

Economic Review



FEDERAL RESERVE BANK OF KANSAS CITY

November 1984

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of Interstate Banking

Futures Markets: A Primer
for Financial Institutions

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The Competitive Effects of Interstate Banking

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By Charles Morris

Many issues need to be resolved before legislators remove the prohibitions against interstate banking. One issue of major importance is whether interstate banking would lead to more or less competition in the market for financial services. At a theoretical level, the effect of interstate banking on competition is uncertain. Empirical evidence suggests, however, that interstate banking would result in a more competitive financial services industry.

Futures Markets: A Primer for Financial Institutions

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By Mark Drabenstott and Anne O'Mara McDonley

Large money center financial institutions have used financial futures extensively for several years. Small and medium-sized institutions have been more reluctant to use this tool in managing interest rate risk. As financial futures become better understood, more institutions can be expected to use them to complement traditional risk management tools.

The Competitive Effects of Interstate Banking

By Charles Morris

The prohibitions against interstate banking have emerged in recent years as a policy issue. Although federal law prohibits branch banking and bank holding company control of banks across state lines, the demand for interstate financial services has increased as state economies have become more integrated with one another. And because there are profits to be made by providing the goods and services that society wants, financial institutions have been extremely innovative in finding ways around the restrictions on interstate banking. As a result of these natural market forces, many bank and bank-like services are now provided on an interstate basis. Bank holding companies can cross state lines and own loan production offices, Edge corporations, and nonbank subsidiaries that provide services closely related to banking. Nonbank institutions, such as thrifts, brokerage houses, and retailers, also offer many financial services on an interstate basis.

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It is often argued that the laws should be changed to allow interstate banking because many financial services are already provided on an interstate basis, but in an excessively costly and inequitable way. Not only do financial institutions spend resources finding ways around current laws but they also often provide interstate banking services in a more costly way than if interstate banking were allowed. Major corporations and wealthy individuals can easily make financial transactions across state lines, but small businesses and households cannot easily make such transactions. Also, traditionally defined banks cannot compete with other financial institutions on an equal basis.

Before legislators decide whether to change the laws, however, several other factors should be considered. These include the effect of interstate banking on the safety and soundness of the banking system, the flow of credit between regions, the viability of small banks, and the competitiveness of the banking system.

Although all of these factors are important,

the impact of interstate banking on competition is of major importance.¹ The reason is that social welfare is usually greatest when firms in an industry actively compete against each other. Competition among firms in an industry results not only in larger levels of output than would otherwise be produced, but also in lower prices and higher quality products. To remain competitive, firms must also meet the demands of consumers and produce at the lowest possible cost.

This article argues that interstate banking will result in a more competitive banking system. Thus, the current prohibitions against interstate banking cannot be justified on the basis that interstate banking would adversely affect the competitiveness of the banking system. A brief discussion of the legislative history of restrictions on interstate banking is presented in the first section. This is followed by a theoretical discussion of the competitive effects of interstate banking. Empirical evidence on the competitive effects is discussed in the third section. Concluding remarks are presented in the final section.

Legislative history

Geographic restrictions on expansion by state and national banks, particularly across state lines, have long been part of the U.S. banking system. State banks can operate only in the state that charters them. If a state bank wants to operate in another state, it must apply for a charter in that state. National banks are also prohibited from crossing state lines. A system of national banks, chartered and regulated by the Comptroller of the Currency, was

¹ Many analysts dismiss the argument that interstate banking would lead to a less competitive banking system as irrelevant to the issue. They argue that the antitrust laws are sufficient to prevent anticompetitive behavior.

created by the Currency Act of 1863, later revised as the National Bank Act of 1864. Although neither act mentioned branches, early Comptrollers interpreted the law as meaning that national banks could not branch at all, either within a state or across state lines. The current prohibition against interstate branching by national banks was adopted in a provision of the Banking Act of 1933 that amended the McFadden Act of 1927. According to the McFadden Act as amended in 1933, national banks can branch in any state within the geographic limits specified by the laws of that state. Thus, the issue of branching was deferred to the states.

Restrictions on branching were often overcome through the use of bank holding companies.² If restrictions on branching kept a bank from operating a multi-office system, the bank could achieve the same end by forming a holding company that owned more than one bank. Multibank holding companies, used to circumvent restrictions against branching in unit-banking states, were also used to set up interstate banking networks. By 1956, seven domestically owned and five foreign owned bank holding companies owned banks in more than one state. As a result, interstate banking had come into existence even though the McFadden Act prohibited interstate branching.

The Douglas Amendment to the Bank Holding Company Act of 1956 prevented any further use of this "loophole" in the McFadden Act by limiting the interest that a bank holding company could acquire in an out-of-state bank to 5 percent of the voting stock.³ Apparently,

² Restrictions on branching also were overcome in other ways. For example, chain banking was often used as a way to avoid branching restrictions.

³ The Douglas Amendment does not prevent bank holding companies from owning subsidiaries that provide bank-like services across state lines. Bank holding companies can establish an interstate presence by owning, say, mortgage banking, factoring, or finance companies in other states.

to avoid a conflict with states' rights, the Douglas Amendment allows a bank holding company to acquire an out-of-state bank if such acquisitions are specifically allowed by the laws of the state where the bank to be acquired is located.

Although the 12 companies that already owned banks in more than one state were allowed to continue their interstate operations, the Douglas Amendment, for the most part, prevented any further expansion of bank holding companies across state lines. In recent years, however, holding companies have used provisions of new and old laws to expand across state lines.

The Garn-St Germain Act, passed in 1982 primarily to help regulators aid distressed institutions, created a way for banks to expand interstate by allowing failing institutions to be acquired by institutions from out of state. For example, the two largest bank holding companies in the United States, Citicorp and BankAmerica Corporation, have used this act to extend their interstate operations.

Still more recently, the so-called "nonbank bank" loophole has given bank holding companies a means of crossing state lines. The Bank Holding Company Act as amended in 1970 defines a bank as an institution that accepts demand deposits and makes commercial loans. A nonbank bank is an institution that has a bank charter and offers many bank-like services, but either does not accept demand deposits or does not make commercial loans. Because nonbank banks do not meet the definition of a bank, bank holding companies can establish nonbank banks in any state without violating the Douglas Amendment. Over 40 major bank holding companies have applied for charters for more than 300 nonbank banks. The future of nonbank banks depends, however, on pending national legislation that redefines a bank for purposes of the

Bank Holding Company Act. Depending on the outcome of this legislation, the nonbank bank movement will be halted or it will not.⁴

Several states have taken advantage of the clause in the Bank Holding Company Act that allows bank holding companies to acquire out-of-state banks if explicitly allowed by outside states. Twelve states have authorized entry by out-of-state bank holding companies. The constitutionality of some of these state laws is being challenged, however, leaving the future of the laws uncertain.

Although the trend in recent legislation has been to provide ways for banks to offer traditional services across state lines within the spirit of the law, some would like to reverse that trend. These opponents of interstate banking give many reasons for their opposition. One of the main reasons is that they believe interstate banking will result in a less competitive banking system.

Interstate banking and competition: theory

At a theoretical level, there is great debate over the competitive effects of interstate banking. Some argue that interstate banking would be anticompetitive in that it would result in a less competitive banking system, while others counter that interstate banking would not be anticompetitive. Still others argue that interstate banking would result in a more competitive banking system.

The anticompetitive argument...

The anticompetitive argument is usually framed within the context of the concentra-

⁴ For a more detailed discussion of the nonbank bank issue, see Charles Morris, "Nonbank Banks and Interstate Banking," *Financial Letter*, Federal Reserve Bank of Kansas City, September 1984.

tion-conduct-performance hypothesis. According to this hypothesis, market concentration in an industry influences firm conduct, which, in turn, affects industry performance. The concentration of a market is measured as the percentage of an industry's output that is produced by the largest firms in the industry. Conduct refers to the degree of rivalry among competing firms in a market or to the extent to which they engage in competitive activities. And industry performance refers to the closeness of industry output and price to their competitive levels.

Figure 1A illustrates the argument that interstate banking would result in a less competitive banking system. Removal of the interstate banking prohibitions, it is argued, would make it easier for out-of-state banking organizations to enter new banking markets either by opening new banks or by acquiring existing banks. These newly opened or acquired banks would then expand their market share at the expense of other banks, making local markets more concentrated.⁵ As concentration increased, the banks in a market would explicitly or tacitly agree to reduce the degree of rivalry among themselves. They might, for example, refrain from raising deposit rates or from lowering loan rates. The result would be a deterioration of industry performance as banks restricted output below the competitive level and provided lower quality services in their efforts to raise prices and profits. For example, the volume of deposits and loans might be held below competitive levels. This argument is used by many as a reason for not removing the prohibitions against interstate banking.

⁵ Even if the market share of newly opened banks increases, there could still be a net decline in market concentration. This is because concentration initially declines when a new bank is opened.

