The Liability Structure of FDIC-Insured Institutions: Changes and Implications

*by Christine M. Bradley and Lynn Shibut**

Depository institutions have traditionally looked to deposits to fund their asset growth. But since 1978, the value of bank assets has increased proportionally much more than the value of bank deposits: between 1978 and 2005 the value of assets held in commercial banks insured by the Federal Deposit Insurance Corporation (FDIC) rose by nearly 500 percent, but total deposits held by these same institutions increased by only 393 percent. And between 1978 and 2005, the percentage of U.S. banks that were able to fund at least two-thirds of their total assets with core deposits fell from nearly 91 percent to 59 percent.[1] In addition to core deposits shrinking, banks are facing increased interest costs since bank customers are reacting to higher interest rates and moving their money out of lower-yielding bank accounts and into certificates of deposit and other higher-paying accounts. As a result of these developments, bank liability management demands more attention today than it did just a few years ago.

In Part 1 of this article we focus on the changes in bank liability structure, and in Part 2, on the implications of the changes for regulators. Part 1 describes the events that led to the decrease in banks' reliance on deposits, examines the changes banks made to their liability management in response, and discusses the possible future of these changes. Part 2 looks at the possible effects of the changing bank liability structure on market discipline, liquidity risk examination, deposit insurance pricing, and failure resolution (domestic depositor preference and operational issues).

PART 1. Changes in Bank Liability Structure

In this section of the paper we survey the past, the present, and the possible future of banks' liability structure. We explain some of the wholesale funding options available to banks and describe other choices that bankers have available in their nondeposit liability management. We

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[1] Core deposits are estimated as total deposits minus brokered deposits and other time deposits that are in denominations greater than $100,000.

observe how the tools bankers choose are driven by developments in the financial marketplace, as well as existing legal constraints. We also take a look at the liquidity risk facing today's banker.

Historical Overview

For 45 years after the Great Depression, the business of banking was largely a process of collecting deposits from people and businesses and loaning the same funds to other people and businesses having credit needs. A bank's success greatly depended on a depositor's willingness to accept a rate of interest lower than the rate the borrower paid for use of the funds. But in the mid-1970s money-market rates rose above the rates that depository institutions were authorized to pay on their time deposits,[2] and by 1979 the savings patterns for U.S. households were affected by that differential in rates: in 1978, U.S. households held $100.4 billion in time and savings deposits, but by year-end 1979 that amount had fallen to $71.2 billion. Similarly, in 1978 U.S. households had $5.7 billion in money market fund shares, but at the end of 1979 the figure had increased to $30.5 billion.[3] Figure 1 shows how the percentage of financial assets of households held by banks and thrifts fell from the mid-1980s until 1999, the year the U.S. stock market hit record levels. The chart further shows that as the stock market retrenched beginning in 2000, depositors again sought the safety provided by a bank deposit.

In the early 1980s, legislative reforms and technological advances became two-edged swords to bankers seeking to increase their deposits. Chief among the legislative changes during this period were the lifting of intrastate banking restrictions and the deregulation of interest rates paid on deposit accounts. But these legislative reforms, which were intended to give depository institutions tools to compete with the money market for deposits, also resulted in increased competition among banks by allowing bankers to go outside their local market to procure deposits. In addition, technological advances that created new delivery channels and increased efficiencies for bankers also made it easier for depositors to leave their local markets for better terms. With core deposits dropping as a percentage of total assets, bankers recognized that they would need to increase their reliance on managed liabilities to fund domestic credit, while managing liquidity risk (see figure 2).

[2] After the banking crisis of the 1930s, interest-rate ceilings were imposed on commercial banks to protect banks, both by holding the institutions' cost of funds below their return on assets and by restraining competition within the industry. Interest-rate ceilings did not apply to savings and loan associations (S&Ls) until 1966.

[3] Federal Reserve Board of Governors (2006), chart B.100.

Figure 1

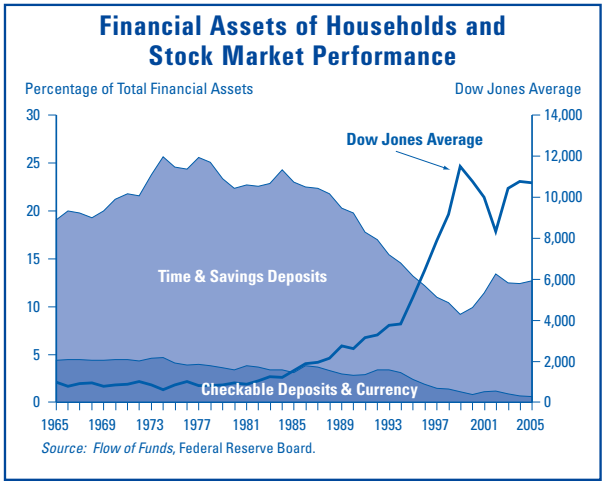
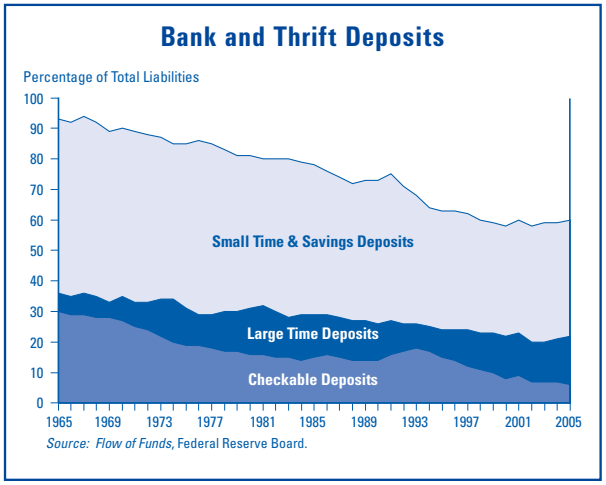


Figure 2



New Funding Trends

When deposits lagged behind loan growth in the 1990s, some bankers argued that there was a funding crisis.[4] And indeed, managing bank liquidity is not as easy as it once was. However, calling it a crisis gives short shrift to the funding options available to banks. Now both small and large banks regularly use wholesale sources and rate-sensitive deposits as part of their funding strategy. By wholesale sources, we mean borrowings (such as federal funds, repurchase agreements, and Federal Home Loan Bank [FHLB] advances) as well as brokered deposits. Bankers have also developed methods of avoiding existing regulations that result in an increase in the bottom line (sweep accounts and international banking facilities). The many products available have much to offer banks, but they often entail more risk and require a more sophisticated management strategy. Thus even though management of liquidity has become more complex, it is by no means impossible.

Federal Home Loan Bank Advances

Congress established the FHLB system in 1932 to facilitate the extension of mortgage credit by providing thrift institutions with collateralized loans.[5] In 1989 the Financial Institutions, Reform, Recovery, and Enforcement Act (FIRREA) expanded the role of the FHLB system by opening its membership to commercial banks and credit unions, and in 1999 the Gramm-Leach-Bliley Act expanded the type of assets that qualify as collateral for FHLB advances. Between year-end 1992 and year-end 2005, the number of commercial banks in the FHLB system grew from 1,284 to 5,927. As of December 2005, the FHLB system had 8,157 members.[6] Although the FHLB system does not interact directly with U.S. households, the system has enhanced the availability of residential mortgages by providing member institutions with a way to liquefy the home mortgages they originate, thus ensuring the flow of available credit.

Some critics of the FHLB system have suggested that FHLBs are no longer necessary because of the growth and strength of the secondary mortgage market.[7] But the FHLB system has done more than help its members fund mortgage loans. The FHLB system also offers products that help members in their asset-liability management, and it generally provides a supplementary source of funds for expansion and liquidity that can address imbalances between deposits and funding needs.[8]

There is no indication that the role of FHLBs in providing a reliable source of bank funding will change in the future. But critics argue that FHLB advances enable banks to evade the natural limits of their expansion and that the advances thereby impede market discipline; thus, any future changes to the FHLB's role in liquidity management may well take the form of restrictions on the use of FHLB advances.[9] An additional impetus for limiting the use of FHLB advances is the effect these advances can have on the deposit insurance fund when an insured depository institution fails: because all FHLB advances are required by law to be secured, they are paid in full before the FDIC recovers funds after an insured institution fails.[10]

Nonetheless, FHLB advances are very popular with bankers (for the ten years ending December 31, 2002, FHLB advances increased by 521 percent) and are likely to remain an important funding tool, possibly with limitations placed on their use by troubled institutions.[11]

[4] For example, see Garver (2000), Jackson (2001), and Silverman (2001a, 2001b).

[5] The FHLB system is a government-sponsored enterprise (GSE) consisting of 12 banks that raise funds by issuing consolidated debt securities in the capital markets.

[6] http://www.fhlb-of.com/mission/membership_frame.html. This includes credit unions and insurance companies as well as banks and savings institutions.

[7] See, for example, Congressional Budget Office (1993).

[8] Another benefit of FHLB advances is that the FHLB system is willing to make both fixed and adjustable-rate advances that can have maturities ranging from one day to 20 years, whereas most other funding sources do not offer long-term maturities. (FHLBs also provide their members with funding for small businesses, community development, and rural and agricultural loans.)

[9] See Stojanovic, Vaughan, and Yeager (2000); Ashley, Brewer, and Vincent (1998); and Bennett, Vaughan, and Yeager (2005). Concerns about the growth of FHLBs have resulted in a proposal by the Federal Housing Finance Board to significantly raise retained earnings held by the FHLBs. See Rucker (2006).

[10] See Shibut (2002).

[11] Dow Jones Capital Market Report (2000). See the section below (in Part 2) on market discipline.

Brokered Deposits

A second funding substitute for core deposits is brokered deposits, generally defined as deposits "issued by a financial institution and purchased by an investor through a third-party intermediary."[12] Brokered deposits were used as far back as the 1950s to aid the thrift industry whenever there was a regional shortfall of funds. Before 1970, the brokered-deposit market consisted primarily of institutional uninsured depositors, including money-market funds, corporations, bank trust departments, and insurance companies. In 1973, when interest-rate ceilings were eliminated on deposits of $100,000 or more, deposit brokers helped institutional investors find the highest rates available for their deposits, while technological advances made a nationwide market possible. But in 1974, an FDIC study indicated that a misuse of brokered funds was a contributing factor to many of the bank failures.[13]

In the early 1980s, the thrift industry used brokered deposits to fund much of its growth. Between 1980 and 1983, brokered deposits within that industry grew by a yearly average of 60 percent. It was during this period that the deposits gained much of their notoriety, and many people concluded that brokered deposits contributed to the savings and loan crisis. In 1984 regulators attempted to curb the use of brokered deposits, and from 1984 through 1989 brokered deposits held by savings and loans increased an average of only 4.27 percent per year.[14] Although the use of brokered deposits is most often associated with the thrift industry, commercial banks also found that brokered deposits met their funding needs. At the end of 1990, commercial banks had $72.6 billion in brokered deposits.[15]

By 1989 Congress had concluded that brokered deposits contributed significantly to the collapse of the savings and loan industry and began restricting their use.[16] Congress adjusted the restrictions in 1991 by prohibiting any insured institution that is not well capitalized from accepting any funds obtained directly or indirectly from a deposit broker. Institutions that are "adequately capitalized" can apply to the FDIC for a waiver of this provision on a case-by-case basis.[17]

People on the periphery of the banking industry might have concluded that brokered deposits would never again be thought of as a conventional source of funding. But brokered deposits have again become one of the tools bankers use in their liability management programs. In fact, as figure 3 shows, large banks' use of brokered deposits has exploded in recent years. From a bank's perspective, brokered deposits can be used to great advantage because they do not upset a bank's local savings market and they give the institution access to national markets: banks can

[12] FDIC (1997), 119.

[13] Hill (1974). The study found that a misuse of brokered deposits contributed to 30 percent of failures from 1960 to 1974. But regulators had expressed concerns even before this study was released. In 1959 the Federal Home Loan Bank Board (FHLBB) limited the percentage of brokered money that a thrift could accept to 5 percent of its total deposits. The limitation was repealed in 1981.

