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Financial
System
FSR Report

Bank of Japan
September 2009

This report mainly covers 12 major banks and 108 regional banks.

The 12 major banks comprise Mizuho Bank, The Bank of Tokyo-Mitsubishi UFJ, Sumitomo Mitsui Banking Corporation, Resona Bank, Mizuho Corporate Bank, Saitama Resona Bank, Mitsubishi UFJ Trust and Banking Corporation, Mizuho Trust and Banking Company, The Chuo Mitsui Trust and Banking Company, The Sumitomo Trust and Banking Company, Shinsei Bank, and Aozora Bank. The 108 regional banks comprise the 64 member banks of the Regional Banks Association of Japan and the 44 member banks of the Second Association of Regional Banks, as of March 31, 2009.

In the charts, "I" and "II" represent the first half and second half of the relevant year, respectively.

Unless otherwise stated, this document uses data available as of August 31, 2009.

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Preface

The Bank of Japan publishes the *Financial System Report* biannually with two objectives. The first is to present a comprehensive analysis and assessment of the stability of Japan's financial system. The second is to facilitate two-way communication in order to contribute to the stability of the financial system.

The *Financial System Report* analyzes the stability of the financial system from two perspectives: the functioning of the system and its robustness. The functioning of the system is assessed in terms of whether it promotes an efficient allocation of economic resources, thereby contributing to the sustained development of the economy, in addition to the assessment of the current state. The robustness is assessed in terms of whether the financial system can absorb factors that might jeopardize its stability. Financial system research also provides a valuable insight into the assessment of monetary policy's transmission channels.

The September 2009 issue of the *Financial System Report* examines the stability of Japan's financial system from a macroprudential perspective, while considering the impact of the global financial crisis affecting Japan. In doing so, this issue of the *Report* emphasizes examining the risks inherent in Japan's financial system with a longer time horizon, while bearing in mind financial linkages between home and abroad, a correlation between risks and an adverse feedback loop between financial and economic activities. Amid the ongoing discussions on rebuilding the financial system worldwide, this issue of the *Report* also considers challenges for Japanese financial institutions in supporting the financial intermediation function to promote the sound development of Japan's economy.

The current global financial crisis has shown again that ensuring the stability of the financial system provides a solid foundation for the stability of the national economy from a long-term perspective. Bearing this recognition in mind, the Bank of Japan continues to conduct research and analysis on Japan's financial system and publish those results.

The Current State of Japan's Financial System and Challenges: An Overview

An assessment of the current state of Japan's financial system

1. Japan's financial system has generally been stable, although the effects from the global financial crisis that began in 2008 still remain. Financial conditions for firms' funding have continued to show signs of improvement after deteriorating from the end of 2008 to the beginning of 2009. The capital strength of financial institutions has not been impaired substantially. Risks inherent in Japan's financial institutions – market risk associated with stockholdings and credit risk in particular – have increased relative to their capital levels. Japan's financial institutions need to reinforce their capital strength and improve their risk management in order to perform their financial intermediation function properly.

Financial intermediation function

2. Funding conditions in financial markets, after deteriorating sharply from the autumn of 2008, have continued to show signs of improvement. That is in part due to the ample liquidity provision and special funds-supplying operations by the Bank of Japan. Bank loans to large firms – those to manufacturing firms in particular – have increased significantly. Bank loans to small firms, underpinned by government support, have declined, albeit at a slower pace than during the past recession phases. In terms of interest rates, an expansion in banks' interest rate margins on loans has been contained, despite the heightened credit risk among the firms reflecting the economic downturn. The financial intermediation function of Japan's financial system has generally been maintained to the extent that the adverse feedback loop between financial and economic activities has been contained.

3. In the corporate sector, the financial indicators representing repayment ability have worsened rapidly due to the plunge in sales. Economic conditions have recently stopped worsening and are projected to start recovering at a moderate pace from the second half of fiscal 2009. Firms have drawn up plans to improve their profits from the second half of fiscal 2009. The risk factors in the area of economic activity continue to be highly on the downside, and the severity in firms' business conditions may increase further. Careful attention is warranted as to whether financial institutions can properly perform their financial intermediation function by responding to the changes in firms' demand for funds.

Robustness of the financial system

4. In the situation where credit costs rise and stock prices stagnate, banks' capital bases are not likely to decline substantially. Accordingly, the robustness of Japan's financial system is not impaired as a whole. Nevertheless, banks' expected losses for the next several years could exceed their operating profits from core business, and the capital bases of banks whose capital strength is relatively weak might remain at low levels. Going forward, uncertainty appears to exist as to the sustainability of the robustness of the financial system.

5. The funding liquidity risk of Japan's financial institutions remains contained in terms of yen currency. In terms of foreign currency, while Japan's financial institutions do not have a large gap in the asset/liability structures, those institutions need to stay vigilant as to managing the funding liquidity risk properly, bearing in mind that the

functioning of financial markets could worsen. As for interest rate risk, the difference in maturity of funding and investment has been on an increasing trend, in particular among the regional banks, as a result of increasing home mortgages on the asset side and ordinary deposits on the liability side. Banks need to manage interest rate risk properly, taking those points into consideration.

Challenges for the financial system

6. Japan's financial institutions need to understand the challenges that have accumulated over the years and take action to meet them.

First, Japan's financial institutions should secure stable profit bases and reinforce their businesses by managing credit risk and reflecting their credit risk assessment in pricing. They need to perform the financial intermediation function properly.

Second, Japan's financial institutions should cope with market risk associated with stockholdings. History suggests that stockholdings are unlikely to contribute to enhancing profit. In addition, banks' losses stemming from their stockholdings exceeded their operating profits from core business in the previous two years. Given the magnitude of the risk associated with stockholdings, those financial institutions need to step up their efforts to reduce that risk.

Third, Japan's financial institutions should strengthen their capital bases. They need to be able to cope with the risks that might materialize due to the changes in economic and financial circumstances. It is essential that they strengthen their capital bases through recapitalization as well as accumulation of the retained earnings.

Finally, Japan's financial institutions should prepare a solid foundation for the autonomous financial intermediation function, while the role of public support in alleviating the strains in firms' funding conditions is likely to be reviewed in the future. For Japan's economy to achieve sound development in the medium to long term, financial institutions are required to assess firms' growth potential and stability, and provide financial services accordingly. They are expected to contribute to furthering Japan's efficient resource allocation through the pricing mechanism.

Policy responses

7. In Japan, various policies have been implemented on the financial, monetary, and financial system fronts in order to cope with the global financial crisis.

With a view to supporting Japan's economy on the monetary policy side, the Bank of Japan, since last autumn, has carried out (a) reductions in the policy interest rate, (b) measures to secure financial market stability, and (c) special funds-supplying operations to facilitate corporate financing. On the financial system front, the Bank has conducted research and analysis of the financial system stability from a macro perspective by carrying out on-site examination and off-site monitoring in order to gauge each individual financial institution's business conditions and verify their risk management. Furthermore, the Bank uses information on financial market developments in its assessment of the financial system stability. Based on these analyses and assessments, the Bank has resumed its purchases of stocks held by banks and has provided subordinated loans to them in order to secure the stability of the financial system.

The Bank of Japan gives advice and guidance to individual financial institutions with respect to, for example, risk management. Furthermore, the Bank, from a macroprudential perspective, intends to properly assess the current state of the financial system and the challenges facing it. From the Bank's viewpoint, its assessment provides an insight into its policy making, thereby contributing to the stability of Japan's financial system.

I. Changes in the Environment Surrounding Japan's Financial System

This chapter provides a brief review of developments in the global economy and the global financial system. It then examines the impact on Japan's economy and financial system. Chapter II will discuss developments in the financial intermediation function, and Chapter III will discuss the robustness of the financial system.

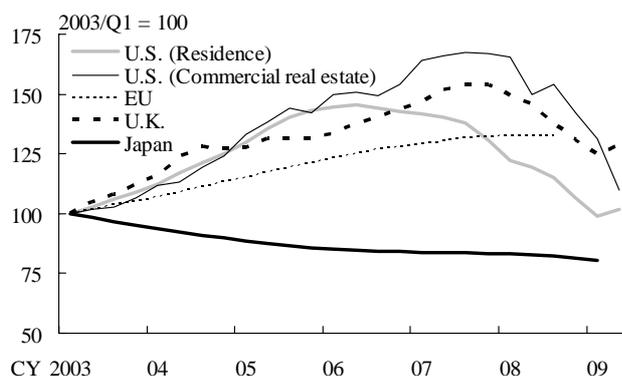
A. Developments in the Global Economy and the Global Financial System

1. Adjustment of financial imbalance

The turmoil in the global financial system stemming from the U.S. subprime mortgage problem evolved into the global financial crisis after the bankruptcy of Lehman Brothers in the autumn of 2008. A rapid decline in financial markets' functions occurred after the autumn of 2008. Financial institutions faced a deterioration in business conditions and became extremely cautious. An adverse feedback loop between financial and economic activities emerged. Currently, in the autumn of 2009, the economy is beginning to show signs of bottoming out, and the global financial system is regaining stability, partly because each country has taken aggressive policy measures. Nonetheless, global financial conditions are still in a severe situation, and the global financial system remains fragile.

Commercial real estate prices have declined along with housing prices in the United States (Chart 1-1). The leverage ratio of the U.S. household sector, which had been rising before 2007, began a modest downtrend after 2008, reflecting worsening employment and declining collateral margin (Chart 1-2). The adjustment

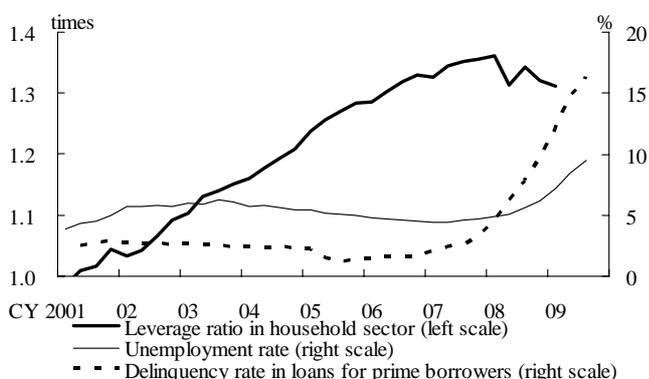
Chart 1-1: Global Real Estate Prices¹



Note: 1. U.S.(Residence): S&P/Case-Shiller index, U.K.: Nationwide house price index, Japan: Urban land price index (Residence), EU: Residential property price index statistics, U.S.(Commercial real estate): Moody's/Commercial property index.

Sources: Standard and Poor's; Moody's; Nationwide; Japan Real Estate Institute; ECB.

Chart 1-2: Financial Conditions in the U.S. Household Sector^{1,2}

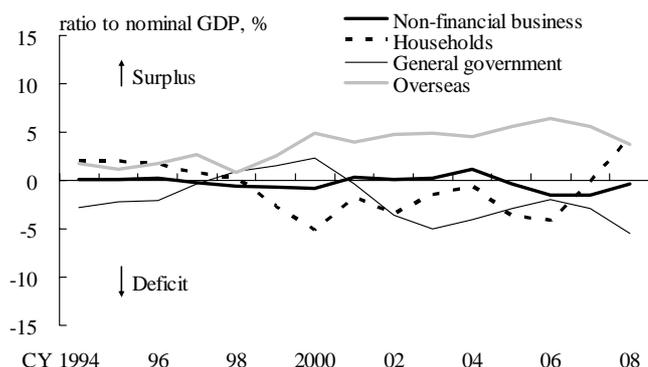


Notes: 1. Leverage ratio = financial debt/disposable earnings.

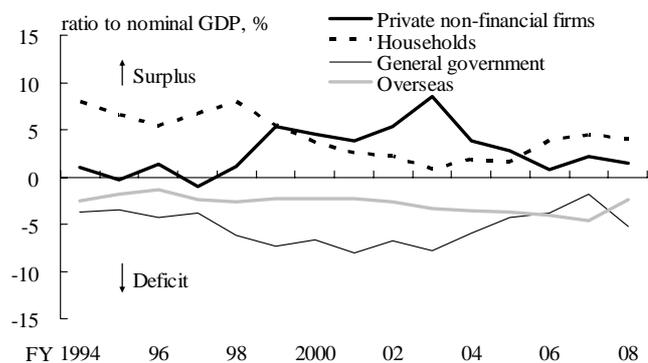
2. Loans for prime borrowers are the loans whose borrowers are graded above a certain level in the FICO score and meet a requirement of lending.

Sources: FRB, "Flow of Funds Accounts of the United States"; Bureau of Economic Analysis, "National Economic Accounts"; Bureau of Labor Statistics, "Labor Force Statistics"; Bloomberg.

