

Bank supervision and central banking: understanding credit during a time of financial turmoil

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Introduction

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

Today I am going to focus my remarks on the information central banks need 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 US financial markets and how those problems might factor into monetary policy decisions and other policy matters.

At today’s seminar we have representatives from a diverse set of countries, and in those countries the responsibilities of the central bank in bank supervision vary considerably. The Federal Reserve has supervisory responsibilities over bank holding companies as well as over 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, the role of bank supervisors continues to evolve, but whatever the institutional arrangements that prevail in your countries, I would argue that hands-on supervisory experience 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 the confidential information available to bank supervisors could be used to improve central bank forecasts of inflation, unemployment and gross domestic product.²

¹ President and Chief Executive Officer, Federal Reserve Bank of Boston. The views I express today are my own, and are not necessarily those of my colleagues on the Board of Governors or the Federal Open Market Committee (FOMC).

² See J Peek, E S Rosengren and G M B Tootell, “Is Bank Supervision Central to Central Banking?” *The Quarterly Journal of Economics*, vol 114, no 2, May 1999, pp 629–53. 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.

See also J Peek, E S Rosengren and G M B Tootell, “Does the Federal Reserve possess an exploitable informational advantage?” *Journal of Monetary Economics*, vol 50, no 4, May 2003, pp 817–39, which found evidence that the Federal Reserve has an informational advantage that can be used to improve monetary policy.

Given the events that have occurred since financial turmoil emerged in July 2007, I am now even more confident that central banks need to have the experience and perspective gained through bank supervision, although the institutional arrangements that can facilitate the acquisition of useful insights from this activity 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 banks are likely to behave is linked to the size of their current and expected future losses, which we, as supervisors with access to internal bank documents and interactions with bank management, can estimate.

Second, banks' balance sheet constraints can transmit financial shocks to the real economy. Banks with capital constraints 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 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 its role as a bank supervisor. These steps, taken by the central bank in its role as a lender of last resort, make it a counterparty to banks, which requires an understanding of banks' liquidity risk and solvency.

Overview: banks and financial turmoil

One can find numerous examples of the critical role played by 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 efforts to lower interest rates through monetary policy, causing the often-cited "headwinds in monetary policy".

A sizeable body of literature indicates that problems in Japan's banking sector played a significant role in that country's so-called "lost decade".³ Also, in the mid-1990s, many Asian

In J Peek, E S Rosengren and G M B Tootell, "Identifying the macroeconomic effect of loan supply shocks", *Journal of Money Credit and Banking*, vol 35, no 6, part 1, December 2003, pp 931–46, the authors found that confidential supervisory information was useful in predicting components of GDP that would likely be dependent on bank financing.

³ See, for example, J Peek and E S Rosengren, "Unnatural selection: perverse incentives and the misallocation of credit in Japan", *American Economic Review*, vol 95, no 4, September 2005, pp 1144–66; and R J Caballero, T Hoshi and A K Kashyap, "Zombie lending and depressed restructuring in Japan", *NBER Working Paper*, no 12129, 2006.

countries found that their banking sectors exacerbated problems that had 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 utilised 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 United States, banks have been providing liquidity to the commercial paper markets, off-balance sheet financial vehicles (such as conduits, special investment vehicles – SIVs – and the like) and 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 – for example, as dealers for municipal auction rate securities. Should they choose to shrink their balance sheets, bank-dependent borrowing and markets where banks are key players could be disrupted.