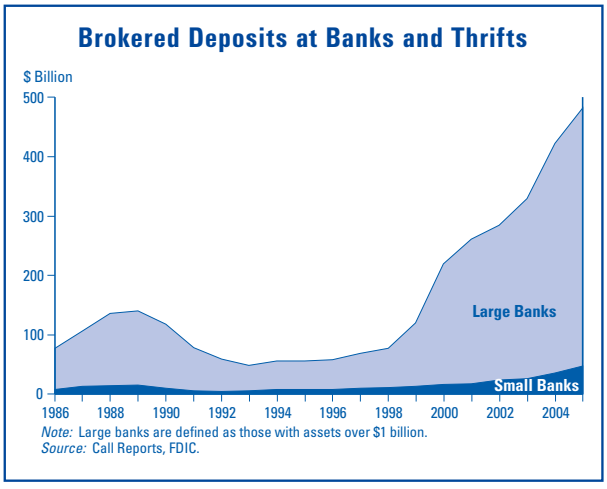
[14] The 1980–1983 growth is documented in FHLBB (1980, 1983, 1984a). The 1984–1989 growth is documented in FHLBB (1984b, 1989). The FHLBB and the FDIC issued a joint regulation that would have limited deposit insurance on any deposits placed by brokers (49 Fed. Reg. 13,003 [1984]), but when the agencies were challenged in federal court, the court rejected their action (FAIC Sec., Inc. v. U.S., 595 F. Supp. (D.D.C. 1984), aff'd mem., 753 F.2d 166 (D.C. Cir. 1985)).

[15] Cope (1991).

[16] 12 U.S.C. section 1831(f) (2001).

[17] Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA), section 301, as codified in 12 U.S.C. § 1831f (2001). The capital categories are statutorily defined (12 U.S.C. §1831o(b)(2001)).

Figure 3



have one rate structure for local deposits and another for deposits placed through brokers. Additionally, because institutions that specialize in commercial lending are limited in their ability to borrow from FHLBs,[18] such institutions find brokered deposits particularly beneficial.

Two forms of brokered deposits that bank managers use for liability management in today's market are deposit splitting, used mainly by large banks, and an Internet-based service, used mainly by small and midsize banks. Other sources of brokered deposits exist as well—for example, less-formal deposit-splitting arrangements, online auctions, and deposit-listing services[19]—but are not discussed here. However, their availability is a reminder that just as technological advances opened entirely new avenues of funding for today's bankers, other options for using brokered deposits will surely be developed in the future.

Deposit splitting by affiliated brokers. Despite the regulatory scrutiny that brokered deposits have received since the savings and loan crisis, the use of deposit brokers is recognized as a legitimate method of obtaining deposits. Although many brokers specialize in locating for their customers the highest rates of interest that are being paid on certificates of deposit,[20] our discussion here concerns the subset of brokered funds that are used to expand deposit insurance coverage beyond the normal limits to much higher levels. The insurance-related risks associated with this form of brokerage are familiar. First, this form increases the exposure of the federal deposit insurance fund. Second, this form of brokerage does not subject banks to the market discipline that is ordinarily brought to bear by larger depositors when they are unable to obtain full insurance coverage.[21]

Paradoxically, two root causes of the recent funding problem of depository institutions—the increased value of the stock market and a preference for higher-paying investments—have indirectly been the means by which larger institutions have found a reliable source of cash through brokered deposits. The volatility that characterized the stock market in the late twentieth century and the opening years of the twenty-first led many investors to be content to wait on the sidelines for future investment opportunities, and the result was a problem for stock brokerage houses: how should the resulting oversupply of cash be invested?

In the late 1990s, Merrill Lynch began breaking up its customers' accounts into amounts of $100,000 or less and distributing the money across its affiliated insured depository institutions, thus offering its clients additional deposit insurance coverage for their funds. Several other brokerage houses subsequently adopted similar deposit-splitting programs. But unlike Merrill Lynch's program, many of the newer arrangements place funds with unaffiliated institutions, a course that may prove more troublesome for regulators. When deposit splitting is restricted to affiliated institutions, the growth of such programs is inherently limited, but when a brokerage uses unaffiliated institutions, the number of depository institutions available is virtually unlimited, and if this activity is taken to the extreme, the resulting influx of insured deposits could lead to a reinstatement of deposit insurance premiums.[22] In addition, when unaffiliated institutions are used, volatility increases, since money that flows so easily into the insured accounts from the brokerage house is just as likely to go elsewhere if the least financial incentive arises.

Although nothing limits this type of deposit-splitting program to large institutions, the largest institutions are currently the most active participants. But other deposit-splitting arrangements exist for mid- and smaller-size institutions. One such arrangement is an Internet-based service.

[18] Institutions with assets over $500 million are not able to use commercial loans as collateral for their FHLB advances.

[19] Campbell (2001).

[20] By using such publications as Bank Rate Monitor or by surfing the Internet, bank customers can locate the higher-paying CDs without ever talking to a deposit broker. Customers' use of these vehicles has encouraged bankers who are in pursuit of funding sources to keep pace with technological advances.

[21] Market discipline is discussed in detail in Part 2.

[22] This possibility assumes that Call Report data will reflect the change in insurance status. An increase in the total deposits insured by the FDIC without a corresponding increase in the insurance fund balance would cause a decrease in the reserve ratio. The effect of a change in the reserve ratio is discussed at note 100 in the Deposit Insurance Issues section below.

An Internet-based deposit-splitting arrangement. Brokered deposits seemed to gain some respectability when the Promontory Financial Network (Promontory) launched the Certificate of Deposit Account Registry Service (CDARS) in January 2003.[23] Promontory was founded by former Comptroller of the Currency and former FDIC board member Eugene Ludwig. Its board of directors includes a former vice chairman of the Federal Reserve Board, Alan S. Blinder, and a former FDIC chairman, L. William Seidman. Even though the principals of Promontory are quick to contrast their program with traditional brokered deposits,[24] a skeptic could just as quickly disagree and argue that the system is nothing more than a well-connected brokered-deposit service. Nevertheless, the new service has met with approval from most observers.[25]

CDARS allows participating banks and thrifts to offer their customers insurance on deposits greater than $100,000—currently, on deposits of up to $25 million.[26] To illustrate how the service does this, let us assume a customer goes into a CDARS-participating bank to make a deposit of $200,000. The bank holds $100,000 in an account and places the other $100,000 with another institution belonging to the CDARS network and offering terms acceptable to the first bank's customer. At the same time, another CDARS bank taking a deposit from one of its own customers arranges to deposit $100,000 with the first bank. By using the CDARS network, the first bank continues to hold $200,000 in its deposit base—an amount that increases its lending capacity; the bank-customer relationship is saved since the customer deals only with the first bank; and the $200,000 deposit is completely covered by deposit insurance.

CDARS has been described as a clearinghouse that appears best suited to the small or mid-size institution,[27] and it is true that the bank customer who benefits from CDARS is primarily an individual with over $100,000 in bank deposits. Nevertheless, the program is also being marketed to nonprofits, small businesses, and municipalities. In the case of municipal deposits, CDARS provides an additional benefit to the depository institution since the institution's collateral is freed up under the program.[28]

Although the service may resemble a typical deposit brokerage, some observers have favorably distinguished it from the brokered deposits that caused problems during the savings and loan crisis.[29] Time will tell, but CDARS may well make brokered deposits a primary consideration when bank management is exploring funding options.

Sweeps and Reserve Requirements

Another area of a bank's nondeposit liability management has been driven by legal restrictions. Under current law, depository institutions may not pay interest on demand deposits or standard checking accounts.[30] However, because nonbusiness account holders are generally paid interest through the use of negotiable order of withdrawal (NOW) accounts,[31] the only group that is effectively barred from earning interest on its demand deposit accounts (DDAs) are holders of business accounts. To circumvent the restriction on the payment of interest, many banks arrange for funds held in a commercial account to be swept into an interest-bearing instrument (target account) on a regular basis.

[23] ABA (2003).

[24] Thompson (2003).

[25] For example, CBS (2003) and ABA (2001).

[26] As of March 2006, more than 1,100 banks were members of the network. Initially the service offered only four-week to one-year CDs, but within six months after it started, it began accepting individual retirement account CDs and extended the available terms to two- and three-year CDs.

[27] Bruce (2003).

[28] In most cases, municipal deposits over $100,000 are required by law to be either fully covered by deposit insurance or secured by a bank's pledge of securities. If municipalities can get deposit insurance on their total deposit through CDARS, securities that would otherwise be used as collateral will become available to the bank for other activities. Information on CDARS is from the Web sites www.cdars.com and www.promnetwork.com.

[29] Vaughan and Yeager (2003).

[30] The prohibition arose in the 1930s, when it was feared that deposit competition could destabilize the banking system. It was also feared that money-center banks would draw funds from rural banks, diverting those funds from productive agrarian uses to speculation in stocks. As a result, the Banking Act of 1933 authorized the Federal Reserve to limit the interest rate member banks could pay on time deposits; the Federal Reserve implemented the law on November 1, 1933, by promulgating Regulation Q. Interest-rate controls though Regulation Q existed in some form until 1982.

[31] NOW accounts are interest-bearing savings accounts with check-writing privileges.

Current law limits the frequency of sweep activity according to the nature of the target account. If the target account being used by the sweep is a traditional savings account or money-market account, banks must limit transfers and withdrawals between the accounts to 6 per month or per statement cycle.[32] However, if the funds are being transferred to a nondeposit instrument, such as repurchase agreements or unsecured instruments, the transfers (or "sweeps") can be made daily. Consequently, bankers can offer the business customer a sweep account that offers automatic investment in a high yield account and a blended rate of interest that is closer to market rate.[33]

An additional impetus to establishing sweep accounts is the dollar amount required to meet a bank's reserve requirements. All depository institutions must reserve an amount equal to between 3 percent and 10 percent of the funds they have in interest-bearing and noninterest-bearing checking accounts. The total required to be held in reserve is determined relative to the total deposits held in the qualifying accounts at each bank. Once the amount of the reserve is determined, banks may choose to hold their reserves in the form of cash (vault cash) or in an account at a Federal Reserve Bank (FRB) (sterile reserves), but in either case the funds are nonincome producing. As a result, a key strategy of bank liability management has been to discover ways of building a bank's deposit base while keeping required reserves to a minimum.[34]

Bankers have successfully reduced their reserves in recent years: reserve balances at FRBs fell approximately $3.5 billion between 1994 and 2004, while total deposits increased by 95.6 percent during the same period.[35] The American Bankers Association cited the example of an institution that was able to reduce its required reserves from $788,000 in August 2000 to $48,000 in August 2001, a period when deposits at the institution rose by $36 million.[36] Although many bankers have used sweep accounts successfully to reduce their reserve accounts, many analysts view the mechanisms being used to evade reserve requirements as "inefficient and costly" and believe they result in price distortion.[37]

During the 109th session of Congress, the Senate discussed whether banks should pay interest on commercial deposit accounts and whether FRBs should pay interest on the reserves they hold.[38] These two issues have been put before Congress in the past, and like past bills, the recent bill combines the two issues.[39] In fact, interest earned on a bank's reserves is frequently viewed as an offset to the interest that the institution would pay on deposits held in its transaction accounts. If legislation goes forward, banks will likely unwind most of their sweep programs. Until then, sweep accounts continue to be used effectively by bank management. We next focus on retail sweep accounts, and sweeps to third-party money brokers, repurchase agreements, and international banking facilities.

Retail sweep accounts. The history of retail sweep accounts shows clearly that even though paying interest on deposit accounts may have been the primary motivation for establishing sweeps, minimizing required reserves quickly became bank management's paramount goal.

As noted above, since the 1970s financial institutions have used sweep accounts to avoid the prohibition of interest payments on DDAs. In 1982, with the creation of the money-market deposit account (MMDA), the use of sweeps increased dramatically. The MMDA was statutorily man-

[32] Recent congressional proposals would increase the number of transfers permitted between deposit accounts to 24 per month, allowing for a sweep on each business day of the month.

[33] The rate typically consists of the money market rate on the excess funds and a NOW account rate on the threshold funds.

[34] Saunders and Cornett (2003) provide a good discussion.

[35] www.federalreserve.gov/releases/z1/current/data.htm, chart L.110. Total Deposits equal Checkable Deposits (line 30), plus Small Time and Savings Deposits (line 34) and Large Time Deposits (line 35).

[36] ABA (2001).

[37] Bennett and Peristiani (2002), 1; *Banking Policy Report* (1997).

[38] S.1586, 109th Cong., 1st sess. (2005).