Chart 1-3: Financial Surplus/Deficit
United States

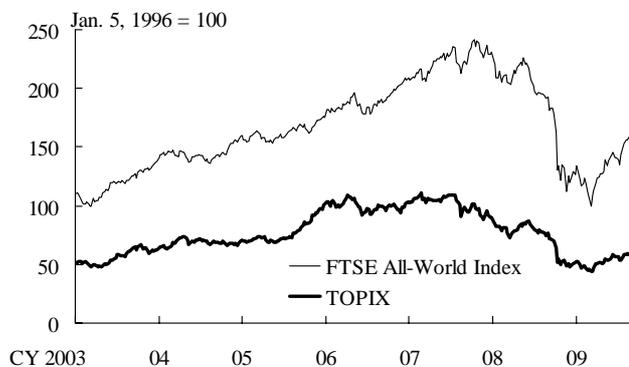


Japan



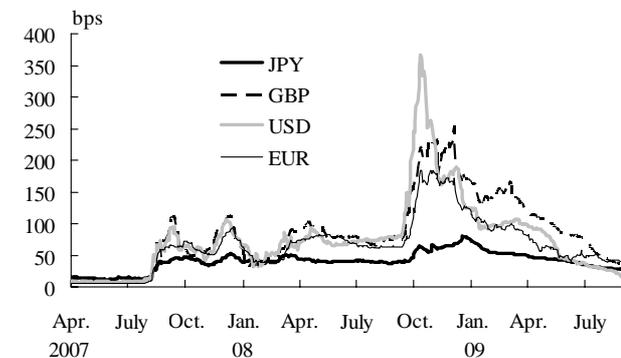
Sources: FRB, "Flow of Funds Accounts of the United States"; Bank of Japan, "Flow of Funds Accounts."

Chart 1-4: Stock Prices in Japan and the World



Sources: FTSE; Tokyo Stock Exchange.

Chart 1-5: Three-Month Spreads between LIBOR and OIS



Sources: Bloomberg; Meitan Tradition.

of household balance sheets is still in progress.

2. Changes in the flow of funds

The deleveraging in the U.S. household sector appears to bring about large changes in the flow of funds among sectors of the U.S. and Japan's economies. The balance of the household sector in the United States turned to surplus for the first time after 1998. In the United States, the Flow of Funds Accounts show that the general government sector increased deficits, reflecting the increase in fiscal expenditure in response to the worsening economy (Chart 1-3). In Japan, the deficit of the overseas sector decreased significantly due to a sharp drop in net exports, and the general government sector increased its deficit due to an increase in fiscal expenditure, similar to that in the United States.

3. Developments in the global financial markets

Turbulence in the global financial markets has intensified after the bankruptcy of Lehman Brothers. While financial markets are currently showing signs of improvement, uncertainty still persists (see the August 2009 issue of the *Financial Markets Report*, Bank of Japan).

In stock markets, stock prices around the world recovered somewhat due to dissipating concern over the financial system and rising expectations for economic recovery (Chart 1-4). The spread between interbank interest rates on term instruments and the overnight index swap (LIBOR-OIS spread) for major currencies, one of the indicators for measuring the funding liquidity risk of financial institutions, narrowed to the levels seen prior to September 2008 (Chart 1-5). These improvements in market function are to some degree supported by the policy measures undertaken by governments and central banks.

However, additional time may be required for a self-sustaining recovery of market functions.

The credit default swap (CDS) premiums for major financial institutions of the United States and Europe trended downward after March 2009 with some degree of volatility, and reached the levels seen prior to September 2008 (Chart 1-6).

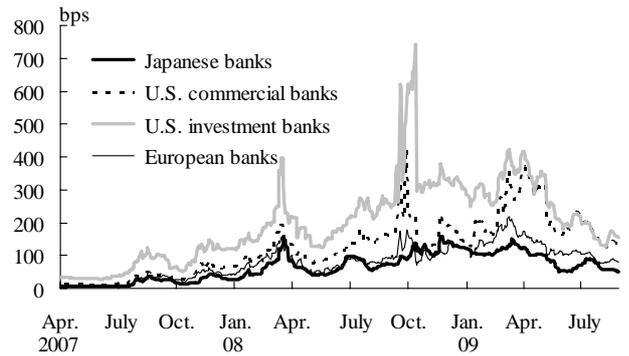
4. Effects on international financial institutions' behavior

Turbulence in the global financial markets has also had an effect on the behavior of financial institutions in major countries.

Major financial institutions in the United States and Europe continued to raise capital after the end of 2008, making use of both public funds and capital raising via the market, for fortifying their capital bases impaired by nonperforming loans (Chart 1-7). Market assessments remained uncertain for financial institutions in terms of sufficiency of capital, while the adverse feedback loop between financial and economic activities continued. However, the supervisory capital assessment program (SCAP) undertaken by the U.S. authorities in May 2009 reduced uncertainty about financial conditions of major financial institutions in the United States.

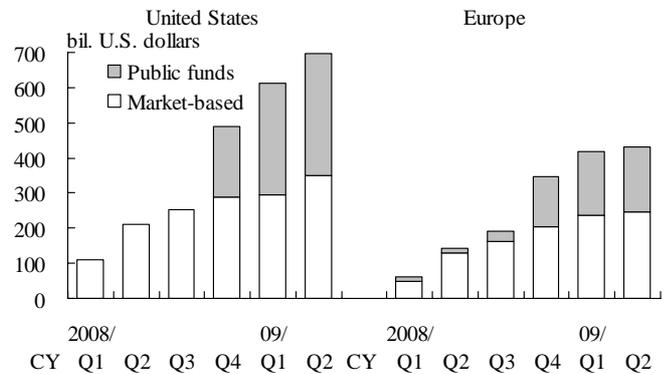
The U.S. and European financial institutions became extremely cautious in lending, reflecting declines in real estate collateral values and increases in mortgage delinquency rates. Their lending attitude remains tight, although the degree of tightness recently narrowed to some extent (Chart 1-8).

Chart 1-6: CDS Premiums of Major Banks^{1,2}



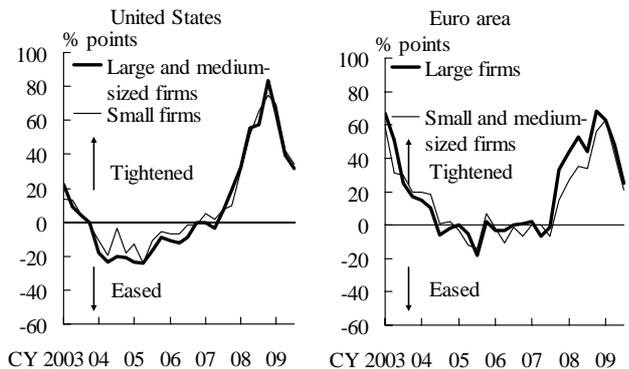
Notes: 1. The values are calculated as the simple average of the CDS premiums.
 2. Financial institutions in Japan, U.S. commercial banks, U.S. investment banks and European banks consist of 3, 5, 5 and 9 financial institutions, respectively.
 Sources: Tokyo Financial Exchange; Bloomberg.

Chart 1-7: Capital Raised by the U.S. and European Financial Institutions^{1,2}



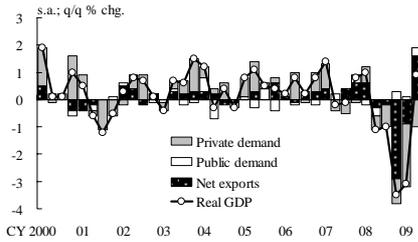
Notes: 1. Figures are accumulated using data from July 2007.
 2. The values are the sum of those of brokerage firms, insurance companies and GSEs, as well as banks. Financial institutions in the United States and Europe are the sum of 43 and 45 financial institutions, respectively.
 Source: Bloomberg.

Chart 1-8: Lending Attitude of the U.S. and European Financial Institutions¹



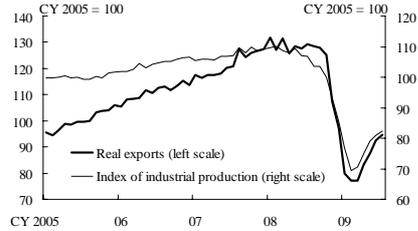
Note: 1. The values are net percentage of respondents' tightening standards for loans.
 Sources: FRB, "Senior Loan Officer Opinion Survey on Bank Lending Practices"; ECB, "The Euro Area Bank Lending Survey."

Chart 1-9: Real GDP



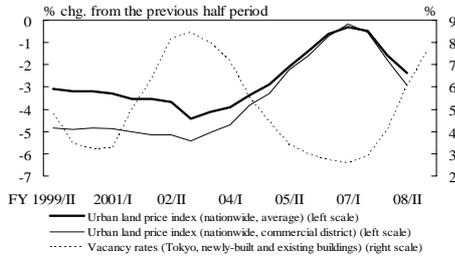
Source: Cabinet Office, "National Accounts."

Chart 1-10: Production and Exports



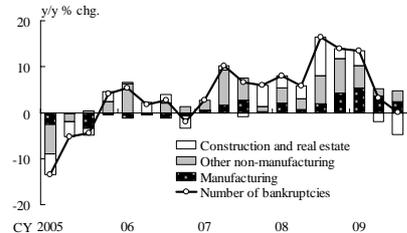
Sources: Bank of Japan, "Real Exports and Real Imports"; Ministry of Economy, Trade and Industry, "Indices of Industrial Production."

Chart 1-11: Real Estate Market Conditions¹



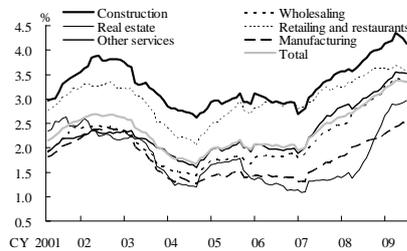
Note: 1. Vacancy rate for the first half of fiscal 2009 is that for July. Sources: Japan Real Estate Institute; Miki Shoji Co., Ltd.

Chart 1-12: Number of Cases in Corporate Bankruptcies



Source: Tokyo Shoko Research, "Tosan Geppo (Monthly Review of Corporate Bankruptcies)."

Chart 1-13: Default Probability by Type of Industry¹



Note: 1. Default probability is defined as follows: borrowers downgraded to the category of "more than three months overdue," "in danger of bankruptcy," or worse for the first time in the past 12 months are assumed to have defaulted and considered as numerators. Within borrowers classified as "normal" or "need attention" at the end of March in the previous year, those that do not correspond to the above definition in the preceding terms are considered as denominators.

Source: The Risk Data Bank of Japan, Ltd. "RDB Kigyō Default Ritsu (Corporate Default Probability)."

B. Effects on Japan's Economy and Financial System

1. Macroeconomic environment in Japan

Amid the turmoil in the global financial system and the deterioration of the global economy, economic conditions in Japan deteriorated significantly in the October-December quarter of 2008, mainly because exports declined substantially (Chart 1-9). The quarter-on-quarter real GDP growth rate turned positive in the April-June quarter of 2009, but exports and industrial production remained at significantly low levels, compared with those before the autumn of 2008 (Chart 1-10). Stock prices were on a declining trend toward early March 2009, following deterioration in economic conditions around the world and heightened concern over the financial system stability, particularly in the United States and Europe. They then picked up, partly reflecting announcements on solid corporate earnings (Chart 1-4). The pace of decline in land prices increased for three consecutive periods after the second half of fiscal 2007, while vacancy rates for offices increased (Chart 1-11).

Bankruptcies still remain at a high level, although the pace of increase is slowing (Chart 1-12). Bankruptcies in the construction and real estate sectors declined on a year-on-year basis after a sharp rise in the previous year, but bankruptcies in the manufacturing sector rose. The default probability of industrial sectors showed signs of leveling off for the construction and real estate sectors, but still on an increasing trend for the manufacturing and other sectors (Chart 1-13).

According to the diffusion index (DI) for firms' financial position, the proportion of firms with "tight" funding conditions far exceeded the proportion of firms with "easy" funding conditions. At present, the index shows signs of improvement, although the

proportion of firms with "tight" funding conditions still remains at an elevated level (Chart 1-14).

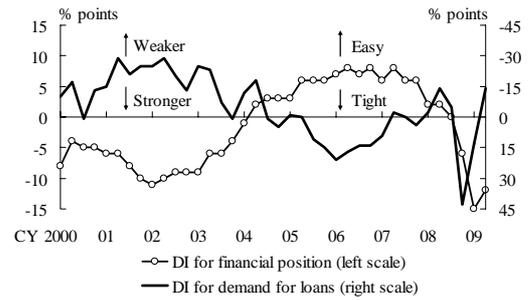
According to the DI for firms' demand for loans from the perspective of financial institutions, the proportion of respondents selecting stronger demand rose sharply after the autumn of 2008. At present, the proportion of respondents selecting weaker demand is rising, reflecting the improvement in the CP and corporate bond market.

The funding conditions continued to be severer for small firms than for large firms according to the DI for financial positions by firm size (Chart 1-15). To support small firms' funding, the "emergency guarantee program to cope with material price hikes" (hereafter, the emergency guarantee program) was launched at the end of October 2008 and increased the guarantee ratios of the credit guarantee corporations to 100 percent. Comparing the emergency guarantee program with the "special guarantee program for financial stability of small firms" (hereafter, the special guarantee program) introduced in October 1998, the amount of emergency guarantees approved in the first three months was lower than that of the special guarantees, but the former started to exceed the latter from the fourth month onwards (Chart 1-16). However, the credit guarantee corporations' subrogation amounts have been at high levels since fiscal 2008, reflecting a deterioration of business conditions for small firms (Chart 1-17).