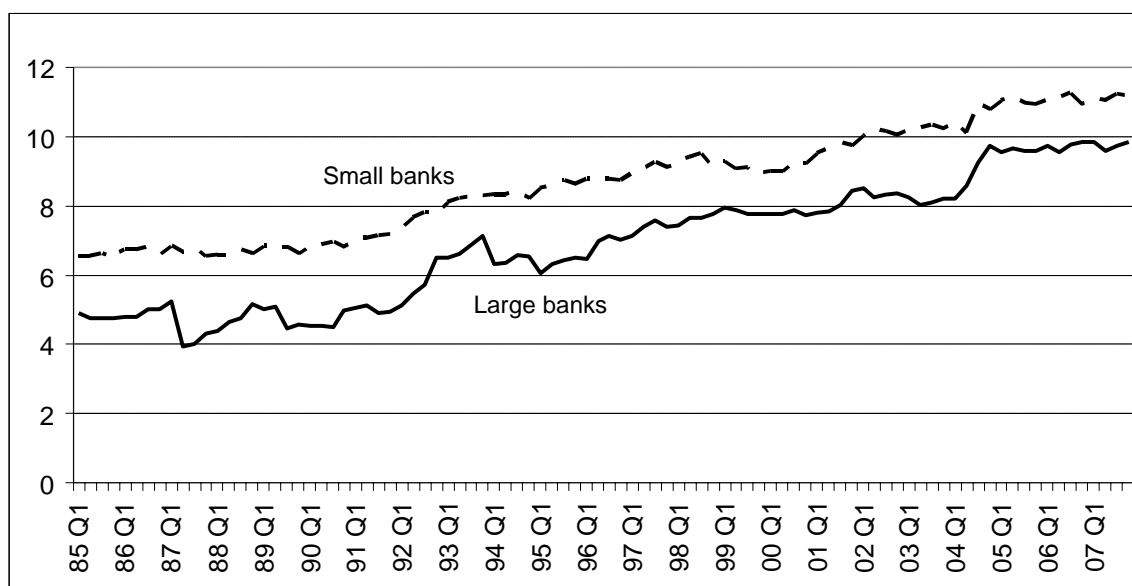
In sum, understanding banks is critical to understanding how financial shocks can be transmitted to the real economy. Unfortunately, understanding how banks are likely to respond to problems requires far more than published financial statements. While US banks report detailed information on their balance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

Estimating losses

The current financial turbulence, like most such episodes, has unexpected sources. In 2006, I met with risk managers from a number of global banks. At that time the risk managers highlighted that they saw little risk emerging from the mortgage market. While they acknowledged the rapid acceleration in residential real estate prices, they emphasised that banks were extremely well capitalised and that internal stress tests indicated that net income would be lower but still positive should real estate prices decline by 10% or even 20% – in other words, there would be a loss of earnings but not of capital. Obviously, events have been more severe than that, and some of the largest financial institutions have found themselves needing to aggressively seek capital infusions.

It is worth highlighting that the banks' observations about being well capitalised were accurate. The attention that regulators have given to capital has caused banks in the United States to be much better capitalised going into these difficulties than they were in the 1990s (see Graph 1).

Graph 1
**Ratio of equity capital to assets at
 US commercial and savings banks, by asset size**
 In per cent



Large banks are banks with assets of \$50 billion or more.

Source: Commercial and savings bank Call Reports.

The introduction of the Basel I and Basel II capital accord frameworks and of modern risk management techniques that focus on value-at-risk modelling has 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 Federal Deposit Insurance Corporation (FDIC)⁴ (see Graph 2) – although there has been some additional deterioration recently.

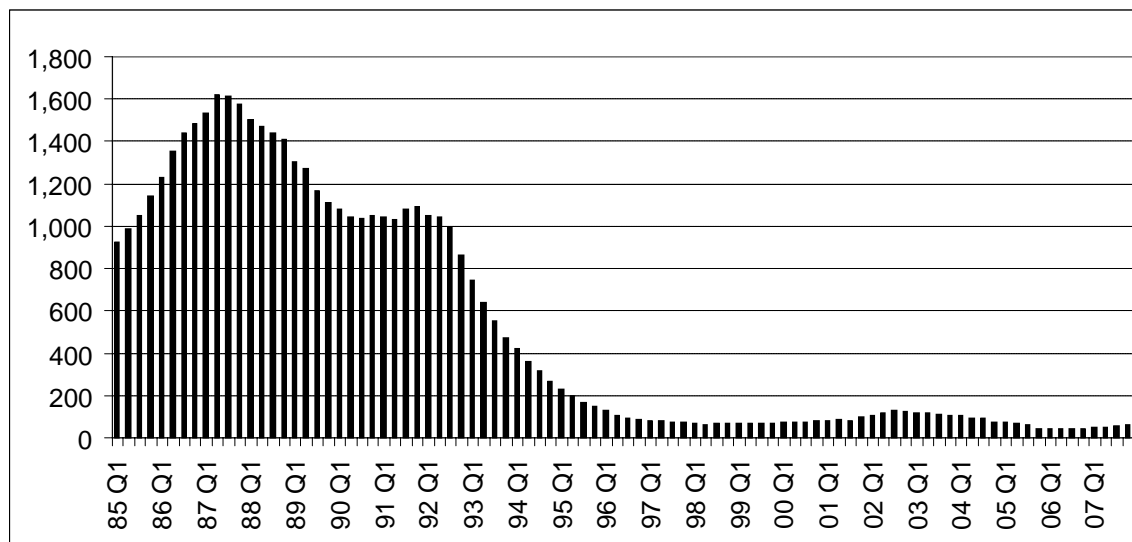
Even with the highly publicised financial turmoil that began in July, most banks remained profitable in 2007 (see Graph 3). While a few banks have announced very significant losses to date, these have been large banks actively engaged in residential mortgage securitisation. Both the number and the share of banks reporting losses in 2007 were well below those of the early 1990s.

