

## Chapter 3

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# The Role of Depository Institutions

**Depository institutions** play a key role in the transmission of monetary policy to the financial markets, to borrowers and depositors, and ultimately to the real economy. They hold a large share of the nation's money stock in the form of various types of deposits and provide for the transfer of those funds to effect the payments that keep the economy functioning. Depository institutions also lend these funds directly to consumers and businesses for a full range of purposes and lend them indirectly by investing in securities.

The United States has a wide variety of depository institutions—commercial banks, savings banks, savings and loan associations, and credit unions. Originally, only commercial banks accepted deposits upon which checks could be drawn, but during the late 1970s and early 1980s, checkable deposits developed at the other institutions as well. Among depository institutions, commercial banks are still a major force in commercial deposit-taking and lending activities, although their share of the business has dropped considerably.

The structure of the U.S. banking system, with many institutions of various sizes, reflects U.S. banking traditions. Until 1982, except for those exempted through grandfathering, bank holding companies were permitted to have offices only in one state. After a number of legal changes, by 1993, only Hawaii prohibited out-of-state holding companies to acquire banks within the state, prompting many banking institutions to expand operations outside their home state. Consequently, multistate or regional bank holding companies that are nearly as large as the major money center banking organizations have been formed.<sup>1</sup>

Despite these changes, the United States continues to have many more depository institutions than other countries: approximately 23,000 at the end of 1996, almost ten times more (per capita) than in the United Kingdom, for example.<sup>2</sup> Some of these institutions are large, multifaceted organizations that attract deposits from and make loans to a wide range of customers, while others specialize in corporate or retail activities.

For many years, commercial banks were unique in conducting all types of banking. Thrift institutions—savings banks and savings and loan associations—provided individuals with selected banking services, primarily savings accounts and mortgage loans.<sup>3</sup> Over time, the powers of thrift institutions have been expanded to overlap those of commercial banks. Although thrifts have aggressively accepted checkable deposits from individuals, to date most have entered the business of commercial lending and deposit taking only in a very limited way. At the same time, institutions have merged, particularly thrift institutions in areas of the country where regional problems or overexpansion have created financial difficulties. Ten years of failures, mergers, and takeovers by commercial banks have reduced the number of thrift institutions by more than 40 percent, from 3,700 in 1986 to only 1,900 in 1996.

The contraction of the thrift industry has left commercial banks, which numbered about 9,500 at the end of 1996, as the predominant depository institution.<sup>4</sup> Commercial banks still handle the bulk of the myriad daily commercial transactions. They also hold most of the reserve balances at the Federal Reserve Banks and play a major role in intermediating between borrowers and lenders. In addition, they are responsible for the lion's share of large-dollar payments over Fedwire, the Federal Reserve's electronic funds-transfer network.<sup>5</sup>

Thus, as the Federal Reserve formulates and implements policy, it must stay closely attuned to commercial bank behavior. Understanding the role of banks helps policymakers assess the linkages between monetary policy and growth in money and credit. More specifically, an understanding of the circumstances and behavior of individual institutions enables the Federal Reserve's Open Market Trading Desk to evaluate the reserve situation knowledgeably as it devises its operating strategy.

## The Business of Banking

Although the core of banking—borrowing and lending money—has remained essentially the same since ancient times, banking in the United States has changed dramatically over the last fifteen years. Deregulation is

sometimes cited as the principal catalyst of the changes. Deregulation may be more appropriately regarded, however, as an outgrowth of the competitive pressures that have increasingly impinged on the banking franchise. Broader access to the money and capital markets, information, and technology have irrevocably altered the competitive landscape.

Banks historically have had a comparative advantage in acquiring the information crucial to credit analysis and thus in making informed credit judgments. However, several factors have diminished this advantage in recent years, including increasingly broad dissemination of information, the emergence of new markets, and other innovations. Computer-aided analytical techniques for investors borrowing directly in the money and capital markets have become accessible to more and more businesses. The development of secondary markets for mortgage and consumer debt has also enabled households to tap the capital markets, at least indirectly. Moreover, technological developments have greatly enhanced the cash management and funding sophistication of the banks' traditional client base. As a result, the relationships between banks and their customers that once formed the basis for profitable banking have yielded to price-sensitive competition and a more fickle clientele.

On the asset side of the ledger, banks have faced increased competition from the commercial paper market. Since the 1960s, growing numbers of large corporations have turned to this market for working capital. Finance companies, which compete with banks in lending to smaller corporate borrowers and to consumers, have also sidestepped banks by borrowing directly in this market. In response, banks began providing backup credit lines to commercial paper issuers and placing the paper as agent for the issuer. Facilitated by expanded authority granted by the Federal Reserve in the late 1980s, nonbank affiliates of banks began underwriting commercial paper and other corporate debt in competition with securities firms.<sup>6</sup>

