BANK SUPERVISION AND CENTRAL BANKING: UNDERSTANDING CREDIT DURING A TIME OF FINANCIAL TURMOIL

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I. Introduction

I would like to thank the Bank of Korea and the Bank for International Settlements for sponsoring this conference on *Household Debt: Implications for Monetary Policy and Financial Stability,* and for inviting me to participate as the keynote speaker.[1] The planned sessions on mortgage finance, consumer credit, and securitization are all particularly topical and touch on areas that, especially since July of 2007, have been of keen interest at the Federal Reserve and at central banks throughout the world.

Today I am going to focus my remarks on the key information necessary for central banks to make informed decisions during periods of financial turmoil. In particular, I am going to highlight the fact that non-public information about financial institutions has been extremely useful in understanding the current problems in U.S. financial markets, and in understanding how those problems might factor into monetary policy decisions and other policy matters.

At today's conference we have representatives from a diverse set of countries, and in those countries the responsibilities of

[1] The views I express today are my own, not necessarily those of my colleagues on the Board of Governors or the Federal Open Market Committee (the FOMC).

the central bank in bank supervision vary considerably. The Federal Reserve has bank-supervisory responsibilities over bank holding companies as well as banks that choose both to have a state charter and to be members of the Federal Reserve. These supervisory responsibilities, I would argue, have been instrumental in dealing with the current episode of financial turbulence.

In many countries bank-supervisory roles continue to evolve, but whatever the institutional arrangements that prevail in your countries, I would argue that hands-on experience as a supervisor can be critically important to the central bank during times of stress and can significantly improve the ability of the central bank to choose appropriate monetary policy and address problems related to financial stability.

To make that argument, today I am going to discuss four areas where knowledge of confidential, non-public information about financial institutions has been important to central bankers. This is a topic that I investigated a number of years ago with co-authors Joe Peek and Geoff Tootell. Our research found that confidential bank supervisory information could be used to improve central bank forecasts of inflation, unemployment, and Gross Domestic Product.[2]

Given the events that have occurred since financial turmoil emerged in July, I am now even more confident of the need for central banks to have the experience and perspective gained through

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[2] See "Is Bank Supervision Central to Central Banking?" by Joe Peek, Eric Rosengren, and Geoffrey M. B. Tootell in *The Quarterly Journal of Economics*. vol. 114 (May 1999): pages 629-653. The paper finds that confidential bank supervisory information could help more accurately forecast important macroeconomic variables and is useful to monetary policymaking. The findings suggest that the complementarity between supervisory responsibilities and monetary policy should be an important consideration when evaluating the structure of a central bank.

Also see "Does the Federal Reserve Possess An Exploitable Informational Advantage?" by Joe Peek, Eric Rosengren, and Geoffrey M.B. Tootell in the *Journal of Monetary Economics*, vol. 50, no. 4 (May 2003), pages 817-839, which found evidence that the Federal Reserve has an informational advantage that can be used to improve monetary policy.

Also, in "Identifying the Macroeconomic Effect of Loan Supply Shocks," by Joe Peek, Eric Rosengren and Geoffrey M.B. Tootell in *the Journal of Money Credit and Banking*. vol. 35, no. l 6 part 1 (December 2003), pages 931-946, the authors found that confidential supervisory information was useful in predicting components of GDP that would likely be dependent on bank financing.

bank supervision, although the institutional arrangements to facilitate those insights are likely to vary by country. For me, the information gleaned from the Federal Reserve's role as a hands-on bank supervisor has been particularly useful in thinking about appropriate monetary policy in the following four ways.

First, understanding the size of and basis for likely losses has been useful in highlighting potential financial stability issues, as well as in determining where credit availability may become a problem. To be sure, the degree of exposure to loss that is embedded in complex financial instruments has been very difficult to ascertain—for banks' own managers, let alone bank supervisors—as many of the recent losses have involved complex and opaque financial instruments tied to the mortgage market. But that challenge notwithstanding, we know that the way that banks are likely to behave is linked to the size of their current and expected future losses; and as supervisors, with access to internal bank documents and interactions with bank management, we can estimate them.