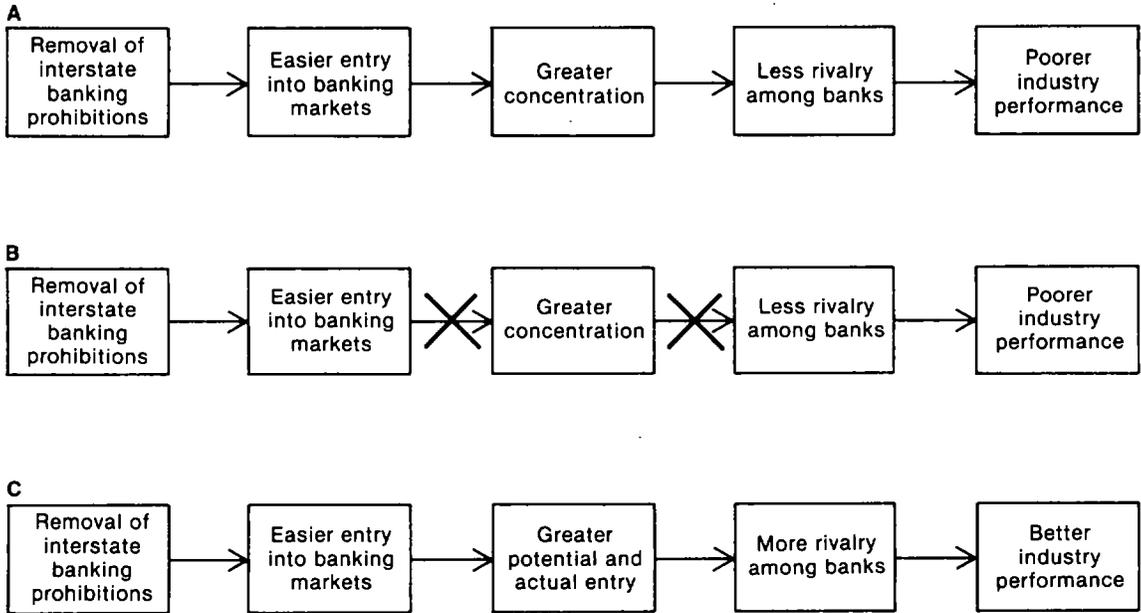
...and the counterarguments

Arguments that interstate banking would not result in a less competitive banking system are illustrated in Figure 1B. One of these counterarguments is that easier conditions of entry would not cause concentration to increase. A second counterargument is that even if greater concentration were to occur it would not cause a reduction in the degree of rivalry among firms. A variation of the second counterargument is that greater concentration might initially result in a lesser degree of rivalry among firms, but would not cause a reduction in the degree of rivalry in the long run. If any of these counterarguments are correct, interstate banking would not result in a less competitive and poorer performing industry.

Some critics of the anticompetitive argument say that easier conditions of entry would not cause concentration to increase. Local market concentration would increase as out-of-state banking organizations entered new markets only if the market share of newly opened or acquired banks increased at the expense of other banks. But these critics argue that the market share of the new banks, whether newly opened or acquired, would increase only if they could produce more output at a lower additional cost than banks of similar size that were not part of a banking network. A newly acquired bank's market share would increase, for example, only if it could attract more deposits or make more loans at a lower additional cost than before it was acquired.⁶

⁶ Because marginal costs must be lower, a decrease in fixed costs will not affect the newly affiliated bank's market share, although it will affect the bank's profits. Affiliation with a banking network could allow a bank to increase its market share without a reduction in marginal costs, however, if affiliation was accompanied by an increase in the demand for bank services. This could happen, for example, if affiliation led to the introduction of a new product that other banks in the market could not copy.

FIGURE 1



Because these critics do not believe there are significant cost advantages to affiliating with banking networks, they argue that entry would not cause concentration to increase. They conclude that, regardless of the link between concentration and conduct, interstate banking would not be anticompetitive because it would not cause concentration to increase.⁷

Other critics of the anticompetitive argument say that even if interstate banking resulted in greater local market concentration, there would not be a reduction in the degree of rivalry among banks. Even if there are only two banks in a market, they say, there are strong incentives for each bank to engage in

competitive activities. Each bank would still have an incentive to compete with the other bank for a larger market share, for example, by offering higher deposit rates or a more attractive mix of deposit services. Output and prices, therefore, will be the same whether there are two banks or 100 banks in a market. These critics conclude that although the degree of rivalry does influence performance, there is no connection between concentration and the degree of rivalry. There is no connection, therefore, between concentration and performance.

A variation of this argument is that even if concentration increased and banks explicitly agreed to refrain from rivalry, there would be no effect on the competitive activities of banks in the long run. These critics argue that explicit collusive agreements are inherently unstable and, therefore, often unsuccessful.

⁷ To the extent that such cost advantages are responsible for more concentrated markets, society still may be better off with interstate banking than without it. The savings in production costs may be greater than other costs associated with interstate banking.

Because every bank in the colluding group has an incentive to produce more than its share of output, successful collusion requires the colluding group to police the behavior of group members and enforce the production quotas. Effective enforcement of such agreements, always difficult, is even more difficult because collusive agreements to restrict output and raise prices are illegal in the United States. Without effective enforcement, such agreements would not be successful so that output would rise and prices and profits would fall to competitive levels.⁸ These critics conclude that, even if interstate banking led to high concentration and explicit agreements that prevented rivalry initially, rivalrous behavior would still result in the long run.

The procompetitive argument

The procompetitive argument, illustrated in Figure 1C, is that interstate banking would result in more competitive banking markets because easier entry results directly in banks engaging in more competitive activities. Because current prohibitions against interstate banking make market entry more difficult, they have resulted in many markets with only a few banks. It is argued that there is little rivalry among banks in these markets. Moreover, the banks in these markets are protected not only from actual competition, but also from the threat of competition from banks ready to enter a market where profits are above competitive levels. If the prohibitions against interstate banking were removed, entry would be easier. The threat of competition from potential entrants would increase immediately in all banking markets, bringing out-

⁸ Successful collusion is even more difficult because it requires not only that group members successfully enforce output quotas but that they prevent all forms of rivalry—price and nonprice.

put, quality, prices, and profits to competitive levels in many previously protected markets. Even in many one-bank markets, the increased threat of competition would prevent the single bank from earning excess profits by restricting output and charging noncompetitive prices. Where banks continued to maintain noncompetitive conditions, high profits would lead to actual entry by new banks that would eventually force output, quality, prices, and profits to competitive levels. This argument is used by many as a reason for removing the prohibitions against interstate banking.

Interstate banking and competition: evidence

Because the competitive effects of interstate banking cannot be determined at a theoretical level, it is an empirical question. The competitive effects of interstate banking depend on the resolution of several issues discussed in the previous section. Does less restriction on geographic expansion by banks result in more concentrated banking markets? If so, does concentration affect bank conduct and performance? And what is the direct effect of easier entry on bank conduct and performance? Evidence from studies that look at these questions will be presented. Further evidence on the competitive effects of interstate banking will be presented from studies that do not test a particular theory but look directly at the relationship between branching laws and bank performance. Overall, the evidence supports the view that interstate banking would result in more competitive markets.

Interstate banking and concentration

The effect of interstate banking on market concentration depends on how interstate banking is implemented. If the Douglas Amend-

ment is changed to allow *bank holding companies* to cross state lines, the effect of bank holding company expansion on market concentration must be determined. On the other hand, if the McFadden Act is changed to allow national banks to *branch* across state lines, the effect of branching on concentration must be determined.

Holding company expansion and concentration. There are two ways to infer the effect of bank holding company expansion on concentration. One way, which is based on the claim that the market share of banks affiliated with a holding company would increase only if they had lower marginal production costs than unaffiliated banks, is to determine whether such costs are lower for affiliated banks.⁹ Another way is to see how past holding company expansion has affected concentration.

Two recent studies indicate that the marginal costs of banks affiliated with a multi-bank holding company are greater than or equal to those of banks that are not affiliated. A study by George Benston, Gerald Hanweck, and David Humphrey showed that holding company affiliation had no effect on state branch or unit bank costs.¹⁰ A later study by Benston, Hanweck, Humphrey, and Allen Berger showed that marginal production costs are greater at affiliated state unit banks than at unaffiliated state unit banks.¹¹ Holding company affiliation had no effect on the costs of

⁹ There are some methodological problems with cost studies in general. They use historical accounting costs, rather than opportunity costs, they implicitly assume that all firms choose from the same set of technologies, they never take risk into account, and they cannot account for unquantifiable aspects of output, such as service differences among banks. Also, older studies may no longer be relevant because of changes in banking technology and the regulatory environment.

¹⁰ George J. Benston, Gerald A. Hanweck, and David B. Humphrey. "Scale Economies in Banking: A Restructuring and Reassessment." *Journal of Money, Credit, and Banking*, November 1982, pp. 435-456.

state branch banks. Because these studies do not find a cost advantage to bank holding company affiliation, they suggest that interstate banking in the form of bank holding company expansion across state lines is not likely to result in more concentrated banking markets.

The implications of the cost studies for banking concentration must be viewed with caution, however, because they do not use data from banks with more than \$1 billion of deposits. While this would not ordinarily be a problem, it becomes a serious shortcoming if these studies are used to determine the likely effect of holding company expansion across state lines on concentration. If there are cost advantages to these large banks affiliating with a holding company and if these are the banks that would become affiliated if the Douglas Amendment was amended, interstate banking could result in more concentrated markets.