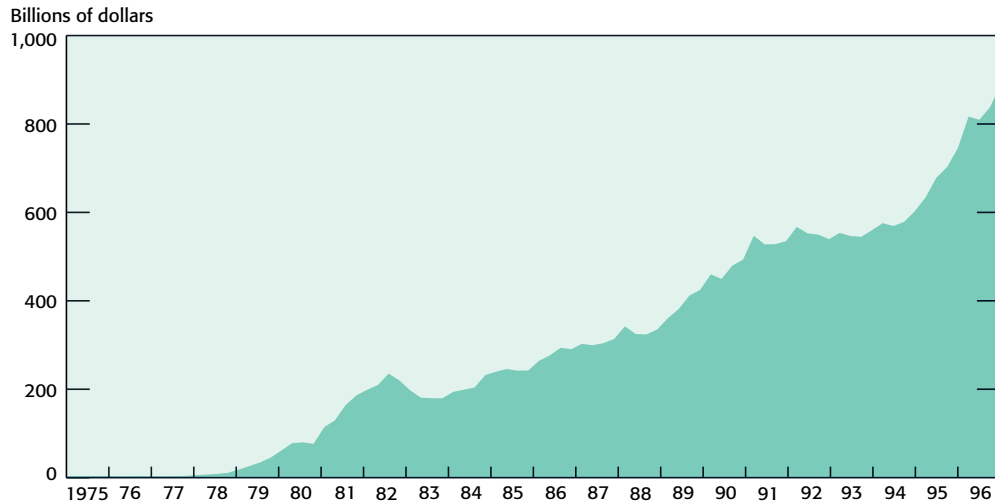
On the liability side, banks have faced competition for both commercial and retail deposits. Initially, competition from nonbank entities was spurred by a combination of high nominal money market interest rates in the 1970s and early 1980s and restrictions on rates that banks and thrift institutions could offer on time and savings deposits. As an alternative to these deposits, investment banks and brokerage firms began offering money market mutual funds (MMMFs). MMMFs paid market-based rates by investing the small sums gathered from many customers in short-term market instruments—primarily commercial paper and Treasury securities—and in large certificates of deposit that were exempt from interest rate ceilings. The MMMFs also provided easy access through limited check-writing privileges. Because of these features, the volume of MMMFs expanded rapidly—and bank deposits contracted—whenever market interest rates topped the deposit rates paid by

banks and thrifts. MMMFs have remained a popular alternative to bank deposits. Growth ceased for a while in the early 1980s when deregulation of deposit rates permitted banks to offer competitive products (discussed below). However, growth resumed in the latter half of the decade and has continued in the 1990s as brokers frequently offered more competitive rates than banks (Chart 1).

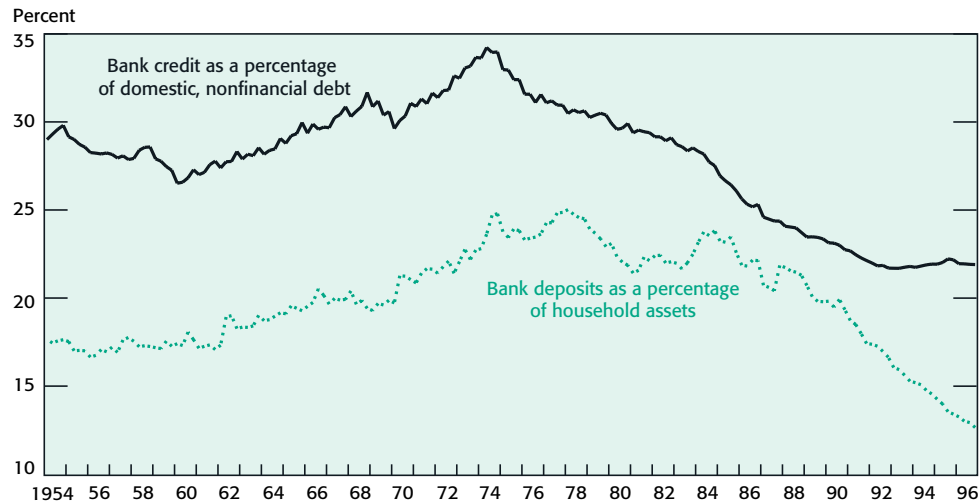
The effects of increased competition with banks for deposits and loans are apparent in Chart 2; measured in relative terms, the commercial banking industry’s balance sheet has shrunk dramatically since the mid-1970s. By the mid-1990s, commercial bank deposits as a share of all household assets had fallen to the lowest levels in over forty years. Bank credit as a share of domestic nonfinancial debt has also declined sharply from the levels in the 1970s. These balance sheet trends have led some observers to pronounce the “decline” of banking.

To improve banks’ competitive position, bank laws and regulations have been relaxed. Restrictions on interest rates that could be paid by depository institutions on most types of deposits were removed gradually, enabling the institutions to offer directly comparable products.<sup>7</sup> In 1982, depository institutions were allowed to offer money market deposit accounts (MMDAs) paying competitive interest rates on small sums that were immediately withdrawable and federally insured. The Federal Reserve also lowered reserve requirements,

**Chart 1. Money Market Mutual Funds**  
**Quarterly Average Assets, Not Seasonally Adjusted**



Source: Board of Governors of the Federal Reserve System.

Chart 2. **Bank Deposits and Credit**

Sources: Flow of Funds; Board of Governors of the Federal Reserve System.

Note: Household assets represent: currency, checkable deposits, savings deposits, and time deposits held by households and nonprofit organizations.

which are equivalent to a tax on bank deposits, in a series of steps over the early 1980s and again in the early 1990s.

