than alternative lenders to gather information on businesses.[4] This view emphasizes the effect of information asymmetry on the supply of bank loans.

Banks have an informational advantage relative to other providers of capital because they can better observe firms' cash flows and investment decisions. A bank establishes a relationship with a borrower, and this gives the bank additional access to information on the firm's performance and the ability to monitor the investments the bank finances.

For example, as a bank develops a relationship with a business, it gains access to the managers of the business, who can provide the bank with information not readily available to the general public. This

[4] Diamond (1984), Ramakrishnan and Thakor (1984), Fama (1985), and Seward (1990) show that banks can bring welfare improvements in an economy with informational asymmetries between borrowers and lenders.

information may range from additional accounting data to a manager's hunch about a new product. Any such information available to the bank, but not to the public, gives the bank a comparative advantage in evaluating the business. In addition, a bank's experience in lending to smaller borrowers may give the bank an advantage in processing the information it does obtain. For example, a bank's experience in evaluating business plans may enable the bank to more accurately evaluate a firm's prospects than an alternative lender could by studying the same business plan. Through this ongoing process, banks may be able to derive more insight from a given piece of information than a nonbank lender could.

The information asymmetry view of banks' role in the credit process implies that a firm with investments that are more difficult to observe will be the most likely user of bank debt. A bank may be able to monitor the investment efficiently, while other lenders would find equivalent monitoring too costly. Similarly, a firm with performance that is difficult to observe will likely use bank debt because banks are probably more efficient monitors of performance.

A more complex version of the information-asymmetry story explains how a firm's choice between bank debt and other debt is affected by its reputation.[5] The *reputation view* illustrates how bank loans can help a firm build and establish a reputation that would enable the firm to earn higher credit ratings in the financial markets. Both supply and demand effects are incorporated in this view.

The reputation view holds that a firm that has not yet established a reputation, and therefore has a low credit rating, may be rejected for a bank loan. By contrast, a firm with a more established reputation and an intermediate credit rating is usually accepted for a loan. The bank loans are made because banks have a comparative advantage in gathering information on these firms relative to other lenders. The more established firm wants to obtain the monitoring services over firm investments and performance that a bank provides because the bank's monitoring will signal other lenders that the firm is a good credit risk. This helps the firm to further establish and enhance its reputation. Finally, a firm with a high credit rating and a well-established reputation chooses to borrow directly from financial markets, issuing publicly traded bonds or commercial paper, because its reputation provides it with low-cost access to these markets.[6]

Empirical implications. The perspectives outlined above offer several reasons why banks might have a comparative advantage in making loans. This section identifies variables that would proxy for the predictions identified in the preceding section. Further examination of these variables would, therefore, lead to some insights into the factors that might lie behind a firm's use of bank versus nonbank sources of credit.

Tangible assets. In the information asymmetry view, the observability of a project is an important determinant of whether a firm borrows from a bank. Empirically, observability of firms' investments can be measured as the fraction of tangible, or fixed, assets to total assets. Firms with more tangible assets will tend to make investments that are more easily observable by outsiders. For example, it would be much easier to verify whether a firm builds a new

[5] Diamond (1991) has shown that information asymmetry may lead to a more complex equilibrium when firms build reputations in the credit market.

[6] Other theories that are important in explaining the role of banks in business financing include the *costly monitoring view*, developed by Rajan (1992). This view emphasizes that the monitoring services a bank provides will involve not only benefits, but also costs. Boot, Thakor, and Udell (1991) develop a *collateral view* of bank lending, which shows that firms that are relatively easy to observe would use more bank debt, not less, because the observable assets serve as collateral on the loans. A more complete discussion of each of these views can be found in Hooks and Opler (1993).

factory with a loan than to verify whether it provides appropriate training to its workers (an intangible asset) with the same loan.

Because the information asymmetry view predicts that more observability is associated with fewer bank loans, it suggests that tangible assets, the empirical measure of observability, will be negatively associated with the concentration of bank debt. So, the greater a firm's proportion of tangible assets, the less it would rely on bank debt.

Firm size. Another measure of the observability of a firm's investment choices is firm size.[7] Small firms are typically more difficult for outsiders to observe than larger ones because little public information is produced about these firms. A bank, however, usually will have access to the management and premises of a firm that borrows from it, regardless of the firm's size.[8] According to the information asymmetry view, this implies that small firms would be more likely to use bank debt than larger firms.

The related reputation view, though, suggests that the amount of a firm's bank borrowing depends on firm size in a more complex way than the simple information-asymmetry view suggests. At the high end of the market, large firms build strong reputations that allow them to tap cheap credit in external credit markets. Therefore, they tend to have little bank debt. At the other end of the market, many small firms are screened out of the financial markets. These firms instead use internal financing, financing from suppliers, or similar credit sources and, therefore, will have little bank debt. In the middle part of the market, firms that lack sufficient reputation to tap the external credit market, but may pose demonstrably low credit risk for a bank, will use banks as a source of capital.

