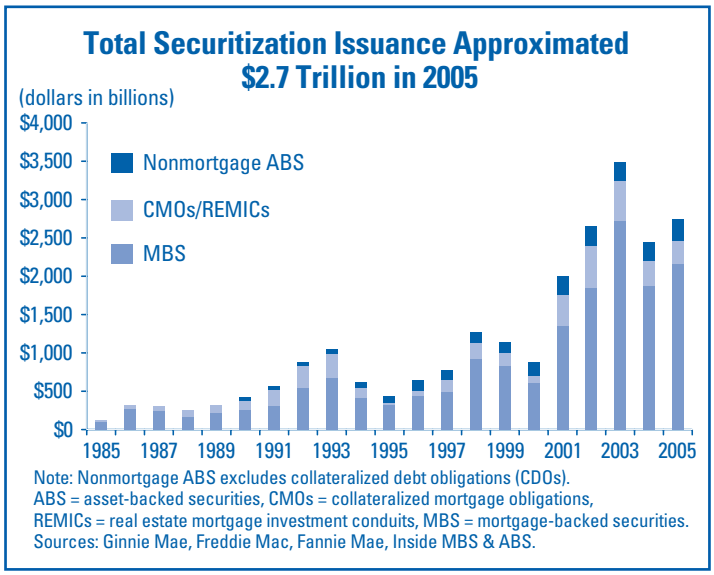
FDIC Outlook

FALL 2006

In Focus This Quarter: Accessing Capital Markets and Managing Market Risk

During the past two decades, FDIC-insured institutions have increasingly turned to the capital markets to finance their activities. Business models have gravitated from traditional balance sheet sources of financing—debt and equity—to project financing, where assets are financed off balance sheet through securitization. These innovations have not only refined the methods by which risk can be partitioned and distributed, but they have also contributed to the depth and breadth of the financial markets themselves. Innovation also is changing the way in which financial managers must evaluate balance sheets as well as the risks associated with securitized instruments. This issue of ***FDIC Outlook*** provides an overview of trends in the securitization market and a closer look at two elements of risk management in which funding decisions play a critical role.



A New Plateau for the U.S. Securitization Market

The traditional practice of holding bank loans on the balance sheet until maturity increasingly is giving way to off-balance sheet securitization. Improved technology and innovative, complex financial structures have made it possible to securitize a wide range of loan types, from mortgages to credit card receivables and beyond. This article provides a brief history of securitization and summarizes the factors that continue to drive growth and innovation in the securitization of bank loans. *See page 3.*

An Assessment of Traditional Liquidity Ratios

Banks have long relied on key balance sheet ratios to assess their funding and liquidity positions. However, the shift from traditional balance sheet funding to off-balance-sheet funding through securitization has changed the structure of many balance sheets and made it more complex to assess liquidity risk. This article explores the relevance of traditional balance sheet measures of liquidity and discusses a dynamic cash flow method that may provide a more accurate assessment of liquidity risk. *See page 11.*

Managing Net Interest Margins Under a Shifting Yield Curve

The shape of the Treasury yield curve influences how banks manage net interest margins. To enhance earnings, managers may be tempted to select investment or funding strategies that involve a considerable degree of market risk. This article identifies strategies used by community banks and large banks to manage net interest margins in the normal, flat, and inverted yield curve environments observed since 2000, and it summarizes the relative performance of these strategies. *See page 17.*

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A New Plateau for the U.S. Securitization Market

Banks exist to provide credit to household and business borrowers. But the traditional practice of holding bank loans on the balance sheet until maturity is increasingly giving way to off-balance-sheet securitization. During the past 30 years, new information technologies and new financial practices have made it possible to securitize a wide range of loan types, from mortgages to credit card receivables and beyond. Recently, these changes have brought about "synthetic" securitizations in which only certain types of risk move off the balance sheet.[1] These new structures are intended to improve the ability of individual institutions—and the system as a whole—to bear the risks of providing credit. But as the complexity of securitization structures has increased, so too have concerns about their transparency and how they might perform in periods of financial market turmoil. This article provides a brief summary of the factors that continue to drive growth and innovation in the securitization of bank loans.

Look How Far Securitization Has Come

What Is Securitization?

Securitization is a method of funding in which illiquid, balance sheet assets are converted into marketable securities. The process starts when assets are transferred from the balance sheet of the originator to a special-purpose entity (SPE). The SPE is a bankruptcy remote trust that is set up by the originator to hold the assets.[2] The SPE is financed by issuing tradable, capital market securities against the pool of assets. Then the SPE uses cash flows generated by the assets to make principal and interest payments to the investors.

SPEs typically issue multiple classes of securities, which are referred to as tranches. Tranches are classified as senior, mezzanine, or junior, depending on their priority in receiving cash flows and sustaining losses from the underlying pool of assets in the SPE. Principal and interest payments generally "cascade" first to the senior tranche, then the mezzanine tranche, and last to the junior tranche, with all of the payments satisfied in the higher tranche before any payments are made to the next tranche. Conversely, losses are generally sustained from the bottom up, with the junior tranche absorbing all of the losses before the mezzanine tranche sustains any losses.

The securities in each tranche have their own risk/return profile. Senior tranches typically carry AAA credit ratings and yields. The most junior tranche is referred to as the residual or equity tranche. It is unrated, has a higher expected return, and typically has been carried on the balance sheet of the originator to enhance the credit quality of higher tranches. Other credit enhancements, such as third-party insurance purchased by the originator, can be incorporated into the securities to protect investors in the event that cash flows from the underlying assets are insufficient to pay principal and interest in a timely manner. Credit enhancements improve the credit rating, and therefore the pricing and marketability, of the securities.

Securitization has thrived during the past 25 years because it is highly efficient at redistributing risk from illiquid, balance sheet assets of the originator to the capital securities markets. Instead of issuing securities based on its overall credit rating, the originator can stratify the risk in the underlying assets and issue securities based on the stratified risk. This efficient redistribution of risk enables the originator to access capital market funds at more favorable rates, and it enables investors to purchase capital market securities tailored to their specific risk/return profile.

A Brief History of Securitization

Securitization dates back to the early 1970s, when the Government National Mortgage Association (Ginnie Mae) pooled mortgage loans and sold single-class, mortgage-backed securities (MBS) against the pool. MBS enabled Ginnie Mae to access national credit markets to fund local mortgage lending. The Federal Home Loan Mortgage Corporation (Freddie Mac) and the Federal National Mortgage Association (Fannie Mae) followed Ginnie Mae in securitizing mortgages in the early 1980s. These government-sponsored entities (GSEs) realized that they could access capital market investors more efficiently by issuing multiple classes of securities against the pooled mortgages,

[1] Synthetic securitizations use credit derivatives to construct an asset pool with characteristics similar to a traditional securitization.
[2] Some SPEs purchase loans from the originators to securitize.

which led to multiple-class collateralized mortgage obligations (CMOs).

Mortgage securitizations were followed by asset-backed securities (ABS) and collateralized debt obligations (CDOs). ABS is a general term that denotes the securitization of any balance sheet asset. In the narrower sense, however, ABS typically refers to the securitization of a large pool of homogeneous assets, such as receivables, and they generally have simple structures. CDOs are securitizations against a pool of heterogeneous loans (collateralized loan obligations, CLOs) or bonds (collateralized bond obligations, CBOs).[3] CDOs can have a variety of complex structures depending on their purpose, exposure to the underlying assets, and credit structure.

CDOs first appeared in the market in the late 1980s.[4] In the 1990s, CDOs were issued against a much broader universe of underlying collateral, including corporate bonds, corporate loans, trust preferred stocks, high-yield loans, middle-market loans, asset-backed consumer debt, and a combination of these asset classes. In 1997, the development of the credit derivatives market led to the construction of synthetic CDO structures in which credit derivatives are used to transfer risk to the SPE instead of actually transferring the underlying assets. Synthetic CDOs allow banks to maintain their loan portfolio on their balance sheet while simultaneously securitizing the credit risk in their loan portfolio. Synthetic CDOs have played a critical role in the growth of CDO issuance and the emergence of a market for traded credit securitizations.

Measuring Risk in the Pool of Assets

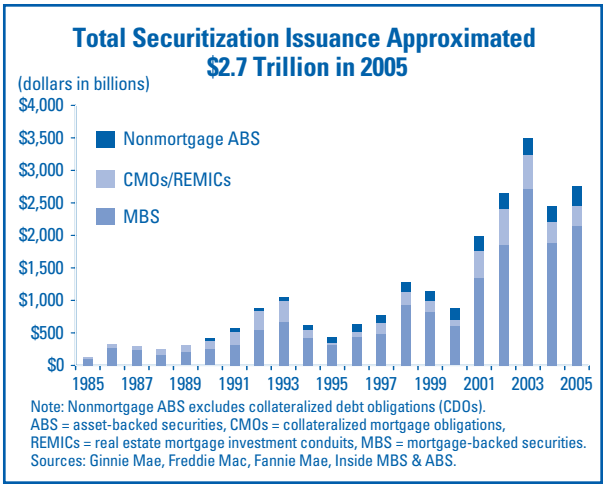
All securitized products share three key characteristics: (1) the pooling of assets into a common asset pool, (2) the issuance (tranching) of securities backed by the asset pool, with each tranche having a distinct risk/return profile, and (3) the delinking of credit risk in the underlying pool of assets from the credit risk of the originator through the creation of an SPE.[5] Securitized products can differ in the types of underlying assets they securitize, the degree of diversification of the underlying asset pool, and the complexity of their capital structure.

MBS, CMOs, and ABS typically bundle together a fairly homogeneous pool of assets such as mortgages or some type of receivable. Idiosyncratic risk from individual assets in the asset pool typically is well diversified. Consequently, the asset pool can be valued based on default probabilities that draw on the historical experience of similar asset pools. In contrast, CDOs often are collateralized by a relatively heterogeneous pool of assets, such as different types of bank loans, corporate debt, emerging market debt, other CDOs, ABS, and many different types of derivative instruments. Both systematic and idiosyncratic risks remain critical factors in pool performance. Consequently, valuing CDO asset pools on the basis of historical default probabilities is a useful, but inadequate valuation method because of the idiosyncratic risk that remains in the asset pool. The CDO market gradually is moving toward valuation models that are based on statistical techniques, but this area remains a challenge.