Second, banks' balance-sheet constraints can transmit financial shocks to the real economy. Capital-constrained banks may be unable to provide loans or extend credit in markets where they are a key source of liquidity. For central bankers to gauge potential balance sheet constraints now and in the future requires a detailed understanding of a bank's financial position, capital management strategies, and likely management actions.

Third, as problems spill over from mortgage loans to other types of credit, banks' actions can have a significant impact on macroeconomic growth. For example, reducing lines of credit on home-equity loans and on credit cards could have a significant impact on consumers and dampen economic growth.

Fourth, many of the recent proactive steps taken by the Federal Reserve relative to Discount Window lending are facilitated and informed by our role as a bank supervisor. These actions, taken as a lender of last resort, make the central bank a counterparty to banks—which requires an understanding of a bank's solvency and its liquidity risk.

II. Overview: Banks and Financial Turmoil

One can find numerous examples of the critical role of banks in periods of financial turmoil. In the United States in the early 1990s, losses on commercial real estate and construction loans caused capital-constrained banks to contract their balance sheets. The

result was that even companies with good business prospects found it difficult to secure adequate financing despite monetary policy's efforts to lower interest rates, causing the often-cited "headwinds in monetary policy."

And a sizable literature indicates that in Japan, problems in the banking sector played a significant role in the so-called "lost decade."[3] Also, in the mid 1990s, many Asian countries found that their banking sector exacerbated problems that originated in real estate and foreign exchange markets. We see similar episodes in Europe as well.

Why do banks play such critical roles during periods of financial turmoil?

First, their balance sheet structure tends to amplify the effect of economic shocks. Banks are highly leveraged and highly regulated. In order to maintain their capital ratios after experiencing a large capital shock, banks must significantly shrink assets on their balance sheets—in other words, not make or acquire loans—since their ability to raise capital at such times can be quite limited.

Second, while their role in financing business and residential investment has diminished in recent decades, banks remain the primary source of liquidity during periods of financial turmoil. Banks extend lines of credit, and these lines are most likely to be utilized when firms are experiencing financial difficulties. However, banks provide liquidity not only to firms, but also to finance an array of complex financial instruments. For example, in the U.S., banks have been providing liquidity to the commercial paper markets, to off-balance sheet financial vehicles (such as conduits, special investment vehicles or "SIVs," and the like), and for municipal financing programs (for example through auction-rate securities).

Third, banks are often the main source of financing to smaller firms, and are key market-makers in a variety of financial markets — one example is their role as dealers for municipal auction- rate securities. Should they choose to shrink their balance sheets, the shift can disrupt bank-dependent borrowing and markets where banks are key players.

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[3] See, for example, Joe Peek and Eric S. Rosengren, "Unnatural Selection: Perverse Incentives and the Misallocation of Credit in Japan," in the *American Economic Review*, American Economic Association, vol. 95(4), pages 1144-1166, September 2005; and Caballero, Hoshi, and Kashyap, "Zombie Lending and Depressed Restructuring in Japan," NBER Working Paper No. 12129 (2006).

In sum, understanding banks is critical to understanding how financial shocks can be transmitted to the real economy. Unfortunately, understanding how banks are likely to respond to problems requires far more than published financial statements. While U.S. banks report detailed information on their balance sheets and their income statements, these reports do not provide sufficient information to allow central banks to really discern how banks are responding to problems.

A. Estimating Losses

The current financial turbulence, like most such episodes, has unexpected sources In 2006, I met with the risk managers from a number of global banks. They highlighted at that time that they saw little risk emerging from the mortgage market. While they acknowledged the rapid acceleration in residential real estate prices, they emphasized that banks were extremely well capitalized and that their own internal "stress tests" indicated that 10 and even 20 percent declines in real estate prices would result in lower (but still positive) net income at their organizations—in other words would result in a loss of earnings, not capital, for their firms. Obviously, events have been more severe than that, and some of the largest financial institutions have found themselves needing to aggressively seek a new capital infusion.

It is worth highlighting that the banks' observations about being well capitalized were accurate. The attention that regulators have given to capital has caused banks in the United States to be much better capitalized going into these difficulties than they were in the 1990s (see Graph 1). The introduction of the Basel I and Basel II capital accord frameworks, and of modern risk management techniques that focus on value-at-risk modeling, have caused banks to increase their capital. Current problems would clearly be worse had this not occurred. Similarly, bank supervisors viewed banks as being in good financial health, as indicated by the very low number of banks considered "problem" institutions by the FDIC[4] (see Graph 2)—although there has been some additional deterioration recently.