As would be expected from the evidence in the cost studies, most studies of the effect of past intrastate bank holding company expansion on banking market concentration have found that holding company expansion had little effect on concentration. These studies have generally looked at changes over time in local banking market concentration after holding companies had expanded in those markets. Cynthia Glassman and Robert Eisenbeis reviewed several studies, conducted in the 1970s, of trends in banking concentration and concluded that bank holding company expansion has not significantly increased local market concentration, where market output is measured as the value of deposits.¹² In another survey of the effect of bank holding company

¹¹ George J. Benston, Allen N. Berger, Gerald A. Hanweck, and David B. Humphrey. "Economies of Scale and Scope in Banking." *Proceedings of a Conference on Bank Structure and Competition*, Federal Reserve Bank of Chicago, 1983, pp. 432-455.

expansion on concentration, Stephen Rhoades looked at seven studies and concluded that bank holding companies had no effect on concentration.¹³ Rhoades also examined the results from four other studies and concluded that bank holding company acquisitions had no systematic effect on the market share of the acquired banks. A more recent study by John Rose and Donald Savage shows that when bank holding companies open new banks in rural and small metropolitan area markets, significant decreases in concentration follow.¹⁴ In another study, Rose found that bank holding company entry into local markets had little effect on the market share of the acquired bank.¹⁵

Although these studies would seem to indicate that removal of the prohibition against interstate expansion by bank holding companies would not increase banking concentration, these results must also be viewed with caution. One reason is that some of the earlier studies attribute all changes in concentration to bank holding company expansion and thereby neglect other factors that could be responsible for the changes in concentration. Another is that many of the studies looked at the change in concentration for only a short

period after bank holding companies expanded. If the effect of holding company expansion was not complete in that time, the evidence from these studies could be misleading.

Branching and concentration. Because there is no evidence on whether bank branches have lower marginal production costs than similar sized unit banks, the only way to infer the effect of branching on banking concentration is to see how past intrastate branching has affected concentration. Instead of looking at how a change in state branching laws has affected market concentration over time, most analysts have looked at how concentration varies across states with different branching laws.¹⁶

The evidence on the effect of branching on local market concentration seems to indicate that local markets are slightly more concentrated in branching states than in unit banking states. Defining a local banking market as a Standard Metropolitan Statistical Area (SMSA), in June 1982 the largest bank's local market share averaged 32.5 percent in SMSA's in statewide branching states, 33.0 percent in SMSA's in limited branching states, and 29.0 percent in SMSA's in unit banking states.¹⁷ The average local five-firm concentration ratios were 82.3 percent in SMSA's in

¹³ Cynthia A. Glassman and Robert A. Eisenbeis, "Bank Holding Companies and Concentration of Banking and Financial Resources," *The Bank Holding Company Movement to 1978: A Compendium*, Board of Governors of the Federal Reserve System, September 1978, pp. 209-261. Banking industry output is measured in most studies as the value of deposits. Throughout the remainder of this article, unless specified otherwise, the value of deposits is the measure of output used in calculating market shares and concentration ratios.

¹⁴ Stephen A. Rhoades, "The Effect of Bank Holding Companies on Competition," *The Bank Holding Company Movement*, pp. 185-207.

¹⁵ John T. Rose and Donald T. Savage, "Bank Holding Company De Novo Entry and Banking Market Deconcentration," *Journal of Bank Research*, Summer 1982, pp. 96-100.

¹⁶ John T. Rose, "Bank Holding Company Affiliation and Market Share Performance," *Journal of Monetary Economics*, January 1982, p. 118.

¹⁶ A 1972 study by Bernard Shull examines the change in concentration in Virginia banking markets after a 1962 change in Virginia law that allowed banks to branch statewide by merger. Shull reports, however, that the change in the law encouraged statewide expansion through the bank holding company mechanism. Thus, the Virginia case cannot be used for evidence on the relationship between branching and concentration. See Bernard Shull, "Multiple-Office Banking and the Structure of Banking Markets: The New York and Virginia Experience," *Proceedings of a Conference on Bank Structure and Competition*, Federal Reserve Bank of Chicago, 1972, pp. 30-43.

¹⁷ Donald Savage of the Board of Governors of the Federal Reserve System kindly provided these data. The average concentration ratios exclude multistate SMSA data and were computed from *Summary of Deposits*, 1982.

statewide branching states, 82.9 percent in SMSA's in limited branching states, and 76.0 percent in SMSA's in unit banking states. While the quantitative differences across states are not large, the evidence seems to imply that branching is related to greater local market concentration. On the other hand, from a comparison of the 1982 concentration ratios with 1970 concentration ratios that were reported in a study by Donald Savage, it appears that concentration tends to decline over time at about the same pace in branching states as in unit banking states.¹⁸

The evidence based on comparisons of concentration ratios between markets may be misleading, however, as such comparisons are meaningful only if the markets are correctly defined. A market is an area in which the action of one firm has an effect on another firm. While the SMSA may be the relevant market in states that allow branching throughout the SMSA, the area may be too wide in unit banking states. The relevant market for many retail deposits and small loans is probably smaller than the SMSA. Where branching is allowed throughout an SMSA, all the banks in the SMSA can have an effect on each other because they can compete for these retail deposits and small loans by branching throughout the area. But in unit banking states, a bank competes for these retail deposits and small loans mostly in the small area around its location. Because the size of the relevant market is overstated in unit banking states, the number of banks and value of deposits in the market are overstated. The con-

¹⁸ Donald T. Savage, "Developments in Banking Structure, 1970-81," *Federal Reserve Bulletin*, Board of Governors of the Federal Reserve System, Washington, D.C., February 1982, pp. 77-85. Savage also reports average state five-firm concentration ratios for different types of state branching laws. He notes, however, that because states are not banking markets, this evidence is of limited value.

centration ratio, therefore, is understated. Although the average concentration ratio in SMSA's is greater in branching states than in unit banking states, the difference in the ratios may be overstated. If the correct market was used to determine concentration in unit banking states, markets in branching states might even be found to be less concentrated than markets in unit banking states.¹⁹

Overall, the evidence does not support the view that interstate banking would increase market concentration. First, evidence from the cost studies, though limited, suggests that interstate banking in the form of holding company expansion would not cause greater concentration. Second, evidence on the effect of past bank holding company expansion on concentration is consistent with the evidence from the cost studies and shows that bank holding company expansion has not affected market concentration. Finally, while the evidence on branching suggests that SMSA's are slightly more concentrated in branching states than in unit banking states, the difference might be reduced or even reversed if the relevant market in unit banking states was correctly

¹⁹ There is some empirical evidence that an SMSA in a unit banking state is not a single market for banking services. According to the law of one price, all firms that sell exactly the same good and operate in the same market will charge the same price. In one study, Larry Mote reports that the prices of banking services across banks are more variable in SMSA's in unit banking states than in branching states. He also reports that in branching states prices of banking services in the suburbs of SMSA's are not significantly different from prices in the central city, but in the largest unit banking SMSA's there are significant price differences between the suburbs and the central city. Because the variation in prices for essentially the same good is greater in SMSA's in unit banking states than in SMSA's in branching states, SMSA's in unit banking states are more likely to be composed of several markets than are SMSA's in branching states. See Larry Mote, "The Perennial Issue: Branch Banking," *Compendium of Issues Relating to Branching by Financial Institutions*, Subcommittee on Financial Institutions, Committee on Banking, Housing, and Urban Affairs, U.S. Senate, U.S. Government Printing Office, 1976, p. 446.

defined. Moreover, concentration tends to decline over time at about the same pace in branching states as in unit banking states.

Concentration-performance studies in banking

Studies of the competitive effects of greater concentration usually focus only on the relationship between concentration and performance. Although the competitive effects of greater concentration depend on the relationship between concentration and conduct in banking, conduct is difficult to measure. Therefore, conduct is usually ignored in empirical studies of the concentration-conduct-performance hypothesis.

Most studies use statistical techniques such as multiple regression or correlation analysis to determine the relationship between concentration and performance in state or local markets. Although concentration ratios are usually used in these studies, other measures of market structure are also used, such as the number of banks in the same market or the Herfindahl index.²⁰ Performance refers to the closeness of output and price to their competitive levels, but these measures are not available. Thus, performance is measured by average bank profits in the market or by the price of bank services, such as interest rates on loans.

Most empirical studies of the concentration-performance hypothesis in banking show a definite but only slight relationship between concentration and performance. Stephen Rhoades reported that of 39 studies conducted between 1960 and September 1977, 30

showed a positive but small relationship between concentration and performance in banking.²¹ In other words, increases in concentration are associated with small increases in bank profits or prices of bank services. The relationship was generally less than that found in concentration-performance studies of other industries. In a follow-up survey of 26 studies performed between October 1977 and June 1982, Rhoades found that 23 studies found a positive but small relationship between concentration and performance.²²

The evidence in support of the concentration-performance hypothesis is not as strong as it first appears, however. First, Rhoades noted that many of the studies that used prices as a measure of performance did not account for the effect of costs on prices. Higher prices due to higher costs is not an indication of poorer industry performance. In the first survey, for example, Rhoades found that 31 studies used prices to measure performance but only 12 accounted for costs. Of the 31 studies that used prices, 27 found a positive relationship between concentration and price. But of those 12 that accounted for costs, only eight found a positive relationship between concentration and price. Rhoades also noted that while 13 of 20 studies found a positive relationship between concentration and profits, these studies usually used profits from a single year rather than profits averaged over a few years. The problem with using profits for a single year is that good business conditions in that year could raise profits. Profits averaged over

²⁰ The Herfindahl index is defined as the sum of the squared market shares of all firms in the same market. Whereas the concentration ratio reflects only the size of the largest firms in an industry relative to the other firms, the Herfindahl index reflects the number of firms in the industry and the size distribution of all firms.

²¹ Stephen A. Rhoades, "Structure-Performance Studies in Banking: A Summary and Evaluation," Staff Economic Studies No. 92, Board of Governors of the Federal Reserve System, 1977.

²² Stephen A. Rhoades, "Structure-Performance Studies in Banking: An Updated Summary and Evaluation," Staff Studies No. 119, Board of Governors of the Federal Reserve System, 1982.

a few years, however, gives a better indication of the long-run profit rate in a particular market.

A more fundamental problem with studies that use profits instead of prices as a measure of performance is that high profits do not necessarily indicate less competitive performance. High profits are seen not only in noncompetitive industries where output is restricted, but also in highly competitive industries where some firms produce at a lower cost than others. Thus, a positive relationship between concentration and profits does not necessarily mean that increases in concentration cause poorer industry performance.