So how is it that the stress tests carried out by large global banks did not indicate these banks' 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

⁴ In defining problem institutions in FDIC, *Quarterly Banking Profile*, fourth quarter 2007, the FDIC notes, "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 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." (OTS is the Office of Thrift Supervision.)

holdings of subprime⁵ loans, but most of the large global banks did not have significant exposure in those areas.

Graph 2
Number of problem US commercial and savings banks



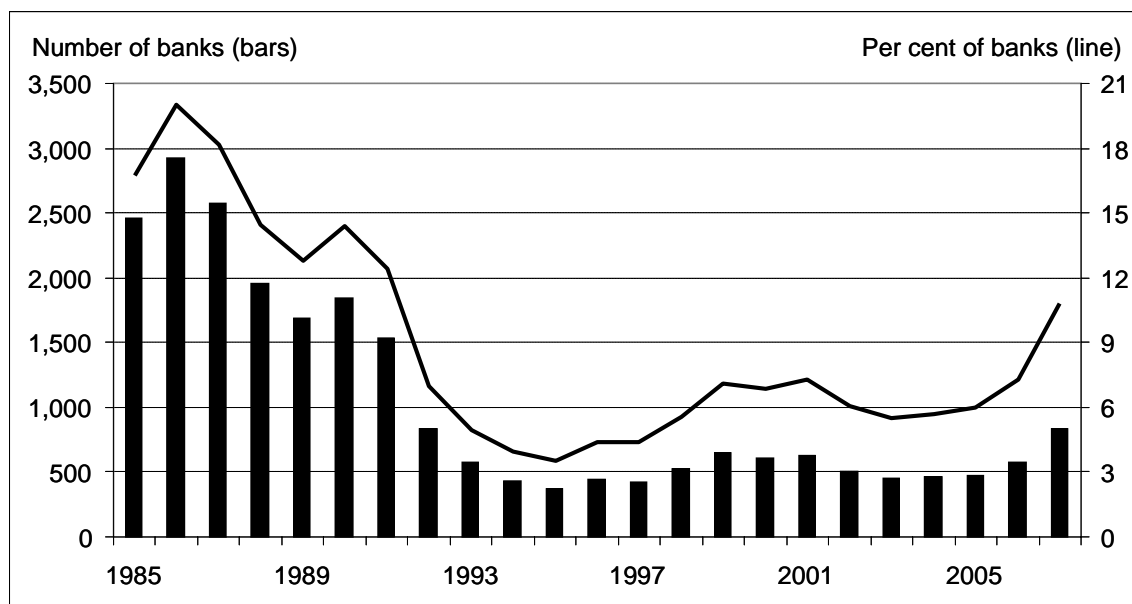
Source: FDIC, *Quarterly Banking Profile*.