Deregulation has not been the only response to changing conditions in the banking business. Regulatory capital requirements have been strengthened in recognition of the risks inherent in innovation, deregulation, and increased competition. In 1981, the federal bank supervisory agencies (the Federal Reserve, the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency) began to systematically raise the minimum requirements for bank capital-to-asset ratios. This development, in turn, encouraged banks to move business off their balance sheets, for example, by packaging and selling loans in the form of securities. This “securitization” of assets—in the form of mortgages, auto loans, and credit-card loans, for example—shifts bank loans to permanent investors, leaving the banks to service the loans for a fee. Origination, distribution, and servicing capabilities have therefore become increasingly significant elements of the banking business, while building up the balance sheet—once perceived as a measure of a bank’s eminence—has diminished in importance. Ignoring this shift and focusing only on the balance sheet variables plotted in Chart 2 exaggerates the apparent decline in banking.<sup>8</sup>

In 1988, bank regulators from the Group of Ten (G-10) countries adopted risk-based capital standards, which classify assets according to

credit risk, with the riskier classes requiring larger amounts of capital.<sup>9</sup> The standards also extend to off-balance-sheet business. As a result, banks with large off-balance-sheet exposures (typically large banks) must maintain higher capital levels than under the old standards. Through 1997, the standards cover only credit risk, but as of 1998 the international agreement is being extended to cover price risk in banks' trading activities.

The upshot of these developments has been a greater premium on flexibility and innovation. Banks have lost their essentially captive markets for "rate-controlled" deposits and for loans. Now they must compete for market-priced liabilities and a wider variety of lending and investment products and services. These changes call for a more dynamic view of the balance sheet, increased levels of capital, and the expansion of fee-based operations.

In response, the banking industry has become more diverse. The cost of being all things to all people has grown more difficult with thinning profit margins, and most institutions have looked to specialize or to move into potential growth areas. The broad traditional distinction between "wholesale" and "retail" banks has been further refined. Some banks have withdrawn entirely from retail or branch banking to concentrate on serving corporate clients. Others have seen their advantage in the consumer sector and have expanded that part of their business. Some have pulled back from international operations while others have expanded abroad, and several larger organizations have begun arranging and financing mergers and acquisitions in direct competition with investment banks. The very largest banks have also become more active in derivatives; the notional value of foreign exchange contracts and interest swaps at the five largest bank holding companies increased to more than seven times their assets at the end of 1995.

Conversely, many smaller institutions have managed to retain some of the traditional character of full-service banks by serving a geographically limited clientele. In these cases, the banks' knowledge of their local communities and their relationships with depositors and borrowers distinguish them from the competition. Nevertheless, the consolidation trend over the last fifteen years has been accompanied by a reallocation of assets from smaller to larger banks. Between 1980 and 1996, the share of all domestic bank assets held at "small" banks (banking organizations with real gross assets of less than \$100 million) fell by more than half, to about 6 percent, while the share at "megabanks" (banking organizations with real gross assets over \$100 billion) more than doubled, to 25 percent.<sup>10</sup>

The U.S. activities of foreign bank branches and agencies have remained largely wholesale-oriented, focusing for the most part on the money markets, foreign exchange, and trade finance. Over the past fifteen years, however, foreign banks have also tried to establish a more broadly competitive presence in U.S. corporate banking by establishing new banking offices or by acquiring

existing U.S. banks. Between 1980 and 1996, the share of debt owed by non-farm and nonfinancial U.S. corporations to foreign-owned U.S. banks more than doubled, with the most rapid growth occurring before 1991.<sup>11</sup> In addition, foreign banks have increased their securities-related activities in the United States.

Although the distinctions among banking firms have grown, banks have increasingly overlapped other financial industries, such as the securities and insurance businesses, in the services they offer. For example, banking organizations in recent years have established and marketed mutual funds, packaged their loans and sold them as securities, entered the bond guaranty insurance and securities brokerage businesses, and begun to underwrite and trade corporate debt through their nonbank affiliates.<sup>12</sup> The Federal Reserve also permits subsidiaries of a limited number of large bank holding companies to underwrite corporate stock.

Securities firms and insurance companies, conversely, have successfully offered deposit-like products to consumers and businesses and provided financing for corporate expansion. Like the banks, they are testing the bounds of current law and regulation that generally prohibit affiliation between commercial banks and full-service securities firms. Securities firms have established or acquired special-purpose banks, such as Edge Act corporations (limited to an internationally oriented business), and nondepository trust companies in order to obtain access to Federal Reserve services. These developments represent significant inroads into banking's province—notably, the ability to maintain accounts at the Federal Reserve Banks and to have direct access to the Federal Reserve's electronic payments system.

## Banking Risks

Because of their crucial importance to the economy, depository institutions are supported by a federal "safety net," composed of the discount window, federal deposit insurance, and an extensive framework of supervision and regulation. Other types of financial firms, such as securities houses and insurance companies, are also heavily regulated and supervised, and their investors and beneficiaries too are protected against a company's failure by pooled guaranty funds. Only depository institutions, however, have direct access to central bank liquidity to guard against the risk that the failure of one institution to settle its obligations on a given day will cause other institutions to default in turn. The potential social costs of a crisis of confidence in the banking system and the likely related money and credit dislocations are certainly large enough to warrant such safeguards. In the

extreme, a banking crisis could exacerbate an economic downturn by restricting the supply of money and credit.

Even with this framework of support, banking still involves considerable risk. Indeed, as we have observed, growing competitive pressures and deregulation have introduced new types of risk and complicated the business. In addition, the growth of markets now allows banks to trade risks traditionally held on the balance sheet, raising the possibility that bank risks can change rapidly.

The federal safety net is intended to safeguard the system as a whole, not individual banks. Nonetheless, the procedures aimed at avoiding systemic risk do provide some protection to the individual institutions, as well, creating the “moral hazard” that banks will take on excessive risk knowing that federal support exists. Bank supervision and regulation, therefore, look to minimize these moral hazards while maximizing systemic protection by letting the discipline of the marketplace work as much as possible. Recent legislative changes have led to risk-based capital adequacy standards, risk-based deposit insurance pricing, and explicit limits on the behavior of banks facing financial difficulties.