2. Banks' financial results in fiscal 2008

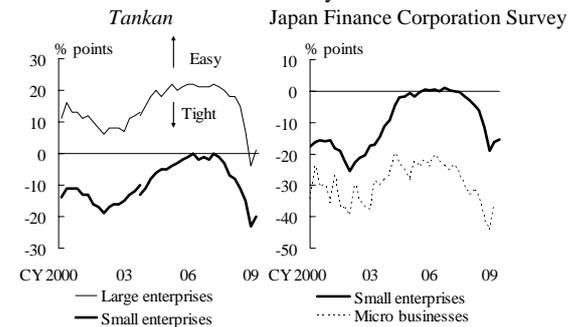
In fiscal 2008, both the major banks and the regional banks recorded net losses for the first time after fiscal 2003 (Chart 1-18). The factors behind this are that (1) operating profits from core business declined mainly due to the decrease in non-interest income reflecting sluggish sales in investment trusts; (2) realized losses

Chart 1-14: DI for Financial Position and Demand for Loans



Sources: Bank of Japan, "Tankan, Short-Term Economic Survey of Enterprises in Japan," "Senior Loan Officer Opinion Survey on Bank Lending Practices at Large Japanese Banks."

Chart 1-15: DI for Financial Positions by Firm Size^{1,2}

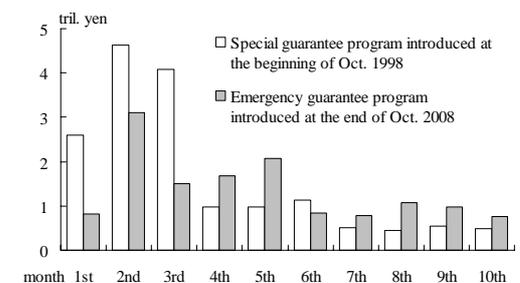


Notes: 1. Japan Finance Corporation Survey results for small enterprises are DI of "easy" - "tight" and those for micro businesses are DI of "easier" - "tighter."

2. Figures for small enterprises surveyed by Japan Finance Corporation are quarterly average of monthly results. The figure for the third quarter in 2009 is the average of July and August.

Sources: Bank of Japan, Tankan; Japan Finance Corporation, "Monthly Survey of Small Businesses in Japan," "Quarterly Survey of Small Businesses in Japan (for micro businesses)."

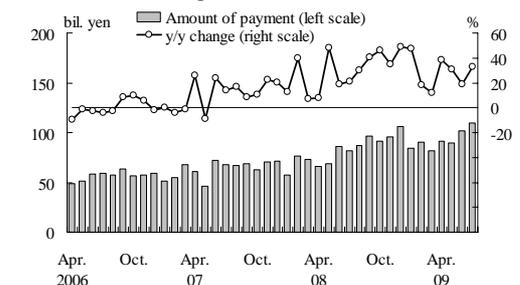
Chart 1-16: Acceptance of Applications for Credit Guarantee Following the Introduction of the Program¹



Note: 1. Acceptance of applications for the emergency guarantee program for the first month following the program's introduction is the total from October 31 up to November 28 in 2008.

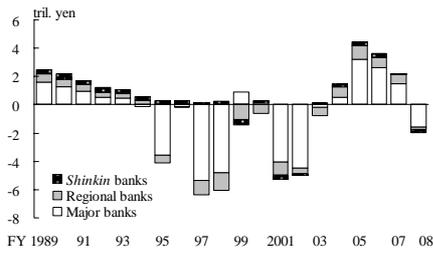
Source: Small and Medium Enterprise Agency.

Chart 1-17: Amount of Payment under Guarantee by the Credit Guarantee Corporations



Source: National Federation of Credit Guarantee Corporations.

Chart 1-18: Net Income/Loss at Banks and *Shinkin* Banks¹



Note: 1. Figures for *shinkin* banks are the sum of those that hold accounts at the Bank of Japan. The number of those *shinkin* banks is 266 at the end of March 2009.

Chart 1-19: Contributions to Changes in Net Income/Loss at Banks

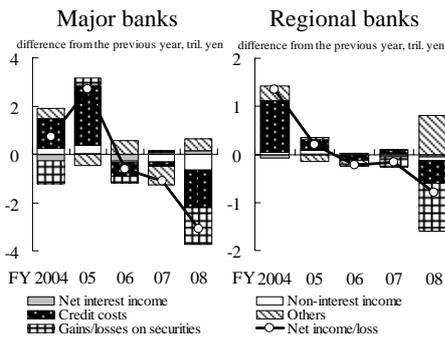


Chart 1-20: Operating Profits from Core Business at Banks

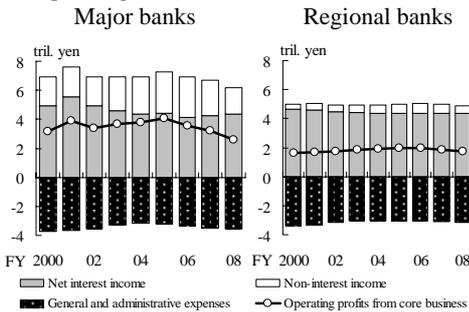


Chart 1-21: Non-Interest Income at Banks

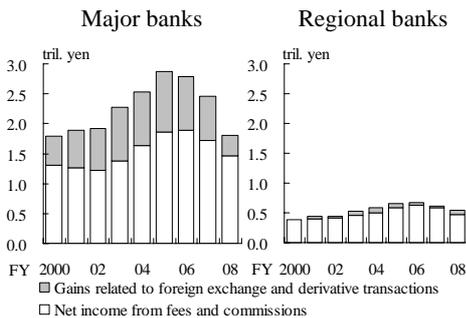
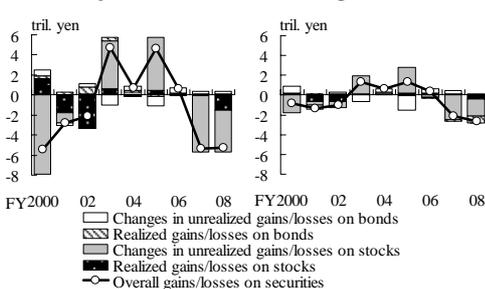


Chart 1-22: Overall Gains/Losses on Securities at Banks



on securities increased sharply with higher write-off losses and losses on sales of stocks; and (3) credit costs rose dramatically with the deterioration in borrowers' businesses and the rise in bankruptcy (Charts 1-19, 1-20 and 1-21; for details, see "Financial Statements of Japanese Banks for Fiscal 2008," *Bank of Japan Review*, No. 2009-E-5, August 2009).

Both the major banks and the regional banks registered large overall losses on securities for two consecutive years, measured by the sum of realized gains/losses on securities and changes in unrealized gains/losses on securities (Chart 1-22). The amount of such losses reached 5.3 trillion yen for the major banks and 2.7 trillion yen for the regional banks, roughly twice the amount of operating profits from core business for both groups of banks.

Credit costs increased sharply from the previous year with higher loan-loss provisions and write-offs (Chart 1-23). The credit cost ratio rose to 72 bps for the major banks and 58 bps for the regional banks. The current level of credit costs was much lower than that in the early 2000s in spite of the postwar peak in bankruptcies of listed firms and a continuing and large deterioration of economic conditions in fiscal 2008. Still, credit costs reached roughly 70 percent of operating profits from core business for the major banks, and 60 percent for the regional banks. Credit costs have a significant impact on banks' profits.

In addition, there was a sharp increase in the number of rating downgrades for banks in the first half of 2009, suggesting that severe assessment for Japanese financial institutions persists in the financial markets (Chart 1-24).

In the April-June quarter of 2009, sluggish sales of investment trusts continued, but both restrained credit costs and an improvement in realized gains/losses on

securities reflecting stock price recovery contributed to a pick-up of net income/loss.

3. Banks' capital

As of the end of fiscal 2008, capital adequacy ratios for the major banks and the regional banks reached 11.9 percent and 10.7 percent, respectively. Both figures represent an improvement of 0.2 percentage point from the end of fiscal 2007 (Chart 1-25). Tier I capital ratios reached 7.9 percent and 8.7 percent for the major banks and the regional banks, respectively, showing an improvement of 0.2 percentage point for both groups of banks.

For the major banks, total capital decreased from the previous year mainly due to a decline in retained earnings and an increase in unrealized losses on securities. This was more than offset by a larger decrease in risk assets (Chart 1-26). Among the components of on-balance-sheet risk assets, corporate exposures declined sharply mainly due to the adoption of the Advanced Internal Ratings-Based (AIRB) approach by some of the major banks (Chart 1-27).

For the regional banks, total capital maintained the level of the previous year. Behind this is the partial relaxation of capital adequacy requirements, which allowed banks to reduce unrealized losses on securities deducted from total capital. Risk assets slightly decreased partly due to an increase in publicly guaranteed loans.

The amount of risks relative to the level of Tier I capital increased sharply while Tier I capital decreased (Chart 1-28). Credit risk that had been contained turned upward, and market risks associated with stockholdings increased sharply.

Chart 1-23: Credit Costs and Credit Cost Ratio at Banks
Major banks Regional banks

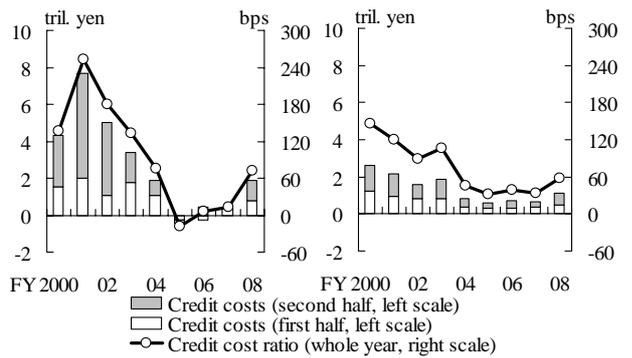
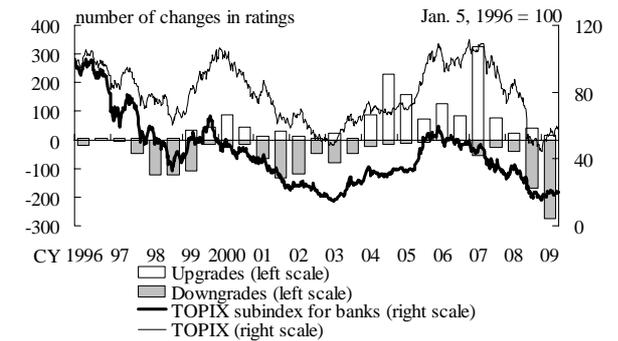
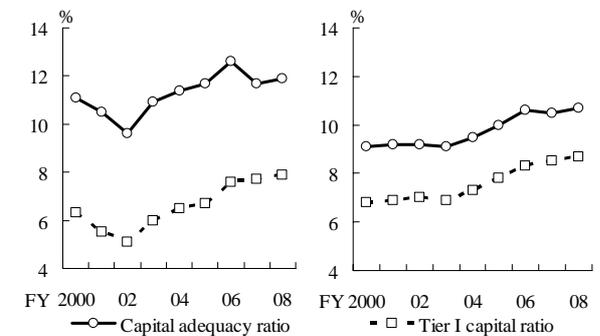


Chart 1-24: Prices of Bank Stocks and Credit Rating¹



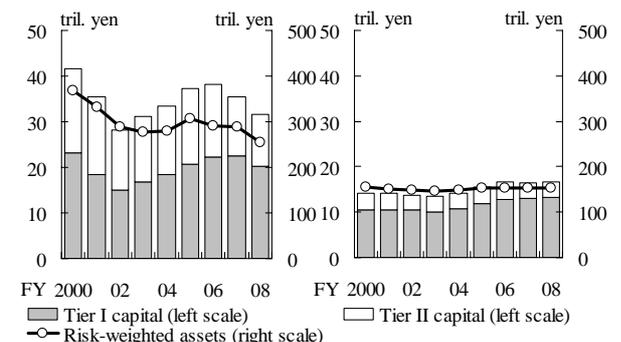
Note: 1. The number of upgrades and downgrades is the sum of the number of changes in ratings made by the following credit rating agencies: Moody's Investors Service, Standard and Poor's, Fitch Ratings, Rating and Investment Information, and Japan Credit Rating Agency. Figures of CY 2009 are as of June 30, 2009. Sources: Tokyo Stock Exchange; Bloomberg.