[39] See, for example, U.S. House Committee on Financial Services (2003, 2001).

dated to be "directly equivalent to and competitive with money-market mutual funds."[40] With this new instrument, banks were finally able to pay their depositors a market rate of interest by sweeping any funds over an agreed-to amount into an interest-bearing MMDA. The funds were automatically returned to the transaction account with interest paid as the bank and depositor had previously agreed. By 1984, banks held more than $370 billion in MMDAs.[41] But even though the MMDA gave banks a product without interest-rate ceilings, banks' ability to compete with the sweep accounts that were available on the open market continued to be limited because MMDAs were prohibited from having more than six transfers and withdrawals per calendar month or statement cycle.

Despite this disadvantage, when newly designed computer software enabled a bank to analyze its depositors' use of their transaction accounts, sweeps became one of the main tools used to minimize a bank's required reserves: any funds deemed by the bank to be excess were automatically transferred into MMDAs. (As a result of these transfers, a bank's required reserve ratio could go from 10 percent to zero). And in 1994, when the Federal Reserve Board authorized banks to use this software to reclassify *any* transaction-account, retail sweep programs developed as banks notified their customers when they opened an account that "your deposit may be reclassified for purposes of compliance with Federal Reserve Regulation D. . . ." Banks began initiating sweeps without the customers' explicit approval, and the volume of transfers occurring between transaction accounts and MMDAs increased dramatically.

The MMDA used in a retail sweep program operates as a "shadow" account that is visible only to the depository institution. The bank reduces its required reserves while leaving unchanged the transaction deposits that are available to the depositor. A bank's level of transaction accounts decreases sharply, whereas the depositor's view of the account appears unaffected.[42] Just as this transfer occurs without the depositor's explicit approval or knowledge, so, too, any profits that the bank earns are not generally shared; in addition, banks also can choose how the funds will be invested.

During 2002, the Federal Reserve estimated that banks swept $526.6 billion into MMDAs, and when then Federal Reserve governor Laurence Meyer testified before Congress, he expressed the belief that banks would probably reduce or eliminate the use of deposit sweeping if the Federal Reserve began paying interest on reserve accounts.[43]

Third-party money brokers. When institutions choose to use third-party money-market brokers as a way to pay interest on commercial accounts, the depositor enters into an explicit contract for the broker's services and the bank plays the role of conduit. The bank's customer sets a target balance to hold in his or her transaction account, and any excess funds are wired out of the bank to a money-market broker. A variety of these arrangements are available, but in each of them the bank's primary motivation is to make available to its commercial depositors interest-paying accounts through daily sweeps. Like retail sweep accounts, these programs reduce a bank's required reserves, but the net saving realized by the bank is relatively insignificant, and unlike with retail sweep accounts, a bank loses control of the funds. Consequently, if new legislation authorized the FRBs to pay interest on reserve accounts and banks to pay interest on DDAs, banks would probably discontinue their use of third-party brokers (though the use of affiliated brokers might continue). If so, they may need to adjust their pricing strategies to maintain their profits.

Repurchase agreements. Repurchase agreements (repos) are contracts between the depositor and

[40] Pub. L. No. 97-320, § 327, 96 Stat. 1468, 1501 (1982) (codified at 12 U.S.C. § 3503 (1982)).
[41] Kaswell (1984).
[42] See Anderson and Rasche (2000) for further discussion of retail sweep programs.
[43] Meyer (2001). http://www.federalreserve.gov/boarddocs/testimony/2001/20010313/default.htm.

the bank that are considered short-term debt obligations in which the bank secures its obligation to pay the amount due under the contract by a pledge of government securities.[44] From the customer's perspective the repo operates much like an insured deposit, since the customer's funds (including interest) are secured up to the value of the collateral. In most cases, repos are overnight agreements: the funds are moved from the deposit account at the end of the business day and are returned to the account at the start of the following business day. With an in-house repo program, the bank decides how to invest the excess funds and retains the net interest margin. The customer is repaid under the terms of the repo from the general liquidity of the bank; that is, the specific government securities being used as collateral under the agreement are not generally sold.

Using repo agreements as a liability management tool has several advantages. First, repos enhance the bank's flexibility: the bank determines the rate of interest to be paid in the transaction and changes it as often as necessary to remain competitive in the market. Second, the bank retains total control: the bank decides how to invest the excess funds and retains the net interest margin. Third, the money remains in the community. But despite these advantages, repos require a pledge of collateral and therefore restrict the bank's use of its securities. For this reason, the payment of interest on reserves and DDAs would probably result in a decrease in the number of sweep arrangements using repos.

International banking facilities. During the 1960s and 1970s the U.S. banking industry developed a substantial offshore international banking sector that allowed banks to attract deposits by avoiding statutory interest rate ceilings. But in 1981, Congress alleviated the need for any offshore investment when it authorized U.S. banks to establish international banking facilities (IBFs). An IBF is merely a set of asset and liability accounts for international banking transactions that is segregated on the books and records of the establishing bank, with no separate organizational structure needed. Dollar-denominated deposits held at a U.S. IBF (or a bank located outside the United States) are Eurodollars—Eurodollars are not subject to interest-rate ceilings, reserve requirements, or deposit insurance assessments.

The Federal Reserve authorized the establishment of IBFs at domestic banking offices in order to enhance the internationally competitive position of U.S. banking institutions.[45] The Board reasoned that since many banks avoided regulatory requirements by conducting their international banking from foreign bank branches, IBFs would make the cost of conducting international banking activities at domestic offices competitive with the cost of conducting business from a foreign branch, and the money would be held in accounts within the United States. In addition, since the cost of establishing a foreign bank branch would prevent any institution except the largest money-center banks from participating in the international banking business, IBFs offered regional banks a way to become involved in international banking. Although stringent requirements limit the type of transaction that can be undertaken by an IBF, qualified funds may be swept between a U.S. bank and its IBF.

Liquidity Risk Management

The trends discussed above have changed the way banks manage their liquidity positions and the associated risks. The basic principles of sound liquidity risk management remain unchanged; however, those who apply them must take into account the new challenges and opportunities faced by banks today.

Some banks have adjusted better than others, but regulators have noted several problems. Sound liquidity management requires that banks weigh

[44] Another type of repurchase agreement allows banks to borrow from major investment firms by pledging government, agency, or mortgage-backed securities as collateral for a loan at market rates on a short-term basis (usually extending from 30 to 180 days). This type of repo is not discussed here and would not be affected by the legislative changes in question.
[45] Chrystal (1984).

the trade-offs among liquidity needs, return on investment, and managerial flexibility. Problems arise when banks begin using new funding sources without understanding them or making the appropriate changes to their liquidity management programs. For example, some banks chose structured FHLB advances that contained options they may not have fully understood. When the FHLBs exercised their options, or when the banks decided to change their funding strategies by prepaying advances, an apparently inexpensive borrowing could have unexpected and expensive consequences.[46] Other areas where banks have sometimes failed to make adjustments include liquidity reporting and the associated management information systems support, as well as contingency planning: banks have not always adjusted their contingency plans or "what-if" analyses to address the characteristics of new funding sources. In 2001, the Office of the Comptroller of the Currency (OCC) found that up to 25 percent of the smaller banks that were represented at a large meeting of bankers had no up-to-date written contingency plans.[47]

Some banks have addressed their funding needs by securitizing assets rather than holding them in their portfolio. This strategy raises different issues that, again, some banks have addressed more successfully than others. The most significant liquidity danger relates to early amortization clauses in the contracts. Such clauses are typically triggered by an indicator of deterioration in the performance of the securitized portfolio. When the clauses are triggered, the bank may suddenly be required to fund a large volume of new lending associated with the portfolio.

For many banks, an increased reliance on wholesale funds could lead to more severe liquidity problems if their financial condition deteriorated. Most core deposits are insured, so these depositors have little reason to exit from a troubled bank. But many wholesale and rate-sensitive funding sources could quickly evaporate if the bank's solvency were in doubt.[48] Thus many banks should be more careful about contingency funding plans.

Bank Liability Structure in the Future

Having examined liability management strategies used by banks in response to the changing environment, we now venture to make predictions. We begin with core deposits because most banks still use core deposits as their preferred primary source of funding, turning to noncore deposits and other wholesale sources to supplement the funding of their operations.

We expect that growth in core deposits will continue to lag behind asset growth. Bank customers do not need to keep their money in core deposits since technological improvements have simplified (and will continue to simplify) the process of shopping for competitive returns from a broad array of options. Furthermore, the aging of the U.S. population has negative (as well as positive) effects on core deposits. Certainly aging customers are more likely to need the liquidity and safety provided by deposit products and will therefore tend to increase the demand for these products; nevertheless, as assets are passed to the next generation, customers are likely to shift away from core deposits in search of better returns.

Growth in core deposits will also be influenced by the health of the general economy and the stock market. If the country's wealth continues to increase as it has in recent decades, the percentage of household wealth invested in core deposits will continue to drop (because wealthy consumers normally have a stronger appetite for and capacity to accept risk). A strong economy will bring about growth in core deposits, but the rate of growth will probably be slower than the rate of

[46] In 2002, 8 percent of FHLB net income came from prepayment fees.

[47] Silverman (2001a).

[48] See Shibut (2002) for a discussion of the incentives for various types of liabilities to exit from a troubled bank. Note, however, that economists and supervisors apparently disagree with each other on the likelihood that FHLB advances will exit from the bank. Economists argue that FHLBs have no incentive to exit from banks because their collateral protects them from losses at failure; for example, see Shibut (2002); Stojanovic, Vaughan, and Yeager (2000); and Ashley, Brewer, and Vincent (1998). Supervisors, in contrast, warn that the FHLBs may exit from the bank or demand additional collateral if the bank's condition deteriorates; for example, see Sexton (2000b) and FDIC (2002).

growth in bank assets. However, if the economy—or the stock market—is weak, core deposit growth could be quite strong during a period when loan demand is relatively weak.[49]

The future is even murkier for total deposits than for core deposits. Of course, the factors that influence core deposits will affect noncore deposits in a similar way. But technological changes have probably influenced noncore deposits more than they have core deposits, and depositors holding large volumes of funds are more likely to be sensitive to perceived trade-offs between risk and return.[50] When deposits are split and distributed among banks, deposits are insured at much higher levels than the level available through one institution. Deposit splitting allows investors to shift from low-risk low-return investments (money-market funds) to low-risk low-return insured investments (deposits) at a very low cost. In the short term, we expect this type of activity to continue generating deposit growth. Although the long-term prospect for the use of deposit splitting is particularly hard to ascertain, we expect these deposits to be more volatile than core deposits.

Banks' reliance on nondeposit sources, such as FHLB advances, will probably be determined largely by two factors: the ability of core deposits to fund asset growth, and returns on funds received from nondeposit sources compared with returns on deposits. If core deposit growth lags behind asset growth (as we expect), nondeposit instruments will continue to grow, as long as banks continue to offer competitive interest rates.

PART 2. Implications for Bank Regulators

Because these changes in bank liability structure have yielded substantial benefits to U.S. consumers and businesses, the task for regulators is not to find ways of turning back the clock but, instead, to accommodate these changes wisely. From this perspective we discuss several areas of bank regulation that are being affected by bank liability structure: supervision, deposit insurance, and failure resolution. Under supervision, we look at market discipline (how to exploit the power of markets to encourage good bank governance)[51] and the examination of liquidity risk at banks. Under deposit insurance, we look at deposit-insurance pricing and identify other issues. And under failure resolution we look at depositor preference (the optimum order of payment for creditors in the event of a bank failure) and some operational issues raised by changes in bank liability structure.

Market Discipline

In recent years, regulators and economists have become increasingly interested in the use of markets to supplement or reduce the reliance on traditional supervision as a mechanism for monitoring and policing bank behavior.[52] With banks relying more heavily on unprotected funding sources, the potential is greater for creditors to influence bank behavior—either directly (as banks respond to creditor demands) or indirectly (as supervisors respond to the changes in creditor behavior). Unprotected market participants have an incentive to monitor banks, an independent viewpoint, and certain advantages over supervisors.[53] In addition, many market signals are available daily, whereas examinations, and even Call Reports, are available much less frequently. And with liability structure now able to change more quickly, the FDIC's risk exposure could shift rapidly. Thus the regulatory community is taking some steps to expand the role of markets in the regulatory process and is exploring the possibility of other steps as well. Perhaps the most visible

[49] We concentrate on consumer issues here because most deposits are held by consumers. But if legislation were passed allowing interest payments on demand deposits, deposits held by businesses could increase markedly.

[50] The search costs and switching costs associated with maximizing one's return are similar for large and small depositors, but large depositors have more to gain from a higher return.

[51] One way to use market discipline relates to capital regulation. We explore market discipline imposed by stockholders, but we do not address the question of capital requirements.