Although these changes have further mitigated the moral hazard problem, investors in bank or thrift stocks are still at risk, as are other creditors, including uninsured depositors. As a result, banks perceived to be risky may find it difficult to raise capital. But regardless of who ultimately bears the cost—bank investors, the federal support system, or depositors—the basic risks to bank solvency remain.

## The Elements of Bank Risk

The fundamental elements of bank risk assume five major forms.<sup>13</sup> These are credit, price, liquidity, country, and payment and settlement risk.<sup>14</sup>

### 1. Credit Risk

Credit risk, perhaps the most notable form, centers on the possibility that a bank’s customer will be unable to meet its interest or principal payments. A key function of bank credit officers is to assess the borrower’s financial condition and evaluate the risk and return characteristics of the loan. Today, many banks also have significant off-balance-sheet credit risk. For instance, banks sometimes sell loans “with recourse,” meaning that the risk of borrower default remains with the bank, even though the loan ceases to appear on the seller’s balance sheet. Banks acting as dealers in the over-the-counter derivatives markets also face significant risk of counterparty default.

To an extent, loan and other credit losses are unavoidable. Among U.S. investments, only U.S. Treasury securities are considered free from issuer credit risk since they are backed by the full faith and credit (that is, the taxing power) of the federal government.<sup>15</sup> However, since banks must pay more than the U.S. government for a large portion of their liabilities, an investment strategy that concentrated on Treasury debt would generally not be profitable. Rather, bankers tend to look for the higher yields that can be obtained from relatively riskier loans and investments.

In managing credit risk, banks attempt to maintain a diversified portfolio priced both to absorb expected losses and to earn a satisfactory return on capital. Recent legislation directs bank regulators to take account of “concentrations of credit risk” in evaluating bank capital adequacy. The portion of a bank’s capital that can be lent to a single borrower is also limited by law, and bank credit departments typically establish even more restrictive internal limits for specific borrowers. Moreover, the financial condition of the borrower is monitored on an ongoing basis as long as the loan or commitment is outstanding.

Collateral also plays a role in the management of credit risk. Important considerations are the liquidity of the collateral and the coverage (margin) of collateral value in excess of the amount outstanding on the loan. Clearly, the ability to foreclose on a property or a piece of machinery can be cold comfort to a bank if it cannot readily sell the collateral in the market at a price that will cover the balance due on the loan and the bank’s related costs. In most cases, the cost of managing, insuring, and maintaining the collateral pending its sale must also be considered, as must the risk that a borrower will seek court protection under the bankruptcy laws. In this instance, the bank may not be allowed to liquidate the collateral.

## 2. Price Risk

A second form of risk facing banks is price risk—the risk that the value of a bank’s assets, liabilities, or off-balance-sheet positions will change as interest rates or foreign exchange rates change.<sup>16</sup> Risks associated with changes in interest rates grew in importance in the 1970s and 1980s as interest rates became less regulated and more volatile. A bank could avoid exposure to interest rate risk by running a “matched book” of assets and liabilities with the same repricing dates or duration.<sup>17</sup> With such a position, movements in interest rates would not affect the bank’s profitability because the rates paid on liabilities would change in lockstep with those earned

on the loans and investments they supported. But the earnings from such a strategy might not be sufficient to cover operating expenses and return a profit to shareholders.

Consequently, most banks mismatch or “gap” the repricing of their assets and liabilities to some degree with a view toward profiting from changes in the level of rates or in the shape of the yield curve. For instance, borrowing short and lending long may be profitable in an environment of falling interest rates because liabilities can be repriced at lower rates while assets lock in relatively high yields. Such a strategy may also be profitable if rates are stable and the yield curve maintains an upward slope. Banks generally vary their interest rate risk gaps in different maturity sectors if they expect changes in rates over time, but “bets” on interest rates are typically kept relatively small given the inherent difficulties of forecasting rates and the high cost of being wrong. Banks also employ interest rate swaps to manage their interest rate risk.

In addition, banks face significant price risk in the form of foreign exchange risk, long a major concern in international banking. Banks make markets in foreign exchange and hold assets and liabilities denominated in various currencies. Thus, they are exposed to gains or losses from movements in exchange rates. Some opportunities exist for hedging exchange rate risks through the use of futures, forwards, and swaps, as well as through balancing assets and liabilities on a currency-by-currency basis. Hedging can be accomplished in the market for foreign exchange derivatives, which has grown very rapidly in recent years. (In fact, the use of foreign exchange forward agreements worldwide has more than doubled since 1990.<sup>18</sup>)

Banks have also begun employing statistical models to measure and manage price risk, particularly when that risk is held in the trading account. A typical model will indicate the “value-at-risk”: the maximum amount under normal market conditions that the bank can expect to lose with a given degree of statistical confidence. These value-at-risk models provide banks with a single, bottom-line figure measuring risk. This approach is especially useful because price risk can be compared across different types of trading portfolios. As a result, international regulators working through the Bank for International Settlements have agreed to use banks’ own value-at-risk models to enforce capital adequacy standards for price risk in the trading account.

### 3. Liquidity Risk

Liquidity risk, a third type of banking risk, involves a bank's ability to meet unexpected demands for cash in the form of withdrawals, funds transfers, or drawdowns of credit lines. In managing its liquidity, a bank must balance the cost of holding cash and short-term money market instruments against its ability to borrow in the market on short notice. Sales of longer term assets are another possible source of liquidity. Banks historically have been reluctant to incur the capital losses that may accompany such sales, while regulators and bank analysts recognize that capital gains may be misleading because banks have an incentive to sell their best assets to improve their balance sheet. Banks can also sell or securitize loans to obtain liquidity. Moreover, the Federal Reserve's discount window can help a bank meet unexpected liquidity needs discovered late in the day, but restrictions on prolonged use of the window make an alternative liquidity source necessary within a day or two.