There is good reason, in fact, for believing that a positive relationship between concentration and profits reflects superior performance. Harold Demsetz argues that the superior performance of some firms causes both concentration and profits to rise together.²³ He argues that it is the potential increase in profits that provides firms with the incentive to lower costs and improve their product. If firms that are more efficient or that produce a better quality product are not rewarded at least temporarily with higher profits, they have no incentive to perform better. And if firms are more efficient, it is the resulting lower costs of production, rather than the higher prices caused by collusion, that produce larger profits. Superior performing firms not only earn greater profits, but also expand their market share as they successfully compete with less able firms. Because superior performance causes profits and market shares to rise together, a positive relationship between concentration and profits is to be expected in industries where some firms are more efficient

²³ See Harold Demsetz, *The Market Concentration Doctrine*, American Enterprise Institute-Hoover Institution Policy Studies, August 1973.

than others. Using data from almost 100 industries, Demsetz presents empirical evidence in support of this view.

Although the evidence on the relationship between concentration and performance suggests that increases in concentration reduce performance, the evidence must be interpreted with caution. First, the effect is small. Second, many studies failed to control for other factors that affect prices and profits. Finally, studies that found a positive relationship between concentration and profits may have found such a relationship only because superior performance by some banks causes both concentration and profits to rise together.²⁴

The effect of entry on bank performance

There have been several studies of the direct effect of entry on bank performance. These studies usually looked at new bank entry into unit banking markets with relatively few banks and compared the pre-entry and post-entry performance of banks in entry markets with the performance of banks in non-entry markets. Better performance was measured not only by decreases in prices and profits as in other studies, but also often by increases in loan to asset ratios and interest-bearing to non-interest-bearing deposit ratios. The studies found that entry substantially improved unit bank performance.

Robert Chandross examined the effect of new bank entry on unit bank performance in

²⁴ There are also reasons for believing that the estimated relationship between concentration and performance is biased. First, if the relevant market is not correctly defined, the results will be upwardly biased. Second, the effect of risk on the measures of performance is usually not taken into account. For a discussion of other problems with concentration-performance studies, see George J. Benston, "The Optimal Banking Structure: Theory and Evidence," *Journal of Bank Research*, Winter 1973, pp. 220-237.

98 previously one-bank towns.²⁵ For the three years before the new entry, these banks earned significantly above-average profits and had significantly below-average loan to asset ratios. In the three years after entry, their earnings fell significantly but not below the average for large groups of banks in the same state. Their loan to asset ratios also rose significantly.

In another study, Donald Fraser and Peter Rose compared the pre-entry and post-entry performance of banks in markets previously served by one, two, or three independent unit banks with the performance of a control group of banks of similar size in a similar environment except that there was no entry.²⁶ Before entry, the loan to asset ratios and time deposit to total deposit ratios were lower in the entry markets than in the nonentry markets. Profit rates were the same in both markets. After entry, both the loan to asset ratios and time deposit to total deposit ratios rose in the entry markets to the same levels as in the nonentry markets, without an increase in prices or a decrease in profitability or growth.

Alan McCall and Manfred Peterson also compared the pre-entry and post-entry performance of banks in markets previously served by one, two, or three unit banks with the performance of a control group of similar banks in markets where there was no entry.²⁷ They found the net benefits of entry substantial in number and magnitude. Before entry, the sample banks in entry markets had greater earnings on assets than banks in the nonentry

markets. They also had lower loan to asset ratios and smaller interest-bearing to total deposit ratios. They paid lower interest rates on time and savings accounts and had a greater proportion of expenses due to officer and employee expense. In the year after entry the banks in the entry markets raised the interest rates paid on deposits. Their loan to asset ratios rose, as did the time and savings deposit to total deposit ratios. The proportion of expenses due to officers and employees declined. Except for the change in the loan to asset ratio, which was not affected consistently after the first post-entry year, all these changes persisted throughout the five-year period after entry that was studied. Although profit rates declined significantly over the five-year period, they did not fall below the levels at the control banks so that entry did not have an adverse impact on the viability of the banks that existed before entry.

These studies indicate that to the extent interstate banking leads to entry into small banking markets with only a few banks, the markets would become more competitive. If interstate banking led mostly to entry into large banking markets, however, the competitive effects are less clear. And while these studies provide evidence on the competitive benefits of actual entry, they give no evidence on the competitive effects of potential entry.

The effect of branching laws on bank performance

The difference in performance between banks in unit banking states and banks in branch banking states provides direct evidence on whether interstate banking would result in markets that were more competitive or less competitive. If easier entry due to less restrictive branching laws results in more competitive markets, bank performance should be bet-

²⁵ Robert H. Chandross, "The Impact of New Bank Entry on Unit Banks in One Bank Towns," *Journal of Bank Research*, Autumn 1971, pp. 22-30.

²⁶ Donald R. Fraser and Peter S. Rose, "Bank Entry and Bank Performance," *Journal of Finance*, March 1972, pp. 65-78.

²⁷ Alan S. McCall and Manfred O. Peterson, "The Impact of *De Novo* Commercial Bank Entry," *Compendium of Issues*, pp. 499-521.

ter in branching states than in unit banking states. But if less restrictive branching laws result in less competitive markets, bank performance should be worse in branching states than in unit banking states.

In their study of the effect of bank entry on performance, McCall and Peterson also found that the effect of entry on performance in branching states was significantly different from the effect in unit banking states.²⁸ In branching states, pre-entry profit levels, deposit interest rates, operating costs, and asset structures were the same at banks in entry markets as at banks in nonentry markets. The only difference was that banks in entry markets had higher service charges on demand deposits than banks in the nonentry markets. Over a five-year period after entry, the only change was that service charges on demand deposits fell in the entry markets in all five years. In unit banking markets, however, there was a substantial difference between banks in entry markets and the control banks before entry and that difference was largely eliminated after entry. Also, before entry, banks in branch entry markets performed better than banks in unit entry markets. Entry in branching areas apparently had little effect because the ability to branch resulted in either actual or potential competition that made bank performance better from the start.

In another test of the effect of branching laws on competition, Donald Savage and Stephen Rhoades compared the performance of unit banks in unit banking states with the performance of unit banks in branching states.²⁹ Unit banks in statewide branching states earned a lower rate of return on assets and paid higher interest rates on time and savings deposits than unit banks in unit banking

states. Service charges on demand deposits were the same in both groups. Unit banks in limited branching states earned a lower rate of return on assets than unit banks in unit banking states. They also charged lower interest rates on loans, charged lower service charges on demand deposits, and paid higher interest rates on time and savings accounts.

In a similar study, Mark Flannery found that unit banking restrictions result in significant price inefficiencies.³⁰ Flannery estimated that unit banks in unit banking states earn 17.5 to 23 percent higher profits than unit banks in branching states. He attributed the difference to unit banks in unit banking states being able to charge higher prices—as opposed to producing banking services at a lower cost.

The evidence suggests that interstate banking would likely result in a more competitive banking system. The evidence is consistent with the hypothesis that less restrictive branching laws result in more competitive banking markets. Banks in unit banking states are apparently protected to some extent from competition. Whether due to potential or actual competition, bank performance is better in branching states than in unit banking states. Because intrastate branching increases competition, it can be inferred that interstate banking would also increase competition.

Conclusion

Many financial institutions have found ways of providing bank and bank-like services on an

²⁸ Alan S. McCall and Manfred O. Peterson, "The Impact."

²⁹ Donald T. Savage and Stephen A. Rhoades, "The Effect of Branch Banking on Pricing, Profits, and Efficiency of Unit Banks." *Proceedings of a Conference on Bank Structure and Competition*, Federal Reserve Bank of Chicago, 1979, pp. 187-196.

³⁰ Mark J. Flannery, "The Social Costs of Unit Banking Restrictions." *Journal of Monetary Economics*, March 1984, pp. 237-249.

interstate basis. Along with the growth of interstate financial services there has been an increasing demand for removal of the prohibitions against interstate banking so that traditionally defined banks can participate in providing these services. Many issues must be settled, however, before legislators decide to remove the prohibitions.

One issue is the competitive effects of interstate banking. This article discusses the theoretical aspects of this issue and empirical evidence. The evidence suggests that interstate banking would likely result in a more competitive banking system. The evidence indicates that interstate banking is not likely to result in more concentrated banking markets. And even if concentration increased, the evidence from concentration-performance studies suggests that there would be little effect on bank performance. The evidence from studies of the effect of entry suggests that the removal of prohibitions against interstate banking would, in fact, result in substantial benefits if it led to new banks being opened in protected local markets. Finally, comparisons of bank performance in branching states with performance

in unit banking states are consistent with the view that the benefits from removing the prohibitions against interstate banking could be large.

Although interstate banking should result in more competitive banking markets, other questions have to be answered before legislators and regulators will support interstate banking legislation. These questions include the effect of interstate banking on the cost efficiency of the financial services industry, the safety and soundness of the banking system, the viability of small banking institutions, and the flow of credit between regions. Furthermore, decisions would have to be made about the best way to implement interstate banking. Some analysts favor repeal of the Douglas Amendment, while others favor amendment of the McFadden Act. Some recommend a gradual movement toward full interstate banking, while others recommend immediate removal of all geographic restrictions in banking. Thus, many issues other than the competitive effects of interstate banking still must be resolved before any legislative action is taken.