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[4] In defining "problem" institutions the FDIC notes the following. "Federal regulators assign a composite rating to each financial institution, based upon an evaluation of financial and operational criteria. The rating is based on a scale of 1 to 5 in ascending order of supervisory concern. 'Problem' institutions are those institutions with financial, operational, or

Even with the highly publicized financial turmoil that began in July, most banks remained profitable in 2007 (see Graph 3). While there have been very significant losses announced by a few banks, to date the losses have been at large banks actively engaged in residential mortgage securitization. Both the number and share of banks reporting losses in 2007 are well below what was experienced during the early 1990s.

So how is it that the stress tests by large global banks did not indicate their susceptibility to falling housing prices in the United States? Most of these stress tests assumed that lower housing prices would cause elevated losses on construction loans and holdings of subprime[5] loans, but most of the large global banks did not have significant exposure in those areas.

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managerial weaknesses that threaten their continued financial viability. Depending upon the degree of risk and supervisory concern, they are rated either a '4' or '5'. For all insured commercial banks and for insured savings banks for which the FDIC is the primary federal regulator, FDIC composite ratings are used. For all institutions whose primary federal regulator is the OTS, the OTS composite rating is used." Source: Definitions section of FDIC *Quarterly Banking Profile* (Fourth Quarter 2007).

[5] In essence subprime loans refer to mortgage loans that have a higher risk of default than prime loans, often because of the borrowers' credit history. The loans carry higher interest rates reflecting the higher risk. Certain lenders, typically mortgage banks, may specialize in subprime loans. Banks, especially smaller community banks, generally do not make subprime loans, although a few large banking organizations are active through mortgage banking subsidiaries. According to interagency guidance issued, in 2001, "The term 'subprime' refers to the credit characteristics of individual borrowers. Subprime borrowers typically have weakened credit histories that include payment delinquencies and possibly more severe problems such as charge-offs, judgments, and bankruptcies. They may also display reduced repayment capacity as measured by credit scores, debt-to-income ratios, or other criteria that may encompass borrowers with incomplete credit histories. Subprime loans are loans to borrowers displaying one or more of these characteristics at the time of origination or purchase. Such loans have a higher risk of default than loans to prime borrowers.

Generally, subprime borrowers will display a range of credit risk characteristics that may include one or more of the following: Two or more 30-day delinquencies in the last 12 months, or one or more 60-day delinquencies in the last 24 months; Judgment, foreclosure, repossession, or charge-off in the prior 24 months; Bankruptcy in the last 5 years; Relatively high default probability as evidenced by, for example, a credit bureau risk

What these stress tests crucially failed to capture was the effect of house-price declines on the large holdings of highly rated securities that global banks held—the products of mortgage securitization activities, with their payment streams ultimately tied to the performance of subprime loans. In particular, they thought that housing prices nationwide were unlikely to fall, but that even if they did, they would only affect the high-risk slices or "tranches" of these securitized pools of mortgages—and the high-risk tranches were not generally held by U.S. banks. In fact, triple-A rated tranches continued to trade close to par when problems in subprime loans first became apparent in 2007 (see Graph 4—Markit ABX.HE indices[6]).

However, since the financial turmoil starting in July, the triple-A rated securities with payment streams derived from subprime loans have more recently been trading as low as 60 percent of par. Such values likely reflect a significant risk premium for holding mortgage-backed assets. The size of that risk premium is somewhat surprising, since the defaults on the underlying subprime assets would need to be quite severe to result in such large losses for these highest-rated and most-secure tranches—and investors would only take losses on these high-grade securities after all lower-graded securities had been wiped out.

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score (FICO) of 660 or below (depending on the product/collateral), or other bureau or proprietary scores with an equivalent default probability likelihood; and/or Debt service-to-income ratio of 50 percent or greater, or otherwise limited ability to cover family living expenses after deducting total monthly debt-service requirements from monthly income. This list is illustrative rather than exhaustive and is not meant to define specific parameters for all subprime borrowers. Additionally, this definition may not match all market or institution specific subprime definitions, but should be viewed as a starting point from which the Agencies will expand examination efforts."