Innovation Continues to Accelerate Growth

The U.S. securitization market has experienced tremendous growth over the past 20 years. Total securities issuance has grown from $126 billion in 1985 to more than $2.7 trillion in 2005 (see Chart 1). The industry's ability to innovate and adapt to changing circumstances and demands of the market has fueled this growth. Several trends have emerged in the securitization market. Four examples are discussed here: (1) the

Chart 1



[3] The first rated CLOs backed by U.S. bank loans were brought to market in 1990, and the first CBO backed by high-yield bonds was brought to market in 1988. Janet M. Tavakoli, *Collateralized Debt Obligations and Structured Finance: New Developments in Cash and Synthetic Securitization* (New York: John Wiley & Sons, 2003).

[4] Merrill Lynch, "U.S. Cash Flow CDOs and Their Assets," *Fixed Income Strategy,* no. 6 (February 9, 2005): 5.

[5] Committee on the Global Financial System, Bank for International Settlements, *The Role of Ratings in Structured Finance: Issues and Implications,* January 2005: 5.

growth in nonagency MBS, (2) the growth of non-mortgage ABS, (3) the growth in cash funded CDOs, and (4) the issuance of new securitized products.

MBS Growth Has Shifted from Agency to Nonagency Issuers

The market for securitized mortgages appears vastly different in many respects than just a few years ago. Until recently, GSEs dominated the market for MBS issues. However, nonagency (or private-label) MBS issuance more than doubled between 2003 ($586 billion) and 2005 ($1.191 trillion), and for the first time surpassed agency MBS issuance in 2005 ($966 billion) (see Chart 2). The most important of the many factors driving this transformation are high housing valuations, a heightened appetite for yield, a reduction in agency issues, and better technology.

As home prices increased and mortgage rates fell to generational lows since 2000, more homeowners have opted for jumbo loans or nontraditional affordability loan products such as interest-only loans, option adjustable-rate mortgages (ARMs), and 40-year loans to finance their home purchases. ***Standard & Poor's*** (S&P) has stated that affordability loan products represented 45 percent of S&P-rated originations in

Chart 2

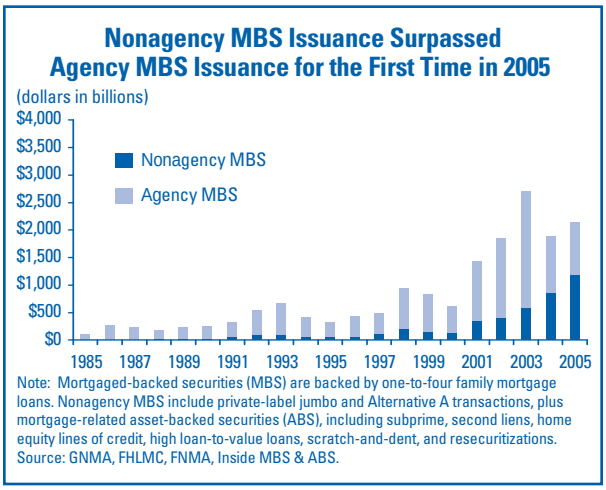


Chart 3

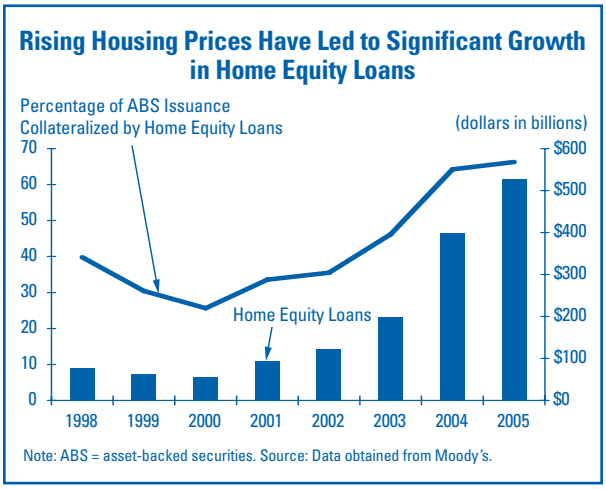
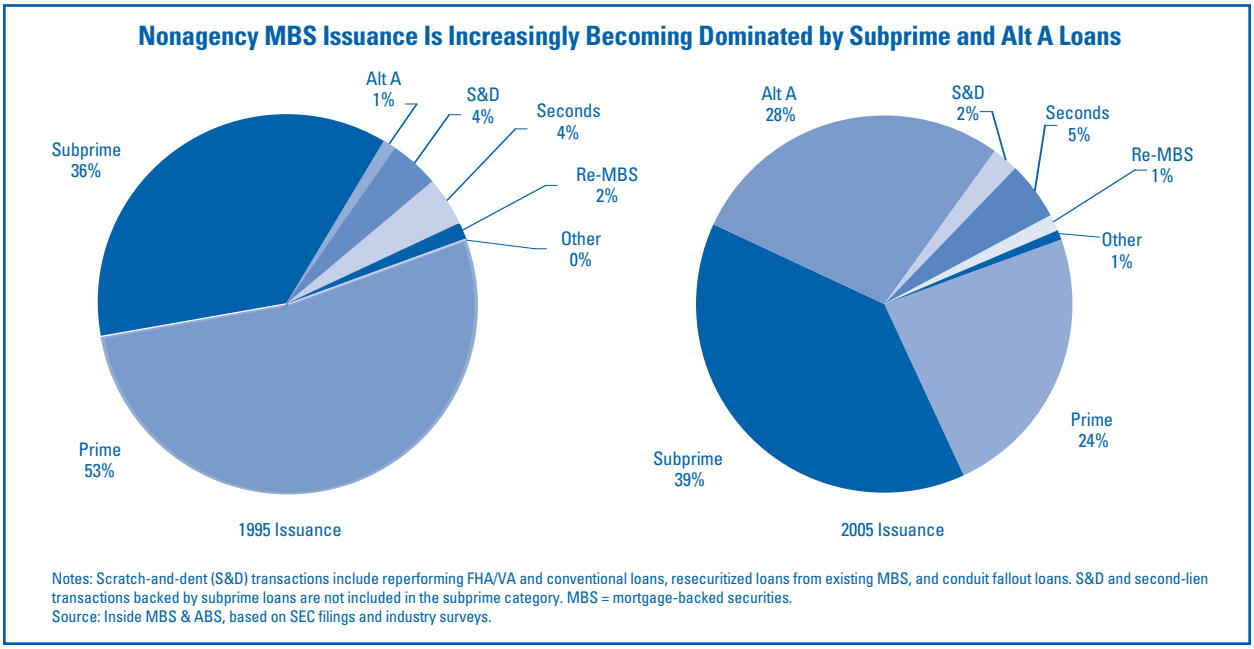


Chart 4



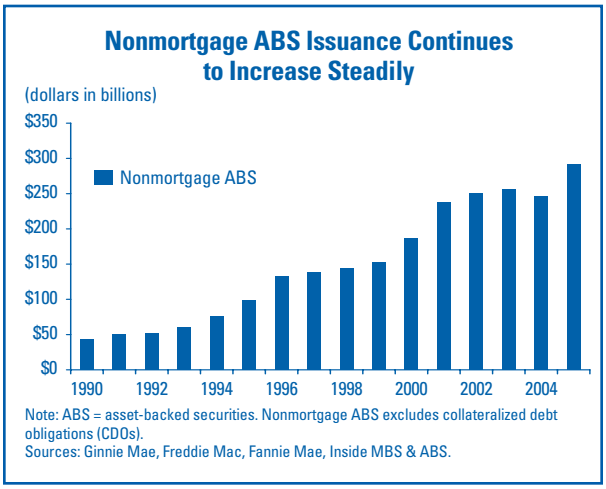
2005, with option ARMs representing 27 percent of the affordability product originations. ***Moody's*** reported that more than 35 percent of the securitized collateral (rated by Moody's) consisted of option ARMs, up from approximately 12 percent in 2004.[6] Origination volumes in these products have been sufficient to permit securitization structures wholly backed by option ARMs.

Homeowners have increasingly used home equity loans to extract their home equity. Many of these home equity loans (of which the vast majority are deemed subprime) were subsequently securitized (see Chart 3, page 5). Despite their subprime status, high yields propelled nonagency lenders to underwrite and securitize jumbo and affordability loan products (see Chart 4, page 5). Investor demand for higher-yielding MBS and improved technology in structuring deals ensured a readily available market for these securitized loan products. Last, there was a reduction in agency issuance over this period, which was likely the result of the accounting scandal facing agency MBS issuers.

ABS Growth Has Shifted from Mortgage to Nonmortgage Assets

The market for securitized assets other than mortgages has undergone its own transformation. As illustrated in Chart 5, nonmortgage ABS issuance continues to grow at a steady pace, achieving a record issuance of $292 billion for 2005. However, it is interesting to note from where most of this growth is coming. In 1995, credit card and vehicle financing made up approximately 81 percent of ABS issuance, while student and business financing made up just 6 percent. In 2005, credit card and vehicle financing represented only 56 percent of ABS issuance, whereas student and business financing increased their portion to 40 percent (see Chart 6 on page 7).

Chart 5



ABS backed by student loans experienced the most significant growth over this period, increasing from $3.1 billion (3 percent of total ABS issuance) to $77.5 billion (25 percent of total ABS issuance). However, much of the growth in student loan ABS issuance occurred since 2001, when total issuance stood at $13.4 billion. Historically low interest rates and increased issuance from nonagency issuers were the primary drivers of growth in student loan issuance since 2001. Last, increases in 2005 issuance volumes were driven in large part by consolidations, whereby borrowers consolidated their student loans before interest rates increased.

The Cash-Funded CDO Market Has Grown Dramatically

In recent years, CDOs have become a dominant vehicle for funding, hedging, and trading virtually all types of debt instruments. There are a variety of structures that CDOs can adopt, depending on their purpose, credit structure, and underlying assets.[7] Consequently, there are a variety of ways to report CDO issuance data. One important way of reporting CDO data is based on whether the underlying debt is sold to the SPE for cash (cash-funded CDO) or synthetically transferred to the SPE using credit derivatives (synthetic CDO). This section focuses on trends in the cash-funded CDO market.