[52] Sironi (2003), Federal Reserve Board (1999b), and Evanoff and Wall (2000) discuss industry changes that support an increased emphasis on market discipline.

[53] See Flannery (1998) for a discussion.

sign of banking regulators' resolve to strengthen market discipline is the status it has in the Basel II accord: market discipline is the "third pillar."[54]

Conditions Necessary for Market Discipline to Succeed

The term "market discipline" is often used broadly to represent the entire role that markets play in bank behavior. But to examine the effectiveness of market discipline and the ways in which regulators could enhance its influence, we need more specificity. We need a more precise definition of market discipline, and we need to understand the conditions necessary if market discipline is to succeed.

Flannery defined market discipline as the ability of markets to perform two distinct functions: to monitor changes in the bank's condition and to influence the bank's actions.[55] Llewellyn used the same breakdown of monitoring changes in condition and influencing actions, but he concentrated on the conditions necessary if market discipline—monitoring and influencing—is to succeed. He presented seven such conditions:

1. Relevant and accurate information must be available to market participants.
2. There must be enough market participants who are able to analyze the information.
3. The market participants must have adequate, clear incentives to monitor banks.
4. A sufficient number of market participants must act on the information.
5. The market response must be rational.
6. The response must lead to equilibrating change in market quantities or prices or both.
7. Bank managers must have the incentives and ability to respond to the market changes (or must be conscious of the potential threat of changes in quantities, prices, or both).[56]

The last condition is the only one that relates to the market's ability to influence banks. A critical aspect of that criterion is timing. When a bank is troubled, market discipline is most useful if it influences bank managers before it is too late to avoid failure.[57] In addition, regulators would naturally prefer that the managerial response be directed at reducing the likelihood or cost of failure (rather than taking on additional risk).

Assuming that market discipline is transmitted through price and quantity signals, Llewellyn concludes that market discipline will not work effectively if any of the seven conditions is violated. Furthermore, he concludes that actions taken by banking regulators to address any of these conditions can improve the effectiveness of market discipline.[58]

Evidence about the Provision of Relevant and Accurate Data to the Markets

The availability of relevant and accurate data is Llewellyn's first condition for effective market discipline. The banking agencies primarily use two tools to help ensure that this condition is met: reporting requirements and examinations. Among the large number of reporting requirements imposed on banks is the requirement that banks collect, edit, and supply Call Report data quarterly. The second tool—the examination function—reduces the ability of banks to ignore or hide their financial difficulties from market participants. Managers at troubled banks have a strong incentive to hide problems, since both markets and regulators impose discipline when the problems become apparent. In fact, several researchers have found that troubled banks frequently reveal bad news (through increases in loan-loss reserves and reductions in equity) short-

[54] For details, see Bank for International Settlements (2001a, 2001b). See also Burton and Seale (2005).
[55] Flannery (2001).
[56] Llewellyn (2002).
[57] FDIC (1997), 487–88, describes the "anatomy" of a failure, with the earliest decisions made some time before problems become apparent in the accounting data. The literature on prompt corrective action puts a strong emphasis on timing: the triggers must occur before it is too late for the bank's management to turn the bank around. See Jones and King (1995) and Peek and Rosengren (1996).
[58] Llewellyn (2002). Similar lists of conditions can be found in Llewellyn (2005) and Hamalainen, Hall, and Howcroft (2005).

ly after a supervisory examination or an associated enforcement action.[59] Therefore, changes made to enhance market discipline cannot ignore the evidence that supervisors play an important role in providing accurate data—particularly for banks that become troubled. This evidence also indicates that efforts to supply the markets with negative information gleaned by supervisors might be a fruitful avenue for enhancing market discipline.

Evidence about Whether Markets Monitor Banks

Most of Llewellyn's conditions (conditions 2–6) relate to the ability of markets to monitor banks and react rationally. The evidence that unprotected creditors are able and willing to monitor banks and to act as expected on available information is very strong. The volume of uninsured and jumbo CDs drops substantially during the period leading up to failure.[60] CD yields increase with bank risk.[61] Stock market prices drop when financial condition variables indicate problems and when examination ratings fall, and subordinated debt yields are higher for riskier banking companies than for less-risky ones.[62] These findings indicate that, to some extent, the first six conditions set by Llewellyn are being met.

The evidence is less compelling (and less plentiful) when one asks whether market information could be used to improve regulatory monitoring. Gilbert, Meyer, and Vaughan tested the use of jumbo-CD rates and runoff as a screening tool to predict downgrades in supervisory ratings or as a factor to improve off-site monitoring models (which are currently based on accounting data).[63] They found that jumbo-CD information contributed nothing in either capacity, and suggested that the strong economy during their sample period (1991–1999) contributed to the weak relationship (that is, depositors might have had little incentive to monitor banks because the industry was so healthy). Jagtiani and Lemeaux examined the stock, bond, and deposit data of five publicly traded companies that failed.[64] They found that except at one bank, both bond and equity markets were slower to identify problems than supervisors were.

Berger, Davies, and Flannery examined the success of bond ratings, abnormal stock returns, and supervisory assessments (examination ratings) in predicting the future performance of banks.[65] They found that bond rating agencies (but not stock market participants) acquire and use information that would improve the ability of supervisory assessments to predict future changes in bank condition. However, their method did not test for the extent to which the benefits from bond rating and stock market information were also captured in the financial data collected in the Call Reports.

A few studies have tested the ability of stock market data to improve off-site monitoring models. Curry, Elmer, and Fissel found statistically significant relationships between various stock market variables and bank condition.[66] They also found that the addition of these variables to an off-site model improved performance, but the incremental improvement was very small. Krainer and Lopez studied the effectiveness of adding both stock market and bond market data to off-site models. They had similar results, finding that abnormal returns tended to anticipate examination rating downgrades. They also found that the addition of stock market and bond market data to

[59] See U.S. General Accounting Office (1990, 1992); Dahl, O'Keefe, and Hanweck (1997); Gunther and Moore (2000); and Curry et al. (1999).

[60] See Jordan (2000); Goldberg and Hudges (2002); Silverberg (1993); and Marino and Bennett (1999).

[61] See Park and Peristiani (1998); Jordan (2000); Maechler and McDill (2003); and Hall et al. (2003).

[62] See Flannery (1998) for a brief review of the literature on a wide range of related topics. The Federal Reserve Board (1999b) provides a more thorough review on sub-debt literature, and Krainer and Lopez (2002) provide a review of the literature on the stock market. See also Berger, Davies, and Flannery (2000); Morgan and Stiroh (1999); DeYoung et al. (2001); and Curry, Elmer, and Fissel (2003).

[63] Gilbert, Meyer, and Vaughan (2003).

[64] Jagtiani and Lemeaux (2000).

[65] Berger, Davies, and Flannery (2000).

[66] Curry, Elmer, and Fissel (2003). They found statistical significance even after controlling for relevant accounting variables. Gunther, Levonian, and Moore (2001) performed a similar analysis that also found a statistically significant relationship between the estimated default frequency (EDF) implied from stock market data and BOPEC (an acronym for a bank holding company rating: B for bank subsidiaries; O for other nonbank subsidiaries; P for parent control; E for consolidated earnings; C for consolidated capital) ratings. They found a small improvement in in-sample tests, but they did not provide out-of-sample tests.

off-site models improved the in-sample fit but did not materially improve predictive ability in out-of-sample tests.[67]

In summary, researchers have found plenty of evidence that uninsured depositors, bond investors, and stockholders impose penalties on banks that become riskier. However, researchers' attempts to use market data to improve the predictive ability of supervisory off-site models have to date been disappointing.

Evidence about Whether Markets Influence Banks

Llewellyn's last condition addresses the ability and incentive of bank managers to respond to market signals. Bank managers' response is just as important as the market's ability to react to bank condition, but it has received far less attention from researchers.[68]

Billett, Garfinkel, and O'Neal examined the abnormal stock returns of banks that had been downgraded.[69] They found that banks with high levels of insured deposits did not experience a significant reduction in abnormal returns from a downgrade, but banks with lower levels of insured deposits did. They also found that banks relied more heavily on insured deposits for funding after the downgrade. Several other researchers have documented significant shifts away from unprotected funds toward insured deposits and secured liabilities as banks become troubled.[70] There is also theoretical evidence that supports such a shift.[71] This shift is frequently cited as evidence that market discipline works, and in a way, those authors are correct: bank managers clearly respond to market signals by shifting their funding strategy. But Billett, Garfinkel, and O'Neal concluded that the ready availability of insured deposits undermines the ability of markets to discipline bank management.

Billett, Garfinkel, and O'Neal have company. Jagtiani and Lemeaux reached the same conclusion, based on their inspection of five publicly held banks that failed. Ashley, Brewer, and Vincent came to a similar conclusion about FHLB advances, based on their finding that during the thrift crisis, insolvent thrifts tended to rely more heavily on FHLB advances than healthy thrifts. Hall et al. studied the effects of depositor discipline on the operating results of healthy banks and found that the effects were too small to influence bank management.[72] Therefore, under the current regulatory regime, the discipline imposed by bank creditors generally causes bank managers to adjust their funding strategy but not necessarily to reduce their risk exposure.

There is some evidence indicating that stockholders tend to encourage rather than discourage risk-taking at banks—particularly when bank condition is weak. Laeven found that concentrated ownership in banks (which ameliorates the agency problem) is associated with greater risk. Saunders, Strock, and Travelos found that management-controlled banks are more risk averse than stockholder-controlled banks. Demsetz, Saidenberg, and Strahan found that the combination of low franchise value and large insider holdings (the latter align the incentives of managers and owners) is associated with higher levels of bank risk.[73]

We found two studies that documented evidence of a beneficial (risk-reducing) managerial response to market discipline. Cannella, Fraser, and Lee found that senior managers have more trouble remaining employed in the industry if their bank fails, particularly if the reason for failure was arguably within the manager's control. Baumann and Nier found that banks that were

[67] Krainer and Lopez (2003).

[68] Flannery (1998), Bliss and Flannery (2000), and Bliss (2001) all note this as an important area for future research.

[69] Billett, Garfinkel, and O'Neal (1998).

[70] For evidence related to insured deposits, see Jordan (2000); Goldberg and Hudges (2002); Silverberg (1993); and Marino and Bennett (1999). For evidence related to secured credits, see Hirschhorn and Zervos (1990) and Ashley, Brewer, and Vincent (1998).

[71] See Jordan (2000) and Birchler (2000).

[72] Jagtiani and Lemeaux (2000); Ashley, Brewer, and Vincent (1998); Hall et al. (2003). Although Hall et al. concentrated their analysis on healthy banks (with a CAMELS rating of 1 or 2), the results did not change materially when they did robustness checks that included weaker banks.

[73] Laeven (2002); Saunders, Strock, and Travelos (1990); and Demsetz, Saidenberg, and Strahan (1997).

subject to more market discipline had higher capital ratios.[74]

Bliss and Flannery examined the effects that abnormal returns on stocks and bonds had on a variety of managerial action variables.[75] Although they found anecdotal evidence that markets influence bank management in extreme circumstances, their results showed no significant relationship between abnormal returns and subsequent managerial actions. They concluded that "in the absence of specific evidence that bank holding company stock and bondholders can effectively influence managerial actions under normal operating conditions, supervisors would be unwise to rely on investors . . . to constrain bank holding company risk-taking."[76] DeYoung et al., on the basis of their analysis of the effects of examination ratings on sub-debt spreads, concluded that their "results suggest that bond investors believe supervisory discipline to be more effective than what the market itself can apply."[77]

Market Discipline in the Future

Most economists and regulators now believe that a heavier reliance on market discipline could potentially improve both the supervisory function and the corporate governance of the banking industry. Related proposals that have been put forth vary widely but can be categorized in one of two basic groups: those that would make major changes, replacing segments of the supervisory function and the safety net with market-driven alternatives; and those that would make lesser changes, enhancing (but not replacing) the basic supervisory scheme and safety net that are currently in place. As may be apparent, the largest differences of opinion are tied to fundamental viewpoints about the need for bank regulation in the first place.[78]

Among the several proposals for major changes is one by Stern, who recommended a mandate to haircut all uninsured depositors at failure, regardless of the circumstances.[79] Another is by Calomiris, who proposed that large banks be required to issue sub debt with an interest rate below a specified threshold. If a bank were unable to meet these conditions, its assets would have to shrink 1/24th each month until the debt was issued (or the bank failed).[80] Proposals along these lines reduce the opportunity for regulatory forbearance and increase the market's influence on bank behavior. Proposals for modest changes are illustrated by calls for expanding disclosure regulations or for adopting off-site models that incorporate market data.