[6] "The ABX index represents a basket of credit default swaps linked to subprime mortgages. The indices are constructed by pooling mortgages with similar (internal) credit ratings." Source: Greenlaw, Hatzius, Kashyap, and Shin (2008), "Leveraged Losses: Lessons from the Mortgage Meltdown" presented at the 2008 U.S. Monetary Policy Forum on February 29, 2008. Furthermore, "The Markit ABX.HE is a synthetic index of U.S. home equity asset-backed securities... The index is a family of five sub-indices, each of which consists of a basket of 20 credit default swaps referencing U.S. subprime home equity securities issued over the previous six months... The ABX.HE-06-01 index was launched on January 19, 2006." Source: Markit news releases.

Valuation has been made difficult by several factors—including uncertainty over the number of borrowers that may eventually default on their subprime mortgage loans as well as the liquidation value of foreclosed properties in the depressed residential real-estate market, and the large discounts that market participants have placed on complex financial assets tied to subprime loans. In addition, the deep discounts on highly rated securities have made investors skeptical of ratings as an indicator of default probabilities. With few trades happening—and many of those trades "distress sales"—the actual worth of many of these instruments is quite difficult to determine with confidence.

However, knowing the nature of the exposure and knowing the possible pricing outcomes are both critical to estimating losses that could stem from these assets. Bank supervisors have the ability to get detailed information on the banks' exposures to these assets, their current pricing, and their possible future pricing. These insights are critical to understanding the size of likely losses to a financial institution, and management's likely responses to the losses (given an environment of falling housing prices, and the prevalence of underwriting problems with many subprime loans originated after 2004).

B. The Importance of Balance Sheet Constraints

How banks manage their lending in the face of balance-sheet constraints can have significant macroeconomic effects. If banks are unwilling to lend in the subprime and jumbo markets because these loans are now difficult to securitize, the recovery of residential real estate may be impeded. If banks cut back on loans to businesses, business fixed investment and investment in commercial property may be impeded. If banks choose to reduce lines of credit to consumers, consumption may be impeded. These examples simply underline the fact that during a period of financial turmoil it is important for central bankers to understand the degree of balance sheet constraint, and how banks' management may choose to respond.

As Graph 5 illustrates, during the recent financial turmoil in the United States bank assets have actually grown, particularly at the largest institutions. Banks have reduced their holdings of government securities, but have expanded their holdings of other securities and commercial and industrial loans.

Much of this growth likely reflects "involuntary lending"—that is, banks expanding assets in response to liquidity commitments they extended during the previous good times. Some of the factors that have increased assets on balance sheets have included the inability to roll commercial paper,[7] firms expanding their use of lines of credit, the inability to sell leveraged loans that were originated with the expectation that they would be quickly distributed, liquidity triggers forcing the purchase of municipal bonds, and the inability to sell assets that were in the process of being securitized. Such factors can significantly swell bank assets, placing pressure on capital-constrained banks to pull back in other areas. And banks' choices regarding which types of credit to shrink can have macroeconomic consequences.

Such information can only be known with detailed knowledge of the bank's assets, both on-balance sheet and off-balance sheet, and information about which business lines each institution views as critical in the event it is forced to shrink (in other words, to cut back on credit extension) in some areas.

Indeed, calculating how constrained banks are likely to become is not straightforward. One component is understanding the size of any possible losses that reduce banks' capital. At the same time, the likely growth in bank assets can also be very important—and it is virtually impossible to estimate without on-going discussions with bank management, such as occur in management's discussions with bank supervisors.

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[7] For example, as problems with mortgage-related loans emerged, some investors became reluctant to continue lending in the asset-backed commercial paper (ABCP) market. This reduction in the availability of short-term funds caused the rates on ABCP to rise; and also forced some financial institutions to buy back ABCP that they could no longer refinance, bringing it onto their balance sheets. The combination of uncertainty over the appropriate rating of mortgage-related securities and the expansion of bank balance sheets caused significant pressure on the availability of short-term credit. In addition banks, as liquidity providers, were expanding their balance sheets in other areas, much of which was not anticipated prior to the financial turmoil. Some banks have had to take write-downs on some assets, and the losses in combination with involuntary growth in assets have made some banks more reticent to expand their balance sheets further.