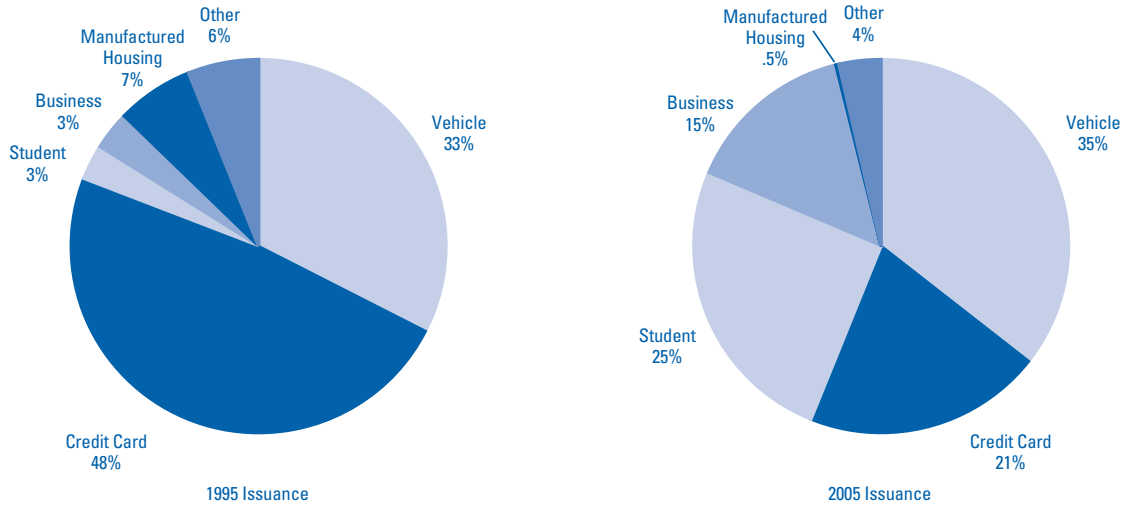
The cash-funded CDO market has grown dramatically over the past ten years (see Chart 7 on page 7). One estimate puts global cash-funded CDO issuance at $224 billion in 2005, up 196 percent since 2000. Prior to 1995, global cash-funded CDO issuance never exceeded $4 billion annually. The U.S. cash-funded CDO market experienced similar growth during this period. U.S. cash-funded CDO issuance was $165 billion in 2005, up 198 percent since 2000. Recent

[6] Data taken from a presentation at the Federal Financial Institutions Examination Council's Capital Markets Conference, June 12, 2006, by Brian D. Grow and Martin C. Kennedy, Directors, Residential Mortgage-Backed Securities (RMBS) S&P's Rating Services, New York, N.Y.; and "2005 Review" and "2006 Outlook: Alternative – A RMBS," Moody's Investor Service. Included in the category of affordability RMBS are interest-only loans, 40-year amortization loans, and option ARMs. There is research indicating that the pace of origination of option ARM loans has slowed in 2006.

[7] JPMorgan, *CDO Handbook,* May 29, 2001.

Chart 6

Growth in Nonmortgage ABS Issuance Has Come from Student and Business Loans



Notes: Vehicle asset-backed securities (ABS) include car loans and leases and financing for buyers of motorcycles, trucks, and other vehicles. Business loans include dealer floorplan financing, franchise loans, SBA loans, and other financing for business borrowers. Other ABS includes tobacco settlement and stranded asset utility securitizations. Subprime mortgages, home equity loans, HELOCs, home improvement loans, and other mortgage collateral are not included. Due to rounding, the percentages may add up to greater than 100 percent.
Source: Inside MBS & ABS.

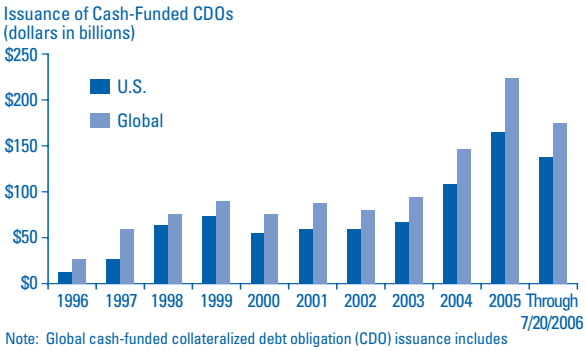
issuance data suggest that 2006 will be another strong year. Through July 20, 2006, global cash-funded CDO issuance has been $174 billion, and U.S. cash-funded CDO issuance has been $138 billion.[8] Many market participants expect cash-funded CDO growth to continue for the remainder of 2006. Originators continue to supply new issues, investors continued to demand new issues, and the market continues to innovate with novel securitization structures and new classes of underlying collateral.

Much of the growth in U.S. cash-funded CDO issuance since 1997 was driven by a general increased demand for CDO products. However, there was clearly a shift in preference away from CDOs collateralized with high-yield bonds and investment-grade debt to CDOs collateralized with structured finance products (both mezzanine and high grade; see Chart 8, page 8). Structured finance CDOs typically invest in MBS, ABS, and other CDOs, whereas high-yield loan CDOs typically invest in sub-investment-grade loans. U.S. cash-funded CDOs collateralized with structured finance products have grown from approximately $250 million in 1997 to more than $76 billion in 2005. U.S. cash-funded CDOs collateralized with high-yield loans also grew significantly during this period, increasing from $4.8 billion to more than $60 billion.

[8] Data obtained through conversation with JPMorgan analyst.

Chart 7

Global and U.S. Cash-Funded CDO Issuance Has Grown Tremendously Since 1996



Note: Global cash-funded collateralized debt obligation (CDO) issuance includes U.S. cash-funded CDO issuance.
Source: JPMorgan.

Strong global demand for high-yield CDOs, a robust housing market, and innovations in capital structures, technology, and underlying mortgage products have helped drive CDOs to the forefront of structured capital market securities. The concentration of residential mortgage products, in particular subprime home equity loans, increased significantly in the 2005 vintage. On average, 81 percent of collateral pools in the 2005 vintage were composed of residential mortgage products, with home equity loans accounting for 66 percent of all pools. This compares with a 65 percent residential mortgage concentration in the 2004

vintage, of which home equity loans represented 46 percent of all pools.[9] According to ***Credit Suisse First Boston,*** many structured finance CDOs contain as much as 50 to 60 percent subprime mortgages (also called residential B&C mortgages) and home equity loan bonds.[10] An increase in private-label MBS issuance collateralized by subprime mortgages and an increase in ABS collateralized by home equity loans (most of which are deemed subprime) soon followed (see Chart 8).

High yields have made these new CDO structures very attractive relative to other fixed-income instruments. However, the increasing use of subprime debt in the collateral pools is of growing concern, particularly in a rising interest rate environment. According to ***JPMorgan,*** "With clear deterioration in U.S. home price appreciation (HPA), the full downside [risk] is still unclear for SF [structured finance] CDO tranches, and potential interest rate increases are likely to be far more penalizing compared to the benefit from one or even two (interest rate) cuts."[11]

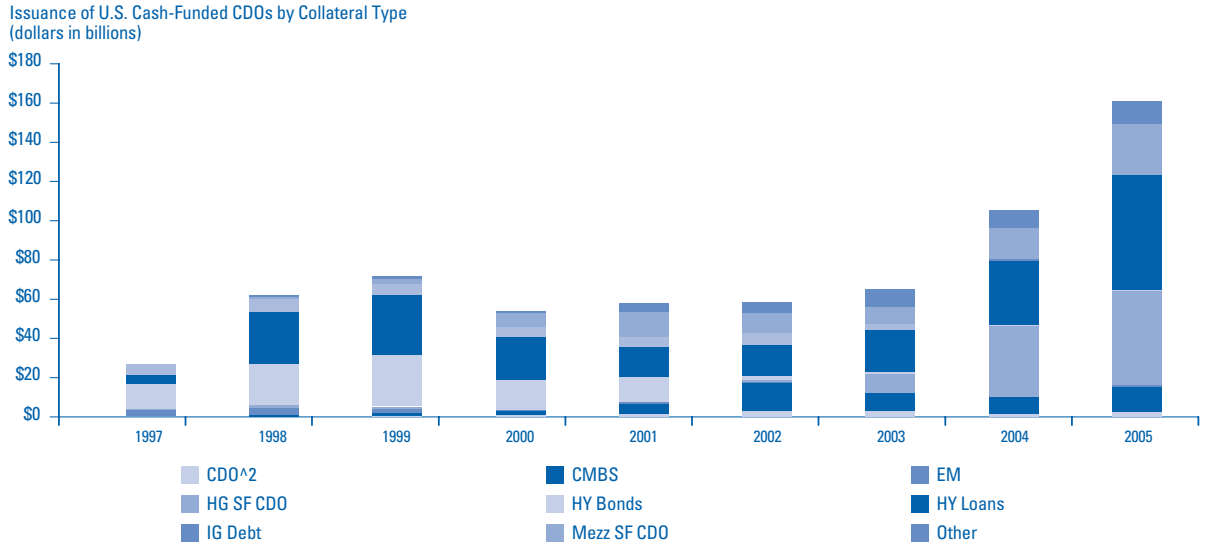
New Structured Finance Products: Net Interest Margin Securities (NIMS)

Many new structured products are introduced in the capital markets every year, but many either do not succeed or take years to gain acceptance in the market. There are a variety of reasons for this, such as lack of credit enhancements, poor transparency, or difficulty in modeling cash flows. This section discusses net interest margin securities (NIMS), which were introduced in the mid-1990s but did not gain wide market acceptance until recently.

NIMS are structured finance products collateralized by the residual cash flows from one or more securitizations (underlying deals). They may be structured within a securitization, but more frequently they are structured as a separate issuance after the inception of the underlying securitization.[12] NIMS are a popular option for subprime residential mortgage securitizations because they allow the issuer to securitize the excess spread, which is the difference between the income on the underlying pooled assets and the financing cost, as

Chart 8

U.S. Cash-Funded CDOs Increasingly Being Collateralized by Structured Finance Products



Note: CDO = collateralized debt obligation, CDO^2 = CDO squared, CMBS = commercial mortgage-backed securities, EM = emerging markets, HG SF = high grade structured finance, HY=high yield, IG = investment grade, Mezz SF = mezzanine structured finance.
Source: JPMorgan.