Financial innovation has significantly affected how banks manage their risk exposures. Increasingly, banks can address liquidity and price risk issues separately because they can avail themselves of derivatives instruments—futures contracts; interest rate swaps; or options on U.S. Treasury securities, Eurodollars, and other primary instruments—and dynamic hedging techniques that use these tools to alter hedges as the rate relationships change. By using instruments such as futures, forwards, and options contracts, as well as interest rate swaps (described in Chapter 4), banks can synthetically alter their interest rate and foreign exchange rate exposures within a given funding profile, although they may incur new risks in the process.

### 4. Country Risk

Country risk relates to the possible difficulties in collecting from borrowers in another country as a result of some development there. For example, a revolution or coup may overthrow the foreign government that took out a U.S. bank loan and bring in a successor government that repudiates the loan. The typical form of country risk in the 1980s was effectively credit risk. Public and private sector borrowers in less developed countries (LDCs) borrowed heavily in U.S. dollars from the international banking community and found it difficult to generate sufficient dollars to service their loans. In the mid-to-late 1970s, the burgeoning revenues of oil-exporting countries had been recycled by banks in industrialized nations in the form of loans to LDCs. Conventional banking wisdom had been

that countries do not default on their obligations because doing so would cut them off from future access to international credit and seriously hinder further development. That assumption, however, did not recognize that the size of a country's debt could overwhelm its ability to accumulate the dollars necessary to service that debt. As foreign governments found it necessary to defer loan payments, declare moratoria on debt service, and negotiate reschedulings that extended repayment terms, U.S. banks' cross-border exposures became a focus of attention for bank management, regulators, analysts, and investors.

In the early 1980s, the Federal Financial Institutions Examination Council, a joint body of the three federal bank supervisory agencies, began to evaluate and monitor the cross-border risk of public and private sector debt in certain countries to permit consistent treatment of such debt in banks' loan portfolios. The International Lending Supervision Act of 1983 also provided a statutory basis for the federal bank supervisors to direct their information-gathering and supervisory responses directly at transfer risks. The supervisory agencies established criteria, comparable to those applied to domestic loans, classifying loans to foreign private or public sector borrowers according to their degree of transfer risk.

## **5. Payment and Settlement Risk**

Finally, with the increasing globalization of financial markets and the rapid movements of huge volumes of funds and securities, payment and settlement risks have also emerged as key concerns. For instance, an institution that fails to receive an expected wire transfer of funds could be forced to acquire the funds in the market or at the discount window. Alternatively, it might itself fail to make a payment when it did not receive the expected funds. Securities, too, may not be delivered to a buyer when expected, who, in turn, might not be able to redeliver them. The implications of such problems for the liquidity of particular institutions, or even of the system as a whole, are significant. Moreover, the fact that the underlying transactions often occur across international boundaries raises the prospect of financial dislocations in one market being transmitted globally.

Accordingly, there has been a concerted effort among banks to manage such risks more explicitly by monitoring exposures to particular counterparties and clearing systems. Transaction netting and other exposure-limiting mechanisms are also being used increasingly to reduce risk.

## Marketability of Bank Risks

Although the main elements of bank risks have not changed, market participants have increasingly found ways to trade in the markets. The growth of loan sales markets, for instance, has allowed banks to trade credit risk. We have even seen the emergence of credit derivatives, which allow banks to sell the credit risk associated with a particular loan while keeping the funding of that loan on the balance sheet. The growth of over-the-counter markets in interest rate swaps and foreign exchange forwards has also enhanced banks' ability to trade price risks.

The development of these markets clearly improves banks' ability to manage portfolio risk. By allowing an unbundling of risks, the markets permit banks to manage credit, price, and liquidity risks separately. For example, a bank can now split a loan's interest rate risk from its credit risk by entering into an interest rate swap. Trading in derivatives similarly facilitates separation of interest rate and foreign exchange risks.

Nonetheless, new difficulties for bank management, bank supervisors, and investors have arisen from these growing markets. Relatively junior traders may have the means to increase a bank's risk profile significantly in a very short time. Good internal control and oversight of personnel have therefore become more important. The growth of markets raises similar problems for bank supervisors. Since banks can now alter the nature of their portfolio risks virtually overnight, periodic bank examinations of the balance sheet reveal less information. As a result, bank supervisors now emphasize more than ever the importance of the internal controls of bank senior management. Finally, increased marketability of bank risks raises problems for investors and creditors in need of accurate and timely financial information. Traditional balance-sheet and income statements have become less useful with the advent of off-balance sheet positions and trading in derivatives. To address this problem, the Financial Accounting Standards Board and the bank supervisory agencies have enhanced disclosure and financial reporting requirements to make bank risks more transparent.

## Strategic Considerations

In most banks, the overall management of risk is highly centralized. Central control is necessary to prevent fundamentally different strategies from offsetting one another to the detriment of a bank's profitability. Typically, a committee sets the bank's strategic direction and provides guidelines for managing interest rate and liquidity risks. Senior officers on the committee represent

the bank's major business areas, such as loans, investments, and funding. In addition, the bank's chief economist normally sits on the committee, providing forecasts of the real economy, interest rates, and monetary policy that are crucial to the institution's strategic planning.