There are a number of reasons that modest changes may be viewed (at least by regulators and Congress) as more palatable than major changes. First, the trade-offs related to modest changes are far easier to understand than are those related to major changes. Thus, the more sweeping proposals may be viewed as riskier because of unanticipated consequences. Second, the lack of convincing evidence that markets cause managers at troubled banks to reduce risk exposure is a concern. Third, some stakeholders (including regulators) may have a vested interest in the status quo.[81]

A fourth complicating factor is that regulatory policies can have inconsistent effects over time. The effects of any policy that is tied to market behavior are likely to vary over the business cycle. Extensive shifts in market behavior have been

[74] Cannella, Fraser, and Lee (1995); and Baumann and Nier (2003). There is also ample evidence that banks generally held more capital before the introduction of deposit insurance.

[75] Bliss and Flannery (2000). The variables ranged from dividend payments and staff levels (presumably fully under the control of management) to the book value of equity (where control may have been less complete).

[76] Ibid, 26.

[77] DeYoung et al. (2001), 924. They found that sub-debt spreads fell when troubled banks retained a bad examination rating (that is, when a bank with a CAMELS 4 or 5 rating was not upgraded to a CAMELS 1, 2, or 3 during the examination). They also found that spreads increased when moderately troubled banks were upgraded (that is, when banks with a CAMELS rating of 3 were upgraded to a rating of 1 or 2).

[78] Benston (1993) provides an example of two diametrically opposed viewpoints.

[79] Stern (1997). See also Feldman and Rolnick (1997).

[80] Calomiris (1997). The proposal included additional requirements about the total amount outstanding (as a percentage of assets) and the frequency of rollover.

[81] See, for example, Kane (1990), Boot and Thakor (1993), and Rosen (2003).

documented by several researchers. Covitz, Hancock, and Kwast found that sub-debt yields were significantly influenced by issuance decisions, which in turn were influenced by factors that varied substantially over time. Hall et al. suggested that shifts might occur in the monitoring efforts of uninsured depositors, depending on the overall health of the banking industry. Danielsson and Shin described how market reactions to increases in risk have sometimes amplified shocks to the system.[82]

Proposals for major change usually include "hard" triggers based on market signals[83] and therefore provide less room for regulatory discretion in extreme circumstances. Historically large banks become troubled or fail during periods of industry-wide distress, and market volatility during those periods may bring about results that were not anticipated when the regulatory system was designed.[84] Furthermore, not only the market's reaction but also the circumstances leading to the industry stress may be unexpected. In large part, the safety net was created to limit the spillover effects of bank failures during periods such as these. During the hearings that led up to passage of FDICIA, Congress spent a lot of time discussing these issues, and the result was prompt corrective action (PCA) and the least-cost test plus the systemic-risk determination.[85] We see no trends in banking (or in recent research) that would support a shift away from regulatory discretion in extreme circumstances. Therefore, we believe that any near-term changes will probably aim for relatively modest enhancements to the current supervisory scheme.

Although there is no consensus about the best approach, some types of proposals have more support than others. The most frequent recommendation is for more research, and that is already occurring. A basic view is that improvements in the use of market discipline should be measured in terms of net social benefits.[86] In other words, one should take into account the substantial differences (in costs and benefits) that may exist between the type 1 and type 2 errors associated with market responses. Along the same lines, Flannery suggested that regulators should not insist on the perfect solution before instituting changes but, instead, should adopt options that yield better solutions more often, or better results for the most important circumstances.[87]

Some of the likely changes are well accepted in academic and regulatory circles—in particular, increased disclosures to the market and increased use of market data in supervisory judgments. In addition, some economists have recommended incorporating market data into deposit insurance prices at large banks.

Increased disclosure requirements are already moving toward adoption as part of the Basel II effort.[88] Given the research showing that supervisors often have an advantage over markets in uncovering private negative information, future research may advocate—and future changes in the reporting requirements may institute—improved disclosures by banks (or perhaps supervisors) when trouble arises.

Supervisors will probably continue to expand their use of these data in multiple ways. Even though the research to date has not produced large improvements in off-site models, supervisors will probably continue to expand the use of these data in the off-site review process.[89] Additional research might produce clearer—and thus more useful—signals for regulators. Also possible are changes in the training of examiners (training them to understand market signals better) and in the conducting of on-site examinations.[90]

[82] Federal Reserve Board (1999b), especially 19 and 58; Covitz, Hancock, and Kwast (2002); Hall et al. (2003), 25–26; Danielsson and Shin (2002).
[83] We define a hard trigger as one where there is effectively no supervisory discretion.
[84] A recent example occurred in 1998 after Russia defaulted on its debt obligations. Bond spreads increased dramatically and liquidity dried up. Other, more extreme examples date from the pre-FDIC banking panics.
[85] Under the systemic-risk determination, regulators can opt to ignore the least-cost test if a bank has failed, but only after crossing several statutory hurdles. In addition, regulators must publish a written analysis of the reasoning behind the decision.
[86] Flannery (2001), 112. Meyer (1999) echoes this view.
[87] Flannery (1998), 280.
[88] See BIS (2001b) for additional information.
[89] See Burton and Seale (2005) for a discussion.
[90] See Emmons, Gilbert, and Vaughan (2001).

Liquidity Risk and Other Supervisory Issues

Because many banks have adopted more complex funding strategies to address shortfalls in core deposit funding, supervisors have reconsidered their evaluation of liquidity risk. Regulatory agencies have increased their emphasis on liquidity management and updated their examiner guidance and training. In 2000 the Bank for International Settlements (BIS) published revised principles on managing liquidity.[91] In 2001, the U.S. banking agencies released an interagency advisory letter on brokered and rate-sensitive deposits, reminding bankers to undertake risk-management measures that are appropriate for banks that rely on these instruments.[92]

In 2001 both the OCC and the FDIC published new examination guidance on liquidity. The FDIC's revisions incorporated changes and additions in several areas, including FHLB advances, securitization, ratio analysis, contingent liabilities, brokered and rate-sensitive deposits, and factors for examiners to consider when rating banks on liquidity.[93] In 2000 and 2002 the FDIC also published new guidance on specific areas related to liquidity.[94] As banks continue to adjust their strategies and examiners continue to identify weaknesses in some banks' strategies, additional changes in examination procedures and training may be needed.

If core deposit growth continues to lag behind asset growth and banks are forced to rely more heavily on wholesale deposits, contingency planning may require more emphasis. For troubled banks, examiners may need to pay more attention to liquidity pressures than they did in the past.

The easy availability of wholesale funding sources raises other supervisory issues. It enables nontraditional banks to grow (and take on additional risk) very quickly. There is a well-established link among high growth, risk exposure, and bank failure.[95] The OCC found a positive relationship between the reliance on wholesale funding and risk exposure.[96] Hall et al. found that riskier banks used jumbo CDs more heavily than low-risk banks, and McDill and Maechler found that banks with a CAMELS rating of 3 relied on uninsured deposits more heavily than healthier banks.[97] Supervisors have already instituted off-site monitoring tools related to high growth. Now that protected wholesale funding sources are becoming more readily available, should regulators be considering other actions as well?

The supervisory function might also benefit from an investigation into new standard performance ratios for liquidity measurement. Liquidity measurement has always been imprecise because it depends on future circumstances, including the market's future view of the bank. Jim Moss, a managing director at Fitch Inc., phrased it well: "You can do a lot of analysis, but there's that human element attached to liquidity."[98] The traditional ratio of loans to core deposits—never sufficient by itself—has become less meaningful and is now inadequate since not only are many rate-sensitive deposits issued at retail for amounts slightly below $100,000, in some cases, deposits in accounts above $100,000 may behave like core deposits.[99] Are there other, more useful measures that could be adopted, or other data that should be collected, to facilitate supervisory or peer-group analysis? These questions might be an area where future research would be fruitful.

[91] BIS (2000).

[92] Office of the Comptroller of the Currency et al. (2001).

[93] Zamorski (2001), 1–2. This memo (that is, the FDIC's new guidance) introduced a major revision of the liquidity and fund management section of the examination guidelines.

[94] See Sexton (2000a) on securitizations, Sexton (2000b) on FHLB advances, and Zamorski (2002) on wholesale funding. Note that the guidance is designed not solely to warn examiners of possible problems but also to remind them that sound liquidity management can include the use of wholesale funding, securitization, and so forth.

[95] See FDIC (1997); Nuxoll, O'Keefe, and Samolyk (2003); and McDill (2004).

[96] OCC et al. (2001).

[97] Hall et al. (2003); McDill and Maechler (2003).

[98] Quoted in Davenport (2003).

[99] Some bankers have argued that this would be the case for certain large banks that use brokered deposits from an affiliated broker. In addition, some jumbo CDs may be long-term deposits that are fully insured.

Deposit Insurance Issues

Bank liability structure affects not only supervision but also deposit insurance, and in several ways. As banks rely less on domestic deposits, the relationship among the assessment base used for deposit insurance pricing, the designated reserve ratio (DRR),[100] and the FDIC's risk exposure has diminished. The FDIC's risk exposure is largely driven by the quantity and quality of industry assets and the industry's equity position.[101] However, the assessment base includes only domestic deposits, and the reserve ratio includes only insured deposits. When asset growth is funded by nondeposit liabilities, the FDIC's risk exposure changes with no similar change in the assessment base or the reserve ratio (or, therefore, in the required minimum fund balance). When asset growth is funded by uninsured deposits, the assessment base increases but the reserve ratio does not increase. Thus the FDIC's funding mechanisms do not respond to changes in the fund's risk exposure from asset growth funded by nondeposit liabilities—or even by uninsured deposits.

Several economists and regulators have raised the question of whether the FDIC's pricing mechanism should be adjusted to reflect shifts in the industry's funding mix.[102] Twice in the last decade the FDIC itself has asked for public comments on the issue.[103] Options include changing the assessment base to: insured deposits; domestic deposits plus secured borrowing; total assets; or total liabilities excluding subordinated debt. Alternatively, the price (rather than the assessment base) could be adjusted for the effects of liability structure on the FDIC's risk exposure.

Most of the deposit insurance pricing options apply to particular priority classes defined under U.S. bank receivership law. In the event of failure, secured claims are paid first (up to the amount of the collateral), and these have received the most attention in the related literature. Administrative expenses of the receivership are paid next, followed by deposits (both insured and uninsured); then general trade claims, including foreign deposits and other unsecured claims; then subordinated debts; and finally shareholder claims.

Currently an institution's assessment base is approximately equal to its domestic deposits minus a deduction for float. Because large banks rely on nondeposit liabilities much more heavily than small banks, any potential changes to the assessment base raise profound issues about the distribution of insurance costs across the banking industry.

There has been less research about the question of whether—given the recent changes in liability structure—the reserve ratio is an appropriate measure of the adequacy of the insurance funds. It is not clear whether changes in bank liability structure have materially detracted from the reserve ratio's usefulness as a rough measure of fund adequacy.[104] This area may be worthy of future research.

[100] Under FDICIA, the DRR–the reserve ratio calculated as the ratio between the insurance fund balance and total deposits insured by the FDIC–was set by statute at 1.25 percent. In addition, the FDIC was required to impose hefty assessments on banks whenever the reserve ratio of the Bank Insurance Fund or the Savings Association Insurance Fund fell substantially below the DRR. Under the Federal Deposit Insurance Reform Act of 2005, the fixed DRR of 1.25 percent was replaced by a reserve range of 1.15 percent to1.50 percent, and the FDIC Board of Directors was directed to set and annually publish a DRR within that reserve range. If the reserve ratio falls below 1.15 percent, the legislation required that the FDIC set assessments at a level that will bring the fund balance back to 1.15 within five years.

[101] More specifically, one way to measure the FDIC's risk exposure for a particular bank is to calculate the bank's expected probability of default multiplied by the expected total loss, multiplied by the FDIC's percentage of the expected loss. The probability of default and expected total loss tend to be related to asset composition. Equity holders normally lose their entire investment at failure. The remaining loss is, for the most part, borne by the FDIC because the FDIC cannot flee a bank before failure, but other unprotected credits usually flee or protect themselves through collateral arrangements before failure. See Shibut (2002) for a more detailed discussion. This section draws heavily from that paper.

[102] See Silverberg (1993); Baer (2000); Bair (2001); Seidman (2001); Carnell (2001); and Thomas (2001).