What these stress tests crucially failed to capture was the effect of house price declines on the large holdings of highly rated securities held by global banks – the products of mortgage securitisation 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, only the high-risk slices or “tranches” of these securitised pools of mortgages would be affected – and the high-risk tranches were generally not held by

⁵ In essence, subprime loans are mortgage loans that have a higher risk of default than prime loans, often because of the borrowers' credit history, and therefore carry higher interest rates. Certain lenders, typically mortgage banks, may specialise in subprime loans. Banks, especially smaller community banks, generally do not make subprime loans, although a few large banking organisations 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 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.”

US 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 4⁶).

Graph 3
**Number and share of US commercial
and savings banks reporting annual losses**



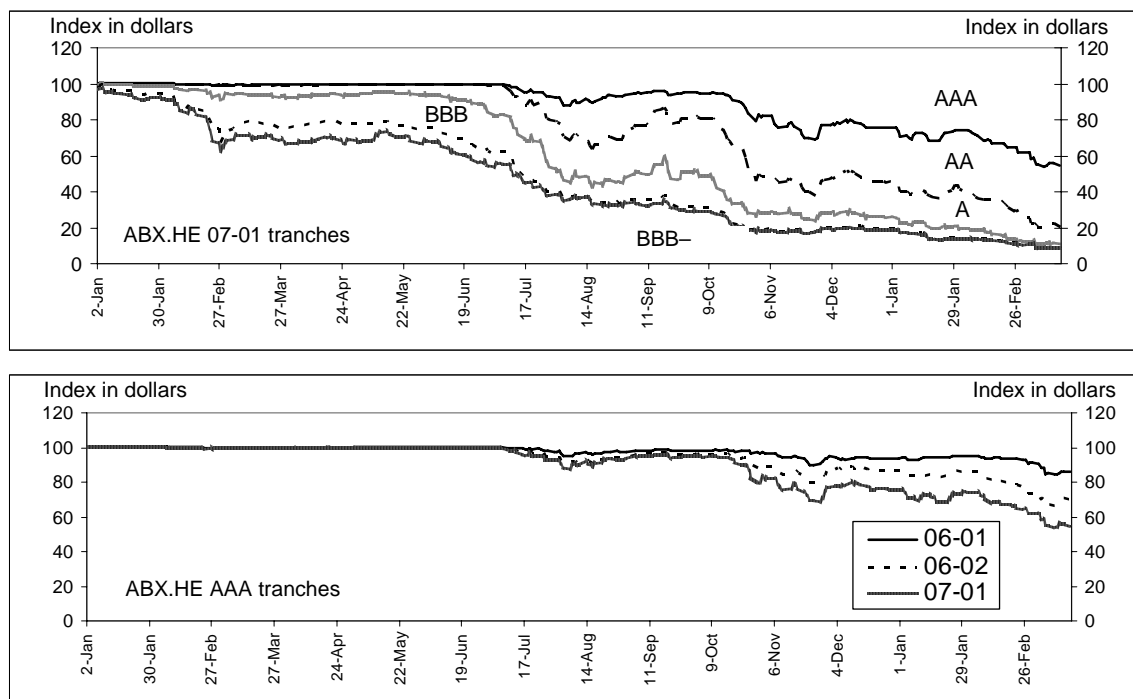
Source: Commercial and savings bank Call Reports.

However, since the financial turmoil starting in July, the triple-A rated securities with payment streams derived from subprime loans have 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 take losses on these high-grade securities only after all lower-graded securities had been wiped out.

Valuation has been made difficult by several factors – including uncertainty over both the number of borrowers that may eventually default on their subprime mortgage loans and 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 sceptical of ratings as an indicator of default probabilities. With few trades taking place – and a large number of those trades qualifying as “distress sales” – the actual worth of many of instruments is difficult to determine with confidence.

⁶ According to D Greenlaw, J Hatzius, A K Kashyap and H S Shin, “Leveraged losses: lessons from the mortgage meltdown”, a paper presented at the 2008 US Monetary Policy Forum on 29 February 2008, “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.”

Graph 4
Markit ABX.HE indices



Markit news releases define the Markit ABX.HE as “a synthetic index of US 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 US subprime home equity securities issued over the previous six months” The ABX.HE-06-01 index was launched on 19 January 2006.

Source: Markit.