Chart 1-25: Capital Adequacy Ratios at Banks¹
Major banks Regional banks



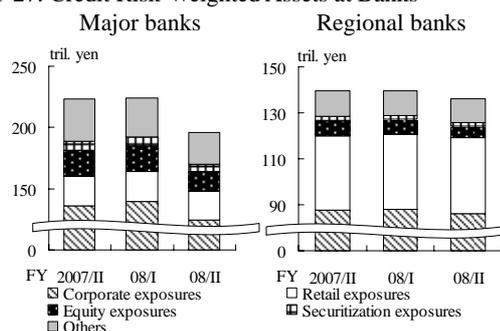
Note: 1. On a consolidated basis.

Chart 1-26: Capital and Risk-Weighted Assets at Banks¹
Major banks Regional banks



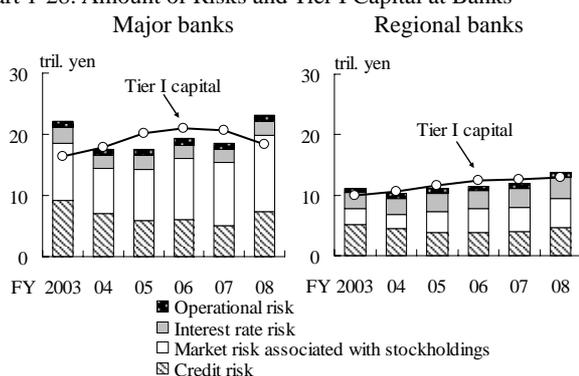
Note: 1. On a consolidated basis.

Chart 1-27: Credit Risk-Weighted Assets at Banks¹



Note: 1. On-balance-sheet assets on a consolidated basis.

Chart 1-28: Amount of Risks and Tier I Capital at Banks^{1,2,3,4,5}



Notes: 1. Bank of Japan estimation.

2. Operational risk is defined as 15 percent of gross profits based on the Basel II basic indicator approach.
3. Interest rate risk is limited to yen-denominated bond portfolios and calculated by the same method as in Chart 3-16.
4. Market risk associated with stockholdings is measured using TOPIX as a risk factor, given 1-year holding period and 99 percent VaR.
5. Credit risk is calculated by subtracting the expected loss (EL) from the maximum loss (EL + UL) based on the Basel II risk weight formulas with a confidence interval of 99 percent. In the estimation, borrowers classified as requiring "special attention" or below (in terms of credit quality) are considered to be in a state of default.

Chart 1-29: Operating Profits from Core Business at the *Shinkin* Banks

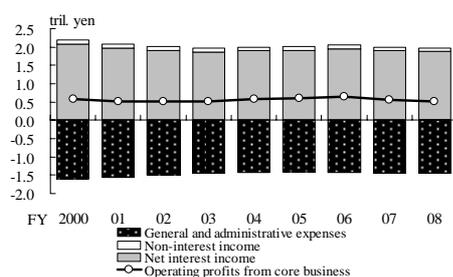
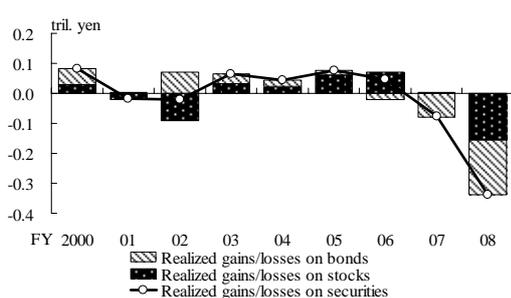


Chart 1-30: Realized Gains/Losses on Securities at the *Shinkin* Banks



4. Financial results of *shinkin* banks in fiscal 2008

Shinkin banks that hold accounts at the Bank of Japan (hereafter, the *shinkin* banks) recorded a net loss for the first time after fiscal 2002 due to a decline in operating profits from core business and a significant deterioration in realized gains/losses on securities (Chart 1-18).

Operating profits from core business declined for two consecutive years. Net interest income declined because of smaller interest margin on loans. In short, operating profits declined to a level similar to the level in fiscal 2002 when a net loss was last reported (Chart 1-29).

Realized gains/losses on stocks largely deteriorated. Realized gains/losses on bonds also worsened mainly due to write-off losses on foreign securities (Chart 1-30).

5. Financial results of securities companies in fiscal 2008

Japanese securities companies registered a net loss for two consecutive years in fiscal 2008, mainly due to a large decrease in net operating profits, while "selling, general and administrative expenses" declined as a result of falling personnel expenses (Chart 1-31). The primary factor driving down net operating profits was a decline in "other fees received" as well as "commissions to consignees" (Chart 1-32).

In the April-June quarter of 2009, revenues from retail sales improved amid recovering stock prices, and an increase in public stock offerings also supported a recovery in operating revenues.

C. Japan's Policy Response

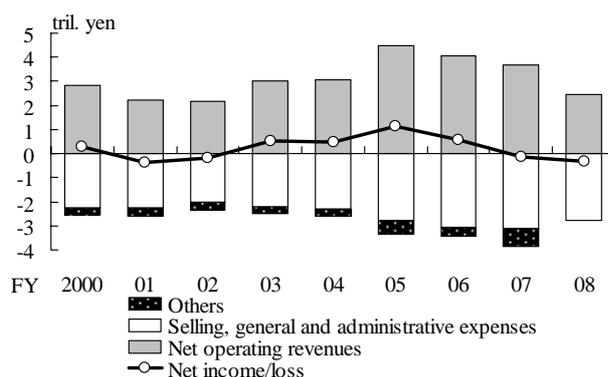
Amid the deterioration in the financial and economic environment, policy measures were formulated in terms of fiscal policy, monetary policy, and financial system policy. The efforts directed at policy formulation by the government and the Bank of Japan continue in fiscal 2009.

First, the government introduced emergency policy measures focusing on support for employment, financial measures, and front loading for public works projects in the "Policy Package to Address Economic Crisis" on April 10, 2009. Of particular importance from the perspective of facilitating the financial intermediation function was the encouragement of the use of the measures made available in the Act on Special Measures for Strengthening Financial Functions. To support funding for small firms, the credit guarantee corporations offered an additional 10 trillion yen in emergency guarantee facilities, and the total guarantee facility amounted to 30 trillion yen. The Japan Finance Corporation also added 3 trillion yen to its safety net lending facility, and the Shoko Chukin Bank added 2.4 trillion yen to its lending facility.

The Bank of Japan has taken several measures to support the economy from the financial front. The policy measures formulated after the autumn of 2008 were (1) cutting policy rates, (2) introducing measures to ensure the stability of financial markets, and (3) implementing special funds-supplying operations to facilitate corporate finance.

As for policy measures taken after April 2009, the Bank expanded the range of eligible collateral for loans on deeds to the government and those with government guarantees in April 2009. It also started to accept loans on deeds to municipal governments as eligible

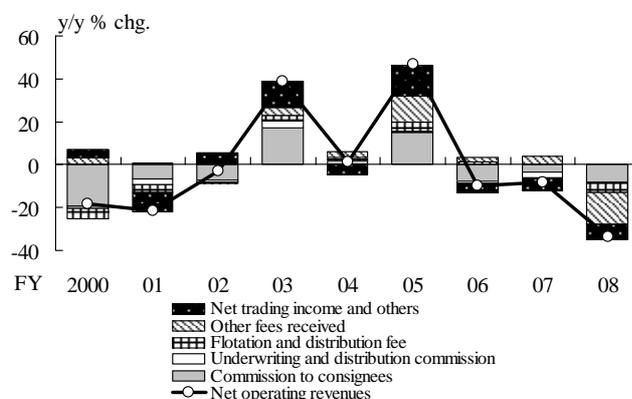
Chart 1-31: Net Income/Loss of Securities Companies¹



Note: 1. Financial statements of 315 members of Japan Securities Dealers Association as of end-March 2009 are aggregated on a non-consolidated basis.

Source: Japan Securities Dealers Association.

Chart 1-32: Contributions to Changes in Net Operating Revenues at Securities Companies¹



Note: 1. Other fees received include commissions related to arrangement of M&A, securitization, etc., and agency commissions of investment trusts.

Source: Japan Securities Dealers Association.

collateral. These measures enabled the Bank to supply funds more proactively. To ensure stability in the financial markets through facilitating money market operations in view of the developments in domestic and overseas financial markets, the Bank established "Collateral Guidelines on Eligible Foreign Bonds" in May 2009, allowing government bonds issued by the United States, the United Kingdom, Germany, and France in their home currencies to be used as qualified collateral.

In July 2009, the Bank also extended the period for which temporary measures, such as outright purchase of CP and corporate bonds and special funds-supplying operations to facilitate corporate finance, will remain in effect. The complementary deposit facility and U.S. dollar funds-supplying operations were also extended.

The Bank of Japan also formulated policy measures to secure the stability of the financial system on the financial system front. First, it decided to resume its purchases of stocks held by financial institutions on February 3, 2009, and the total purchase amounted to 38.1 billion yen at the end of August 2009. In April 2009, the Bank established principal terms and conditions for provision of subordinated loans by enabling Japan's financial institutions to maintain a sufficient capital base, and thereby facilitating the financial intermediation function and stabilizing the financial system. Auctions were held on May 29 and August 27, 2009. Additional auctions are to be held twice, on November 26, 2009 and February 24, 2010.

II. Financial Intermediation Function

This chapter analyzes the developments in the financial intermediation function. Amid the global financial crisis after the autumn of 2008, corporate financing conditions in Japan tightened sharply, in particular toward the end of 2008. Bank lending increased on the whole, supporting firms' funding. One of the reasons behind the increase in bank lending is the strengthening of firms' financial base (for details, see the March 2009 issue of the *Financial System Report*).

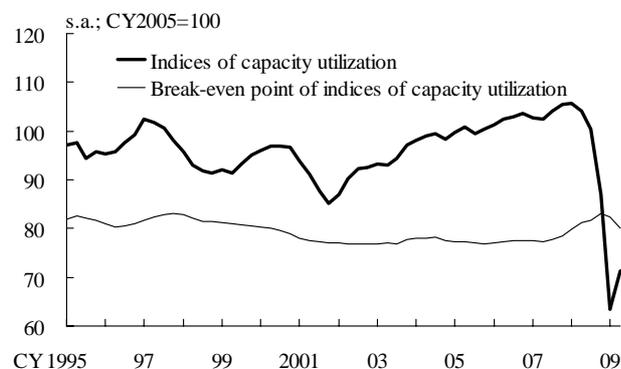
The production activity in Japan's economy declined substantially and the condition for firms' profits deteriorated. Against such a background, changes are taking place with respect to firms' financial conditions and their funding. In the following sections, the soundness of firms' financial conditions is first examined. The developments in bank lending and other funding for firms are then analyzed, taking account of the following perspectives: (1) how bank lending during the current economic downturn has performed compared to past economic downturns; and (2) to what extent policy measures by the public sector have been effective.

A. Firms' Financial Conditions

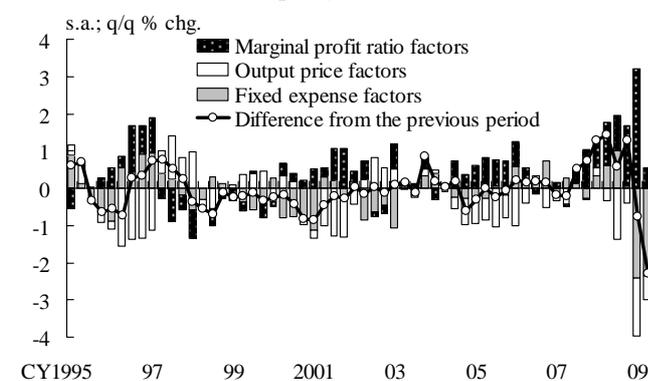
1. Corporate profits

Japan's production activity declined substantially. In particular, capacity utilization rates in the manufacturing sector dropped well below the break-even point as a whole (Chart 2-1). This situation has led to a significant deterioration in Japanese corporate profits. The ratio of current profits to sales in the manufacturing sector deteriorated sharply, and that in the non-manufacturing sector continued to decline

Chart 2-1: Break-Even Point of Indices of Capacity Utilization
[1] Indices of Capacity Utilization



[2] Contributions to Changes of Break-Even Point of Indices of Capacity Utilization^{1,2}



Notes: 1. Break-even point of indices of capacity utilization is the four-term backward moving average.

2. X: Break-even point of indices of capacity utilization, O: Quantity of output; C: Capacity of output; F: Fixed cost; V: Variable cost; R: Operating profits; S: Sales.