C. Potential for Spillover to Retail Consumption

While the problems at many large banks originated with subprime mortgages and securitization, policymakers and others are rightly paying attention to potential spillovers. As banks have seen housing prices decline, they have been reducing lines of credit associated with credit cards and home-equity loans. Declining home prices, which are a key driver of subprime defaults,[8] also erode the collateral value for home-equity lines. Thus, geographic areas that are experiencing falling home prices are likely seeing less credit available on home-equity lines, even if credit scores have not changed.

Similarly, banks are noticing—perhaps not surprisingly—that nonperforming credit card loans have increased more in areas with elevated home foreclosures.[9] As a result, some banks are reexamining their risk exposure for lines of credit in areas with falling home prices and elevated mortgage problems.

Consumers who are informed that their credit lines have been reduced or possibly limited to loans outstanding lose an important financing option, which may dampen their consumption spending. To the extent that untapped lines of credit serve as a precautionary source of funds, consumers may reduce their willingness to purchase items. And purchases will likely fall for consumers who find themselves limited to current cash flow.

Let me emphasize that it is too early to determine the degree that consumers will be restrained by credit availability in the current situation. But such trends will be easier to detect sooner and more accurately if the central bank has supervisory engagement with financial institutions.

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[8] See "Subprime Outcomes: Risky Mortgages, Homeownership Experiences, and Foreclosures," Working Paper No. W07-15 by Kristopher Gerardi, Adam Hale Shapiro, and Paul Willen, available on the Federal Reserve Bank of Boston's website, www.bos.frb.org.

[9] In March 4 testimony, Federal Reserve Board Vice Chairman Donald Kohn noted that delinquency rates on credit cards and consumer installment loans had increased over the second half of 2007. He added the Fed is monitoring these consumer loan segments for signs of spillover from residential mortgage problems and that we are paying particular attention to the securitization market for credit card loans.

D. Bank Supervision and the Lender of Last Resort

I would argue that it is very difficult for a central bank to be an effective lender of last resort without significant knowledge of the current and prospective value of assets and liabilities within financial institutions. Like any counterparty, a central bank acting as a lender needs to be able to evaluate the solvency and liquidity of a borrowing institution.

Of course, determining future solvency of an institution can be challenging, particularly when assets are difficult to value Knowing how likely it is that an institution's sources of funds will evaporate during times of financial stress requires a significant understanding of the institution's liabilities and its counterparty relationships. Such information has been particularly important of late, as the Federal Reserve has initiated a variety of innovative techniques to provide liquidity to the marketplace.

Graph 6 provides a list of the various steps taken recently by the Federal Reserve related to our Discount Window—steps we have taken to try to enhance market liquidity and prevent ripples of difficulty that impact more institutions and ultimately the real economy and individuals. Because of the complexity and institutional details involved in each of these steps taken, I will focus today only on one, the Term Auction Facility.

The Term Auction Facility allows banks to obtain short-term financing using as collateral a subset of assets that the marketplace is currently seeing as illiquid. It has also provided an opportunity for banks to get financing for approximately one month during a period when obtaining such financing has sometimes proved difficult. Every other week, the Federal Reserve holds an auction where banks are able to use collateral at the Discount Window to get a loan. Currently the size of each auction is $50 billion. The auctions have been well received, and have generally resulted in financing terms (determined by the auction) that are somewhat above the Federal Funds rate.

To qualify, a bank first needs to be in sound financial condition, as the Federal Reserve must have confidence that the bank will be solvent over the time the loan is extended. While this determination is left to the individual Reserve Bank whose district the institution resides in, it generally requires that the bank not have low supervisory ratings. Second, the institution needs to have collateral at the Federal Reserve. Our Discount officers determine, as best they can, the market value of the collateral and apply an appropriate "haircut."

There is little question in my mind that both the determination of the potential solvency risk and the evaluation of the institution's collateral are greatly aided by having experienced bank supervisors at the central bank.