[9] Credit Suisse, "U.S. CDO Strategy, Insight & Market Recap," *The CDO Strategist,* June 29, 2006.
[10] Credit Suisse First Boston, "Classification Conundrum: Residential Mortgage Classifications in SF CDOs," Fixed Income Research publication, December 23, 2004.
[11] JPMorgan, *CDO Monitor,* October 30, 2006: 3.
[12] Yogesh Gupta, "Understanding Net Interest Margin Securities (NIMS)," Structured Finance Group publication, Pricewaterhouse Coopers Web site.

well as prepayment penalties. If not securitized, the excess spread would remain on the issuers' balance sheet as a form of credit enhancement used primarily to absorb credit losses on the senior tranches of the deal.

NIMS are either sold in the secondary market, which provides regulatory capital relief to the issuer, or maintained on the issuer's balance sheets. The recent growth in NIMS issuances is the result of growth in the subprime mortgage market, new structures, and attractive yields that have increased investor demand. Although issuance statistics on NIMS are not widely published, S&P experienced significant growth in its rated NIMS deals. According to S&P, the par value of rated NIMS in 2003 increased more than sevenfold to $3.4 billion, and growth in 2004 was more than fourfold to $14.97 billion.[13]

The Future of Securitization

Securitization has continued to thrive because it is highly efficient at converting illiquid balance sheet assets into capital market securities. We are likely to see continued advances in technology, more accurate modeling of future cash flows, more complex securitization structures, and increased participation by institutional investors. Continued refinement in stratifying and managing the risk/return profile of securities through tranching will enable originators to reduce funding costs and investors to increase value through investments that meet their specific risk/return profiles.

Advances in Technology

Technological advances in cash flow modeling, data processing, and data availability will continue to play an integral role in the highly innovative market for securitizations. Advances in computer processing speeds and improvements in modeling irregular cash flows—such as late payments, partial payments, defaults, recoveries, prepayments, and payment triggers—will enable issuers and investors to model the timing and amount of cash flows from the underlying asset pool in a securitization more accurately. Both issuers and investors will benefit from technological advances.

Data availability will continue to have a significant impact on growth in the securitization market. Long periods of historical data are needed to model cash flows and default probabilities in the underlying asset pool so that the securities issued in each tranche can be priced accurately. As more historical data become available, originators will be able to securitize new assets such as hybrid loan products, ABS structures, and derivatives. Data available to investors also have improved significantly. Information on loan pools that was once available only to issuers is now available to investors. This information has added a new level of transparency that will continue to increase demand for securitized products.

Increasing Capital Structure Complexity

Much of the complexity of today's securitizations stems from the introduction of new types of collateral used in the underlying asset pools. There is less homogeneity in the underlying collateral than in the past, which makes it more difficult to value and price the deal. For example, CDOs now pool a number of different types of assets, including corporate loans, high-yield bonds, emerging market debt, other CDOs, ABS, and many different types of derivative instruments. Because innovation in the securitization market tends to coincide with advances in technology, structuring and pricing many of these more complex deals was improbable only a few years ago.

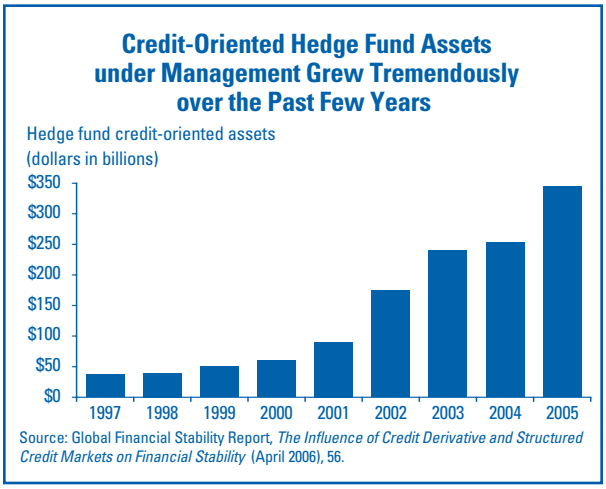
Refined Risk/Return Profiles of New Securitization Structures

One of the major factors driving new securitization structures is the desire of issuers to reduce funding costs and of investors to purchase securities that increasingly meet their risk/return profile. For example, banks, pension funds, and insurance companies will continue to invest in AAA-rated securities in the senior securitized tranches, while hedge fund and money managers seeking yield will invest in securities in the mezzanine and equity tranches.[14] The combination of historically low interest rates and the explosion of hedge funds over the past several years has increased the demand for yield, which has increased demand for securities in the mezzanine and junior structures.

[13] National Mortgage News, "S&P Tracks and Forecasts U.S. NIM Trends," *Nonprime News* 30, no. 8 (November 14, 2005): 26.

[14] It is believed that the main participants in the market for equity and mezzanine tranches are the hedge funds and dealers, whereas the insurers and pension funds are more focused on the mezzanine and senior tranches. Banks are also buyers of senior and super senior tranches. See Global Financial Stability Report, *The Influence of Credit Derivative and Structured Credit Markets on Financial Stability* (April 2006), 51.

Chart 9



What Does the Reemergence of Risk Aversion Mean for the Market?

Risk aversion in the financial markets can reemerge gradually or quickly. Should the reemergence of risk aversion happen quickly as a result of a major market disruption, the subsequent flight to quality may cause significant losses for investors in securitized products, especially investors in the higher risk mezzanine and equity tranches. For example, many hedge funds, traders, and other market participants experienced sizeable losses in securitized products resulting from the flight to quality that took place following the Russian debt default in 1998. Material losses also were noted at hedge funds in spring 2005, when default risk at General Motors and Ford increased.

Currently about 8,500 hedge funds are operating worldwide, managing more than $1 trillion in assets, compared with about 2,800 hedge funds managing $2.8 billion in 1995.[15] Credit-oriented hedge funds, which are the most likely to hold securitized products, have also grown significantly in recent years, from about $30 billion in 1997 to about $340 billion in 2005 (see Chart 9). Consequently, given the significant increase in assets under management at hedge funds in recent years, the potential for losses among investors (especially in mezzanine and equity tranches) should a major market disruption occur is even greater today than in the past.

Mitigating the Risk Associated with New Securitization Structures

As the securitization market continues to innovate and offer new structured products, issuers and investors need to perform proper due diligence before taking positions. Market participants should have a thorough understanding of the risks associated with each structure, such as market, credit, and liquidity risks, and how these risks fit in with their overall market strategy. More historical data, advances in technology, improved modeling techniques, and more experience will help issuers and investors understand the risk/return profile of increasingly complex securitized products.

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[15] Angel Ubide, "Demystifying Hedge Funds," *Finance and Development* 43, no. 2 (June 2006).

An Assessment of Traditional Liquidity Ratios

Liquidity refers to an institution's ability to meet its short-term financial obligations. Liquidity risk is inherent in the banking industry. It arises from the maturity mismatch between long-term loan portfolios on the asset side of the balance sheet and short-term deposit funding on the liability side, as well as market constraints in converting loan portfolios into cash.

How banks measure and manage liquidity risk depends to a great extent on the complexity of their operations and the funding mechanisms they use. Historically, many banks, particularly smaller community banks holding less than $1 billion in assets, have relied on balance sheet ratios to assess their funding and liquidity positions and, by extension, their liquidity risk. However, during the past decade, there has been a fundamental shift away from traditional balance sheet sources of funding to alternative off-balance-sheet funding sources through securitization and alternative borrowings. Consequently, the structure of many bank balance sheets has changed, and assessing liquidity risk has become more challenging.

As funding mechanisms evolve, so too must the tools that banks use to measure and manage liquidity risk. The first section of this article shows that the traditional balance sheet measures of liquidity may have become less relevant for many banks, and that more sophisticated methods may be needed to monitor and manage liquidity risk. The second section discusses more dynamic cash flow methods of measuring liquidity that potentially can provide a more accurate assessment of liquidity risk.

The Traditional Approach to Liquidity Measurement

Traditionally, banks have used core deposits to fund loan growth and have held marketable securities to meet short-term liquidity needs.[1] While core deposits remain the primary source of funds for many banks, the ability to generate deposits locally depends a great deal on local economic conditions and demographic trends. For the past generation, bankers have seen household savings rates decline, while household investments in money market accounts and mutual funds have increased, making it harder to generate core deposit growth at many institutions.[2] During the same period, banks have remained important sources of credit to both household and business borrowers. Consequently, banks increasingly have turned to alternative funding sources to meet loan demand and fund growth.

One important trend in alternative funding at insured institutions has been the increased use of borrowings such as wholesale deposits, Federal Home Loan Bank (FHLB) advances, and Federal funds.[3] However, these are balance sheet activities that allow traditional forms of liquidity measurement and management. Another trend in bank funding is the increasing use of capital market funding through securitizing loan portfolios.[4]

The shift to new off-balance-sheet funding sources has complicated liquidity measurement. Traditionally, bank managers measured liquidity using balance sheet ratios that consider an institution's asset and liability structure at a particular point in time. The relative simplicity of such ratios and the ease by which they can be compared with historical trends at peer institutions increased their attractiveness. However, in today's more complex funding environment, these ratios, while still useful, may not adequately reflect an institution's liquidity position. In fact, ratio-based analysis can hide potential problems and leave a bank unknowingly exposed to considerable liquidity risk. For example, balance sheet ratios do not consider off-balance-sheet financing, nor do they adequately address fundamental aspects of liquidity management such as projected cash flow, borrowing capacity, and the potential impact of contingent liabilities.

[1] Core deposits include savings and transactions accounts, and domestic certificates of deposit up to $100,000.

[2] According to recent FDIC research, the percentage of U.S. banks that were able to fund at least two-thirds of their assets with core deposits fell from nearly 91 percent in 1978 to 59 percent in 2005. Christine M. Bradley and Lynn Shibut, "The Liability Structure of FDIC Insured Institutions," 2006 *FDIC Banking Review,* Vol. 18 No. 2.

[3] For an historical overview of the events that led up to the banks' decreased reliance on deposits and an explanation of different wholesale funding options available to banks, see Christine M. Bradley and Lynn Shibut, "The Liability Structure of FDIC Insured Institutions," *FDIC Banking Review* 18, no.2 (2006).

[4] Securitization is a process where balance sheet assets are transferred to a special-purpose entity, and then capital market securities are issued against the pooled assets.