The committee meets periodically to review the bank's financial position against the backdrop of the economic and market outlooks. Committee members focus on recent material changes in the consolidated global balance sheet and expected future projects. The outlook for loan demand is reviewed, both as it would flow from the firm's economic forecast and as it would reflect particular business considered likely to develop over the planning horizon. Upcoming maturities of assets and liabilities are also reviewed, since they will generate funding needs and liquidity. Committee members then take up questions of pricing and funding, considering the implications for liquidity, interest rate exposure, capital adequacy, and, ultimately, expected profitability. For example, the members might decide if the bank should alter its asset allocation, enhance or reduce liquidity, mismatch its book in certain maturity sectors, reduce its asset size and hence its required capital, or raise equity or debt capital.

As noted earlier, banks generally take some position on the direction of interest rates over periods of a few months or so. For example, if a bank expected rates to rise over the next three months, although the yield curve did not reflect this pattern, the bank might plan to be somewhat long-funded out to three months, so that its assets would reprice at increasing interest rates while its fixed-term funding would protect it against rising costs over the period. Although some "gapping" of this sort is common at most banks, such exposures are generally kept relatively modest given the perils of interest rate forecasting and the attendant downside risk of "betting the store" on a particular outlook. Nonetheless, the relatively narrow profit margins inherent in simply matching the maturities of assets and liabilities generally provide an incentive to mismatch the book to some extent.

### **Tactical Considerations**<sup>19</sup>

Once the committee managing risk exposure sets the overall strategy for the bank's balance-sheet structure, the money desk plays an important role in implementing the strategy in the market. The money desk will consider the longer term perspective in deciding on the maturity mix to fund near-term cash needs if regular business flows do not fully fund the bank. If the bank is routinely overfunded from its normal business activities, it will allow for the committee's perspective in planning near-term lending.

The liquidity management team will usually cover some portion of the bank's funding need (or effect some of its near-term net lending) with instruments maturing in more than one business day. The desk may be able to borrow through repurchase agreements (RPs) by using a portion of the bank's portfolio of U.S. government securities if those securities are not all pledged as collateral against balance sheet liabilities. (RP lending augments the portfolio.) The desk may issue certificates of deposit (CDs) for the bank. It will also track commercial paper sales by the parent bank holding company. Other desk responsibilities include directing the acquisition of Eurodollar funds for the head office through offshore branches and carrying out some of those branches' funding operations. In addition, the desk handles the funding of the bank's U.S.-based international banking facilities, through which the bank can conduct offshore business without incurring U.S. taxes.

The funding process has seen tremendous innovation over the past few decades. As indicated above, exchange traded options and futures and over-the-counter forward contracts have become widely used to hedge exposures in the cash market, and interest rate and currency swaps have emerged as vehicles for synthesizing a particular "risk" profile. In addition, "caps," "collars," and "floors" have evolved in the derivative product markets, allowing interest rate exposures to be shaped as desired. In all, the funding operation has become more complex; banks have faced variable interest rates on an increased share of their balance sheets and have had to manage the associated risks. As such, they have had to be flexible and ready to adapt to new products and conditions.

### **1. Day-to-Day Reserve Management**

At most large banks, the money desk arranges the day-to-day buying and selling of funds. The desks need to make sure their banks avoid ending the day with overdrafts in their reserve accounts because they would be fined. These banks also aim to achieve daily reserve levels that are consistent with meeting reserve requirements for the maintenance period as a whole with as little uninvested or "wasted" excess reserves as possible because they earn no interest on excess reserves.

Reserve requirements must be met over a statement period ending every other Wednesday. Requirements are based on daily average transaction deposits held for the two weeks ending two days earlier.<sup>20</sup> Either reserve balances held at the Federal Reserve or vault cash held one computation period earlier count toward meeting requirements. Some reserve excesses from the previous period can be carried over into the current period. Deficiencies up to a limit can be carried forward for one period but then must be covered.

Although banks conceptually could meet their average requirements with a range of daily reserve balance levels, the Federal Reserve's policy of strongly discouraging overnight overdrafts limits their feasible options. Many banks no longer have much flexibility to allow excesses or deficiencies to build during a maintenance period because in recent years required reserve balances have declined to levels that are very low relative to the activity in their reserve accounts. The difference between a costly, unusable excess reserve position and an even more costly end-of-day overdraft is small for many banks. Thus, they may not benefit from accumulating an excess reserve position early in the reserve maintenance period and will risk an overdraft penalty if they aim for a reserve deficit.<sup>21</sup> To the extent banks retain any flexibility, they may modify their daily reserve management strategy in consideration of near-term interest rate expectations. If a bank expected rates to fall within the maintenance period, it might attempt to delay meeting reserve needs relative to its normal pattern; conversely, it might build a small excess reserve position if it expected rates to rise.

Even when money desk managers intend to run a position short of required levels, they will target a sufficiently large positive reserve balance at the end of each day to guard against last-minute unexpected outflows that could cause overnight overdrafts. Improved tools for monitoring reserve positions have allowed banks to reduce somewhat the minimum end-of-day reserve levels they feel comfortable targeting, but they still aim for significant positive balances to minimize the risk of an inadvertent overdraft. If a bank found that it was overdrawn at day's end, it could cover the overdraft by borrowing from the Federal Reserve's discount window. (The discount window is available for several hours after Fedwire closes if a bank alerts the Fed of a potential need to borrow.) If the overdraft was not discovered in time to borrow, forcing it to remain on the books overnight, the bank would face a stiff penalty and would have to make up the overdraft on another day.