Thus, the reputation view has the empirical implication that bank borrowing depends on both observability and on firm size. Firms that have investments that are difficult to monitor (have fewer tangible assets) will more likely be denied credit when they are small. However, as they grow sufficiently in size to be able to access external credit markets, they will be more likely to borrow from banks when outsiders can't easily observe their quality. Therefore, firms with low concentrations of tangible assets will have low bank loan intensity when they are small but high bank loan intensity as they grow in size. Ultimately, when they become very large and well-known in the external credit market, they will have little bank debt at all.

Leverage. The information asymmetry view may be interpreted to suggest that a relationship exists between a firm's leverage ratio, or total debt to asset ratio, and its use of bank debt. According to this view, firms with low observability have difficulty obtaining financing and, therefore, may have low leverage ratios. But because banks have a comparative advantage in producing information about these difficult-to-observe firms, they do obtain bank loans. Thus, firms with low observability might be expected to have low leverage, but high concentrations of bank debt.

Evidence on Businesses' Use of Bank Loans

This section turns to some empirical evidence to determine the relative importance of the information asymmetry view in practice.[9] The data, obtained from Dun and Bradstreet, provide aggregate information on the borrowing behavior of a sample of small- and medium-sized businesses

[7] Observability might also be measured by the age of a firm. Unfortunately, this variable is not available for the data analyzed in the next section.

[8] Fama (1985) and Slovin, Johnson, and Glascock (1992) discuss these ideas further.

[9] Previous empirical studies of the determinants of bank borrowing include Easterwood and Kadapakkam (1991), Calem and Rizzo (1992), and Hoshi, Kashyap, and Scharfstein (1993). Related literature finds that announcements of bank loans can have positive effects on a firm's market value. See James (1987), Lummer and McConnell (1989), and Slovin, Johnson, and Glascock (1992).

each year between 1982 and 1987.[10] Because all firms in the sample have less than $5 million in assets, this analysis will, of course, provide only suggestive evidence on the questions posed.

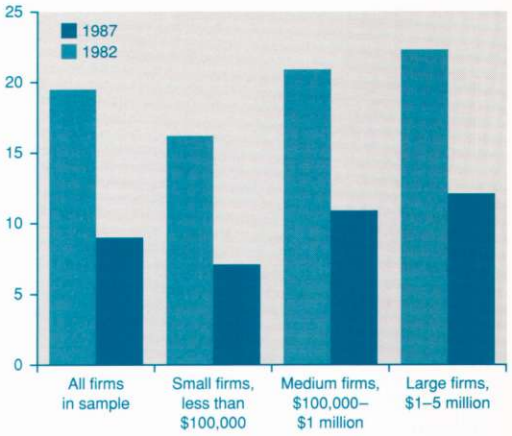
The analysis measures reliance on bank debt by calculating the ratio of industry-consolidated bank debt to total industry-consolidated liabilities. It is important to note that the analysis distinguishes between two decisions: reliance on debt and reliance on *bank* debt. The theories discussed earlier in this article address only the second decision, reliance on bank debt. Thus, the principal question may be restated as follows: Given the amount of debt that a firm chooses, how much of that debt will be bank debt?[11]

The concentration of bank loans in total firm debt. The recent trend away from bank financing for many firms is apparent in Chart 3. Between 1982 and 1987, the large firms in the sample—those with assets between $1 million and $5 million—decreased their average proportion of bank debt to total liabilities from 22 percent to 12 percent. Small firms, with assets up to $100,000, and medium-sized firms, with assets between $100,000 and $1 million, also held a reduced share of bank debt by 1987. For all firms combined, the relative amount of bank debt held over the period fell by about one-half.

While the share of bank debt for firms of all sizes has decreased over time, Chart 3 also indicates that small firms use less bank debt than larger firms in each time period. In 1982, the smallest firms in the sample held an average of 16 percent of their liabilities as bank debt, but the largest firms held a higher share—22 percent of their liabilities—as bank debt. A similar pattern holds for 1987. The simple information asymmetry view predicts that small firms will use relatively more bank debt than large firms, but this is not reflected in the data.

Although the reputation view can be only partially examined with the data at hand, the evidence in Chart 3 does support a number of its predictions. The finding that small firms use less bank debt is consistent with the reputation view because it predicts that small firms without well-established reputations will often find it difficult to obtain bank loans. The reputation view also predicts that medium-sized firms will hold more bank debt, and this prediction, too, is consistent with the evidence in Chart 3. Unfortunately, the prediction that large firms with good reputations

Chart 3
Firms' Average Concentrations of Bank Debt by Firm Size



NOTE: Firm size by asset value.

DATA SOURCE: The INSIGHT database from Dunn & Bradstreet.

[10] The analysis that follows is based on Hooks and Opler (1993). The data are at the 4-digit SIC level. Firms need not have outstanding debt to be included in the sample. Other sources of credit for these firms include finance companies, venture capitalists, mezzanine financiers, and Small Business Administration loans. Using data up through 1987 avoids possible distortions that may have arisen in light of the credit crunch episode that began several years later.