Futures Markets: A Primer for Financial Institutions

By Mark Drabenstott and Anne O'Mara McDonley

Volatile interest rates and deregulation in recent years have highlighted the interest rate risk of financial institutions. Because most financial institutions are highly leveraged, improperly managed interest rate risk can reduce earnings or even result in losses that jeopardize the firm's financial stability. As a result, the new interest rate environment has forced institutions to rethink and reemphasize strategies to manage their interest rate risk.

In examining strategies, financial institutions are looking to both old and new risk management techniques. Banks and thrift institutions traditionally have reduced interest rate risk by matching maturities of interest-sensitive assets and liabilities and by pricing loans with variable rates. But with the advent of new futures contracts, hedging in futures markets has become a viable technique for managing risk.

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This article describes how futures markets work and how they can be used by financial institutions. A brief history of futures markets is provided, followed by a discussion of how futures markets operate. The article then discusses how financial institutions can hedge interest rate risk by using futures markets. Finally, the article considers broad issues that will determine whether futures markets will be widely used by financial institutions.

The history of futures markets

Futures markets arose from the need to reduce price risk in commodity trading. Commodity price risk became evident during the mid-1800s in the grain market center of Chicago. In the fall of each year, large numbers of farmers hauled their harvested grain to Chicago, resulting in a glut of grain that inevitably dampened prices. In the spring, a shortage of grain pushed prices to high levels. These wide price swings created price uncertainties for producers that sold grain and processors that bought grain.

Futures markets emerged as a means for buyers and sellers to reduce price risk. The Chicago Board of Trade was organized in 1848 as a place of grain trade, both for immediate cash delivery or for delivery in the future. As a central market, the Board of Trade allowed buyers and sellers to enter into a contract that guaranteed a price at a future date. Prices confirmed in the futures markets allowed the price uncertainty of the spot market to be avoided.

Commodity futures trading became popular both as a price protection device for grain buyers and sellers and as a new market for speculators. Grain producers and buyers could legitimately “hedge” price risk. Speculators, those that bought or sold contracts without owning or intending to buy grain, found a new arena for profit. Such traders, though seeking quick profits, serve a useful purpose. They add liquidity to the markets, making hedging transactions easier to accomplish.

As the Chicago Board of Trade grew, so did other futures exchanges. The New York and New Orleans Cotton Exchanges became well established and served a vital role in exporting cotton. The Butter and Egg Board, forerunner to the Chicago Mercantile Exchange, came into being because of seasonal variations and problems of storing perishable commodities, a risk different from the risk of grain marketing. And, as the number of exchanges grew so did the number of successful futures contracts. These new contracts allowed the prices of more and more types of commodities to be hedged.

By the early 1970s, futures markets had proven their value as risk-shifting mechanisms. But in the late 1970s and early 1980s—with higher rates of inflation, deregulated financial markets, and changing macroeconomic policies—interest rates were increasingly volatile and of major concern to the

financial economy. Fluctuating interest rates became one of the most prominent risks facing financial institutions.

Because interest rate risk is just another form of commodity price risk, futures markets quickly developed new contracts that allowed hedging. A contract based on Government National Mortgage Association (GNMA) bonds began trading in 1975. After its success, numerous contracts followed. Nine interest rate futures contracts are actively traded today on three exchanges in the United States, with additional contracts traded in London and Singapore. Thus, with the evolution of successful financial futures contracts, futures markets have become a tool that financial institutions can use to manage interest rate risk.

How futures markets work

The economic functions of futures markets are to provide a competitive market price discovery mechanism, a hedging mechanism for price risk, and a means to improve market efficiency. The price of a futures contract for a commodity or financial instrument represents the expectations of a large number of buyers and sellers concerning the current and prospective effect of all market influences. As events shape the current situation, the expected changes are reflected in the form of changing prices for futures contracts. In short, futures markets provide a current consensus of knowledgeable opinions about the future price of commodities or financial instruments. Futures markets improve market efficiency by providing a central marketplace where price offers are known and compared. This free flow of information defuses attempted monopoly positions. Futures markets enhance competition by allowing the free flow of information relative to prices, volume, and market

expectations. Thus, futures markets help eliminate market imperfections and contribute to more efficient economic activity.¹

A number of unique terms are associated with futures markets. To aid in understanding this terminology, a glossary is included in the Appendix. Some basic terms, however, require discussion.

Futures contracts, simply stated, are a promise between two persons to exchange a commodity at a specified time and place in the future for a stated price. As a commitment between a buyer and a seller, a futures contract specifies precisely the commodity being traded and the terms of delivery. The clearinghouse of the commodity exchange, made up of exchange members, guarantees contract performance by both parties. Individual traders cease to deal with each other and instead become obligated to the clearinghouse, which becomes the guarantor of performance of all futures contracts traded on a particular exchange. At the close of every trading day, the clearinghouse matches buy and sell contracts for the day and informs every exchange member of their net settlement status.

Financial futures contracts are no different from commodity futures contracts, except that the item delivered is a financial instrument rather than a commodity, such as wheat or cattle. Financial futures include contracts not only for debt instruments but also for precious metals, foreign currencies, and stock indexes. Futures in precious metals, such as gold, silver, and platinum, allow manufacturers using these metals to hedge price risk. Currency futures, based on specific foreign currencies, allow various commercial interests to hedge against fluctuations in exchange rates. A

¹ For a more detailed discussion, see Mark Powers and David Vogel, *Inside the Financial Futures Markets*, 2nd ed., John Wiley & Sons, New York, 1984, pp. 5-13.

recent innovation is stock index futures. Based on the performance of a group of stocks, these futures allow investors to protect a portfolio of stocks from a decline in value.² The narrower term "interest rate futures" refers to specific contracts for interest sensitive financial instruments.

The mechanics of interest rate futures

Interest rate futures are based on long and short-term, fixed-income financial debt instruments with prices that vary inversely to their interest rates. For example, U.S. Treasury bills are sold on a discount basis and then redeemed at maturity at face value. The difference between the face value and the discounted selling price equals the amount of interest earned.³ Similarly, the price of a futures contract is inversely related to the interest rate of the underlying debt instrument.

Participants in futures markets can take one of two positions in the market. A *buyer* of a futures contract takes a *long* position in the market. That is true because the buyer owns a contract that can be sold at any time. To profit from a long position, he must sell the contract for a price higher than the purchase price. In

² Stock index futures contracts are based on cash settlement, rather than delivery of a commodity or financial instrument.

³ The dollar price or discount value of a Treasury bill is calculated by the following formula.

$$\text{Discount Value} = \text{Face Value} - \frac{(\text{days to maturity} \times \text{yield} \times \text{face value})}{360}$$

For example, a \$1 million Treasury bill yielding 10.01 percent and maturing in 91 days would have a discounted value of \$974,697.

$$\$1,000,000 - \frac{(91 \times .1001 \times \$1,000,000)}{360} = \$974,697$$

the case of an interest rate futures contract, such as a Treasury-bill contract, a long position profits from a decline in interest rates. A lower interest rate means a higher contract price, since the two are inversely related. Thus, a long position in a Treasury-bill futures contract can be sold at a profit when interest rates fall. An increase in interest rates, on the other hand, produces a loss in a long position.

A *seller* of a futures contract takes a *short* position in the market. That is true because the seller sells a contract that is a promise to deliver on a specified date a commodity or financial asset even though he may not currently own that asset. To profit from a short position, he must buy the contract at a price lower than the selling price. In the Treasury-bill futures contract example, a short position profits from an increase in interest rates, because the contract price then declines, allowing the contract to be bought at a profit. A decline in interest rates produces a loss in a short position.

Only rarely do buyers and sellers of futures contracts ever make or accept delivery of the actual instrument. Rather, most participants offset their positions by taking a market position opposite to the original one. For instance, if the original position was to buy a March Treasury-bill contract, the position would be offset by subsequently selling a March Treasury-bill contract. When futures positions are offset this way, the final result is a profit or loss, not an exchange of securities. Only 2 percent of all futures contracts are believed to result in actual delivery of the financial instrument or commodity involved. Most market participants prefer to offset futures positions rather than to make actual delivery for many reasons. The most common reason, however, is that the market is used primarily for either risk management or speculation, and neither purpose requires delivery.

Essential concepts of hedging

Hedging in futures markets is synonymous with shifting risk. A hedge is placed by taking a futures position opposite to the position held in the cash market, and exactly equivalent in value. For example, a banker that expects to invest \$1 million in a Treasury bill in three months needs to protect himself against a decline in interest rates. A decline would lower his interest income. To hedge, he buys a Treasury-bill futures contract, thus taking a long position. Later, when he actually invests the \$1 million, he offsets his futures position by selling a Treasury-bill futures contract. Such a strategy protects the banker against the risk of an adverse movement in interest rates because reduced yields in the cash market resulting from lower interest rates are offset by profits in the futures position. Example 1 illustrates the mechanics of a banker placing a perfect hedge.

There are few perfect hedges in the real world. This is because of basis risk. Basis is defined as the difference between the futures market price and the cash market price. Basis is both stable and predictable because of the tendency of the cash and futures prices of a financial instrument to move together. Three market forces operate to assure similar price movements. First, arbitrage between the cash and futures markets helps remove distortions in the basis. Second, changes in economic and financial market conditions influence cash and futures prices simultaneously. Third, the possible delivery of the cash instrument forces cash and futures prices to converge as the delivery date approaches.