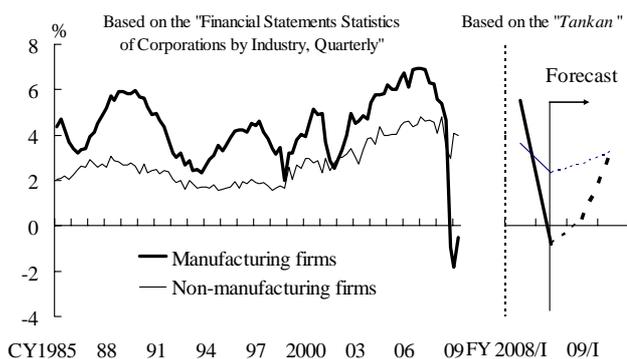
$$X = (F/(F+R))(O/C),$$

$$\Delta X = \Delta(F/C) \cdot (O/S)(1-V/S)^{-1} + \Delta(O/S) \cdot (F/C)(1-V/S)^{-1} + \Delta(V/S) \cdot (F/C)(O/S)(1-V/S)^{-2}.$$

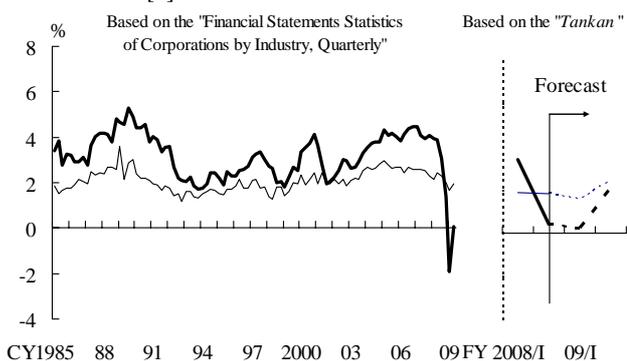
"Fixed expense factors" refers to the first member of the equation. "Output price factors" refers to the second member. "Marginal profit ratio factors" refers to the third member. Fixed cost, variable cost, operating profits, and sales are adjusted to correct biases in figures caused by sample changes and are seasonally adjusted.

Sources: Ministry of Economy, Trade and Industry, "Indices of Industrial Production"; Ministry of Finance, "Financial Statements Statistics of Corporations by Industry, Quarterly."

Chart 2-2: Ratio of Current Profits to Sales^{1,2}
[1] Large Firms



[2] Medium-Sized and Small Firms

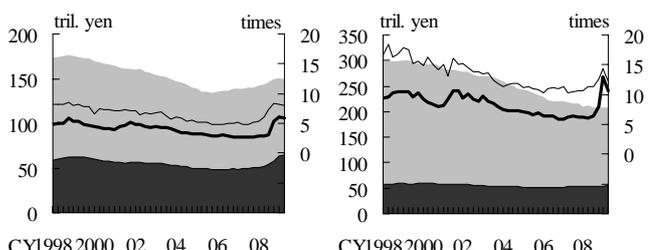


Notes: 1. Dotted line based on the "Tankan" shows the forecast of the firms for the first half and the second half of 2009.

2. Figures are adjusted to correct biases caused by sample changes, and are seasonally adjusted.

Sources: Ministry of Finance, "Financial Statements Statistics of Corporations by Industry, Quarterly"; Bank of Japan, "Tankan."

Chart 2-3: Ratio of Interest-Bearing Debt to Cash Flow^{1,2,3}
Large firms Medium-sized and small firms



Legend:
 ■ Outstanding of interest-bearing debt (non-manufacturing firms, left scale)
 ■ Outstanding of interest-bearing debt (manufacturing firms, left scale)
 — Ratio to cash flow (non-manufacturing firms, right scale)
 — Ratio to cash flow (manufacturing firms, right scale)

Notes: 1. Interest-bearing debt = long-term and short-term loans + corporate bonds.
 2. Cash flow = current profits/2 + depreciation expenses.
 3. Figures are adjusted to correct biases caused by sample changes, and are seasonally adjusted.

Source: Ministry of Finance, "Financial Statements Statistics of Corporations by Industry, Quarterly."

(Chart 2-2). According to firms' business plans, however, the profitability is expected to recover during the second half of fiscal 2009.

Against such a background, firms' repayment capacity is on a decline. The ratio of interest-bearing debt to cash flow increased, irrespective of firm size, reflecting that a decrease in operating cash flow was covered by interest-bearing debt. For large firms, their tendency to secure funds for a precautionary motive also contributed to an increase in interest-bearing debt (Chart 2-3).

2. Financial conditions of bank borrowers

Next, bank borrowers' financial conditions are examined.

First, the financial indicators by firm size (large firms, medium-sized firms, and small firms) and by industry group (26 industries) are collected from "Financial Statements Statistics of Corporations by Industry, Annually." These indicators are then aggregated, weighing lending shares by industry group and firm size with respect to each bank, to build consolidated indicators representing financial conditions for a group of borrowers for each bank. Specifically, net worth ratio, quick ratio, interest coverage ratio (hereafter, ICR), and the ratio of break-even point to sales with respect to borrowers' groups are chosen (Chart 2-4; see Box 1 for details).

According to those indicators, the net worth ratios have consistently been on an uptrend, partly because bank borrowers have been fortifying their financial bases through post-bubble balance-sheet adjustments. Conversely, the quick ratios, which indicate short-term payment capacity, are on a decline, particularly among banks with high lending shares to industries facing liquidity shortage, although the quick ratio of small

firms still remain at high levels. In addition, the ICRs, which indicate interest payment capacity relative to firms' profits, declined sharply after the second half of fiscal 2008. Currently, the ICRs for more than 20 banks fall below 100 percent. The ratios of break-even point to sales accelerated their pace of deterioration and at present they stay around 80 to 100 percent for all banks.

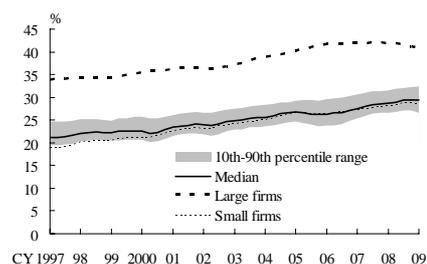
Comparing these indicators as evaluated at the end of fiscal 2008 with those during the past economic downturns, while net worth ratio improved, quick ratio, ICR and the ratio of break-even point to sales deteriorated (Chart 2-5).

3. Robustness of firms' financial conditions

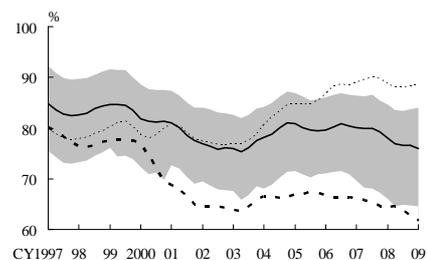
Firms' recent outlook for corporate profits shows that the forecasts of profits for the second half of fiscal 2009 were revised upward from original forecasts, marking an increase on a year-on-year basis (Chart 2-6). However, the outlook for sales of fiscal 2009 is still lower than the previous year's level, suggesting that a substantial decrease in their variable costs is necessary (Chart 2-7).

In order to assess the impact of possible downward revision of fiscal 2009 business plans on financial indicators, simulation is conducted based on the following two scenarios: (A) a scenario in which firms achieve profit plans, and (B) a scenario in which they fail to achieve profit plans (i.e., there is no improvement in variable costs and fixed costs remain high) (Chart 2-8). Comparing the simulated financial indicators with average values from the first quarter of 1998 to the first quarter of 2009, all financial indicators return to levels comparable with past averages under the scenario in which firms' profit plans are achieved (case A). However, quick ratios and ICRs are even

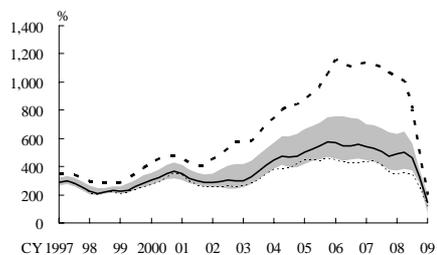
Chart 2-4: Borrowers' Financial Indicators
[1] Net Worth Ratio



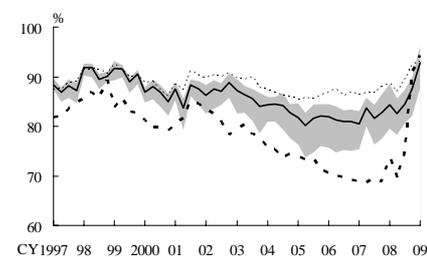
[2] Quick Ratio



[3] Interest Coverage Ratio

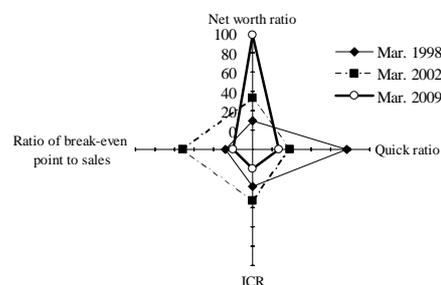


[4] Ratio of Break-Even Point to Sales



Sources: Bank of Japan, "Loans and Discounts Outstanding by Sector"; Ministry of Finance, "Financial Statements Statistics of Corporations by Industry, Quarterly."

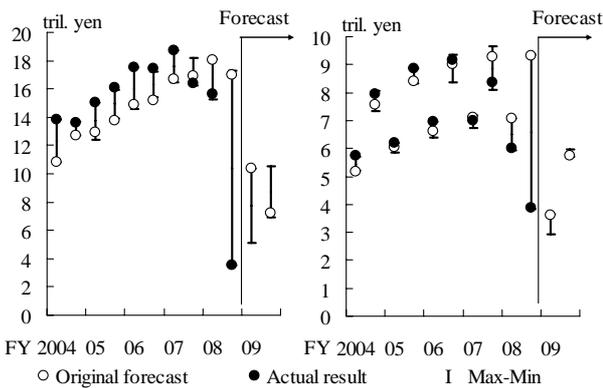
Chart 2-5: Comparison of Borrowers' Financial Indicators¹



Note: 1. Each financial indicator is indexed using a base value of 100 for the maximum and zero for the minimum between 1998/Q1 and 2009/Q1, whereas the ratio of break-even point to sales is indexed using a base value of 100 for the minimum and zero for the maximum.

Sources: Bank of Japan, "Loans and Discounts Outstanding by Sector"; Ministry of Finance, "Financial Statements Statistics of Corporations by Industry, Quarterly."

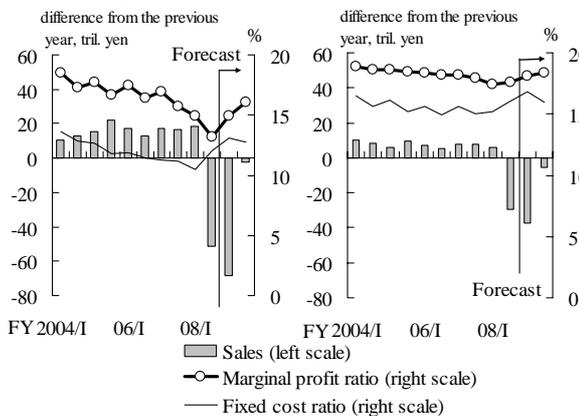
Chart 2-6: Forecasts and Results of Current Profits¹
Large firms Medium-sized and small firms



Note: 1. "Original forecast" is based on the annual projection on the first survey for each year (March survey). "Max-Min" shows the maximum-minimum range of the forecasts and results.

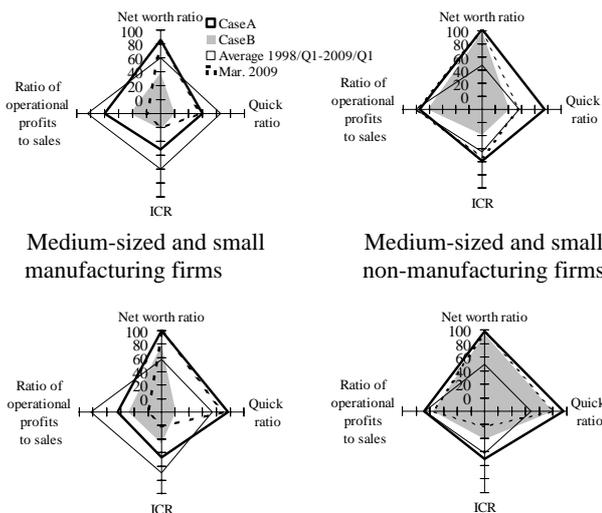
Source: Bank of Japan, "Tankan."

Chart 2-7: Forecast of Sales and Marginal Profit Ratio
Large firms Medium-sized and small firms



Source: Bank of Japan, "Tankan."

Chart 2-8: Analysis of the Robustness of Financial Conditions¹
Large manufacturing firms Large non-manufacturing firms



Note: 1. Each financial indicator is indexed using a base value of 100 for the maximum and zero for the minimum between 1998/Q1 and 2009/Q1 while using a base value of zero for the estimated indicator if that is below the minimum.

Sources: Ministry of Finance, "Financial Statements Statistics of Corporations by Industry, Quarterly"; Bank of Japan, "Tankan."

lower than historical levels under the scenario in which firms fail to achieve plans (case B), although the impairment of net worth ratios is limited. For the large manufacturing sector, all indicators decline below historical levels.

4. Summary

After the second half of fiscal 2008, the capacity utilization rates of the manufacturing sector were below the break-even point as a whole. Amid a weakening production activity, there was a substantial deterioration in corporate profits, particularly in the large manufacturing sector.

The financial conditions of bank borrowers indicate that net worth ratios have remained at high levels, partly because firms had been fortifying their financial bases.