[103] In 1994, the FDIC issued an Advance Notice of Proposed Rulemaking (ANPR) focused on the assessment base; the notice did not result in changes to the assessment base (FDIC 1994). In 2000 the FDIC's options paper on deposit insurance reform also raised the issue of the assessment base (FDIC 2000).

[104] Other factors, such as the riskiness of the industry's asset holdings or its financial condition, are also not captured in the reserve ratio. Most of the discussion of fund sufficiency focuses on the appropriate role of an insurance fund, public versus private funding, ex ante versus ex post funding, measures of fund exposure, and concentration risk (that is, funding adequacy, given the size of the largest insured bank). Another way to gauge fund adequacy is through the reserving process for near-term future losses. Liability structure also affects the FDIC's contingent-loss reserves. Both the current method used by the FDIC to estimate contingent-loss reserves, and recent proposals for change in the current method, take liability structure into account. The FDIC hired McKinsey and Company in 2003 to review its risk management program and contingent-loss reserving methods. See McKinsey and Company (2003) for details. One of the short-term recommendations was to change the contingent-loss reserve to take liabilities into account (p. 19); the FDIC has already made this change. McKinsey concurred with the FDIC's plan to move toward using credit-loss modeling techniques for measuring the corporation's contingent-loss reserve. Jarrow et al. (2003) have developed a draft contingent-loss model for this purpose. Their model also incorporates liability structure into its loss estimates.

Recent developments in wholesale deposit practices raise other policy issues that have received scant attention by regulators but may be worth additional analysis as well, and possibly changes in policy. We list these other policy issues here, but in the rest of the section we concentrate on the pricing issues. The first of these other issues is that some banks (particularly those with affiliated brokerages) could easily shift from deposit to nondeposit funding whenever insurance losses triggered substantial premiums. Such shifting could increase the volatility of the reserve ratios (and thus the volatility of premiums) and could raise questions about equity across banks. Second, deposit-splitting practices can circumvent the insurance coverage limits that Congress intended. Should regulators (or more likely Congress) be taking action to make the $100,000 limit[105] more meaningful for depositors? Another question is the most appropriate treatment of sweep accounts for deposit insurance purposes.

Secured Liabilities

Under the FDIC's current pricing method, secured nondeposit claims introduce the most distortion. If a bank fails, secured claimants are invariably paid in full because collateral protects them.[106] Thus, losses are usually borne by the FDIC and other unprotected creditors.[107] If a bank shifts its funding strategy away from domestic deposits and toward secured borrowing but makes no other change to its business strategy, the FDIC's loss exposure remains unchanged even though insured deposits fall.[108] Moreover, most banks are currently in a position to make this shift; that is, they can choose their asset portfolio independently of their funding sources.[109] And the FDIC's pricing method provides an incentive for banks to shift from uninsured deposits to secured borrowing, since investors are willing to accept a lower interest rate when their investment is protected by collateral.[110] In addition, ceteris paribus, banks that do not rely on secured borrowing for funding are effectively subsidizing banks that do. If two banks are identical in all aspects except that one relies on domestic deposits for funding but the other relies on a mix of domestic deposits and secured borrowing, both banks will expose the FDIC to identical losses, but the second bank will pay smaller assessments.

Some researchers have argued that the ready availability of secured borrowing may have important secondary effects as well. If bank managers know that they can easily replace unprotected credits—uninsured and unsecured debt—with secured borrowing if their financial condition deteriorates, they may choose to increase their exposure to risk.[111]

Therefore, both Silverberg and Baer have urged that secured liabilities be included in the FDIC's assessment base. Bair, Seidman, Carnell, and Thomas have recommended that the appropriate treatment of secured liabilities be considered as part of deposit insurance reform.[112]

Uninsured Deposits

In contrast to the case of secured borrowing, if a bank shifts its funding strategy away from insured deposits and toward uninsured deposits but makes no other change to its business strategy, the FDIC's loss exposure decreases as losses are shifted

[105] $250,000 for individual retirement accounts.

[106] Theoretically, they could be haircut if the value of the collateral were less than the outstanding balance of the borrowing.

[107] Of course, the availability of collateral limits the volume of secured credits that can be fully protected. In practice, however, these limits have rarely been binding.

[108] The funding shift would not influence total losses to unprotected credits or the FDIC. Therefore, even though the volume of deposits fell, losses imposed on deposits at failure would not change. Shibut (2002) elaborates this point.

[109] Of course, there are important limits on asset growth related to equity, but most banks meet the regulatory minimums for capital. Given the choices available for the types of assets that can be pledged as collateral, most banks have the freedom to increase their secured borrowing substantially without adjusting their asset portfolio. Their ability to increase unprotected--uninsured and unsecured--funding is tied much more closely to financial condition.

[110] See Birchler (2000) for a theoretical model that supports this point.

[111] See Shibut (2002), 25, for a discussion. See also Stojanovic, Vaughan, and Yeager (2001); and Ashley, Brewer, and Vincent (1998).

[112] Silverberg (1993) and Baer (2000); Bair (2001), Seidman (2001), Carnell (2001), and Thomas (2001). Thomas recommended that deposit insurance prices be adjusted for secured borrowing, but he did not specify how the adjustment should be made.

from the FDIC to uninsured depositors (provided that the uninsured deposits remain in the bank at failure). Nevertheless, the FDIC assesses uninsured deposits even though they are unprotected at failure. On the surface, this appears to be patently unfair to these depositors—particularly since some banks pass assessment costs directly to depositors that receive no insurance protection.[113] For this very reason, a number of countries use insured deposits for assessments.[114]

However, most uninsured depositors do not lose money when a bank fails because they manage to withdraw their deposits and receive full payment beforehand. As the bank's condition deteriorates, these funds are sometimes replaced by insured deposits or secured borrowing.[115] This phenomenon is well documented: from 1990 to 2002, on average an estimated 22.8 percent of domestic deposits were uninsured, but during the same period only 1.5 percent of deposits at failed banks were uninsured and exposed to losses.[116] To the extent that uninsured depositors flee troubled banks and banks respond by replacing the uninsured deposits with insured deposits or secured instruments, the inclusion of uninsured domestic deposits in the assessment base makes sense. Uninsured depositors' preferred status under domestic depositor preference also provides some compensation for the assessments. In addition, the inclusion is easy to administer, for the distinction between insured and uninsured deposits is hard to make before failure.

Some banks, however, rely so heavily on unprotected funds (including uninsured deposits) that, in the event of failure, many of the unprotected creditors will be unable to exit in time to avoid losses. These are typically wholesale banks, where the FDIC's losses will be mitigated—or even wiped out—because other creditors will bear significant losses.[117] For these banks, it may be unfair to charge assessments on uninsured deposits. In truth, their heavy reliance on unprotected funding sources may merit a discount on their assessments.

General Trade Claims and Subordinated Debt

Both general trade claims and subordinated debt are excluded from the assessment base. If a bank fails, both of them serve to reduce the FDIC's losses, since the FDIC suffers losses only after these credits are wiped out.[118] However, like uninsured deposits, many unsecured claimants are able to exit from banks (and thus receive full payment) before the banks fail. When this occurs, the unsecured claimants effectively "put" losses to the FDIC. To the extent that these creditors succeed in exiting from banks before failure, one can argue that they should be included in the assessment base. Longer-term credits (typically sub debt) or credits that are bank-specific (such as lawsuits) are less able to exit from a troubled bank and thus more likely to absorb losses at failure. As a result, there is less justification for including these debts in the assessment base.

For credits that are likely to dodge losses at failure, one can argue that they should be included in the assessment base. Silverberg concludes that all borrowing except sub debt should be included because they all help to fund bad assets before failure but are not around to suffer losses at failure.[119] However, both general trade claims and sub debt that remain in a bank at failure usually

[113] In testimony on deposit insurance reform, Mr. Nolan North of the Association for Financial Professionals made exactly that argument (2001).

[114] Garcia (2001), 86.

[115] The bank often shrinks as well. See Jordan (2000); Silverberg (1993); Marino and Bennett (1999); and Billett, Garfinkel, and O'Neal (1998). Jordan found that during the two-year period preceding failure, the failed banks that relied most heavily on uninsured deposits recorded dollar volume increases in small-denomination time deposits that exceeded the reduction in large-denomination time deposits.

[116] These are simple averages. The figures for failed banks include only banks where the FDIC imposed haircuts on uninsured depositors at failure. For additional evidence, see the section above on market discipline; see also Silverberg (1993); Jordan (2000); Marino and Bennett (1999); and McDill and Maechler (2003).

[117] Marino and Bennett (1999) discuss this phenomenon at length.

[118] Ceteris paribus. If these credits encouraged banks to take on additional risk or if they brought about a more lax supervisory stance, the result could differ. Most of the theoretical literature suggests that unprotected credits should encourage less risk taking; a notable exception is Blum (2002). There is little empirical evidence on the topic. For more detail, see the section above on market discipline.

[119] Silverberg (1993), 1.

suffer a complete loss; moreover, these types of credits may also provide useful corporate governance services in the form of market discipline. Thus, the case for including these items in the assessment base is far weaker than the case for including secured credits.

Other Considerations

In focusing on the relationship between various types of liabilities and FDIC losses, we have looked at each type in isolation, but the distribution of these instruments across the industry is also important. In addition, the discussion so far has implicitly assumed that the current pricing method captures the FDIC's risk exposure well—except for the treatment of bank liabilities. It turns out that adjustments to deposit insurance pricing are not nearly as straightforward as they first appear.

Of the major types of liabilities used by banks, only uninsured deposits are relied on equally by large and small banks.[120] Small banks rely much more heavily on insured deposits than large banks, and large banks are much heavier users of nondeposit liabilities. Unfortunately, no full breakout of nondeposit liabilities into secured and unsecured components is currently available. But even without full information on the status of nondeposit credits, it is clear than any significant adjustments will materially alter the distribution of assessments across the industry. The inclusion of secured credits in the assessment base, for example, would probably shift the funding burden toward large banks, whereas the exclusion of uninsured deposits would shift the burden toward small banks. In fact, the reason the FDIC in 1935 advocated changing the assessment base from insured deposits to total domestic deposits was that the corporation thought the change would produce a fairer distribution of assessments across bank size.[121]

Two aspects of bank size are not addressed in the current pricing method. First, the pricing matrix is designed to capture differences in the likelihood of failure, but not differences in the anticipated loss severity if failure occurs. The FDIC has historically suffered much lower loss rates from large banks than from small banks. From 1980 to 2000, the average loss rate for banks under $100 million was 22.4 percent; for banks over $10 billion, only 5.6 percent.[122] The exclusion of loss severity from the pricing method means that large banks pay more, and small banks pay less, than expected losses.

Second, the very largest banks pose unique challenges and risks to the FDIC. The least-cost resolution of some of these banks might pose a systemic risk to the financial system. If so, regulators might pay some creditors more funds than they would be entitled to under a normal resolution. To the extent that markets perceive these banks as "too big to fail," the banks benefit from less-expensive and more readily available funding sources.[123] Large banks also impose a great deal of concentration risk on the insurance funds. Even though the loss rates of these banks tend to be low, the size of the institutions alone is enough to threaten the solvency of the deposit insurance fund. For that very reason, private insurance firms generally do not accept this level of concentration risk. The appropriate pricing for concentration risk is not at all clear.

[120] As of year-end 2000, uninsured deposits made up 15.7 percent of the liabilities of banks with assets below $100 million, and 14.6 percent for banks above $10 billion. Thrifts, however, depended less on uninsured deposits for their funding. See Shibut (2002), 8.

[121] Bradley (2000), 10.

[122] Shibut (2002), 42. In recent years, however, very small banks have had the lowest loss rates, largely because of a few failures of fast-growing subprime lenders. See Salmon et al. (2003). Loss rates are calculated as a percentage of total failed-bank assets.

[123] The perception that the very largest banks are too big to be allowed to fail was particularly strong in 1984 after Continental Illinois failed and the Comptroller of the Currency testified that 11 banks were "too big to fail." Since then, the perception has faded somewhat but not disappeared. For related analyses, see O'Hara and Shaw (1990); Billett, Garfinkel, and O'Neal (1998); Morgan and Stiroh (1999); and Flannery and Sorescu (1996). Note that FDICIA required that the incremental cost of a systemic-risk determination be paid through a special assessment. The special assessment would be paid on the basis of total liabilities excluding subordinated debt; therefore, large banks' share of the special assessment would be larger than their share of regular assessments. Because the special assessment would be imposed only after the failure (and after the systemic-risk exception was invoked), large banks might well enjoy the benefits of a too-big-to-fail aura without ever paying extra for the privilege.