To adjust overnight reserve positions, banks can use several markets: the interbank Federal funds market, which operates through brokers and directly from bank to bank in the United States; the Eurodollar market, which operates among offshore branches and foreign-based banks; and the RP market, which deals in secured borrowing and lending. (Banks may also be able to access surplus liquidity generated by their holding company.) Banks choose among the markets based on relative rates. Only a subset of banks can use all of the markets; Eurodollar borrowing requires at least one offshore facility, and RP borrowing requires unpledged collateral.

The daily funding officers of major banks usually start each day with information on the previous night's closing positions at the Federal Reserve, receipts and payments definitely scheduled for that day (such as asset and liability maturities), and likely receipts and expenditures that are not yet definite (such as anticipated repayments and drawdowns of loans and likely deposit flows). Large banks that provide correspondent services will also predict activity by respondent banks that place excess funds with them and rely on them for other services. From that information, these banks can gauge whether they are likely to be net borrowers or lenders in the overnight funding markets and will have tentative ideas of the size of the borrowing or lending required.

Banks with overseas branches may begin funding in the Euro-dollar markets before their U.S. headquarters opens for the day. If the officials at the headquarters had been confident the night before of large reserve needs for the next day, they might have given instructions to their offices in Asia or Europe to borrow overnight Eurodollars if the rates were attractive. Trading activity in the overnight Eurodollar market winds down after European markets close, although there is some afternoon offshore activity before the close of the Clearing House Interbank Payments System (CHIPS), which specializes in international settlements, at around 4:30 p.m. eastern time.<sup>22</sup> Generally, RPs can be arranged for delivery only before the midafternoon close of the securities wire system, although later transactions are possible when both parties keep securities in custody accounts at the same commercial bank.

Many banks begin borrowing or lending in the Federal funds market early in the day based upon their tentative estimates of their deficiency or excess. They will refine these estimates during the day as new information is received. For instance, wire transfers of funds for customers or deposit withdrawals that were unanticipated by the money desk could force a bank to replace those reserves in the overnight funding markets to avoid being overdrawn in its reserve account at day's end. Or an unexpected inflow of reserves could provide a bank with unwanted excess reserves that it would try to sell. Routinely, Fedwire—the interbank wire system run by the Federal Reserve—closes at 6:30 p.m. eastern time, allowing Federal funds trading to continue after settlement systems for other markets have closed. Hence, the Federal funds market is the only option available for making reserve adjustments near the close of business. In the last half hour of trading, the wire system cannot be used for so-called third party transactions—those made on behalf of bank customers (including other banks). Limiting flows during the final half hour of trad-

ing to transactions initiated by the banks directly means that the banks control the flows, simplifying the management of reserve positions.

In planning the day, the funding officers try to gauge whether overnight rates are likely to rise or fall during the day by using broker comments, experience with direct Federal funds trades, and projections of aggregate reserve supplies made by money market economists. Expectations may slightly affect the timing of operations, although if a large need to borrow or lend is expected, most banks would make part of the adjustment in the morning when the market can best handle large-volume trades.

Money desk managers are limited in their ability to be both borrowers and lenders in the overnight markets on the same day. Two-way operations enlarge gross asset positions, increasing capital requirements. While some banks are more constrained than others, they all face restrictions. Consequently, apparent arbitrage opportunities sometimes persist, with rates differing modestly between two overnight markets. The opportunities may not always be exploited because the banks that could potentially make offsetting trades in both markets may consider the spreads too small to justify the use of capital. These balance sheet constraints also limit banks' willingness to bet on rate movements over the day. For instance, when reserve managers believe that rates will rise near the day's close, they may hesitate to overfund their positions in the morning in order to have funds to sell later because the potential gains may not justify the use of scarce capital. (These transactions are not truly arbitrages. The expected firming may not in fact occur, in which case the transactions could earn nothing or even result in losses.)

Some days are more challenging to reserve managers than others because flows of reserves are particularly heavy and uncertain. Many more financial transactions occur than usual on those days when the Treasury delivers new securities, retires maturing securities, and pays interest on outstanding securities. The Treasury routinely engages in these transactions at the middle of each quarter and at the end of each month or at the beginning of the following month if the month ends on a weekend. (Treasury bill settlements, which occur each Thursday, seem to have less impact than coupon settlements.) Ends of quarters and payment days for social security checks are also subject to heavy flows. These days often experience relatively high volatility in the Federal funds market as banks struggle to make reserve adjustments in an uncertain environment.

The final day of the reserve maintenance period has also traditionally been subject to rate volatility. On settlement Wednesdays,

funding managers have to bring the Fed balance to the level needed to meet the average level required for the two-week maintenance period, after allowance for any excesses or deficiencies carried in from the previous period. Reserves in the banking system may be either overly abundant, encouraging the Federal funds rate to fall, or in short supply or poorly distributed, producing upward rate pressure. The managers' success in contributing to their banks' profits is enhanced by their winding up on settlement Wednesdays short of reserves when the funds rate is low and with adequate reserves when the funds rate is high.

When banks are suddenly short because of unexpected transactions and funds are not available in sufficient volume before Fedwire closes, their option is to turn to the Federal Reserve discount window. Traditionally, banks were willing to use the window on such occasions as long as they had not recently borrowed to the limits of their perception of Federal Reserve tolerance for such borrowing. In the 1980s, however, many banks became especially reluctant to use the window because borrowing had come to be associated in the public's mind with an institution's being in financial difficulty. While those concerns eased during the 1990s, some reluctance to borrow has remained. Banks have sometimes gone to extraordinary lengths to avoid discount window borrowing, occasionally bidding the Federal funds rate up to very high levels. The highest rate observed was 100 percent, but the circumstances were very unusual. Peaks of 20 to 30 percent are more common. When the funds rate falls sharply, it usually stops just short of zero since selling reserves involves incurring a brokers' fee.