By contrast, quick ratios and ICRs have rapidly deteriorated. According to firms' business plans, while sales forecasts continue to decline in fiscal 2009, corporate profits are expected to recover significantly in the second half of fiscal 2009, mainly because of the reductions in variable costs. If these forecasts are achieved, the current deterioration in financial indicators is likely to be only temporary. However, if these business plans are not achieved, quick ratios and ICRs could worsen further.

B. Funding in the Corporate Sector

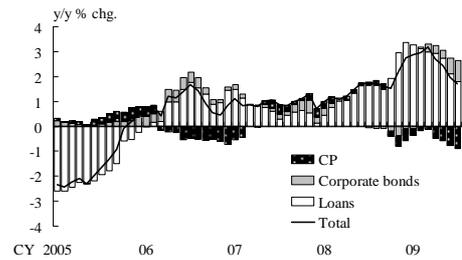
The funding conditions for firms in Japan remained severe, as epitomized by the impairment of CP and corporate bond markets after the autumn of 2008. At present, there are signs of improvement in the financial markets. Outstanding issues of corporate bonds increased year on year, in particular among high-rating companies, and the decreasing pace of structured credit products slowed year on year (Charts 2-9 and 2-10). As seen in Chapter I, however, the DI for firms' financial position continues to be substantially on the "tight" side. In particular, small firms' funding continues to be severe, while trade credits and foreign trade credits showed a sharp decline (Chart 2-11). In the following section, the developments in bank loans and other forms of funding are first examined for large firms and small firms. Then the developments in interest margins on bank loans are examined, followed by the analysis of the interest rate setting behavior of banks in relation to credit risk.

1. Bank loans to large firms

Bank loans to large firms increased sharply from the end of 2008 to the beginning of 2009, and then the pace of increase slowed year on year (Chart 2-12).

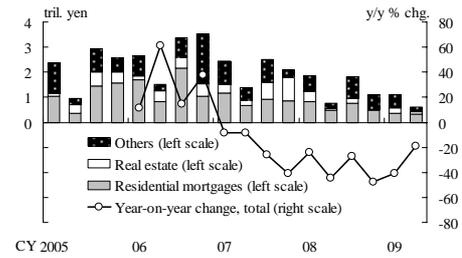
Breaking down by sector, bank loans increased substantially in sectors – such as precision machinery, transport machinery and electrical machinery – that experienced a sharp deterioration in the ICRs during fiscal 2008 (Chart 2-13). Decomposing outstanding bank loans into "number of borrowers" and "amount of loans per borrower," increases in the amount of loans per borrower explain the major part of changes in bank loans (Chart 2-14). In sectors such as electrical machinery, the size of loans is particularly increasing as a result of declining number of borrowers and

Chart 2-9: Amount Outstanding of CP, Corporate Bonds, and Loans



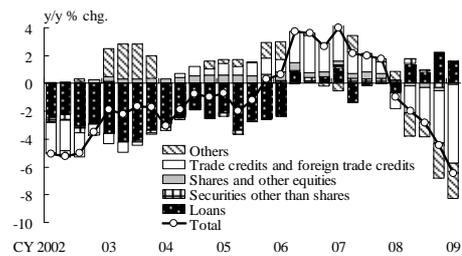
Source: Bank of Japan, "Financial Markets Report."

Chart 2-10: Outstanding Issue of Structured Credit Products by Type of Underlying Assets



Source: Deutsche Securities, "Securitization."

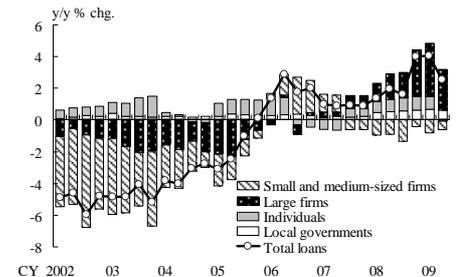
Chart 2-11: Financial Liabilities of Private Non-financial Firms¹



Note: 1. Loans, shares and other equities, and securities other than shares are valued at face or book values.

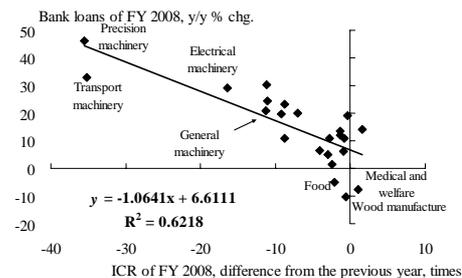
Source: Bank of Japan, "Flow of Funds Accounts."

Chart 2-12: Bank Loans Outstanding by Type of Borrower



Source: Bank of Japan, "Loans and Discounts Outstanding by Sector."

Chart 2-13: Changes in Interest-Payment Ability of Large Firms and Bank Loans



Sources: Bank of Japan, "Loans and Discounts Outstanding by Sector"; Ministry of Finance, "Financial Statements Statistics of Corporations by Industry, Quarterly."

Chart 2-14: Contributions to Changes of Outstanding Bank Loans to Large Firms in Fiscal 2008

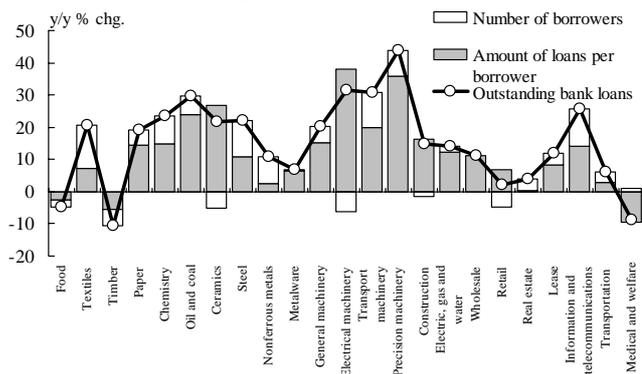
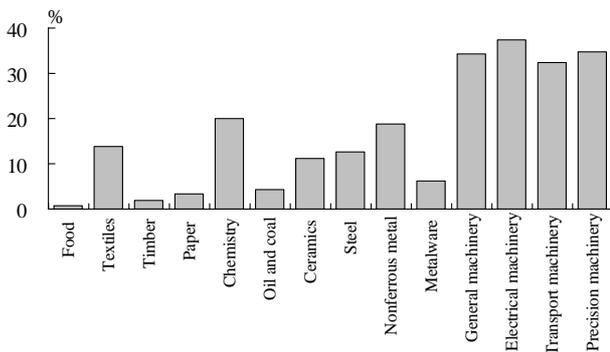
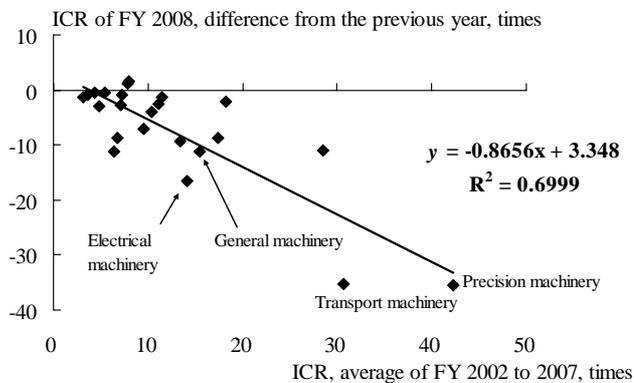


Chart 2-15: Dependence on Exports in Manufacturing Sector¹



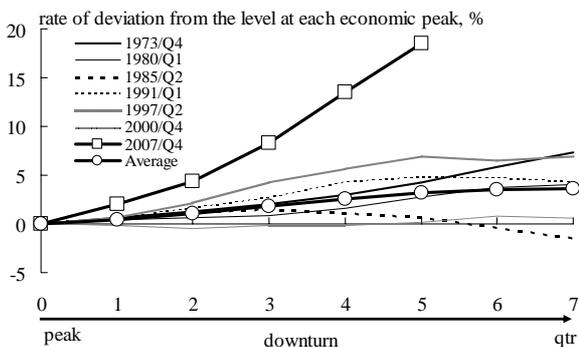
Note: 1. Dependence on exports = exports/domestic production.
Source: Ministry of Economic, Trade and Industry, "Input-Output Table."

Chart 2-16: Interest-Payment Ability of Large Firms



Sources: Bank of Japan, "Loans and Discounts Outstanding by Sector"; Ministry of Finance, "Financial Statements Statistics of Corporations by Industry, Quarterly."

Chart 2-17: Bank Loans to Large Firms in Economic Downturns¹



Note: 1. Economic downturn starting at 1977/Q1 is excluded from the analysis due to a break in that period's statistics.

increasing amount of loans per borrower.

Machinery sectors (i.e., electrical machinery, transport machinery, precision machinery, and general machinery) where bank loans registered a large increase during fiscal 2008 are characterized by high export-dependence relative to total production compared with other sectors (Chart 2-15). These highly export-dependent sectors have seen a rapid drop-off in their capacity to pay interest relative to operating profits due to declining exports after the autumn of 2008, although their interest payment capacity in the past was somewhat high (Chart 2-16). As long as sluggish corporate profits caused by declining exports recover within a relatively short time period, the increasing size of loans may not cause serious problems. However, if corporate profits remain sluggish for a prolonged period, credit risk to those sectors might materialize.

In order to examine the relationship between bank loans and business cycles, the "cyclical" component of bank loans during this economic downturn is compared to those in the past downturns by subtracting "trend" component from the growth in loans (see Box 2 for details). There is a tendency that the cyclical component of loans to large firms increases during economic downturns, but the increasing pace of that component is extremely large in this economic downturn compared to that in the past downturns (Chart 2-17). This large increase in bank loans substitutes the declining functioning of capital markets by meeting funding demand of firms facing a sharp decline in sales.

2. Bank loans to small firms

The cyclical component of loans to small firms tends to decline, contrary to that to large firms. During this economic downturn, however, the size of decline has

been kept relatively small. More strikingly, the component shows an uptrend at the *shinkin* banks (Chart 2-18).

This is partly due to a role played by the guaranteed loans issued by the credit guarantee corporations (Chart 2-19). While loans with no public guarantee (i.e., proper loans) for small firms declined as a whole, loans with public guarantee increased, alleviating the declining pace of bank loans to small firms. Indeed, the loan survey shows that the lending attitude toward small firms has been eased after the introduction of the emergency guarantee program at the end of October 2008.

The effect of public guarantee to restrain declines in lending to small firms was prevalent from the special guarantee program in October 1998. This program supported lending by the regional banks and the *shinkin* banks to small firms (Chart 2-18). It appears that the current emergency guarantee program also has contributed to alleviating difficulties in firms' funding, while screening standards of the program have been tighter to some extent in comparison with those in the past.

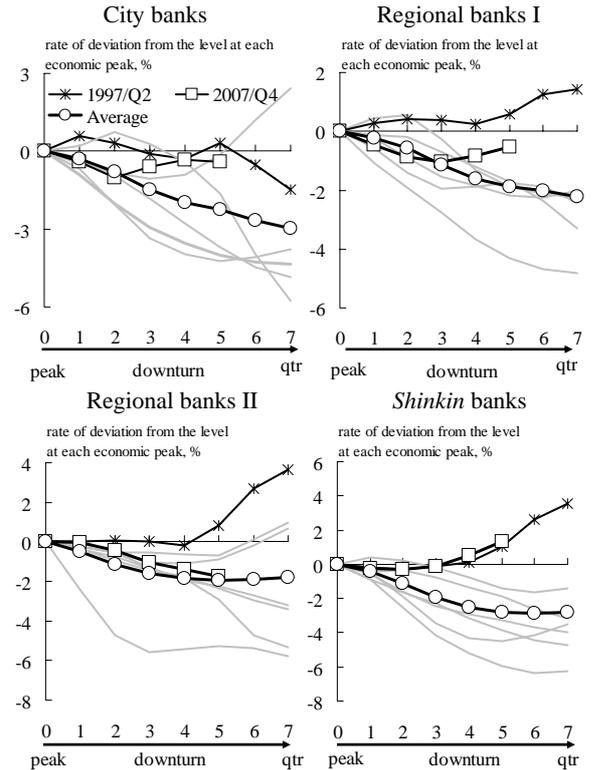
3. Funding other than bank loans

There is a considerable decline in trade credits during this economic downturn compared to those in the past downturns (Chart 2-20). The other funding such as corporate bonds and stocks showed a significant decrease especially in large firms (Chart 2-21). It appears that the decline in these types of funding has been offset by the increase in bank loans.