In summary, the FDIC's pricing method does not take into account differences in liability structure, even though these differences can materially influence the FDIC's risk exposure. Moreover, liability structure is not the only aspect of the FDIC's risk exposure that is excluded from the agency's current pricing method: loss severity and concentration risk are excluded as well. Because of the interrelationships between liability structure and these other important (but thorny) aspects of deposit insurance, we believe that the incorporation of liability structure into deposit insurance pricing would probably be beneficial, but it would also require careful thought about multiple related issues.

Failure Resolution Issues

The movement away from deposit funding also has ramifications for failure resolution, raising issues associated with depositor preference and aggravating two operational challenges the FDIC sometimes faces when resolving failed banks.

Domestic Depositor Preference

In 1993, Congress passed the Omnibus Budget Reconciliation Act, which amended the Federal Deposit Insurance Act (FDI Act) and instituted depositor preference nationwide. The law states that when banks fail, deposit liabilities are to receive priority over general trade claims. Before the law was passed, deposits and general trade claims shared the same priority class.[124] As the banking industry's reliance on nondepository funding has increased, so also have the ramifications of this change.

The change was not part of a banking bill, was made with very little debate, and has received relatively little attention in the United States since being enacted. However, questions have been raised about both the lack of deliberation before the provision was enacted and the change itself.[125] Here we briefly review the questions and examine certain possible changes to depositor preference.[126]

Background. In 1983, the FDIC advocated a national depositor preference statute as a means to increase market discipline, reduce the corporation's costs, and permit the use of purchase and assumption (P&A) transactions for more failures.[127] At the time, the FDIC was allowed to select any resolution method if it were less costly than a payout, but in the absence of depositor preference, use of a P&A agreement required the FDIC to satisfy all general trade claims. In depositor preference states, in contrast, the FDIC could execute a P&A agreement without satisfying all general trade claims (except for national banks located in the state). The FDIC found this to be an excellent way to reduce costs (particularly those associated with contingent claims related to lawsuits, loan guarantees, and loan commitments) while simultaneously simplifying the resolution transaction, minimizing the FDIC's cash flow requirements, and reducing the scope of its liquidation operations.[128] Large banks strenuously objected to depositor preference, arguing that it

[124] In 1993, 29 states had depositor preference laws, but these laws did not apply to national banks. See Curtis (2000), 243.

[125] See Silverberg (1994) for an account of the events leading up to enactment of the change. The change was motivated by budgetary considerations. In fact, we found no in-depth analyses of the depositor-preference provision that came to a favorable conclusion. For criticisms, see the Shadow Financial Regulatory Committee (1993); Ely (1993); Silverberg (1994); Bureau of National Affairs (1994); Ratway (1995); Kaufman (1997); Marino and Bennett (1999); and Curtis (2000).

[126] There are other aspects of the payment priority order used in a receivership that might merit a review in light of recent changes in bank liability structure. Failure resolution practices vary widely across the world, and there are significant disagreements among economists and attorneys about the optimum policies. Although most of them are unrelated to bank liability structure, one area of disagreement is related: the appropriate treatment of secured credits. Some researchers argue that the use of collateral is unfair to general (unsecured) claimants; others argue that creditors should be allowed to protect themselves from loss by demanding collateral. For more general discussions about issues related to the appropriate resolution policy for failed banks, see Aghion, Hart, and Moore (1992); Contact Group on the Legal and Institutional Underpinnings of the International Financial System (2002); and Hadjiemmanuil (2004).

[127] See FDIC (1983, 1985) and Silverberg (1986).

[128] Without the P&A transaction, the FDIC was required to execute a payout transaction or an insured deposit payout, both of which required more cash at resolution and more liquidation activity in the receivership. See Silverberg (1986) for details.

would hinder their ability to compete with foreign banks and nonbanks in affected markets.[129]

The Financial Institutions, Reform, Recovery and Enforcement Act (FIRREA) in 1989 explicitly allowed the FDIC to treat depositors differently from other general trade claimants at resolution.[130] Therefore, the FDIC's interest in depositor preference waned.[131] Nonetheless, depositor preference was passed in 1993 for budgetary reasons.[132]

Analyses and concerns. The priority status of claimants affects more than just the treatment of creditors once a bank fails. It also influences the behavior of the various stakeholders (creditors, banks, regulators) before failure, and it influences decisions about the method to use for failure resolution. Judgments about depositor preference should therefore consider the dynamic effects of the priority rules in light of appropriate policy goals.

In discussing this issue, we find it helpful to look to the goals for bankruptcy proceedings. Aghion, Hart, and Moore articulated three generally accepted goals for bankruptcy proceedings:

1. Maximize the ex post value of the firm.
2. Distribute the firm value appropriately across the claimants.
3. Preserve the ex ante bonding role of debt (that is, maintain the disciplinary role of debt and penalize the firm's management).[133]

Most observers agree that the appropriate distribution to claimants in a bank resolution is one that retains the statutory priority order in place at the time of failure. Because of the role banks play in facilitating commerce, many economists have articulated a fourth goal that applies to banks: the optimum treatment of a failing bank—particularly a large bank—should minimize the harmful effects to the overall economy. Disorderly or contracted proceedings that disrupt the bank's ability to continue operations are more likely to cause harm to the overall economy.[134] With these goals in mind, we review the literature on depositor preference and consider options for change.

Birchler examined bankruptcy priority rules from a contract theoretic viewpoint; he found that the establishment of dual priorities (that is, depositor preference) is socially optimum, mainly because it reduces costly monitoring for senior claimants (that is, depositors).[135]

Pages and Santos developed a theoretical model to examine the effect of depositor preference on the closure policy of the deposit insurer. Under depositor preference, the deposit insurer would close risky banks earlier (and at a more socially optimum time) than it would if all claims were given equal status. If the deposit insurer were a junior claimant, it would forbear much too long because it would have a stronger incentive to "gamble for resurrection." Pages and Santos also found that the deposit insurer, as the senior claimant, would monitor healthy banks less than was socially optimum, but that as the junior claimant, it would not monitor unhealthy banks

[129] See U.S. Department of the Treasury (1991), III-17. FDIC (1989), 245–46, also discusses the issue. The markets included letters of credit and other guarantees and foreign deposits (if they were treated as general trade claims in the statute). Silverberg (1994) echoed some of these concerns and concluded that large banks might incur costs (by forming separate banks in foreign countries or taking other protective measures) to address investor concerns.

[130] In 1988, the FDIC developed a rationale for paying general trade claimants differently, as long as all claimants received at least as much as they would receive under a liquidation. See FDIC (1989). At the request of the FDIC, FIRREA explicitly codified that rationale into law.

[131] See Curtis (2000) or Marino and Bennett (1999) for a more detailed discussion. Even so, the FDIC applauded passage of depositor preference at the time (see Rehm [1993]). However, the treatment of foreign deposits might not have been clear just then. In 1989, the FDIC stated that "on balance," FDIC authority to pay foreign and domestic depositors in full (while their standing would remain the same as other general trade creditors under U.S. bank receivership law) might be superior to depositor preference. See FDIC (1989), 244–48.

[132] The OMB estimated that depositor preference would reduce FDIC's losses by $750 million from 1994 to 1998. See Silverberg (1994).

[133] Aghion, Hart, and Moore (1992).

[134] See Hupkes (2000), especially p. 49 and 81, for additional discussion.

[135] Birchler (2000).

frequently enough.[136] However, Lutton and Becher argued that supervisory monitoring would increase under depositor preference because of heightened concerns about liquidity risk.[137]

One rationale for depositor preference has certainly been to reduce costs for the deposit insurer.[138] Barring any dynamic effects, depositor preference should achieve that goal. However, as described above in the section on market discipline, historical experience raises doubts about the amount of savings that depositor preference might produce in the United States. Both general trade claimants and uninsured depositors have been successful in shifting losses to the FDIC before failure. In addition, we found scant evidence that depositor preference had diminished the market discipline imposed by uninsured domestic depositors.[139] On the basis of anticipated changes in the behavior of unprotected creditors, a number of economists have concluded that savings from depositor preference in the United States are uncertain, and possibly negative.[140] It appears that savings from on-book creditors materialize primarily in situations in which either the bank fails suddenly (as in some fraud failures) or some claimants cannot exit from the bank quickly (long-term unprotected debt or contingent claims).[141] To date, concerns about the ability of large banks to compete in markets associated with unprotected general claims do not appear to have been realized. From 1995 through 2005, foreign deposits have more than doubled; moreover, they grew a little more quickly than domestic deposits. It appears that most banks (even most large banks) have a large enough retail deposit base to allow most unprotected creditors to flee the bank before failure.[142]

Several authors have found that domestic depositor preference would have troubling consequences if a multinational bank were to fail.[143] Curtis found that as depositor preference is currently interpreted, it is inconsistent with international law because it effectively uses assets from all affected countries to satisfy domestic depositor claims ahead of foreign claims, thereby discriminating against all other nations. He then states the inevitable result:

> Insisting on the subordinate status of foreign deposits, while attempting to implement a single-entity liquidation of a U.S. multinational bank, would not be effective, as it is impossible to imagine that foreign regulators would allow it. The effect of such an attempt would simply be to force foreign governments to segregate the assets of branches in their countries for the benefit of claimants against those branches.[144]

The practice of separating assets and claims by country at failure, commonly referred to as "ring-fencing," is entirely legal. The FDIC would have no authority whatsoever to prevent it. And except in rare circumstances, the financial incentives to ring-fence under domestic depositor preference are very strong.

If a multinational banking organization were to fail and ring-fencing had been adopted, the FDIC might end up controlling the resolution process only for the assets and liabilities located in the United States.[145] Planning and operations would

[136] Pages and Santos (2003); Kaufman (1997), 59. The prompt corrective action (PCA) provisions of FDICIA may reduce (but not eliminate) the importance of incentives to close banks at the optimum time. The mandatory examination schedule in the United States, and the fact that the FDIC is not the primary federal supervisor for many banks, may reduce the importance of the findings about the deposit insurer's incentive to monitor banks.

[137] Lutton and Becher (1994), Rehm (1993), and Kaufman (1997) also anticipated more liquidity risk for banks that were funded with unprotected credits. For a more detailed discussion, see the section above on liquidity risk.

[138] Birchler (2000), especially p. 3; Garcia (2001), 67; and Silverberg (1994). This goal relates to the recoveries of one major creditor, rather than to the overall recoveries associated with the value of the firm as a whole (the first goal set forth by Aghion, Hart and Moore [1992]).

[139] McDill and Maechler (2003) found that domestic depositor preference resulted in a small increase in uninsured domestic deposits for most banks. The effect was much smaller than the reduction in uninsured deposits associated with FDICIA.

[140] Kaufman (1997); Thomson (1994); Silverberg (1994); Osterberg and Thomson (2003). One big difference between the savings associated with depositor preference in other countries and the savings associated with it in the United States may relate to insurance limits. In some countries, insured depositor preference has been coupled with a low insurance limit, a coupling that facilitates low-cost deposit insurance.

[141] See Shibut (2002), 14–16, for a discussion of the incentives and capacity of claimants to exit from a troubled bank. See Silverberg (1994), 12–13, and FDIC (1998), 662, for examples of large contingent claims.

[142] Marino and Bennett (1999).

[143] See especially Curtis (2000) and Marino and Bennett (1999), but also Silverberg (1986, 1994); Bovenzi (2002); and Marino and Shibut (2002).

[144] Curtis (2000), 257.

[145] It appears highly probable that the FDIC would lose control of foreign assets and liabilities unless a systemic-risk exception were invoked and, at a minimum, foreign depositors were paid more than they would receive under the least-cost test.

be more uncertain, since the FDIC would not know which assets would ultimately fall under its control until after the failure.[146] It is unlikely that the bank could be sold as a whole. There would probably be a scramble as governments sought to control the assets of the failed entity (with associated lawsuits and other overhead costs). Business lines that crossed international boundaries would be sold piecemeal, even if the aggregate values were higher. The liquidation process would be slower, so administrative costs would increase and more creditors would suffer liquidity losses.[147] Because of these problems, the FDIC could lose more money under domestic depositor preference than it would have lost without depositor preference despite the benefits that depositor preference yields at domestic failures.