III. Conclusion

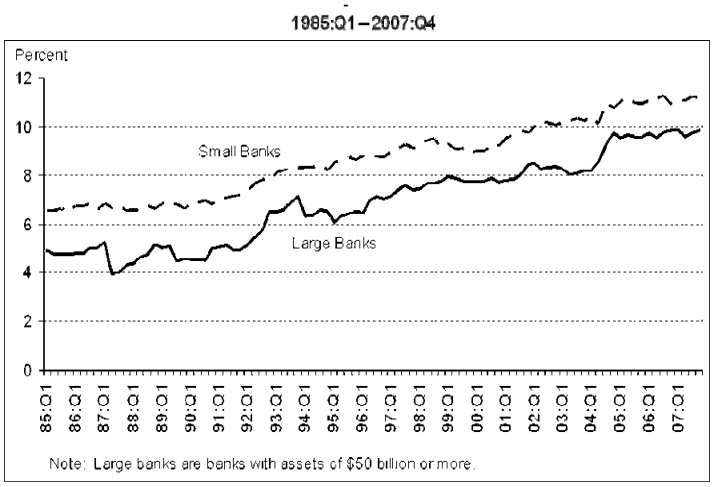
Two years ago, few analysts were anticipating significant retail credit and banking problems. The most recent banking problems in the United States had been driven by problems in commercial real-estate loans. The current turmoil stems from troubles with *residential* real estate loans that are for the most part only indirectly owned, through securitizations.

The uncertainty surrounding ratings applied to relatively new and opaque financial products and the difficulty in pricing complex financial assets have seriously disrupted the "originate to distribute" model of recent real estate finance. In particular, it is clear that instruments that involve financing long-term assets with short-term liabilities, without institutional liquidity backing them up, are not especially suited to withstand times of financial distress such as the one we are facing.

Today I have argued that knowledge of financial institutions has been a critical component of my own thinking as a central banker. In my view, central banks with potential counterparty risk as a lender of last resort need to have sufficient information to assess the solvency of their counterparty and the liquidity of its collateral—the same factors that any private counterparty would require.

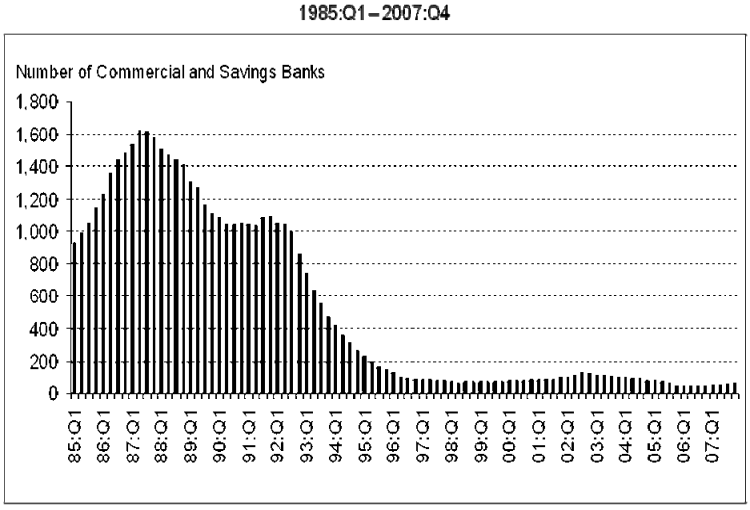
Much of our understanding of the economy's evolution since July has been greatly influenced by turmoil affecting financial markets. The economy's path will vary depending on the size and nature of the problems at financial institutions, the distribution of those problems, and the reaction of bank management to those problems. I believe strongly that at the Federal Reserve, our role as a bank supervisor within a central bank has greatly facilitated our ability to operate effectively during this challenging period.