However, knowing both the nature of a bank’s exposure to these assets and the possible pricing outcomes is critical to estimating the bank’s potential losses and its management’s likely responses to them, given an environment of falling housing prices and the prevalence of underwriting problems with many subprime loans originated after 2004. Bank supervisors have the ability to get detailed information on banks’ exposures and the current and possible future pricing of the assets.

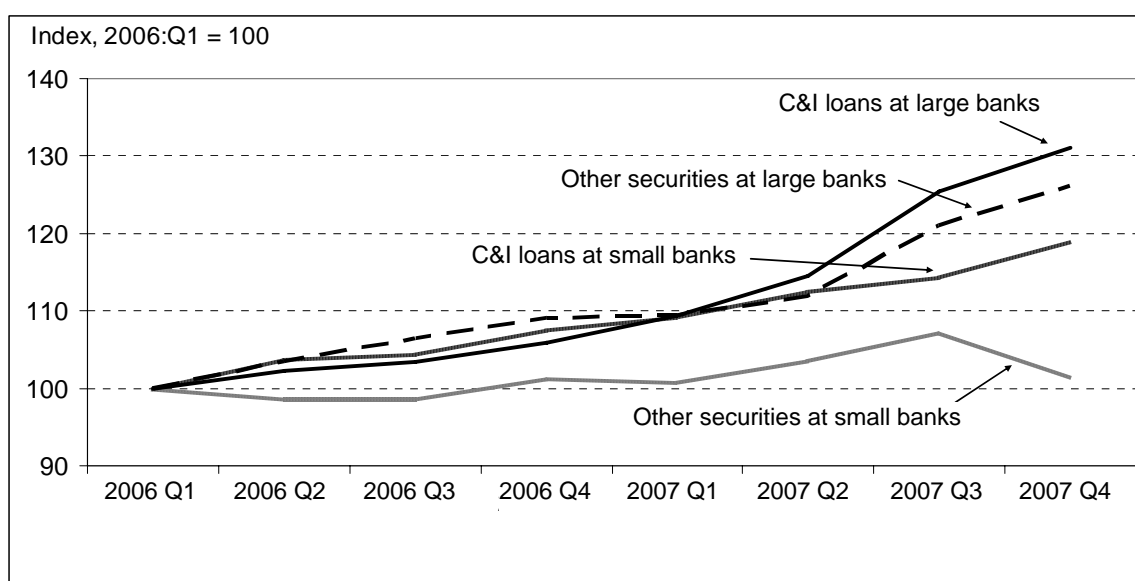
The importance of balance sheet constraints

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 loans in these markets are now difficult to securitise, 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 bank assets in the United States 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.

Graph 5

Balance sheet growth at US commercial and savings banks, by asset size



Large banks are banks with assets of \$50 billion or more. Other securities include all securities except government securities.

Source: Commercial and savings bank Call Reports.

Much of this growth is probably due to “involuntary lending” – that is, banks expanding assets because of previous liquidity commitments made when conditions were more favourable. Factors contributing to the increase in balance sheet assets include the inability to roll over commercial paper⁷ and to sell either leveraged loans originated in the expectation that they would be quickly distributed or assets in the process of being securitised, liquidity triggers forcing the purchase of municipal bonds and expanded use of lines of credit. 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.

Predicting how a bank is likely to respond requires detailed knowledge of its 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 its activity (in other words, to cut back on credit extension) in some areas.

Indeed, calculating how constrained banks are likely to become is not straightforward, requiring, among other things, an understanding of the size of any possible losses that reduce banks’ capital. At the same time, the likely growth in bank assets can also be very

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, putting it on their balance sheets. The combination of uncertainty over the appropriate rating of mortgage-related securities and the expansion of bank balance sheets put significant pressure on the availability of short-term credit. In addition, banks, as liquidity providers, were expanding their balance sheets in other areas, and much of this expansion was not anticipated prior to the financial turmoil. Some banks have had to take writedowns on various assets, and the losses, in combination with involuntary growth in assets, have made some banks reluctant to expand their balance sheets further.

important – and it is virtually impossible to estimate without the kinds of ongoing discussions bank supervisors have with bank management.