Basis risk refers to unexpected changes in the cash-futures price relationship. These unexpected changes can arise for a number of reasons. In essence, however, to the extent that futures prices correctly anticipate impending

Example 1

A bank investment manager learns from his current cash flow report in January that \$1 million will be available for investment in March. He knows the \$1 million will be invested in a 90-day Treasury bill. The investment manager expects interest rates to decline between January and March, lowering his rate of return when the \$1 million is actually invested. To preserve the current rate until the cash becomes available to invest, he hedges in the futures market. By buying a Treasury-bill futures contract—by taking a long position—he stands to profit in the futures market if interest rates decline. In January, his cash and futures markets positions are as below:

In March, the \$1 million becomes available to invest, but interest rates have declined. The cash and futures markets positions are then as shown.

The final outcome, as shown, is a futures market profit that offsets the cash market loss.

The profit made in the futures market exactly offsets the loss in the cash market. The investment manager effectively locked in the interest rate that prevailed in January by hedging in the futures market. In this example, the hedge worked perfectly because basis risk was zero. In most cases, basis risk will make the hedge less effective.

January	
Cash Market	Futures Market
Notified of cash flow situation. Can purchase a 90-day T-bill at a price of 92.40, which implies a 7.60 percent interest rate.	Buys one T-bill contract for March delivery at a price of 91.90, which implies an 8.10 percent interest rate.
March	
Cash Market	Futures Market
Invests \$1 million in a 90-day T-bill at a price of 93.20, which implies a 6.80 percent rate of return.	Sells one T-bill contract for March delivery at a price of 92.70, which implies a 7.30 percent interest rate.
Final Result	
Cash Market	Futures Market
92.40 Target Price <u>93.20</u> Current Price 0.80 Net Loss Or, 80 basis points at \$25 per basis point = \$2,000 Loss	92.70 Selling Price <u>91.90</u> Purchase Price 0.80 Net Profit Or, 80 basis points at \$25 per basis point = \$2,000 Profit

ing movements in cash market interest rates, basis risk will be minimized. And while swings in the basis at times can be large, they are generally less than price movements in the cash or futures markets alone.

Many factors interact to influence the basis. Changing economic conditions can cause interest rates in cash and futures markets to fluctuate differently. When a cross hedge—hedging with a similar but not identical futures contract—is placed, the relationship between the prices of the cash instrument and the futures contract may be more volatile than expected. If the cash instrument bears an administered rate while the futures instrument bears a free market rate, the basis can be affected by changing market conditions. Of greatest importance, changing expectations about future interest rates, particularly the future shape of the yield curve, can cause wide basis swings. On balance, however, basis risk remains less volatile and more manageable than cash market risk.

Other important hedging concepts are margin requirements and leverage. The initial margin requirement on a futures transaction is simply a good faith deposit to ensure performance according to the terms of the futures contract. For example, an investor might purchase a \$1 million 90-day Treasury-bill contract and be required to deposit \$1,500 margin money, less than 1 percent of the face value of the contract. Daily settlements are made relative to each trader's profits and losses; that is, futures positions are marked-to-market daily. A trader that suffers a loss on a futures contract is required to post additional margin money to maintain the original margin level. A trader that profits from the futures transaction on a particular day has any excess margin money added to the account, and it can be withdrawn.

Margin requirements ensure the perfor-

mance of both parties to a futures contract. They also provide traders with substantial leverage. A position can be taken in the futures market with less capital than in the the stock market, which requires that a much higher percentage to be deposited in a margin account with the broker.

A complete analysis of the many intricacies of futures markets and the factors that affect their function cannot be presented here. A list of selected readings discussing the detailed underpinnings of futures markets appears at the end of the article.

Managing interest rate risk

This section outlines how financial institutions can use financial futures in managing interest rate risk. The section also examines other potential uses for futures.

Assessing interest rate risk

Interest rate risk must be understood and fully assessed before it can be managed. For the financial institution, interest rate risk is the risk that—because of a mismatch of rate-sensitive assets and liabilities—fluctuations in interest rates will adversely affect net interest margin. The risk arises naturally from an institution's portfolio. For example, when the portfolio mix is such that rate-sensitive liabilities outweigh rate-sensitive assets, the institution's net worth will decline if interest rates rise.

Interest sensitivity analysis provides a technique for assessing an institution's interest rate risk. The analysis is an effort to determine how net interest margin is affected by changes in interest rates. Interest sensitivity analysis entails a number of steps. First, the institution must separate its fixed-rate and rate-sensitive assets and its fixed-rate, rate-sensitive, and

nonpayment liabilities. Following this separation, the portfolio can be examined at successive categories of maturities by comparing the volume of rate-sensitive assets and rate-sensitive liabilities. The difference, or gap, provides a measure of interest rate risk. The size of the gap will be influenced by the current balance sheet position and also by any expected balance sheet changes. A negative gap, greater volume of liabilities than assets, is vulnerable to rising interest rates and a positive gap is vulnerable to declining interest rates.

The gap provides a measure of interest rate risk that serves as the foundation for an institution's business plan. In constructing its plan, an institution has two choices. It can accept this cash market risk or set out to reduce the risk. In accepting the risk, it is also endorsing an interest rate forecast. If it accepts a negative gap, it accepts a forecast that interest rates will decline, for only in that outcome can it earn profits. If it accepts a positive gap, it accepts a forecast that interest rates will rise.

In setting out to reduce the risk, an institution can use traditional asset/liability techniques that include restructuring rate-sensitive assets to match the maturities of rate-sensitive liabilities more closely. This may be difficult in the short run, either because the institution lacks experience in making loans of the proper maturity or because it faces resistance in shortening maturities of existing loans. The institution can also make more of its assets rate-sensitive by making more loans with variable rates. A final alternative is to reduce the risk by hedging with futures contracts.

Before the use of futures is discussed, it should be noted that assessing interest rate risk has taken on a new meaning in the last couple of years as duration analysis has gained support. Duration analysis goes beyond gap analysis to focus on the pattern of the cash flow

associated with assets and liabilities.⁴ While duration analysis has the benefit of considering the timing of cash flow, not just the maturity, it remains a new and somewhat controversial technique for financial institutions.

Hedging with futures contracts

Presently, commercial banks can use either of two hedge strategies to reduce interest rate risk—the short hedge or the long hedge. Thrift institutions are restricted to making short hedges to reduce risk.

Institutions can take a short position in the futures market to hedge the risk of rising interest rates in the cash markets—a *short hedge*. By selling interest-sensitive futures contracts, an institution stands to profit should interest rates rise. A bank that will issue a CD in three months, for instance, faces the risk of higher interest rates if the CD is not matched by an asset that either matures or is repriced then. To hedge this risk, the bank could sell a CD or Treasury-bill futures contract. If interest rates rise, the higher cost of issuing the CD would be offset by profits in the futures position. The size of futures markets profits, of course, will depend on the amount of basis risk encountered. Similarly, a short hedge can be used to protect the value of a pool of mortgages against rising interest rates before the

⁴ Duration determines the average life of an asset or liability by applying present value weights to the cash flow of the asset or liability. The duration of an institution's assets, therefore, is found by multiplying the time until receipt of each prospective cash flow by the present value of the cash flow, adding the weighted present values, and dividing by the current asset prices. If the duration of liabilities is less than the duration of assets, net worth declines if interest rates increase.

For a discussion of duration analysis, see Sanford Rose, "Once More, with Feeling," *American Banker*, July 3, 1984. Also see Ingersoll, Skelton, and Weil, "Duration Forty Years Later," *Journal of Financial and Quantitative Analysis*, November 1978, pp. 627-650.

mortgages are discounted to a national purchaser.

Alternatively, banks can take a long position in the futures market to hedge the risk of falling interest rates in the cash market—a *long hedge*. By buying an interest-sensitive futures contract, an institution will profit when interest rates decline. For example, a bank that will invest \$1 million in three months faces the risk of reduced income if interest rates fall. To hedge this risk, the bank can buy a Treasury-bill futures contract. If interest rates decline, the lower yield in the cash market will be augmented by the profits made when the futures position is offset. Similarly, a long hedge can be used to preserve the value of currently held assets.

When hedging, an institution should first take a macro perspective and determine its overall interest rate exposure through some form of interest sensitivity analysis. By identifying individual or groups of assets or liabilities responsible for this exposure, it can then develop hedging strategies and place specific hedges, using a short hedge for a negative gap and a long hedge for a positive gap. While the firm will be making hedges on specific balance sheet items—micro-hedges—it will be done within a broader context of lowering total balance sheet risk. Although there is controversy about the application of micro-hedging, regulatory guidelines do allow banks to use financial futures in situations that reduce overall interest rate exposure. If only one balance sheet item is hedged, it must be done to reduce overall balance sheet interest rate risk.

Successful hedging involves a series of steps. The following is a general description of the steps to be taken. A more detailed description appears in Example 2.

The first step is to assess total interest rate risk. Having determined the dollar volume of the risk, the institution must decide how much

of the risk it is willing to accept. Management can decide to accept all the exposure or only a part of it.

The second step is to select a futures contract for the hedge. To hold basis risk to a minimum, the contract should have a price that correlates highly with the price for the asset or liability category being hedged. Some hedges can be made with contracts for the same financial instruments as the instrument being hedged. In many situations, however, cross-hedging with similar instruments is the only alternative. One consideration in selecting the appropriate contract is the liquidity of trading in that contract. Even though one contract might not correlate as well as some other contract in terms of the pattern of interest rate movements, greater trading volume—and therefore, greater ease in placing and lifting the hedge—could make it the better hedging vehicle.