Graph 1
Equity Capital to Assets Ratio at U.S. Commercial and Savings Banks by Asset Size



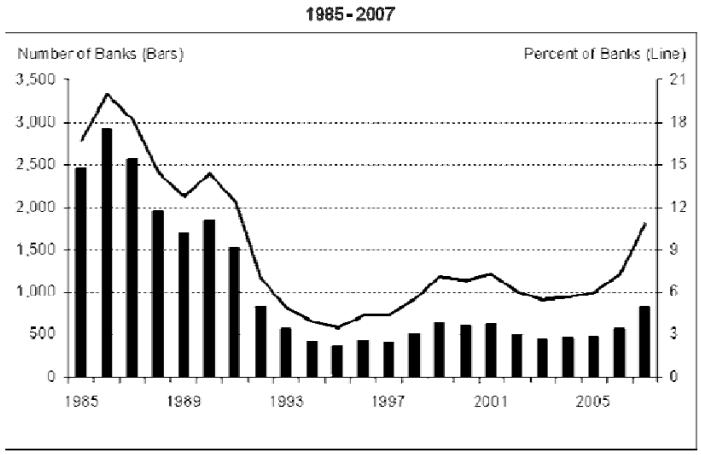
Source: Commercial and Savings Bank Call Reports

Graph 2
Number of "Problem" U.S. Commercial and Savings Banks



Source: *FDIC Quarterly Banking Profile*

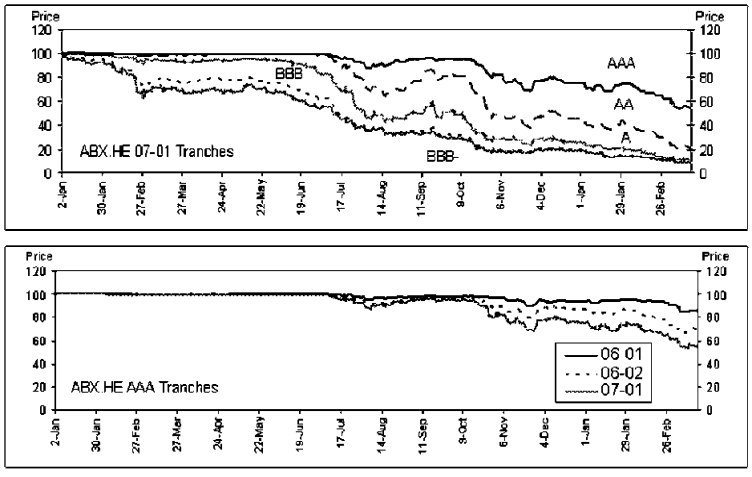
Graph 3
Number and Share of U.S. Commercial and Savings Banks
Reporting Annual Losses



Source: Commercial and Savings Bank Call Reports

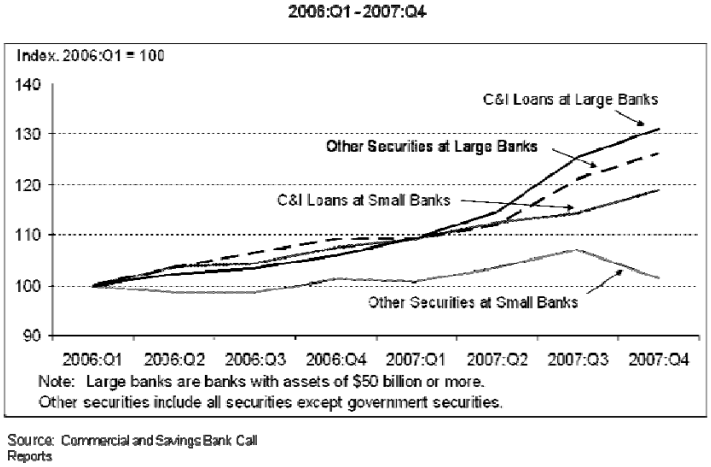
Graph 4
Markit ABX.HE Indices

January 2, 2007 – March 17, 2007



Source: Markit

Graph 5
Balance-Sheet Growth at U.S. Commercial and Savings Banks by Asset Size



Source: Commercial and Savings Bank Call Reports

Graph 6
Recent Federal Reserve Actions

- Term Auction Facility (TAF)—Each auction (2 per month) provides $50 billion in discount Window Loans
- Expanded Collateral for Fed 28 day repurchase program—helps dealers finance mortgage-backed securities (MBS) – up to $100 billion
- Term Securities Lending Facility (TSLF)—Lend up to $200 billion in Treasury securities in return for agency and MBS
- Primary Dealer Lending Facility (PDLF)—discount window loans available for primary dealers at the primary credit rate