Potential for spillover to retail consumption

While the problems at many large banks originated with subprime mortgages and securitisation, 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. The decline in home prices, which is a key driver of subprime defaults,⁸ also erodes the value of the collateral in home equity lines. Thus, geographic areas that are experiencing falling home prices are likely to see a decline in the credit available for home equity lines, even if credit scores have not changed.

Similarly, banks are noticing – perhaps not surprisingly – that non-performing credit card loans have increased more in areas with elevated home foreclosures.⁹ As a result, some banks are re-examining their risk exposure with regard to lines of credit in areas with falling home prices and significant mortgage problems.

Consumers whose credit lines are reduced or limited to loans outstanding lose an important financing option. To the extent that untapped lines of credit serve as a precautionary source of funds, consumers may be less willing to make purchases, and purchases by consumers who find themselves limited to current cash flow are likely to decrease.

Let me emphasise that it is too early to determine the degree to which consumers will be restrained by a lack of credit in the current situation. But the central bank will be able to detect such trends more easily, earlier and with greater accuracy if it has supervisory engagement with financial institutions.

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 held by 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 the 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 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.

Table 1 provides a list of the various initiatives taken recently by the Federal Reserve related to its discount window in an effort to enhance market liquidity and prevent difficulties from

⁸ See K Gerardi, A H Shapiro and P S Willen, "Subprime outcomes: risky mortgages, homeownership experiences and foreclosures", *Federal Reserve Bank of Boston Working Papers*, no W07-15, updated May 2008, at www.bos.frb.org/economic/wp/wp2007/wp0715.htm.

⁹ In his testimony to the US Senate Committee on Banking, Housing and Urban Affairs on 4 March 2008, Federal Reserve Board Vice Chairman Donald Kohn noted that delinquency rates on credit cards and consumer instalment loans had increased over the second half of 2007. He added that the Fed was monitoring these segments of the consumer loan market for signs of spillover from residential mortgage problems and that it was paying particular attention to the securitisation market for credit card loans.

spreading to more institutions and, ultimately, to the real economy and individuals. Because of the complexity of, and institutional details involved in, each of these initiatives, today I will focus on just one, the Term Auction Facility.

Table 1

Recent Federal Reserve initiatives

<ul style="list-style-type: none"> • • • • 	<p>Term Auction Facility (TAF) – each auction (two per month) provides \$50 billion in discount window loans.</p> <p>Expanded collateral for Fed 28-day repurchase agreements – helps dealers finance mortgage-backed securities (MBS) – up to \$100 billion.</p> <p>Term Securities Lending Facility (TSLF) – lends up to \$200 billion in Treasury securities in return for agency and MBS.</p> <p>Primary Dealer Lending Facility (PDLF) – discount window loans available for primary dealers at the primary credit rate.</p>
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For a complete listing of the forms of Federal Reserve lending to financial institutions, see the Federal Reserve Bank of New York’s website, www.newyorkfed.org/markets/Forms_of_Fed_Lending.pdf.

The Term Auction Facility allows banks to obtain short-term financing using, as collateral, a subset of assets that the marketplace currently sees as illiquid. It also provides 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 to get a loan at the discount window. Currently, \$50 billion in loans is available at each auction. The auctions have been well received and have generally resulted in financing rates (determined by the auction) that are somewhat higher than the federal funds rate.

To qualify, a bank needs, first of all, to be in sound financial condition, as the Federal Reserve must have confidence that the bank will be solvent for the term of the loan. While determining the bank’s financial condition is left to the individual Federal Reserve Bank in whose district the institution resides, the Fed 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.

Conclusion

Two years ago, few analysts anticipated significant retail credit and banking problems. At that time, 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, owned indirectly, through securitisation.

The uncertainty surrounding the 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 the backing of institutional liquidity, 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, a central bank incurring potential counterparty risk as a lender of last resort needs to have sufficient information to assess the solvency of its counterparty and the liquidity of the latter's collateral – the same information required by private counterparties.

Much of our understanding of the economy's evolution since July 2007 has been greatly influenced by the 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 them. I believe strongly that at the Federal Reserve, our role as bank supervisors within a central bank has greatly facilitated our ability to operate effectively during this challenging period.