The third step is to determine the number of contracts needed to hedge the dollar volume at risk. This determination depends on four factors: the dollar amount to be hedged, the face value of the futures contract, the maturity of the asset or liability in question, and the correlation between cash and futures prices. Expressed as a formula, or hedge ratio, the number of contracts can be stated as follows.

$$N = \frac{V}{F} \cdot \frac{M_c}{M_f} \cdot b$$

where N = number of contracts needed
 V = value of asset or liability to be hedged
 F = face value of the futures contract instrument
(usually \$1 million)
 M_c = maturity of asset or liability to be hedged

- M_i = maturity of futures contract instrument
 b = correlation coefficient of cash and futures interest rates

For example, to hedge a \$1 million six-month Treasury-bill with a 90-day Treasury-bill futures contract, and assuming perfect correlation, two contracts are needed.

$$\frac{\$1 \text{ million}}{\$1 \text{ million}} \cdot \frac{180 \text{ days}}{90 \text{ days}} \cdot 1 = 2 \text{ contracts}$$

The fourth step is to determine the length of time the hedge will extend and the number of contracts needed in each period of the hedge. This amounts to spreading the number of contracts over the life of the hedge. Ideally, the contracts will be put together in a "strip" consisting of equally-sized pieces that extend over the life of the hedge.⁵ One problem with this approach is that contracts are listed for trading only about two years in the future. If the hedge extends longer than two years, the necessary number of contracts must be "stacked" on the available contract months.

The stacking approach has two drawbacks. First, it requires that more contracts be purchased and sold because the contracts must be rolled forward—that is, they must be offset and replaced as new contract months are listed. This raises transaction costs. Second, stacking creates new uncertainty, because the

⁵ The term, "strip" hedge, can carry two meanings. In this case, it simply refers to a chain of futures contracts joined together for the life of the hedge. Frequently, a strip hedge refers to a strategy of purchasing a series of futures contracts to secure a higher rate of return than is currently available in the cash market. In effect, this type of strip hedge simply takes advantage of yield curve relationships.

cost of the rollover is uncertain. If the basis moves against the hedger, the cost of rolling the hedges forward can be high. Because of these drawbacks, institutions may choose to hedge only the part of the cash instrument's maturity that can be covered by contracts that are being currently traded.

The fifth step in a successful hedge is to monitor the hedge. Once a futures position is undertaken, it has to be watched in much the same way that investment managers monitor cash investments. Of primary concern are movements in the basis and changes in expectations for future interest rates. In short, the institution must manage basis risk. While unnecessary placing and lifting of futures positions can amount to speculation, placing a hedge and forgetting it in the face of fundamental changes in the basis can amount to imprudent hedging.

In sum, a successful hedge begins with the proper assessment of interest rate exposure. It includes selecting the appropriate futures contract and the right number of contracts. The contracts must then be spread out over available contract months for the life of the hedge. Finally, the hedge must be monitored.

For the profit maximizing financial institution, hedging contains a paradox. If an institution decides to hedge only part of its overall interest rate risk, it should not be surprised to find its hedging program reporting losses. The reason is that by hedging only part of the risk, the financial institution accepts some cash market risk and effectively endorses an interest rate forecast. If this forecast for the cash market is correct, net interest margin will be positive. But by definition, profits in the cash market position mean losses in the futures market. Thus, losses in the futures market when only part of the risk is hedged probably mean that the business plan embodied in the cash position was the correct one.

Example 2

Step 1. Determine total interest rate risk. In March, a financial institution issues a \$1 million six-month money market certificate of deposit (MMCD). The institution knows it will roll over the MMCD in September. Through interest sensitivity analysis, the institution concludes that it will have a negative gap in September because no assets are repriced then. Because the MMCD rollover accounts for most of the gap, the institution decides to hedge the MMCD portion of its negative gap against the risk of higher interest rates.

Step 2. Select a futures contract. The institution selects the 90-day Treasury-bill futures contract as the hedging medium because price movements between Treasury bills and MMCD's are closely correlated. Technically, the hedge is a cross hedge. It is used because the volume of trading is heavier in Treasury-bill futures contracts than in the CD futures contracts.

Step 3. Determine the number of contracts needed. The institution calculates the hedge ratio as below:

$$\frac{180 \text{ days}}{90 \text{ days}} \cdot \frac{\$1,000,000}{\$1,000,000} \cdot 1 = 2 \text{ contracts}$$

For the purposes of this example, MMCD and Treasury-bill interest rates are assumed to be perfectly correlated.

Step 4. Determine the length of hedge. The length of the hedge is six months, to corre-

spond with the rollover of the six-month MMCD.

Step 5. Place the hedge. The institution places the hedge by selling two 90-day Treasury-Bill contracts for September delivery. The cash and futures markets positions in March are as shown.

Step 6. Monitor the hedge. A realistic hedging strategy requires that the hedge be closely monitored to determine basis risk and the direction that risk takes. In this example, basis risk is assumed to be zero.

Step 7. Lift the hedge. Interest rates have risen since March. In September, the institution rolls over the MMCD at a rate of 11.64 percent, an increase of 191 basis points. The hedge is offset by buying two 90-day Treasury-bill contracts for September delivery. The cash and futures market positions then are as shown.

Thus, hedging in the futures market produced a profit to offset the cash market loss, as shown.

The net result also can be examined in terms of annual interest expense. The total MMCD interest expense for March and September issues is \$106,850 (\$48,650 plus \$58,200). Subtracting the \$2,950 profit made in the futures market lowers the total expense to \$103,900. Thus, hedging lowered the institution's annual interest expense from 10.69 percent to 10.39 percent.

March

Cash Market	Futures Market
Issues six-month MMCD at a rate of 9.73 percent. Interest expense for six months is \$48,650.	Sells two 90-day T-bill contracts for September delivery at a price of 90.87, which implies an interest rate of 9.13 percent.

September

Cash Market	Futures Market
Rolls over six-month MMCD at a rate of 11.64 percent. Interest expense for six months is \$58,200.	Buys the 90-day T-bill contracts for September delivery at a price of 89.69, which implies an interest rate of 10.31 percent.

Final Result

Cash Market	Futures Market
\$48,650 March Interest Expense -\$58,200 September Interest Expense \$(9,500) Net Loss	90.87 Selling Price 89.69 Purchase Price 1.18 Net Profit Or, 118 basis points at \$25 per basis point = \$2,950 Net Profit

Options markets

One drawback of hedging with futures contracts is that if interest rates move favorably in the cash market, profits will be foregone. For instance, if a financial institution hedges a negative gap in its portfolio by selling futures contracts and then interest rates decline, the increased profits in the cash market are negated by losses in the futures market. One way of capturing these potential profits is through options markets.⁶

Combining the use of options markets and futures markets gives a firm additional flexibility in managing its interest rate risk. The

institution that hedged a negative gap by selling futures contracts could have preserved its potential cash market profits by buying an option contract when it placed the short

⁶ Basically, an option is a contract that gives the buyer the right but not the obligation to complete a transaction according to specified terms. Options can be written on actual commodities or on futures contracts. Similar to the short and long positions in the futures markets, two opposite positions can be taken in the options market. The buyer of a "call option" has the right but not the obligation to execute a long futures position at a predetermined price. The buyer of a "put option" has the right but not the obligation to execute a short position at a predetermined price. Buyers of call or put options pay a price conceptually similar to an insurance premium. And in many respects, using options can be compared with buying insurance against price movements.

hedge.⁷ Then, when interest rates declined, the institution could have exercised its option, offset its futures position without loss, and thereby preserved its cash market profit.

Options markets are very recent innovations. Few financial institutions are likely to become involved in the potentially complex strategies that combine futures contracts and options. Moreover, the high cost of the option premium deters the use of options. But as options markets develop, institutions may begin adding options to their complement of risk management techniques.

Other uses for futures

Although hedging interest rate risk is the primary use made of futures markets, financial institutions can make use of them in other situations. Synthetic fixed rate loans, investment trading, and hedging exchange rates are three situations where hedges can be used.

Many financial institutions pass interest rate risk on to borrowers through variable-rate loans. However, this strategy can lead to increased risk of loan default. And beyond that consideration, many borrowers prefer fixed-rate loans. To avoid the problems of variable-rate loans, lenders can make a fixed-rate loan and then hedge the interest rate risk in the futures market, a strategy limited primarily to short-term loans. These "synthetic fixed rate loans" effectively insulate the institution from interest rate risk while providing the borrower a fixed loan rate.⁸ Used in this way, futures may be more a tool for marketing financial services than for managing the institution's interest rate risk.

⁷ In this case, the institution would buy a call option. By exercising the call option, it would offset its short futures position with a long position that has a price determined by the option contract. Alternatively, it could sell a put option on a financial instrument.

Financial institutions can also look to futures contracts for investment trading purposes. Because interest rate futures contracts are based on a deliverable financial instrument, institutions can view the futures market as an alternative to the cash market for purchasing investment securities. A financial institution can buy a futures contract, let the contract expire, and take delivery of a financial instrument rather than buy it in the cash market. Naturally, this strategy entails basis risk. But depending on the similarity of the movements in the cash market and futures markets, basis risk may be minimal.

An institution might choose this futures market alternative for any of three reasons. First, the implied rate of return in the futures market may be higher than in the cash market. In other words, there may be opportunity for arbitrage between the cash and futures markets. Second, the futures market may be more liquid than the available cash market. The institution may find the range between the bid and ask prices lower in the futures market than the available cash market, reducing transaction costs. Third, the financial institution may want to use futures contracts for tax reasons.

Financial institutions with large foreign currency positions can use foreign currency futures contracts to hedge their exposure to fluctuations in exchange rates. Such fluctuations could adversely affect their income and equity in the same way as fluctuating interest rates. Exchange rate risk is hedged in much the same way as interest rate risk. For instance, a U.S. commercial bank with large

⁸ The synthetic fixed-rate loan can be set up in a variety of ways, but important issues center on picking a loan rate that corresponds to an available futures contract and determining who places the hedge, the borrower or lender. For further discussion, see James Kurt Dew and Terrence F. Marted, "Treasury Bill Futures, Commercial Lending, and the Synthetic Fixed Rate Loan," *Journal of Commercial Lending*, June 1981, pp. 17-38.