[11] A measure of reliance on total debt, like the ratio of debt to assets or the leverage ratio, is not appropriate for testing the predictions of the views described above because it does not focus on the relative use of bank debt.

will use little bank debt cannot be tested with this sample because the sample does not include very large firms.

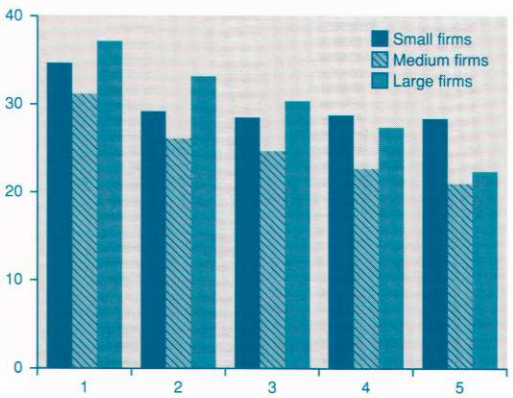
The relationship of bank loans and firms' observability. Chart 4 shows the pattern between one measure of businesses' observability, tangible assets relative to total assets, and the concentration of bank debt in 1987. The chart groups the firms in each size category into five classes that depend on firms' concentrations of bank debt. The firms with the least bank debt are in group 1, and those with the most bank debt are in group 5.

As shown in Chart 4, firms with more bank debt tend to have relatively fewer tangible assets than firms with little bank debt. This trend is especially apparent for the medium- and large-sized firms in the sample. The pattern displayed in Chart 4 is consistent with the information asymmetry view of bank lending, which holds that firms that are more difficult to observe are more likely to use bank financing than are other firms.

The pattern in Chart 4 is also consistent with the reputation view. Among those banks with the largest concentration of bank debt (group 5), small firms hold more tangible assets (or collateral) than do larger firms. One interpretation of this is that small firms do not have established reputations, so to obtain bank loans they must pledge part of their tangible assets as collateral. Larger firms that have established stronger reputations are less likely to need collateral to obtain bank loans.[12]

Chart 4
Firms' Average Share of Tangible Assets, Ranked by Concentration of Bank Debt, 1987

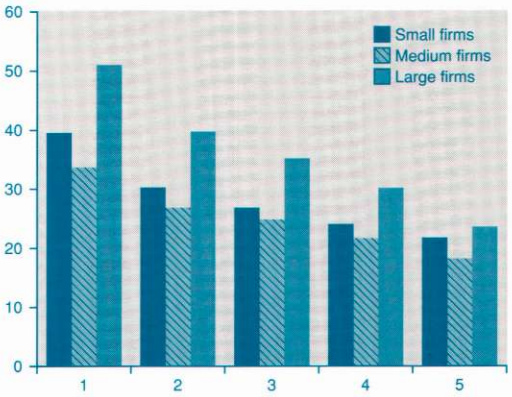
Percent of total assets



NOTE: Rank based on ratio of bank debt to total debt.
DATA SOURCE: The INSIGHT database from Dunn & Bradstreet.

Chart 5
Firms' Average Leverage, Ranked by Concentration of Bank Debt, 1987

Percent of total assets



NOTE: Rank based on ratio of bank debt to total debt.
DATA SOURCE: The INSIGHT database from Dunn & Bradstreet.

Bank loans and firms' leverage. Chart 5 shows the relationship in 1987 between the relative amount of total debt held by firms, or the leverage ratio, and the concentration of bank loans for firms. As before, the firms have been classified into five groups based on their bank loan concentrations. The pattern in Chart 5 suggests that firms with relatively higher concentrations of bank debt (groups 4 and 5) have relatively

[12] A formal test that controls for other factors affecting firms' bank loan concentration shows that the relationship between fixed assets and loan concentration is positive for small firms but negative for large firms. This evidence, which supports the conclusions drawn here, is described in Hooks and Opler (1993).

smaller amounts of total debt. That is, bank debt concentration is highest in those firms whose leverage ratios are low. The relationship is most pronounced in the large-firm category, for which the average leverage ratio falls from 51 percent to 24 percent across the bank loan-concentration groups.

The negative relationship between leverage and bank loan concentration is consistent with the information asymmetry view. As discussed earlier, a firm that is difficult to observe may encounter difficulties obtaining financing in general, so it would have low leverage. However, such a firm is well-suited to bank financing, so it may have a relatively high concentration of bank debt even though it has low leverage.

Conclusions

Current economic theory suggests that banks play an important role in lending to businesses because of information asymmetries. Empirical evidence exists that is consistent with the simple information asymmetry view, which says that banks may have a competitive advantage in obtaining and processing information on firms. This evidence sheds light on bank loan patterns observed for larger firms but is less compelling as an explanation for the patterns associated with smaller firms. The reputation view of bank lending, which implies that bank financing depends on firm size as well as an informational advantage, better fits the patterns observed among different sizes of firms.

The ongoing relationship between borrower and lender can allow banks to cultivate informational advantages and reduce monitoring costs in lending to businesses. The importance of these types of relationships between banks and their business customers and the implications for banking and economic activity have been the motivating factor behind recent policy actions that attempt to ensure the smooth flow of credit to businesses.

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