Possible Limitations of Traditional Balance Sheet Ratios

To assess the accuracy of ratio-based liquidity analysis, FDIC analysts reviewed all Reports of Examination generated during FDIC supervisory exams conducted between November 2002 and December 2005. Of these, some 93 institutions had a CAMELS (Capital, Asset quality, Management, Earnings, Liquidity, and Sensitivity to market risk) liquidity component rating of 3, 4, or 5. For the purposes of this analysis, these ratings indicate institutions with liquidity concerns. (See CAMELS Liquidity Rating Components inset box.) For each institution identified as having liquidity concerns, subsequent analysis surveyed the frequency and range of four traditional balance sheet liquidity ratios: net noncore funding dependency, pledged securities to total securities, large deposits to total deposits, and loans to deposits. (See inset box "Traditional Balance Sheet Ratios" on page 13 for a description of the liquidity ratios.)

Of the institutions with liquidity component ratings of 3, 4, or 5, the analysis found

- The noncore funding dependence ratio appeared in 75 percent of exam reports. It ranged from negative 43.9 percent to 95.0 percent, with the majority of ratios distributed evenly between 0 percent and 70 percent.
- The pledged securities-to-total securities ratio appeared in 45 percent of exam reports and ranged from 0 percent to 100 percent.
- The ratio of large deposits to total deposits appeared in 40 percent of exam reports and ranged from 0 percent to 43 percent.
- The loans-to-deposits ratio ranged from 51 percent to 148 percent.[5]

These results show that balance sheet ratios can vary widely among institutions with identified liquidity concerns. Consequently, some traditional ratios may not be the most accurate indicators of an institution's true liquidity position, and may be misleading when considered in isolation. In the past, the assumption was that banks with liquidity concerns would have poor ratios and thus would be easily distinguishable from institutions with a more favorable liquidity position.

[5] Not all ratios appeared in each individual exam report.

CAMELS Liquidity Rating Components

The Uniform Financial Institutions Rating System rates liquidity based upon, but not limited to, an assessment of the following evaluation factors:

- The adequacy of liquidity sources compared to present and future needs and the ability of the institution to meet liquidity needs without adversely affecting its operations or condition.
- The availability of assets readily convertible to cash without undue loss.
- Access to money markets and other sources of funding.
- The level of diversification of funding sources, both on- and off-balance sheet.
- The degree of reliance on short-term, volatile sources of funds, including borrowings and brokered deposits, to fund longer term assets.
- The trend and stability of deposits.
- The ability to securitize and sell certain pools of assets.
- The capability of management to properly identify, measure, monitor, and control the institution's liquidity position, including the effectiveness of funds management strategies, liquidity policies, management information systems, and contingency funding plans.

Ratings

1. A rating of 1 indicates strong liquidity levels and well-developed funds management practices. The institution has reliable access to sufficient sources of funds on favorable terms to meet present and anticipated liquidity needs.
2. A rating of 2 indicates satisfactory liquidity levels and funds management practices. The institution has access to sufficient sources of funds on acceptable terms to meet present and anticipated liquidity needs. Modest weaknesses may be evident in funds management practices.
3. A rating of 3 indicates liquidity levels or funds management practices in need of improvement. Institutions rated 3 may lack ready access to funds on reasonable terms or may evidence significant weaknesses in funds management practices.
4. A rating of 4 indicates deficient liquidity levels or inadequate funds management practices. Institutions rated 4 may not have or be able to obtain a sufficient volume of funds on reasonable terms to meet liquidity needs.
5. A rating of 5 indicates liquidity levels or funds management practices so critically deficient that the continued viability of the institution is threatened. Institutions rated 5 require immediate external financial assistance to meet maturing obligations or other liquidity needs.

Traditional Balance Sheet Ratios

Non-Core Funding Dependence

Non-core funding dependence[a] is the difference between non-core liabilities and short-term investments, divided by long-term assets. This ratio is based on the premise that non-core liabilities are better suited to fund short-term investments rather than long-term assets. In theory, a lower ratio implies that an institution is better able to meet its' liquidity needs. Today there are many concerns with the original premise of this dependency ratio. Highly stable funding items, such as long-term borrowings and long-standing large deposits, are considered non-core, while most highly volatile internet deposits are considered core deposits. Additionally, all loans regardless of time to expected repayment are considered long-term.

Pledged Securities to Total Securities

Pledged securities to total securities is the book value of all securities pledged to secure deposits, repurchase transactions, or other borrowing (regardless of the balance of the deposits or other liabilities against which the securities are pledged), as performance bonds under futures or forward contracts, or for any other purpose, divided by total securities.[b] In theory, this ratio measures an institution's borrowing capacity, with a high ratio indicating a diminished ability to borrow.[c] For institutions with stressed liquidity positions, this ratio could be as high as 100 percent. Other institutions may have no liabilities requiring collateral. This ratio does not consider other assets, such as loans, that can be pledged as collateral. As such, the pledged securities-to-total securities ratio could have minimal application under the liquidity management strategies used by some insured institutions.

Large Deposits to Total Deposits

The ratio of large deposits to total deposits has been used to evaluate the stability of a bank's funding.[d] By virtue of size alone, a high percentage of large deposits could represent a liquidity concern because a single large depositor leaving the institution will cause a significant drain on liquidity. However, anecdotal evidence suggests that certain large deposits remain relatively stable for long periods. A single point-in-time ratio may not be sufficient to evaluate the intricacies of most large deposit relationships. Factors such as the depositor's relationship to the bank and the community, balance fluctuation, the borrower's willingness to place the funds out for bid, and seasonality also must be understood.

Loans to Deposits

The loans-to-deposits ratio is total loans divided by total deposits. The idea behind this ratio is that loans are illiquid, and any deposit runoff likely would be funded through the sale of securities. The higher the ratio, the more illiquid an institution is considered. Today, loan portfolios have become a more important factor in liquidity management. Banks can use loans as collateral for secured borrowings, enter into loan participation agreements, and sell the loans on the secondary market. Moreover, the loans-to-deposits ratio does not consider some widely used alternative sources of funding, such as FHLB advances and fed funds.

[a] Non-core liabilities are defined in the *UBPR Users Guide* as the sum of total time deposits of $100M or more and include:
- + Other borrowed money (all maturities)
- + Foreign office deposits
- + Securities sold under agreements to repurchase and federal funds purchased
- + Insured brokered deposits issued in denominations of less than $100,000
- + Demand notes issued to the U.S. Treasury (Not available from March 31, 2001, forward).

[b] *UBPR Users Guide*

[c] Banks use Treasury and other securities as collateral for certain transactions such as repo agreements and FHLB advances.

[d] For examination purposes, large deposits are defined as those concentrations of funds under the control of or payable to one entity, which aggregate 2 percent or more of the bank's total deposits.

However, given the changing balance sheet structure and uniqueness of individual bank funding strategies, poor ratios do not necessarily mean banks are under liquidity pressures, and favorable ratios do not always depict a strong liquidity position.

Old Assumptions May Not Capture New Risks

As funding strategies and mechanisms have changed, the assumptions behind traditional liquidity ratios (that investments are the only liquid assets and deposits are the only stable and acceptable funding source) may no longer apply to many institutions. In fact, these ratios may hide underlying risks, given that liquidity pressure may arise from a number of factors, including heightened credit or reputational risk. For example, examiners noted liquidity concerns as a result of negative publicity in 4 percent of exams surveyed, and examiners noted liquidity concerns as a result of holding company concerns, such as a rating

downgrade, in 5 percent of exams. In addition, the review found that some banks underestimate the difficulty of obtaining or retaining credit-sensitive borrowing lines during times of financial stress. Eleven percent of the exam reports noted that a bank was unable to maintain or establish desired borrowing lines.

Asset quality often is prominent in determining an institution's liquidity position. However, the survey found that poor asset quality is not necessarily a precursor to the development of liquidity concerns. Liquidity concerns often emerged among institutions with no asset quality problems, as indicated by the institution's CAMELS asset quality rating. In fact, 45 percent of banks with a liquidity rating of 3, 4, or 5 were rated 1 or 2 for asset quality.

Traditional balance sheet ratios may not accurately address risks essential to understanding and planning for liquidity risk. Furthermore, today's complex funding mix may require more formal procedures, not only to measure liquidity, but also to address liquidity concerns in extenuating circumstances. The next section explores cash flow analysis as a dynamic alternative to evaluate an institution's liquidity risk profile. It also discusses contingency funding analysis and places liquidity measurement in the broader context of liquidity risk management.

New Ways to Measure and Mitigate Liquidity Risk

Strategies for measuring liquidity continue to evolve and must be commensurate with the complexity of funding strategies used by banking institutions. Given the diverse funding options now available to banks, the most effective liquidity measurement tools are dynamic, forward looking, and sensitive to potential future concerns. For most institutions, the quantitative assessment of liquidity is only one component of sound liquidity risk management. The broader framework for liquidity management identifies, measures, monitors, and controls exposure to liquidity risk. Not only should an institution be capable of assessing current and expected future funding sources and uses, it should also maintain strong internal controls and governance practices to create and promote comprehensive liquidity management strategies, policies, procedures, and limits.[6]

[6] This discussion is based on the principles of sound liquidity management as described by the Basel Committee in "Sound Practices for Managing Liquidity Risk in Banking Organizations" (February 2000), the *Comptrollers Handbook on Liquidity,* the Federal Reserve's Commercial Bank Examination Manual (Section 4020), and the FDIC's *Revised Examination Guidance for Liquidity and Funds Management.*

Cash Flow Analysis

Cash flow analysis can help banks of all sizes and levels of complexity identify the sources and uses of funds, both now and in the future. Unlike traditional balance sheet ratios, cash flow analysis captures liquidity implications arising from all asset, liability, and off-balance-sheet positions, including a bank's borrowing capacity.

Given the heightened complexity of funding sources used by most institutions, as well as the credit- and rate-sensitive nature of popular funding sources, an institution's liquidity profile can be significantly affected by external factors. For example, a low interest rate environment may increase the demand for longer-maturity loans while increasing retail deposit customers' demand for shorter-term liabilities. Conversely, a higher interest rate environment might have the opposite affect—customers may opt for higher-yielding products, such as money market accounts and mutual funds, over bank deposits. In addition to identifying these risks, cash flow analysis also may be used to determine the effect of operational risks, such as the introduction of a new deposit product on an institution's liquidity position.

Unlike ratio-based analysis, cash flow analysis is a dynamic tool that enables banks to assess their funding structure, liquidity needs, and alternative sources of funds, while considering a variety of economic and financial risk factors, including:

- Current and future economic and financial market conditions,
- Current asset quality trends,
- Changes in credit ratings,
- Earnings projections,
- Asset growth and new product development,
- Current and future interest rate expectations and funding costs,
- The market's perception of the institution and the potential effect on its liquidity risk profile, and
- Contingent events, including the inability to fund asset growth, the inability to renew/replace maturing liabilities, the exercise of options by customers, and use of off-balance-sheet commitments.