4. Banks' interest rate margins on loans

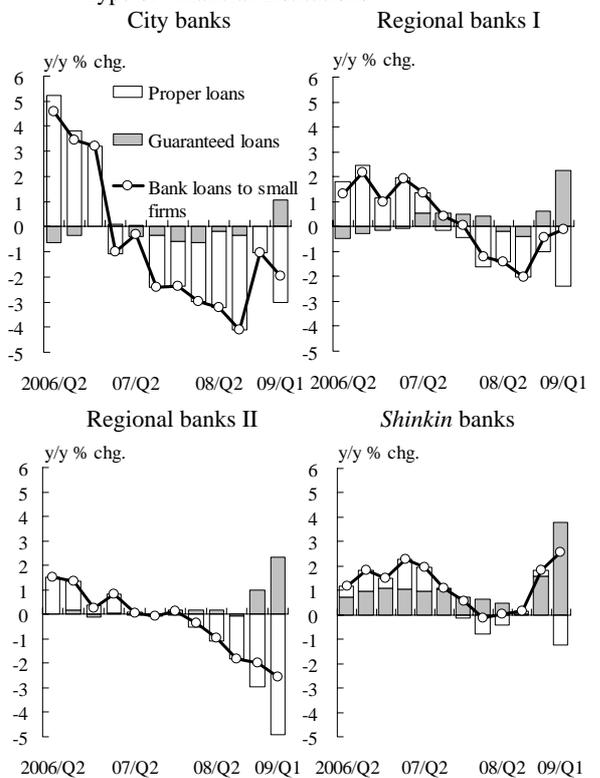
In the second half of fiscal 2008, total interest margins on loans (i.e., the interest rate on lending minus the

Chart 2-18: Bank Loans to Small Firms in Economic Downturns^{1,2}



Notes: 1. "Regional banks I" refers to members of the Regional Banks Association of Japan. "Regional banks II" refers to members of the Second Association of Regional Banks.
 2. Starting periods for each economic downturn are the same as those in Chart 2-17.

Chart 2-19: Composition of Bank Loans to Small Firms at Each Type of Financial Institutions¹



Note: 1. Bank of Japan estimation.
 Sources: Bank of Japan, "Loans and Discounts Outstanding by Sector"; National Federation of Credit Guarantee Corporations.

Chart 2-20: Trade Credits in Economic Downturns

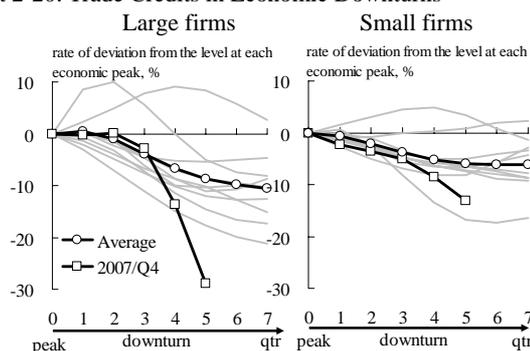


Chart 2-21: Funding through Corporate Bonds and Stocks, etc., in Economic Downturns

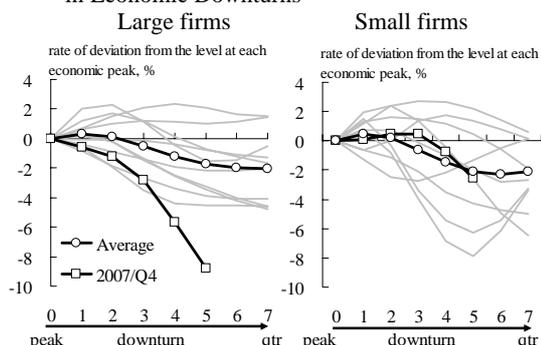


Chart 2-22: Total Interest Margins on Domestic Loans

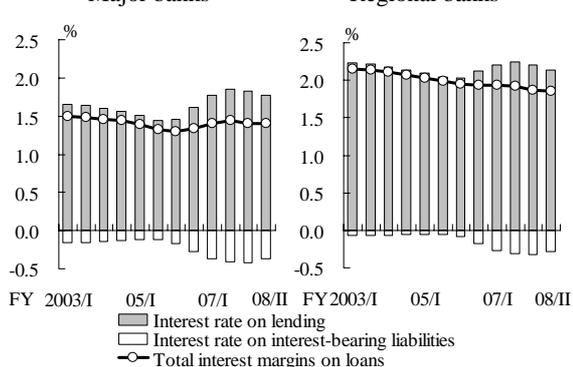
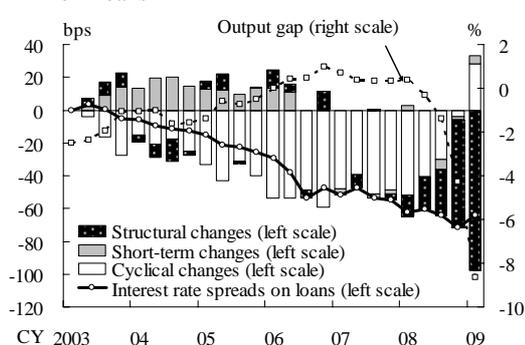


Chart 2-23: Decomposition of Changes in Interest Rate Spreads on Loans^{1,2,3,4}



Notes: 1. Bank of Japan estimation.

2. Interest rate spread on loans = average contracted interest rate on new loans and discounts (short-term) - CD interest rate (3-month).

3. Figures are the deviation from those in 2003/Q1 except for output gap.

4. For details, see Box 1 of the *Financial System Report* published by the Bank of Japan in March 2007.

interest rate on interest-bearing liabilities) remain almost unchanged both at the major banks and the regional banks (Chart 2-22). In general, interest rate margins tend to increase, reflecting worsening creditworthiness of borrowers. In the current economic downturn, such tendency is not observable.

The multivariate time-series model is employed to examine factors behind this. The model decomposes changes in short-term interest rate spreads on loans into three contributing factors: (1) cyclical changes induced by the business cycle, (2) short-term changes reflecting the fact that loan interest rates do not immediately follow the change in market interest rates, and (3) structural changes in the lending market environment. The result shows that the recent cyclical changes accompanied by the sharp expansion of negative output gap have contributed to expanding spreads. On the other hand, structural changes have contributed to a significant reduction of spreads (Chart 2-23).

One of the factors behind the structural changes is the changes in lending portfolio, such as sharp declines in the ratios of small and medium-sized firms' loans to total loans (Chart 2-24). In addition, changes in the transactional relationships between banks and firms as well as increases in public guarantee ratios are also likely to have helped restrain pressures that would have otherwise expanded spreads.

5. Credit risk and interest rates setting

The stronger public supports for firms' funding such as a rise in guaranteed loans may obscure the creditworthiness of borrowers and make lending rates less sensitive to the creditworthiness. To examine this, this section analyzes the relationship between borrowing firms' creditworthiness and lending interest

rates from a medium- to long-term perspective.

Banks' cross-section data indicates that long-term credit cost ratios and lending interest rates have no significant relationship (Chart 2-25).

Looking at the relationship between borrowing firms' creditworthiness, as measured by years of debt redemption, and borrowing interest rates, there is high dispersion in years of debt redemption, while such dispersion does not exist in borrowing interest rates (Chart 2-26). This tendency appears to be more obvious in 2000s for small firms. The results suggest that a mechanism where banks allow premiums to be charged to firms with less debt redemption capacity may not be working.

One factor behind this is the policy measures that are aimed at stimulating lending to small firms after the end of the 1990s. In order to observe the impact from these measures, the ratio of outstanding guarantees from the credit guarantee corporations to total loans for small firms tends to be higher in sectors with longer years of debt redemption or higher default rates (Charts 2-27 and 2-28).

In the short term, the public guarantee complements the financial intermediation function of private financial institutions, exerting an effect to restrain bankruptcies. At the same time, however, prolonged business relationships with firms with insufficient profits relative to their risks may undermine banks' ability to raise core profitability. That may distort the efficiency of resource allocation of the economy on the whole.

As implied in the analyses above, the bank loan market in Japan faces a significant challenge in achieving efficient resource allocation through the pricing mechanism.

Chart 2-24: Identified Structural Changes and Ratio of Small and Medium-Sized Firms' Loans

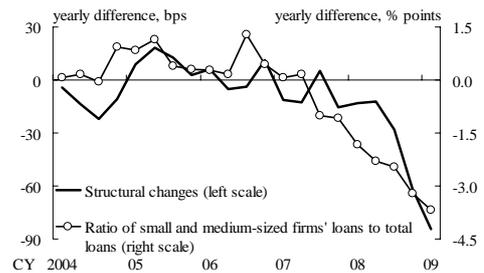
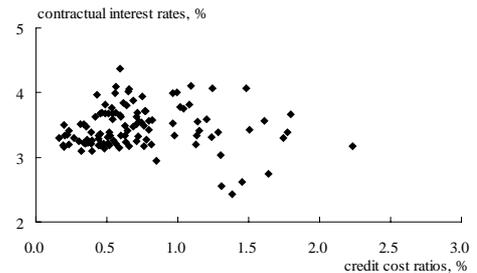
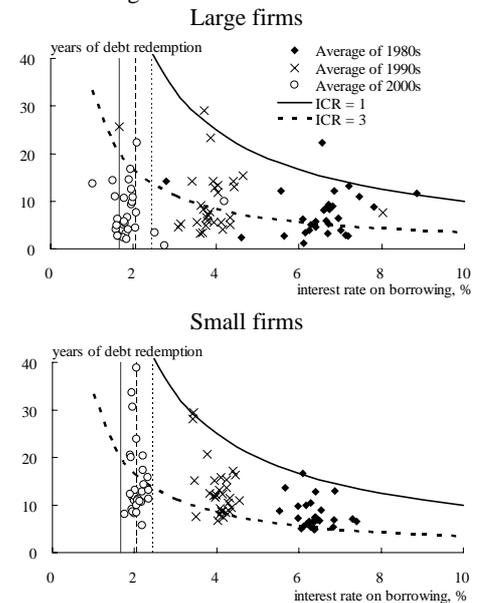


Chart 2-25: Credit Cost Ratios and Contractual Interest Rates at Banks^{1,2}



- Notes: 1. Both credit cost ratios and contractual interest rates are the average of fiscal 1990 to 2008 at each bank.
2. The analysis covers the major banks and the regional banks that existed for the whole period. The observation for one bank falls outside the chart.

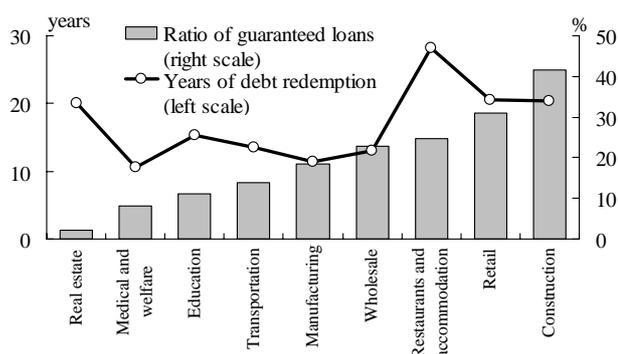
Chart 2-26: Years of Debt Redemption and Interest Rate on Borrowing^{1,2,3,4,5}



- Notes: 1. Each dot plotted in the chart shows the corresponding industry in the covered decade.
2. Years of debt redemption = interest-bearing debt/(operating income + interest revenue).
3. Interest rate on borrowing = interest expense/interest-bearing debt.
4. The average of 2000s is the average of fiscal 2000 up to fiscal 2008.
5. The three vertical lines indicate averaged contractual interest rates from April 2000 up to March 2009 in three bank categories. The lowest rate is that for city banks, the middle one for regional banks I, and the highest one for regional banks II, respectively.

Sources: Ministry of Finance, "Financial Statements Statistics of Corporations by Industry, Quarterly"; Bank of Japan, "Average Contracted Interest Rates on Loans and Discounts."

Chart 2-27: Ratio of Guaranteed Loans and Years of Debt Redemption in Small Firms^{1,2}

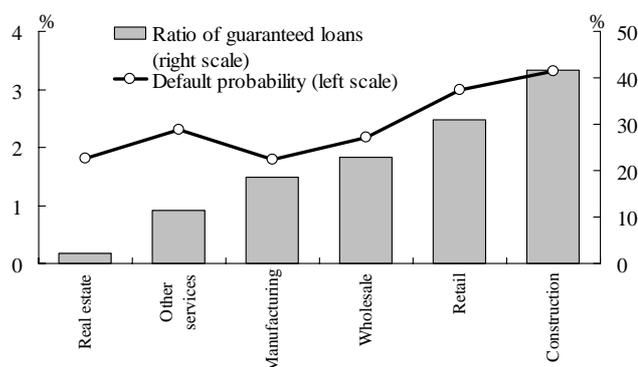


Notes: 1. Ratio of guaranteed loans = loans utilizing guarantee system / total outstanding loans to small firms. The figures are the average of those from the April-June quarter of 2007 to the April-June quarter of 2009. Bank of Japan estimation.

2. Years of debt redemption for real estate, transportation, manufacturing, wholesale, accommodation, retail, and construction industry are the average of figures from fiscal 2000 to fiscal 2008. Those for medical and welfare, education, and restaurants are the average of figures from fiscal 2004 to fiscal 2008. The figures cover businesses capitalized at less than 100 million yen.

Sources: Bank of Japan, "Loans and Discounts Outstanding by Sector"; National Federation of Credit Guarantee Corporations; Ministry of Finance, "Financial Statements Statistics of Corporations by Industry, Quarterly."