For large international banks, ring-fencing would probably also exacerbate the market disruption associated with closure. The higher aggregate losses, the initial lack of certainty about the distribution of assets across receivership(s), and the necessarily piecemeal asset sales strategy could slow down the resolution process considerably and thus reduce market confidence. The uncertainty about the resolution process would probably compound the market disruption because it would hinder the FDIC's ability to mitigate liquidity losses and payments-processing concerns through advance dividends to unprotected creditors.[148]

Bliss cites some benefits of ring-fencing: it places assets at the disposal of the court that is most likely to control them; it provides a way—an admittedly crude way—to settle conflicts in laws and legal objectives; and it reduces the need for cross-border data sharing.[149] Baxter, Hansen, and Sommer also find that ring-fencing improves supervisory incentives and may reduce the chance of costly forbearance.[150]

Concerns about market disruption and the costs associated with ring-fencing might lead bank regulators to use the systemic-risk exception to the least-cost test if a bank with a large volume of foreign liabilities were to fail.[151] Depending on the circumstances, use of the systemic-risk exception could hinder efforts to meet the third goal of bankruptcy cited earlier (the ex ante bonding role of debt) through market discipline. If regulators were to provide substantial relief to creditors, there would probably be a long-term reduction in market discipline at all large U.S. banks (with associated long-term losses in market efficiency and increased risk to the FDIC).

The problems associated with ring-fencing would potentially disrupt the resolution of only a few banks since less than 1 percent of FDIC-insured banks hold foreign deposits. Moreover, most banks with foreign deposits have branches in only two countries; for these banks, both the costs and the disruptions of ring-fencing would probably be minimal. However, as of year-end 2003, the few global banks that do have branches in several countries hold more than 80 percent of foreign deposits and 30 percent of the assets of FDIC-insured institutions.

Options. There are at least four possible ways of treating depositors and general trade claimants at insolvent banks:

1. Make no changes to the current priority order.
2. Give priority status to all deposits (with foreign deposits remaining uninsured and excluded from the assessment base).

[146] The FDIC has recognized these problems repeatedly. See Marino and Bennett (1999); Bovenzi (2002); and Marino and Shibut (2002).

[147] See Contact Group on the Legal and Institutional Underpinnings of the International Financial System (2002), a study that was launched by the G-10 deputies, for a discussion of the complexities of the bankruptcy proceedings of an international bank. See Marino and Shibut (2002) for a discussion of the FDIC's resolution options for megabanks. See Baxter, Hansen, and Sommer (2004) for an alternative view.

[148] Both Kaufman and Seelig (2002) and Marino and Shibut (2002) emphasize the benefits of advance dividends as a means to reduce market disruption at failure. Garcia (2001) cites quick payments to insured depositors as a good practice for deposit insurers. However, with the FDIC's costs associated with ring-fencing unclear until well after failure, the FDIC would be taking a substantial financial risk if it were to pay a large advance dividend at failure.

[149] See Bliss (2003), especially 51–52.

[150] Baxter, Hansen, and Sommer (2004). They cite additional reasons to prefer territoriality as well.

[151] If regulators decided that a systemic-risk determination was necessary regardless of the disruptions associated with ring-fencing, these concerns could lead them to provide more relief to creditors than they otherwise would.

3. Give priority status only to insured deposits.
4. Drop depositor preference altogether.[152]

Each option has different strengths and weaknesses. In terms of enhancing market discipline and reducing insurance fund losses, the differences are clear for banks without foreign deposits: option 3 is unquestionably the best, followed by options 1 and 2, and lastly option 4. Recent changes in bank liability structure have probably expanded the differences among the options, but the degree of change is difficult to gauge. The differences are probably greatest for liquidity failures, unexpected failures, and failures where there is a large volume of contingent liabilities or long-term unprotected borrowing. For banks with foreign deposits, one cannot readily determine which option would most enhance market discipline or reduce insurance fund losses (although the question would be an excellent one for further study).

For a few large international banks, the current preference order will limit the options of regulators in the event of failure. Regulators may be left with essentially two choices. First, they could run a series of territorial receiverships (separate proceedings in multiple countries), where market disruption could be significant, even systemic, because continuing the normal ongoing operations of the bank would be difficult or impossible. Creditor recoveries might suffer because of competition across countries and the lost franchise value, but market discipline would certainly be imposed. Second, regulators could try to avoid territorial receiverships by paying some general claimants (for example, foreign depositors) more than they would otherwise receive under the current depositor preference treatment.[153] If the regulators succeeded, then the extent of market disruption would fall and the franchise value of the bank would be retained, but market discipline would be weakened and insurance fund losses might be larger. For banks with a substantial foreign deposit base, this option does a poor job of meeting the three goals stated above and has therefore been criticized by several researchers. Since the passage of FIRREA in 1989, no one has proposed this option.

If priority status were provided to all deposits (option 2), the financial gains from ring-fencing would be significantly reduced and U.S. banking regulators would be in a better position to contain systemic risk while still imposing losses on unprotected creditors. On the basis of a legal analysis and concerns about ring-fencing, Curtis recommended that the FDIC choose this option by changing its interpretation of the statute.[154]

In terms of the likelihood of ring-fencing, option 3 (insured depositor preference) probably falls between options 1 and 2. If a large international bank had relatively few insured deposits and a relatively low loss rate, the financial benefits of ring-fencing would be small; in other circumstances, the benefits (and thus the likelihood) of ring-fencing would increase. Under option 4 (the elimination of depositor preference), the incentives for ring-fencing would probably be similar to those under option 2 (all-depositor preference).

Option 3 (insured depositor preference) would probably raise concerns about fairness within the United States.[155] To the extent that investors assume that large banks are too big to fail and therefore that large banks have de facto complete insurance coverage, small banks have a disadvantage in competing for uninsured deposits. When the FDIC was created in 1933, insured depositor preference was enacted at the same time, but in 1935 it was revoked precisely because of concerns that it was unfair to small banks. Option 2 (all-depositor preference without deposit insurance for

[152] This list is not exhaustive. For example, Silverberg (1986) discussed ring-fencing and concluded that foreign deposits should be treated the same as domestic deposits in all respects (including deposit insurance and assessments). However, we excluded that option from our discussion because Congress deliberated on the insurance status of foreign deposits during the hearings that led up to FDICIA and rejected equal insurance treatment for them out of concern that that would harm the competitiveness of large U.S. banks abroad (see Curtis [2000]). Another option might be to give contingent claims a lower priority than other general trade claims, and place deposits and general trade claims in the same priority.

[153] However, some countries might still ring-fence, regardless of any clear financial incentive to do so. For example, Japanese law requires ring-fencing. The only option that would avoid all ring-fencing with complete certainty is open-bank assistance.

[154] Curtis (2000), especially 262.

[155] See Garsson (1993); Lutton (1994): and Marino and Bennett (1999).

foreign deposits) might also raise concerns about competitiveness across banks in the United States.

In conclusion, analyses of the optimum insolvency priority order for U.S. banks are scarce, and no consensus on the best approach has been reached. However, there is a consensus that the current insolvency priority order could cause very serious problems if a large international bank were to fail in the future. We recommend a thorough study of the issues rather than specific changes. Perhaps the best approach would be to commission a U.S. interagency group to study the options in more depth and make recommendations, or to have an international group tackle the research question and the difficult task of harmonizing the treatment of creditors at insolvent international banks.[156] After the options are studied more carefully, any recommended changes should be pursued promptly, while the banking industry is healthy and time is available for a reasoned debate.

Operational Issues

Depositor preference is not the only failure-resolution area affected by changes in bank liability structure. The movement away from deposit funding aggravates two operational challenges the FDIC sometimes faces when resolving failed institutions: one concerns situations when the FDIC has little or no advance warning of failure, and the other concerns FHLB advances.

When most banks fail, the FDIC has advance warning that failure is imminent. There is enough time to prepare, and the FDIC normally has some flexibility in selecting the failure date. Thus, most failures occur on a Friday, and most insured depositors have access to their funds on the following Monday. Often the FDIC has time before failure to perform some of the insurance administration and quietly arrange for the sale of at least some (and sometimes almost all) of the failed bank's assets.

The situation changes if a troubled bank relies heavily on unprotected credits (either uninsured deposits or general trade claims) for funding and then fails. In this case, the timing of the failure may well be determined by the creditors, as they attempt to exit from the bank and the bank's liquidity dries up. The FDIC may have little or no time to prepare for failure. The possibility of such liquidity failures poses significant operational challenges for the FDIC, particularly if the bank is large.

The changes in bank liability structure may have increased the likelihood of liquidity failures in the future. If so, liquidity failures will still occur less often than the typical capital-driven failure,[157] but the combination of more unprotected funding plus a more concentrated industry will be a continuing challenge for the FDIC.

A second issue arises from FHLB advances. From 1992 to 2002, outstanding FHLB advances at commercial banks increased fivefold. The advance contracts almost always impose prepayment penalties. The FDIC has routinely paid these penalties to facilitate a quick sale of the institution's assets, but this policy has sometimes been expensive. When the Bank of the Alamo failed in 2002, the prepayment penalties amounted to 14 percent of the outstanding balance of advances. This is an area where the FDIC may want either to seek relief from prepayment penalties (perhaps by avoiding prepayment through guaranteeing the advances in exchange for the collateral, perhaps by seeking legislative remedies) or to reconsider its standard policy of prepaying advances in order to facilitate asset sales.

[156] In recent years, several efforts have been made to harmonize bank insolvency laws. Because of different philosophies, such negotiations are difficult. Even so, there have been some successes. In 2001 the European parliament passed the Winding-up and Reorganization Directive (which provides for a more coherent treatment of banks headquartered in the European Union), and several countries in Europe have adopted its provisions. In addition, many countries have adopted "carve-out" provisions for derivatives that follow harmonized netting agreements recommended by the International Swap and Derivatives Association (ISDA). See Contact Group on the Legal and Institutional Underpinnings of the International Financial System (2002) for an excellent discussion of the issues involved and the harmonization efforts to date.

[157] Many researchers have found that most liquidity failures are, at bottom, capital failures as well. Unprotected creditors do not usually exit en masse from banks that are unquestionably in sound condition. Even if they do, such banks can normally arrange for alternative financing.

Summary

Bank deposit growth has not kept pace with the growth in bank assets. As a result of the deposit shortfall, bank management has looked to alternative funding sources. We describe the events that led to the gap between asset growth and deposit growth, describe some of the ways bankers are addressing the shortfall, and conclude that banks will continue to need alternative funding sources since future deposit growth is not likely to meet banks' future funding needs.

Consequently, banks must continue to adapt the way they manage their liability structure. Because banks are relying more heavily for funding on wholesale funding sources and rate-sensitive deposits, liquidity risk exposure has increased and liquidity management has become more important—and more complex—for banks.

Changes to a bank's liability structure raise several issues for banking regulators. The one that has received the most attention recently is market discipline—particularly for large, complex banking organizations. The research to date shows that unprotected investors monitor bank performance and respond to changes in risk exposure. Supervisors play an important role in ensuring that markets have accurate data on banks, since troubled banks otherwise tend to overstate capital. The evidence is weaker when it comes to the ability of markets to encourage banks to reduce their risk exposure when troubles arise. We expect that in the future, the disclosure of information to markets will receive more emphasis and the use of market data to inform and enhance the supervisory process will increase; market data may be incorporated into future deposit insurance pricing mechanisms as well.

Regulators have responded to the additional complexity of bank liability management by making several updates to their examiner guidance on liquidity risk. Regulators might want to weigh whether further action is necessary in order to better monitor the increasing use of wholesale funding. It may also be worthwhile for regulators to seek better ways of measuring liquidity risk.

An additional issue for banking regulators is whether the FDIC's insurance-pricing mechanism should be changed so that it better captures the relationship between bank funding strategies and the FDIC's risk exposure. We summarize the rationale for change and find that the relationship among funding strategies, bank size, and fund exposure is too complicated for there to be any easy solutions.

Finally, we discuss issues that center on failure resolution: domestic depositor preference and operational matters. Changes in liability structure have highlighted the importance of priority status when banks become insolvent. Economists have questioned the cost savings attributed to domestic depositor preference as well as the effects if a multinational bank were to fail. We describe the effects of four options and recommend further research—with prompt pursuit of the appropriate changes—while the banking industry is healthy and time is available for a reasoned debate. Changes in liability structure may also have two other effects on failure resolution: they may decrease the amount of preparation the FDIC can do before failure, and they may affect the way the FDIC handles FHLB advances at failed banks.

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