The Federal Reserve's Trading Desk routinely observes how the large money center banks and various groupings of smaller banks and thrifts are managing their reserve positions. Members of the Desk staff speak with money desk managers of large banks and monitor daily statistics on reserve positions of groups of other institutions by size and type. What they learn can clarify the behavior of aggregate excess reserves and of the Federal funds rate. It may also help Desk officials to understand instances when reserve and Federal funds rate behaviors do not seem consistent. This knowledge often helps the Desk when planning a strategy for reserve management.

## **2. Daylight Overdrafts**

In addition to managing the day's flows with a view toward producing a desired end-of-day position, the large banks must also monitor their intraday positions in accordance with Federal

Reserve policies regarding payment system risk. The huge volumes of daily payment flows over Fedwire and the payments arising out of the Federal Reserve's Book Entry Securities System (BESS) currently cause overdrafts in a number of banks' reserve accounts during the day—referred to as daylight overdrafts.

Daylight overdrafts arise because the Federal Reserve generally honors instructions from a bank to transfer reserves out of its account to another bank's account even if the reserve balances in the paying bank's account are insufficient to cover the size of the transfer.<sup>23</sup> Daylight overdrafts may be generated from direct transfers of funds over Fedwire and from securities transfers over BESS, which is a delivery-versus-payment system. When a bank instructs the Federal Reserve to deliver securities from its account to another bank's account, the movement of securities simultaneously results in an offsetting transfer of funds from the bank receiving the securities. Although this procedure eliminates payment risk from the securities transfer system, it does mean that the bank receiving the securities will lose reserves without having taken any specific action and thus has no direct control over the loss.

The small number of banks that manage clearance for government securities dealers are particularly vulnerable to large reserve losses, primarily because of the conventions that prevail in the RP market. Dealers often borrow money overnight in that market, using their inventories of securities as collateral. The dealers and their clearing banks receive money when they send out the securities being used as RP collateral, traditionally in the late morning or early afternoon. Most commonly, when an RP contract matures, the custody bank for the entity that loaned the money (and thus holds the securities) returns the securities when Fedwire opens, currently 8:30 a.m. eastern time. The banks that manage dealer accounts lose reserves when the securities come back and do not regain them until the dealers instruct the banks to deliver securities to a customer or the securities are again financed through an RP.

Daylight overdrafts represent unsecured credit from the Federal Reserve to the banks that generate them. Although a bank can normally cover an overdraft before the close of business, it could fail to do so, which would leave the Federal Reserve vulnerable to loss. That credit risk became a source of serious concern to the Federal Reserve System during the 1980s, as rising transaction volumes on its funds and securities transfer systems contributed to ballooning daylight overdrafts. A wide range of studies sought to determine the best way to address the problem.

Simply forbidding such overdrafts was not considered feasible by those assessing the issue. Reserve balances at the Federal

Reserve Banks were too low to permit the large volume of transfers to occur smoothly without overdrafts. (By 1996, the average daily volume of Fedwire money transactions was close to \$1,000 billion, \$700 billion for securities wire transactions. In contrast, average reserve balances at the Federal Reserve Banks were only around \$26 billion.) The analysts feared that an attempt to eliminate overdrafts would cause “gridlock” as banks would delay transfers until they received sufficient funding; however, such funding would not be forthcoming since the banks owing money would likewise delay transfers. In addition, the RP market would have required major restructuring.

Instead, a series of limits on the peak and average volumes of daylight overdrafts were introduced during the 1980s, with the limits based upon the capital of the bank. Review and planning for explicit charges continued for a number of years, and in April 1994, the Federal Reserve introduced charges equal to 10 basis points.<sup>24</sup> The fee was raised to 15 basis points in April 1995.

The response to the charges was dramatic for overdrafts arising from RP transactions. The banks that clear securities for dealers informed the dealers before the fees took effect that they would have to pay for any overdrafts they generated. Dealers responded by speeding up the process of arranging RPs so that they could send out securities being used as collateral earlier in the day, and thus receive their money sooner. The overdrafts generated by funds transfers declined much less; the overdrafts were substantially smaller to begin with and most banks did not consider the costs incurred to be large enough to develop monitoring procedures needed to pass them on to customers. Peak daylight overdrafts from both systems dropped from a daily average of \$124 billion in the six months prior to the introduction of charges to \$70 billion over the balance of 1994. In 1996, they averaged \$70 billion.

The Federal Reserve’s Open Market Trading Desk had been concerned that pricing of daylight overdrafts might reduce the late-morning liquidity in the RP market, at the time when it typically carried out its RP operations. To make its RPs more attractive, the Desk delayed the time at which it returned collateral on maturing RPs from early morning until 11 a.m., a step that gave the participants more reserve balances during the morning. In practice, the Desk did not experience a significant change in participation rates.

Procedures in the brokered Federal funds market changed only slightly. Brokers reported more complaints about funds being sent or returned late, but no new conventions developed to more closely control the times funds were sent or returned.<sup>25</sup> Furthermore,

though much anticipated, no intraday Federal funds market has developed. Brokers have indicated that some banks have preferred to arrange more overnight transactions through the Eurodollar market, which involves only one late afternoon net settlement on Fedwire and therefore is less likely to generate daylight overdrafts.