Deutsche mark holdings faces the risk of a decline in the exchange rate between marks and dollars. To reduce this risk, the bank can sell Deutsche mark futures contracts. Then, if the mark weakened, the dollar value loss in the cash position is offset by gains in the futures position.

The potential for futures

Because financial futures can be highly effective as a tool for managing interest rate risk, the real question is whether their potential will be realized. Several issues will determine the use of financial futures as a risk management device.

The interest rate environment

The future interest rate environment could be a major issue encouraging wider use of financial futures. Deregulation and macroeconomic policies will remain critically important in determining the interest rate environment.

Deregulation has intensified competition among financial institutions and forced institutions to pay market rates for deposits and charge market rates on loans. The resulting squeeze on bank margins places a premium on interest rate risk management. Institutions that cannot manage this risk effectively will go the route of merger, acquisition, or closing. The institutions that take their places will likely use more sophisticated tools in crafting their business. The result will be more financial institutions that understand interest rate risk and consider hedging in their strategy to manage risk.

Huge prospective federal budget deficits create a large element of uncertainty about future interest rates, as well. Financial markets worry that the sheer size of federal borrowings relative to the pool of investable

funds will keep upward pressure on rates. Whether these deficits can be funded without excessive growth in the money supply creates additional uncertainty about future rates. The uncertainty and potential volatility in interest rates that result from the current mix of economic policies will encourage more financial institutions to manage interest rate risk.

Acceptance and access

One of the main barriers to wide use of hedging by financial institutions is their general acceptance of the concept. For many, the distinction between hedging and speculating is nebulous. A survey of agricultural banks in 1981 showed that about a third of the banks cited skepticism or lack of understanding about futures markets as primary reasons for not hedging.⁹ Obviously, education on the workings of futures markets and their uses for financial institutions is the antidote for this constraint.¹⁰

Whether financial institutions make full use of financial futures will depend to some extent on their access to broadly developed and liquid markets. Given the rapid development of financial futures trading, both in number of contracts and in volume of trading, this constraint would not appear to be a factor in the future. Nevertheless, the thin liquidity of outlying contracts is a concern to institutions that want to hedge interest rates one year out or

⁹ See Dräbenstott and McDonley. "The Impact of Financial Futures on Agricultural Banks." *Economic Review*, Federal Reserve Bank of Kansas City, May 1982, pp. 19-30.

¹⁰ For individual financial institutions, the board of directors' lack of approval of a hedging program can be a very real constraint to wider use of futures. Regulators require that the board of directors authorize all financial futures trading and assume final responsibility. Thus, the most important educational task within an institution is often convincing a reluctant board of directors that hedging can be in their best interest.

more. The lack of liquidity in the contract that matures then forces hedgers to use near-term contracts and roll their hedges over as succeeding contracts mature. However, this is a more costly approach. Thus, institutions that can hedge most efficiently by using outlying contracts may have to decide whether they are willing instead to pay the added cost of using near-term contracts.

Regulations and accounting

The use of futures markets by financial institutions is circumscribed by the guidelines of regulatory agencies, guidelines that vary across regulators. The Comptroller of the Currency, which regulates national banks, allows the use of financial futures for activities deemed to be "incidental to banking." The Comptroller's policy allows hedging to reduce a bank's overall interest rate exposure. The Federal Home Loan Bank Board, regulator for federal savings and loan associations, allows associations to hedge when the hedging is used to reduce overall interest rate exposure.

One regulatory issue of current importance is macro-hedging as against micro-hedging. Regulators tend to favor macro-hedging and have become concerned over the use of micro-hedging. Until the controversy surrounding the use of macro and micro-hedges is resolved, an appropriate strategy for financial institutions may be to determine the optimal overall macro-hedge position and then implement this strategy by a series of micro-hedges tied to individual assets.

Controversy has surrounded the accounting treatment of financial futures since financial institutions began using them. The controversy centers essentially on two issues. First, what types of futures positions are hedges and what types are speculative? Second, should futures positions be accounted for in financial state-

ments by marking-to-market or by deferring gains and losses? Regulators, wanting to discourage speculation, have required institutions to mark-to-market all futures contract positions.¹¹ Financial institutions, on the other hand, favor deferral accounting—deferring gains and losses until the hedge is offset or the underlying cash position is changed.

The Financial Accounting Standards Board (FASB) recently came out with the long-awaited statement on the accounting for futures contracts. The new guidelines take effect for futures contracts entered into after December 31, 1984. The new rules allow the use of deferral accounting for futures transactions that meet the following hedge criteria. First, the asset or liability to be hedged exposes the institution to price or interest rate risk. And second, the futures contract selected reduces the interest rate exposure of the institution, is specifically designated as a hedge, and its price is highly correlated with the cash item being hedged. Futures transactions not meeting these criteria will be accounted for by marking-to-market.

Although thrift regulators already allow deferral accounting, bank regulators do not. Their reaction to the FASB statement, if any, is yet to be determined.

Potential pitfalls

Although hedging interest rate risk in futures markets may be straightforward in theory, in practice it holds many potential pitfalls. Financial institutions that decide to hedge must recognize that imprudent use of futures can only worsen their financial position. The recent experiences of some institutions who incurred large futures market losses

¹¹ Federal Home Loan Bank Board regulations allow savings and loan institutions to use deferral accounting.

serve as a reminder of the problems that can be encountered.¹² Thus, financial institutions need to exercise caution both in considering and in implementing hedging programs.

Financial institutions should consider using financial futures only after they have been studied and can be integrated into a thorough, ongoing asset/liability management program. A hedging program will never fully replace other risk-reducing techniques, it will augment them. Some financial institutions, and particularly the smallest institutions, may find that more traditional risk management techniques are adequate. But those institutions that can use futures markets prudently and effectively will have a broader range of tools to manage interest rate risk.

Conclusions

The more volatile interest rate environment of the 1980s has led many financial institutions to a better understanding of interest rate risk and how to manage it. The rapid increase in trading of financial futures contracts over the past decade has made hedging a viable means of managing this risk. Money center financial institutions now use futures markets daily in managing interest rate risk. Small and medium-sized institutions, however, have been much slower to adopt hedging.

As futures markets and their applications for the financial services industry become better understood, more financial institutions will view hedging the same way they view more traditional risk-managing devices. Although human resources may always constrain small institutions, a steadily emerging supply of advisory services can probably be expected to

make futures a part of asset/liability management for more financial institutions. While the cost of using financial futures may be low, some financial institutions will continue to view traditional risk management techniques as adequate.

Use of futures markets holds benefits for both financial institutions and their customers. Hedging can enable a financial institution to keep the portfolio it wants while reducing the risk of doing so. And the financial institution that properly manages interest rate risk will be in a better position to meet the financial services needs of all its customers.

Appendix

Basis: The difference between the price of a futures contract and the price of underlying cash instrument or commodity. The cash price minus the futures price equals the basis.

Cash Market: A market (a public place where buying and selling takes place) in which transactions for the purchase or sale of physical commodities or financial instruments are conducted at agreed-on prices and terms. The cash market is sometimes referred to as the spot market, an outgrowth of the phrase "on the spot," meaning commodities available for immediate delivery.

Cross Hedge: Hedging a cash market instrument (commodity) with a futures contract whose deliverable instrument (commodity) is similar but not identical to the cash instrument (commodity).

Futures Contract: A transferable written agreement to make or take delivery of a standard amount of a commodity or financial instrument in a particular month at a specific price.

Futures Market: A market in which contracts

¹² For example, see "Norwest Ousts Chief of Its Mortgage Unit Due to Big Write-Off," *Wall Street Journal*, August 31, 1984, p. 10.

for the future delivery of a commodity or financial instrument are bought and sold on a designated futures exchange.

Hedging: A method of reducing risk by taking a position in the futures market that is intended as a temporary substitute for either the sale or purchase of the actual commodity or financial instrument. A hedge in the futures market is a market position that is equal in value but opposite to a position in the cash market.

Interest Rate Risk: The risk that fluctuations in interest rates will adversely affect net interest margin due to a mismatch of rate-sensitive assets and liabilities.

Long Hedge: To buy a futures contract in anticipation of a future purchase of a cash commodity or financial instrument as protection against the risk of an increase in the cash price.

Margin: An amount of money deposited by both buyers and sellers of futures contracts to ensure the performance of the terms of the contract.

Margin Call: Additional margin money required by a clearinghouse or brokerage firm from a trader when the market has moved against the trader's position.

Open Interest: The number of futures contract positions that are not yet offset for a specific contract month. For each contract counted as open there will be one short position and one long position.

Price Risk: The potential that the value of an asset or commodity may decline from the seller's perspective or rise from the buyer's perspective.

Risk: The potential for losses or foregone profits due to adverse price or interest rate fluctuations.

Short Hedge: To sell a futures contract in anticipation of the future sale of a cash commodity or financial instrument as protection against the risk of a decline in the cash price.

Speculator: An individual that tries to anticipate commodity or financial instrument price changes and profit through the sale or purchase of futures contracts or of the actual physical commodity.

Spread: Four applications: (1) differences between bid and offer prices on a commodity or financial instrument, (2) differences between yields or prices of two cash instruments, (3) difference between the two prices of futures contracts, and (4) the profit margin of a dealer in a transaction.

Volume: The number of transactions that have taken place during a specific trading session.

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