Cash flow analysis can be the basis for a more targeted examination, allowing an institution to consider funding gaps, funding concentration, and asset/liability mismatches. It also can be helpful in determining liquidity risk tolerance under both normal and adverse conditions. For example, an institution may use a cash flow analysis to set target amounts of liquid assets or set ceilings for wholesale funding and brokered deposits.

Contingency Funding Planning

Cash flow analysis can be the basis for a contingency funding plan, which is a predetermined course of action should a bank face a liquidity event. In the past, contingency funding plans often were limited to informal discussions about the type of assets that could be sold or borrowing lines of credit that would be available. Considering the diverse funding alternatives available to most banks, which expose institutions to a variety of risks and may increase the speed of a liquidity event, contingency planning takes on heightened importance.

A formal contingency funding plan should identify and test all potential funding sources. It should:

- Be customized for the liquidity situation of the financial institution,
- Identify alternative stress events and scenarios,
- Evaluate stress events under different levels of severity and duration, and
- Assess funding needs and sources under different stress events.

A contingency funding plan should define policies and procedures for managing potential liquidity events. Much like cash flow analysis, contingency funding should be stress tested for potential changes in economic and financial conditions. For example, credit quality may deteriorate in weaker economic environments, directly affecting the cash flow and funding sources available to the institution through the marketability and use of collateral.[7] The potential duration of a liquidity event may also be a factor in determining strategies for using various sources of contingent funding. Used in combination, cash flow analysis and contingency funding planning should alert a bank to events that may result in a liquidity crisis, giving the institution time to strengthen its liquidity position before a major liquidity event occurs.

Effective Liquidity Risk Management

An institution's liquidity risk management process should be an extension of its overall corporate governance structure and internal controls. Strong corporate governance, as it applies to liquidity, means that the board of directors should guide the strategic management of liquidity risk and establish the institution's tolerance for this type of risk. The priorities approved by the board should articulate the liquidity risk management objectives and strategies for the institution, and provide clear guidance on the level of acceptable liquidity risk. In addition, the board should identify executive-level lines of authority and responsibility for managing liquidity, thus ensuring that senior management has a full understanding of the institution's risks. Should an adverse liquidity event occur, such as a run on bank deposits, the contingency funding plan is there to guide the bank through the troubled period.

Internal controls are an important aspect of robust corporate governance. In general, they are a set of procedures, approval processes, and reviews designed to provide a reasonable degree of assurance that the institution's risk management objectives are achieved. It is important to review and update the risk measurement and management systems periodically to ensure that the assumptions, parameters, and methodologies are still useful and relevant. Appropriate internal controls should address all the elements of risk management, including adherence to polices and procedures, and the adequacy of risk identification, measurement, and reporting.

Conclusion

Funding strategies for banks of all sizes have evolved during the past two decades and now incorporate a wide variety of balance sheet and off-balance-sheet funding sources. Liquidity measurement and risk management should be tailored to fit an individual institution's complexity and liquidity risk profile. For some institutions, traditional balance sheet ratios that describe funding mix, deposit retention, or asset composition adequately assess their liquidity positions.

[7] Nonperforming loans directly reduce otherwise expected cash inflows, and the reduced credit quality of problem assets impairs their marketability and potential use as a source of liquidity through either sale or their use as collateral.

However, the funding alternatives and liquidity risk profile of many institutions have become too complex for traditional balance sheet ratios to measure. A more dynamic, cash-flow-based approach is necessary for banks to manage liquidity in a changing financial environment.

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Managing Net Interest Margins Under a Shifting Yield Curve

FDIC-insured institutions have operated in normal (upward sloping), flat, and inverted yield curve environments since 2000. The shape of the yield curve influences investment and funding strategies as well as net interest margins (NIMs).[1] With every decision, financial managers face a risk/return trade-off. To enhance earnings, managers may be tempted to "chase yields" by selecting traditionally higher yielding investments without considering the impact on longer-term risks, such as credit, market, and liquidity risks. Institutions face similar risks on the funding side. Banks have a variety of short-term funding alternatives available with which to fund growth in higher-yielding, longer-duration asset portfolios. However, banks not only face risk from duration mismatches between investment and funding alternatives; managers may try to manage NIMs using funding sources without fully understanding the risks involved. (See inset box, "The Yield Curve Defined," for a description of the yield curve and the risks it embodies.)

This article explores the performance of FDIC-insured institutions in the normal, flat, and inverted yield curve environments observed since 2000. It identifies strategies used by community banks (banks with less than $1 billion in assets) and large banks (banks with more than $1 billion in assets) to manage NIMs, as well as strategies that may have raised institutional risk profiles in the recent flat yield curve environment.

The Changing Yield Curve Since 2000

The yield spread between one-year Treasury bills and ten-year Treasury notes since 2000 has ranged from –40 to 320 basis points. Consequently, FDIC-insured institutions have operated in normal, flat, and inverted yield curve environments (see Chart 1, page 18). In 2000, yields on ten-year Treasuries lagged yields on one-year Treasuries, and the yield curve went from flat to inverted. In 2001, yield spreads increased and the

[1] Other factors—including credit shocks, interest rate shocks, term shocks, asset quality, and balance sheet composition—can affect NIM performance. See Gerald Hanweck and Lisa Ryu, "The Sensitivity of Bank Net Interest Margins to Credit, Interest Rate, and Term Structure Shocks," *FDIC Working Paper,* September 3, 2004.

The Yield Curve Defined

The ***term structure of interest rates*** refers to the relationship between interest rates and the time to maturity. The ***yield curve*** is a graph of the term structure. The yield curve typically is presented using Treasury securities to eliminate the impact of credit risk on the term structure. Interest rates generally go up with the time to maturity, and the yield curve normally is upward sloping. However, yield curves can be flat or inverted in unusual economic environments. The slope of the yield curve is measured by the ***yield spread,*** which is the difference between a short-term and long-term interest rate, such as a one-year and ten-year Treasury rate.

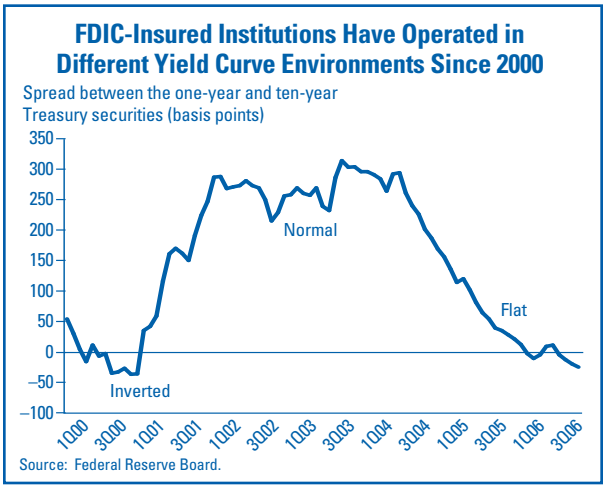
A variety of risks affect the level and slope of the yield curve. ***Liquidity risk*** is the possibility that an instrument cannot be obtained, closed out, or disposed of rapidly at, or very close to, its economic value. ***Market risk*** is the possibility that an instrument will lose value as a result of a change in the price of an underlying instrument, an index of financial instruments, changes in various interest rates, or other factors. The principal types of market risk are price risk, interest rate risk, and basis risk.

- ***Price risk*** is the possibility that an instrument's value will fluctuate and unfavorably affect a bank's income, capital, or market risk reduction strategy.
- ***Interest rate risk*** is the possibility that an instrument's value will fluctuate in response to current or expected market interest rate changes.
- ***Basis risk*** is the possibility that an instrument's value will fluctuate at a rate that differs from a related instrument (for example, three-month LIBOR and three-month Treasury bills).

Yield curve risk is a manifestation of interest rate risk. Specifically, it is the risk that changes in the shape of the yield curve (such as a nonparallel shift where short-term rates change relative to long-term rates) may affect an institution's financial condition (such as earnings, asset values, or nature of funding).[a]

[a] Definitions appear in the FDIC Division of Supervision and Consumer Protection *Capital Markets Handbook,* January 1999.

Chart 1



yield curve steepened. From late 2001 to mid 2004, the spread between one-year and ten-year Treasuries exceeded 200 basis points, and institutions operated in a normal, upward-sloping yield curve environment. In the second half of 2004, yield spreads fell and the yield curve flattened. From early 2005 through mid 2006, one-year and ten-year Treasury yield spreads averaged less than 30 basis points, and institutions operated in a relatively flat yield curve environment.

How FDIC-Insured Institutions Fared in Each Yield Curve Environment

During the **normal** yield curve environment in effect from late 2001 to mid 2004, NIMs fluctuated at both community and large institutions. (See Chart 2 for an example of a normal upward-sloping yield curve.)

However, the two types of institutions followed different strategies to enhance NIMs. Community institutions invested in longer-term securities and expanded their commercial real estate portfolios on the investment side, and they grew deposits and Federal Home Loan Bank (FHLB) advances on the funding side. Large institutions expanded their residential loan and home equity loan portfolios on the investment side as demand for commercial and industrial (C&I) loans continued to decline. On the funding side, large institutions saw rapid growth in interest-bearing deposits and other borrowings.

During the **flat** yield curve environment in effect from early 2005 through mid 2006, NIMs diverged at community institutions and large institutions, with large institutions experiencing greater NIM compression. (See Chart 3 for an example of a flat yield curve during this period.) To enhance NIMs, community institutions grew their commercial real estate portfolios and home equity lines on the investment side, and reported a rise in short-term FHLB advances on the funding side of the balance sheet. Large institutions had a rebound in C&I lending and strong commercial real estate loan growth on the investment side, and they continued to report record levels of interest-bearing deposits on the funding side. Community institutions experienced shrinkage in their securities portfolios, while large institutions saw a shift toward longer maturities in their portfolios.

In the **inverted** yield curve environment of 2000, community institutions experienced greater NIM compression than larger institutions. (See Chart 4 for an example of an inverted yield curve.) In response,

Chart 2

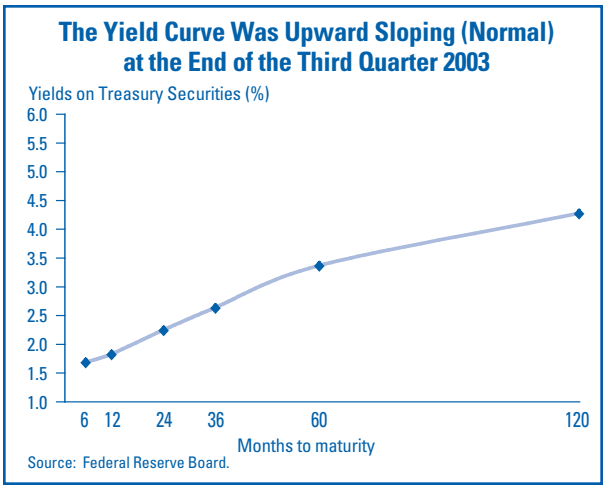


Chart 3

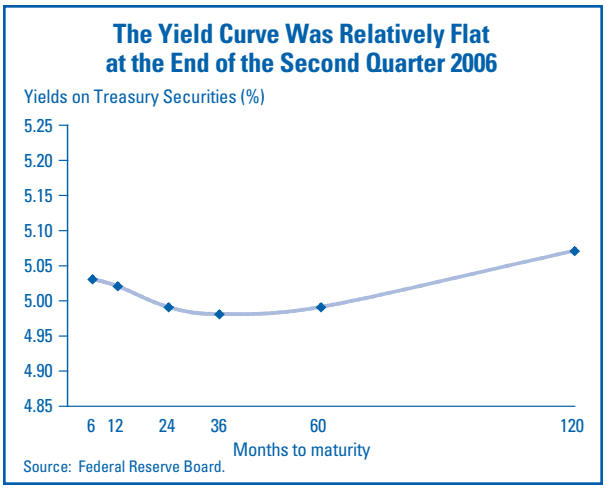
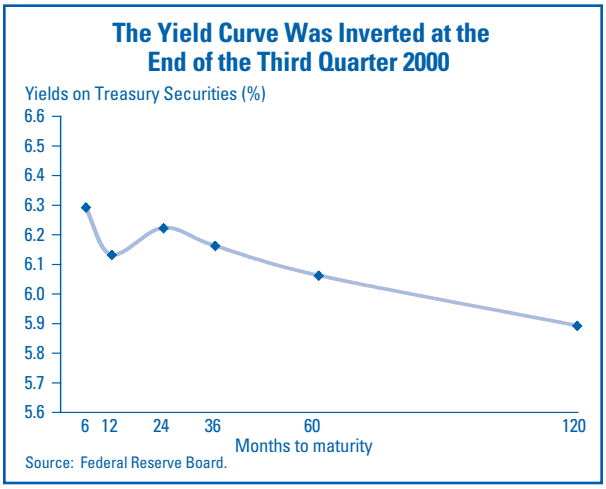


Chart 4



community institutions shifted assets from longer-term securities to higher-yielding loans. Large institutions took advantage of loans that matured or repriced within 12 months at higher interest rates to maintain more stable NIMs. Both community and large institutions experienced higher funding costs, with depositors looking to lock in higher short-term interest rates.

The appendix contains a more detailed analysis of how large and community institutions performed in each yield curve environment, including the effects on NIMs, operating challenges, investments, funding allocations, and risk/return trade-offs.

Risk/Return Trade-offs When Operating in a Flat Yield Curve Environment

While it is important to understand the risk/return trade-offs of operating in a range of yield curve environments, FDIC-insured institutions have operated in a relatively flat yield curve environment from 2005 through mid 2006. In June 2004, the Federal Reserve began 17 straight quarter-point increases in the federal funds rate. Consequently, the short end of the U.S. Treasury curve (one-year T-bill) increased almost 350 basis points from 2004 to 2006, while the long end (ten-year T-note) shifted up only 100 basis points. The net effect has been a dramatic shift from a normal, upward-sloping yield curve to a flat yield curve.

The shape of the yield curve affects investment and funding decisions, and ultimately the performance of FDIC-insured institutions. In a flat yield curve environment with compressed NIMs, managers may be tempted to chase yields through investment or funding strategies that initially offer attractive yields, but most likely also carry higher credit, market, or liquidity risks. For example, investing in government-sponsored agency securities or FHLB notes, which appear to have very little risk, may in fact increase investors' exposure to changes in financial markets, interest rates, or the shape of the yield curve.

Investment and funding strategies should be considered in the context of an institution's overall strategic goals. The investment process should be based on an understanding of the nature and characteristics of a security, how the security may perform in different yield curve environments, and the overall risk/return profile of the security.[2] On the funding side, managers should consider how an institution's funding is obtained, the risk/return trade-offs of alternative funding decisions, and the longer-term implications of liabilities repricing under alternative yield curve scenarios.

Structured Products and Yield Curve Risk

It is important for managers to understand the longer-term risk/return trade-offs on the investment side of the balance sheet when operating in a flat yield curve environment. This section uses two examples to illustrate the point. The first example uses an investment in U.S. Government Agency Collateralized Mortgage Obligation (CMO) securities, and the second example uses an investment in an FHLB note.

Example 1

In this example, an institution purchased U.S. Government Agency CMO securities in early 2005. These securities are considered to have virtually no credit risk because they are issued by a government-sponsored

[2] The Office of the Comptroller of Currency (OCC) issued guidance in 2002 entitled "Unsafe and Unsound Portfolio Practices for National Banks." The OCC bulletin discussed the ramifications of poor investment selection on future earnings and capital. Further, it emphasized the importance of maintaining prudent credit risk, interest rate risk, and liquidity risk management practices to control risk in the investment portfolio. In April 1998, the Federal Financial Institutions Examination Council (FFIEC) issued a document adopting a new "Supervisory Policy Statement on Investment Securities and End-User Derivatives Activities" (1998 Statement). The 1998 Statement provides guidance on sound practices for managing the risks of investment activities, with a particular emphasis on market risk (primarily interest rate risk) and can be accessed at www.fdic.gov/news/news/financial/1998/fil9845.html.

enterprise (GSE).[3] When these securities were purchased, yields on GSE CMOs were attractive at about 350 basis points above the risk-free rate of return. However, the coupon on this CMO series is based on a complex floating rate formula that moves *inversely* with the one-month London Interbank Offered Rate (LIBOR).[4] As short-term interest rates increased throughout 2005 and early 2006 and the yield curve flattened, the price of these CMOs began to fall and the coupon payments dropped to zero.

This example shows that risks can appear later as the interest rate and yield curve environment changes, particularly for financial instruments with complex structures. Although initial yields may appear attractive, the risk/return trade-off inherent in each investment should be evaluated under a variety of market and interest rate scenarios. Other investments may be susceptible to the same yield curve risk. For example, structured notes, such as dual-index floating-rate notes, stepped inverse notes, and range accrual notes, may also react unfavorably to yield curve shifts.[5] (See inset box, "Structured Notes," for a description of these instruments.)

Example 2

This example is based on an FHLB note that matures in 2015 and has a floating-rate coupon of three-month LIBOR plus 200 basis points, contingent on LIBOR not exceeding a certain rate based on a complex formula. In the case of the 2006 accrual formula, if three-month LIBOR is less than or equal to 4.75 percent, then the investor receives the stated coupon rate (which is attractive, given the AAA rating). If three-month LIBOR exceeds 4.75 percent, then the investor receives a floor rate of 3 percent. Given that the three-month LIBOR rate was well above 5 percent at the end of third quarter 2006, the investor received the 3 percent floor instead of the more attractive floating-rate formula. Consequently, this investor held an underperforming, relatively low-yielding asset with an extended duration, high market risk, and poor liquidity in the secondary market.

Structured Notes

Structured notes are hybrid securities that combine standard fixed or variable rate instruments with derivative products, such as embedded call options, and interest rate caps and floors. Examples of structured notes are dual-index floating rate notes, single and multiple step-up notes, stepped inverse notes, and range notes (or accrual notes).

A ***dual-index structured note*** is a security whose coupon is tied to the spread between two market rate indices. It can be structured in any manner and is designed to allow the investor to take advantage of the spread between two indices. Common interest rate indices used include LIBOR (London Interbank Offer Rate) and CMT (Constant Maturity Treasury index). However, these notes can be tied to indices other than interest rates, such as foreign exchange rates, commodity prices, or stock indices.

Single step-up notes are bonds with one coupon increase (if not called) according to a predetermined coupon schedule. Typically, coupon payments are semi-annual. Principal is repaid at par at maturity or, if callable, on the call date, as determined by the issuer. If the coupon has more than one adjustment period, the bond is a ***multiple step-up note.*** Multiple step-up notes generally have coupons that increase annually or semi-annually until maturity. A stepped inverse note is a variant of the step-up note. It also contains a coupon formula that moves in the opposite direction of the referenced index (inverse moves in interest rate).

Range notes (or accrual notes) accrue interest periodically at a fixed or floating coupon rate tied to a specified index. Most range notes have two accrual rates that allow interest payments to vary according to the number of days the designated index falls within or outside an established range of interest rates. If the index remains within the designated range, interest will accrue at the coupon rate. During periods that the index is outside the designated range, interest will accrue at a lower rate. In some structures, the lower accrual rate may be zero.

Borrowings—Caveats in a Flat Yield Curve Environment

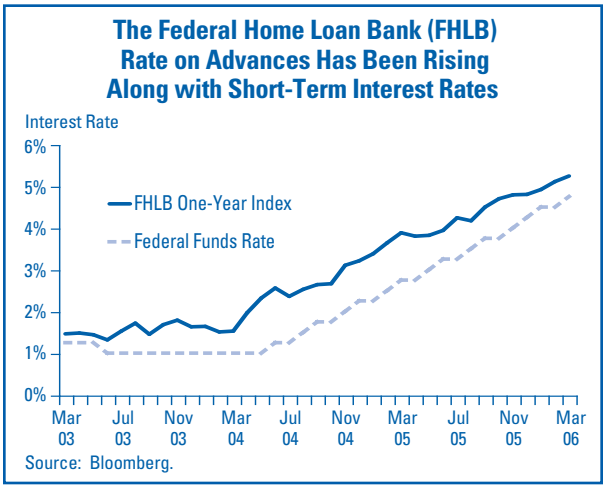
There has been growing use of FHLB advances on the funding side of bank balance sheets. FHLB advances are particularly relevant in the context of a changing

[3] GSEs are chartered by Congress to serve a public policy purpose (such as housing and availability of credit). GSEs are rated AAA by the Nationally Recognized Statistical Rating Organization (NRSRO)—the highest credit grade and lowest risk of default. The capital markets view GSEs as having the implied backing of the U.S. government during times of financial stress.

[4] In this example, interest rates were increasing rapidly, so yields on these inverse-floating securities decreased.

[5] The FDIC has issued several Financial Institution Letters (FILs) addressing structured notes: "Structured Note Holdings Reported at FDIC-Supervised Banking Institutions" FIL-59-2004 issued May 18, 2004, and "Examination Treatment for Certain Types of Credit-Linked Notes" FIL-88-2000 issued December 13, 2000.

Chart 5



yield curve environment. As short-term rates have risen over the past three years, so too have rates on FHLB advances. Chart 5 shows that fixed rate one-year advances began trending upward well in advance of the Federal Reserve's decision to raise the federal funds rate, rising from 1.5 percent in first quarter 2004 to 5.5 percent in June 2006.

FHLB convertible advances carry embedded options that may magnify their risk in a changing interest rate and yield curve environment.[6] In a convertible advance, the FHLB has the option of (1) calling the advance and issuing a new floating-rate advance tied to market rates, or (2) raising the interest rate on the advance. In return for accepting this risk, financial institutions obtain slightly lower funding costs than would otherwise be available. If rates rise, then the FHLB could exercise its option and either convert the advance from a fixed-rate to a market-based floating rate or terminate the advance and reissue it at the prevailing higher interest rate. For a financial institution that uses this instrument, the higher rate on convertible advances may alter cash flows on the funding side of the balance sheet, and may increase interest rate risk and the cost of funds. This is why special risk disclaimers appear in FHLB product circulars.[7]

Conclusion

FDIC-insured institutions have operated in normal, flat, and inverted yield curve environments since 2000. The shape of the yield curve influences their investment and funding strategies, and how they manage NIMs. FDIC-insured institutions should continually evaluate the risk/return trade-offs of their investment and funding strategies in the context of the institution's overall risk management strategies. Strategies that are appropriate in one yield curve environment may not be suitable in another. Institutions that assume complex risks are required to identify, measure, monitor, and control the risks they assume. Ultimately, each institution is unique, and the investment and funding strategies must be appropriate for the circumstances and needs of the institution.

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Appendix

This appendix contains a detailed analysis of how community banks (banks with less than $1 billion in assets) and large banks (banks with more than $1 billion in assets) performed in each yield curve environment. It addresses the impact of the yield curve on NIMs, operating challenges, investments, funding allocations, and risk/return trade-offs. Table 1 evaluates bank performance in the normal yield curve environment from late 2001 to mid 2004; Table 2 evaluates bank performance in the flat yield curve environment from 2005 to mid 2006; and Table 3 evaluates bank performance during the inverted yield curve of 2000. (Tables begin on next page.)

[6] The FDIC Division of Supervision and Consumer Protection Memorandum dated August 22, 2000, entitled "Federal Home Loan Bank Advances" addresses the risk/return trade-offs of using FHLB advances.

[7] *Member Products and Services Guide,* p. 52, Federal Home Loan Bank of Atlanta www.fhlbatl.com/misc/MPSG/MPSG_jan2006.pdf#page=1.

Table 1

In the Normal Yield Curve Environment from Late 2001 to Mid 2004, Community Banks Grew Securities Balances and Maturities to Enhance NIMs, While Larger Banks Focused on Consumer Loan Demand

	Community Banks	Large Banks
Net Interest Margins	The average quarterly annualized NIM ranged from a high of 4.27 percent to slightly less than 4.00 percent.	The average quarterly annualized NIM for first quarter 2002 was 4.04 percent, but it declined to less than 3.70 percent by the second half of 2003.
Operating Challenges	The U.S. economy was rebounding from a mild recession, so institutions were trying to attract higher-yielding assets. Portfolios of commercial real estate loans grew, particularly nonfarm, nonresidential properties.	Interest rates were low, and the demand for residential mortgage loans and home equity lines of credit was strong. At the same time, the demand for C&I loans fell, and total C&I loans outstanding dropped below $800 billion for the first time since mid 1998.
Investments	Securities portfolios grew, reaching a peak of $331 billion in first quarter 2004. Institutions increased exposure to securities with maturities between 5 and 15 years to achieve higher, longer-term yields.	Investments in longer-maturity securities grew, with maturity and repricing dates in excess of five years.
Funding	FHLB advances, non-interest-bearing deposits, and interest-bearing deposits all grew.	Interest-bearing deposits grew to a new record, reaching more than $3 trillion in first quarter 2003. Other borrowings grew as well, particularly those with maturities of less than one year.
Risk/Return Trade-off	Institutions were taking advantage of longer-term interest rates by investing in securities with longer maturities and repricing dates. Institutions were using nondeposit funding sources, including FHLB advances, to fund growth. By shifting to longer-term securities, yields were higher, but market and interest rate risks increased.	C&I loan demand was weak, but demand in the residential real estate market was growing. With excess funds, management relied on a risk/return strategy of investing in longer-term securities to increase yields, fund residential loan demand, and grow deposits.

Community banks are FDIC-insured institutions with total assets less than $1 billion.

Large banks are FDIC-insured institutions with total assets greater than $1 billion.

Table 2

In the Flat Yield Curve Environment from 2005 to Mid 2006, Community Banks Managed Interest Expenses to Offset Lower Interest Income, While Large Banks Had Significant NIM Compression Partly as a Result of Higher Funding Costs

	Community Banks	Large Banks
Net Interest Margins	During this time of a relatively flat yield curve, smaller institution NIMs averaged 4.11 percent.	The story was NIM compression. The quarterly annualized NIM dropped to 3.36 percent by first quarter 2006, the lowest since year-end 1990.
Operating Challenges	Commercial real estate lending was very strong, particularly in the areas of construction and development and nonfarm, nonresidential properties. Home equity lines of credit were expanding, while consumer lending volumes continued to decline.	Commercial real estate loans grew, particularly construction and development loans, one-to-four family residential mortgages, and home equity lines of credit. C&I loan growth also rebounded, topping $1 trillion, a new record.
Investments	Securities volumes began to drop, notably in securities with longer maturity and repricing dates, as institutions realized they could obtain similar yields with shorter-term securities.	Securities growth was moderate during this time, but maturity and repricing allocations changed dramatically. Larger FDIC-insured institutions reported a significant drop in mortgage pass-through securities backed by one-to-four family residential properties with maturity or repricing dates of 3 to 15 years. However, securities with maturities and repricing dates greater than 15 years increased markedly.
Funding	The volume of FHLB advances less than one year grew, while longer-term advances declined and federal funds purchased and securities sold under agreements to repurchase (repos) remained at about the same level. Other longer-term borrowings increased. Interest-bearing deposits also surged, with depositors taking advantage of higher short-term interest rates.	Interest-bearing deposits peaked at $4 trillion at year-end 2005. Money market deposits and time deposits in excess of $100,000 with a maturity of less than one year accounted for the majority of growth. Repos grew approximately one-third from year-end 2001 to late 2005.
Risk/Return Trade-off	Smaller institutions focused on construction lending and short-term securities to take advantage of higher short-term interest rates. Smaller institution funding costs remained lower than those of larger institutions, reducing some margin pressure.	For larger institutions, the risk/return trade-off shifted to longer-term securities with maturities or repricing dates over 15 years in an effort to hold longer-duration assets. As rates on interest-bearing deposits and short-term liabilities continued to rise, compressing NIMs, large banks focused on real estate lending to achieve higher yields and to grow shorter-term assets.

Community banks are FDIC-insured institutions with total assets less than $1 billion.
Large banks are FDIC-insured institutions with total assets greater than $1 billion.

Table 3

During the Inverted Yield Curve of 2000, Community Banks Experienced Greater NIM Pressure as Funding Costs Increased Faster Than Yields on Assets, and Large Banks Were Better Able to Manage Assets and Liabilities Repricing at Short-Term Rates

	Community Banks	Large Banks
Net Interest Margins	Community banks had a relatively stable quarterly annualized NIM of 4.30 percent for the first nine months of 2000. By first quarter 2001, NIM dropped considerably to 4.07 percent.	Large banks had a relatively stable NIM, dropping only 11 basis points from 3.72 percent in first quarter 2000 to 3.61 percent a year later.
Operating Challenges	Institutions shifted from consumer lending and securities to commercial real estate loans to increase their share of traditionally higher-yielding assets. Institutions were trying to increase NIMs.	The more stable NIM reflected how larger institutions implemented different asset and liability management strategies to deal with different yield curve environments.[a] On the asset side, large institutions reported 61 percent of loans, excluding closed-end one-to-four family loans, repriced or matured within 12 months. This allowed large institutions to reprice assets faster and at higher rates than smaller institutions.
Investments	The volume of total securities declined almost 11 percent during the year ending first quarter 2001. U. S. government, agency, and other securities with repricing dates greater than three years reported a marked decline as yields on longer-term securities lagged those of shorter-term securities.	The volume of debt securities remained relatively stable, but securities reallocation occurred. Securities with repricing dates of less than one year increased. The volume of mortgage pass-through securities backed by one-to-four family residential properties with maturities greater than 15 years grew rapidly at the beginning of 2001.
Funding	The volume of interest-bearing deposits grew, while non-interest-bearing accounts remained relatively stable as depositors searched for short-term higher yields.	Brokered deposits and money market deposits grew rapidly because of attractive short-term yields.
Risk/Return Trade-off	Funding costs were rising more rapidly than yields on interest earning assets, squeezing NIMs. Institutions increased exposure to commercial real estate loans to hold higher-yielding assets and reduced securities exposure, which offered lower yields. Interest-bearing deposits were growing, resulting in higher funding costs.	Larger institutions managed higher interest expenses by holding shorter-term assets that repriced upward. They shortened asset durations and attracted higher-cost funds through brokered deposits.

Community banks are FDIC-insured institutions with total assets less than $1 billion.

Large banks are FDIC-insured institutions with total assets greater than $1 billion.

[a] John M. Anderlik and Richard D. Cofer, "Does Net Interest Margin Matter to Banks?" *FDIC Outlook*, Second Quarter 2004.

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