Chart 2-28: Ratio of Guaranteed Loans in Small Firms and Default Probability^{1,2}



Notes: 1. Ratio of guaranteed loans = loans utilizing guarantee system / total outstanding loan to small firms. The figures are average of those from the April-June quarter in 2007 to the April-June quarter in 2009. Bank of Japan estimation.

2. Default probability is the average of March 2001 to June 2009. The probability for the retail industry includes the restaurant business.

Sources: Bank of Japan, "Loans and Discounts Outstanding by Sector"; National Federation of Credit Guarantee Corporations; The Risk Data Bank of Japan, Ltd., "RDB Kigyō Default Ritsu (Corporate Default Probability)."

C. Assessment of the Financial Intermediation Function

Based on the above analysis, this section summarizes the current state of the financial intermediation function in Japan.

Since the second half of fiscal 2008, Japanese firms have experienced significant declines in corporate profit. Under such circumstances, financial indicators showing repayment capacity have been rapidly deteriorating, while net worth ratios have been maintained at high levels. Recently, Japan's economic condition stopped worsening and firms anticipate a recovery in profits toward the second half of fiscal 2009. However, the downside risk of the economic activity remains high, and a further worsening in the business conditions for corporate profits could take place.

Firms' funding conditions deteriorated sharply after the autumn of 2008, but are recently showing signs of improvement, partly due to the effect of provision of sufficient liquidity and measures to facilitate corporate finance by the Bank of Japan.

Bank loans to large firms increased mainly in sectors where fiscal 2008 profits registered the sharpest declines. The recent growth in bank loans to large firms moderated as a result of the improved functioning of CP and corporate bond markets. The decreasing pace of bank loans to small firms has been alleviated compared to the previous economic downturns partly because of public assistance such as the credit guarantee system.

On the price front, even though the economic downturn has increased firms' credit risks, spreads of bank loans have been kept down.

The results of above analyses show that the financial intermediation function of Japan's financial system has generally been maintained to the extent that the adverse feedback loop between financial and economic activities has been contained. Japanese banks played a pivotal role in supporting firms' funding under severe financial conditions after the autumn of 2008. At the same time, however, it appears that they do not set interest rates consistent with borrowers' creditworthiness. It is in that regard that Japan's financial system continues to face important challenges as to achieving efficient resource allocation through the pricing mechanism.

III. Robustness of the Financial System

This chapter conducts scenario analyses from a macro perspective against the four risk categories, that is, credit risk, market risk associated with stockholdings, interest rate risk, and funding liquidity risk. The aim of these analyses is not at future projections but at clarifying risk characteristics faced by banks and assessing the robustness of the financial system. These analyses are estimates, and the results should be treated with care.

This issue of the *Report* extends the analytical framework of the credit risk analysis by taking into account movements of flows and stocks of the economy, based on the previous framework. In addition to the risk assessments, an examination is made of the correlation between risks, and propagation effects through domestic and international financial transactions.

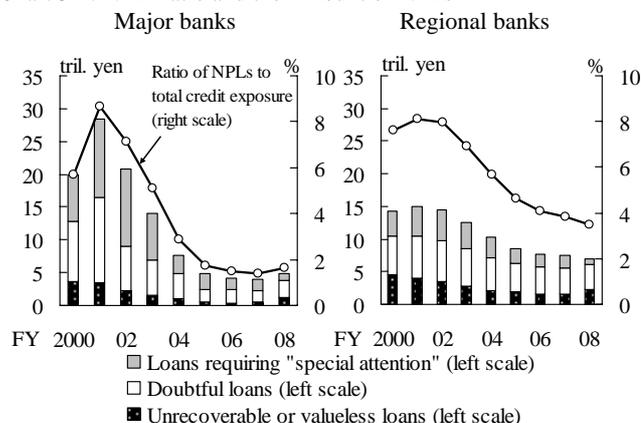
A. Credit Risk and Market Risk Associated with Stockholdings

1. Current state of credit risk

The NPL ratio for the regional banks as of the end of fiscal 2008 declined since loans requiring "special attention" fell owing mainly to the relaxation of the requirement for restructured loans of small and medium-sized firms. In contrast, unrecoverable or valueless loans and doubtful loans started to increase for both the major banks and the regional banks, contributing to an increase in credit costs (Chart 3-1).

As shown in Chapter I, credit costs have not increased as much as the increase in firms' default rate (Charts 1-13 and 1-23). To explore the backdrop, the credit cost ratio calculated by using transition matrices (on

Chart 3-1: NPL Ratio and the Amount of NPLs^{1,2}



Notes: 1. NPLs disclosed under the Financial Reconstruction Law.
2. Figures include NPLs that are transferred to subsidiary companies for corporate revitalization.

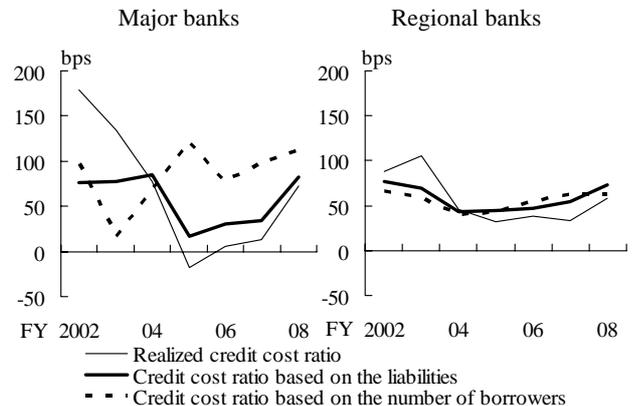
the basis of the number of borrowers and of the liabilities, according to self-assessment classification) is compared with the actual credit cost (see Box 3 for details). The results are summarized as follows: (1) the estimations on the basis of the liabilities move almost in parallel to realized credit cost ratios; (2) for the major banks, the estimation on the basis of the liabilities consistently exceeds the estimation on the basis of the number of borrowers after fiscal 2005; and (3) recently, both for the major banks and the regional banks, the pace of increase of the estimations on the basis of the liabilities exceeds that of the estimations on the basis of the number of borrowers (Chart 3-2). Result (2) moderates the pace of increase in credit costs relative to the pace of increase in the default rate. Result (3) suggests that the exposure of a downgraded borrower is on an increasing trend, namely, the size of default is increasing.

2. Focal point in future credit risk

In considering the development in credit risk in the future, several points should be taken into account. First, corporate profits may not recover briskly in spite of a moderate recovery in the economy (Chart 2-1). Second, firms' financial bases have been strengthened over time (Chart 2-4). Third, the effect of banks' recent lending behavior such as the increasing size of lending to large manufacturing firms should be considered (Chart 2-14).

To incorporate those points, this issue of *Report* extends the credit risk analysis by incorporating the following three mechanisms into the model: (1) a mechanism by which deterioration in firms' financial bases causes increased downgrades in borrower classification owing to economic downturn; (2) a mechanism by which the changes in economic conditions and firms' financial bases affect the

Chart 3-2: Credit Cost Ratios Estimated by Using Transition Matrices¹



Note: 1. Bank of Japan estimation. Estimated credit cost ratio based on the borrowers' transition from commencement rating to last rating during a term. See Box 3 for details.

transition matrices after a certain period; and (3) a mechanism by which the increases in the size of lending would lead to an increase in the size of default after a certain period (see Box 3 for details).

The model also has limitations. First, it does not reflect quality changes in overseas lending. Second, it does not include bank loans to the consumers such as home mortgages. Third, the effects of policy measures such as the emergency guarantee program are not explicitly considered either. It should be noted that the results of credit cost calculation in the model conceptually differ from the actual credit costs. They should be treated as part of the instruments in order to assess the robustness of the financial system.

3. Scenarios

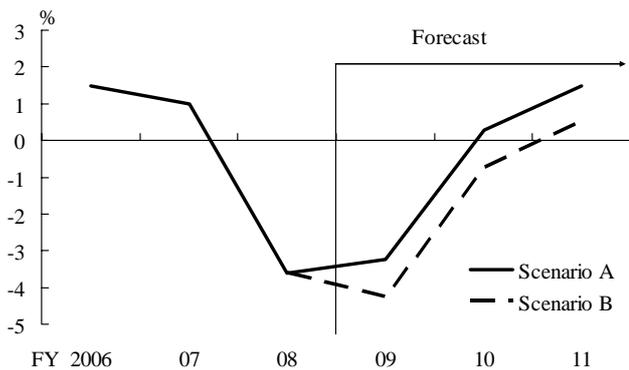
Two scenarios on macroeconomic conditions and firms' financial bases are considered. Scenario A uses the average of private forecasts of the nominal GDP growth rate, and assumes that firms' financial indicators remain constant at an average over the past ten years consistent with the present forecast of corporate profits (Chart 3-3).

Scenario B assumes that the nominal GDP growth rate is 1 percentage point below Scenario A. Because of a further decline in corporate profits, firms' financial indicators are also assumed to decline as the quick ratio of borrowing firms declines by 5 percentage points and the ICR by 100 percentage points from the end of fiscal 2008.

4. Scenario analysis

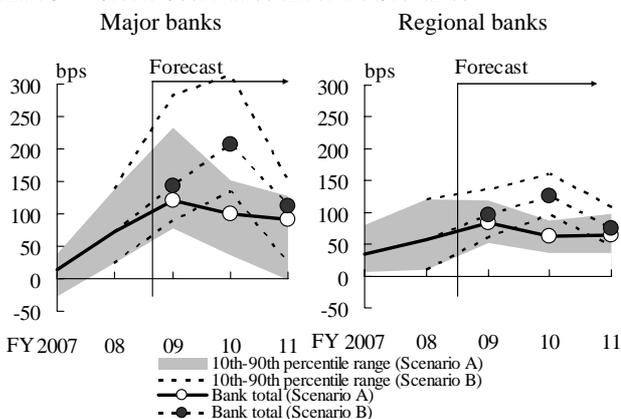
In Scenario A, credit cost ratios of the major banks and the regional banks for fiscal 2009 are estimated to be about 120 bps and about 80 bps, respectively (Chart 3-4). Many banks exceed the breakeven credit cost ratio, where the median of the ratio was 76 bps as of

Chart 3-3: Nominal GDP Growth Rate for the Scenarios¹



Note: 1. Scenario A from fiscal 2009 to fiscal 2010 is the average of forecasts of the GDP growth rate at private forecasting agencies. For fiscal 2011, the GDP growth rate is assumed to be the average growth rate over the past 20 years. Scenario B is subtracted 1 % point from Scenario A.

Chart 3-4: Credit Cost Ratios under the Scenarios¹



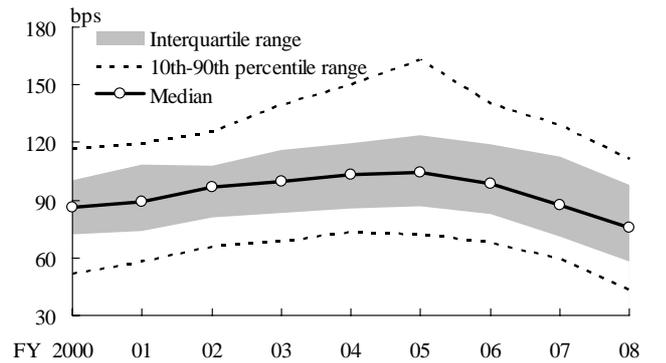
Note: 1. Bank of Japan estimation.

the end of fiscal 2008 (Chart 3-5). For fiscal 2010 and 2011, in spite of the nominal GDP growth rate being assumed to turn positive, credit cost ratios are estimated to remain high, and cumulative credit costs for two years are estimated to be about 190 bps for the major banks and 130 bps for the regional banks. This is because a mechanism will be at play by which the nominal GDP growth rates and conditions of firms' financial bases of past fiscal years up to fiscal 2009 affect the quality of bank lending with a certain lag. The stickiness in the estimation results differs significantly from the previous report. In addition, it should be noted that, for the major banks, the current increase in the size of bank lending to borrowers is expected to result in the increasing size of default.

The credit cost ratios for fiscal 2010 under Scenario B are estimated to increase, compared with those under Scenario A, by about 110 bps for the major banks and about 60 bps for the regional banks (Chart 3-4). Of these, about 50 bps for the major banks and about 30 bps for the regional banks could be explained by the deterioration in firms' financial bases. In considering the future developments in credit costs, the borrowing firms' financial conditions such as quick ratio and ICR need to be monitored carefully.

In summary, cumulative credit costs of the banking sector for the next three years are estimated to exceed cumulative operating profits from core business during the same periods, under the assumption that the economic outlook and future corporate profits are similar to those of the market consensus. If economic conditions and corporate profits are assumed to be severer, the estimated losses will not peak out in fiscal 2009, and cumulative credit costs for the next three years will be about 40 percent higher.

Chart 3-5: Breakeven Credit Cost Ratios^{1,2}



Notes: 1. Breakeven credit cost ratio = operating profits from core business / loans outstanding.
 2. Breakeven credit cost ratios are sorted in ascending order. The 10th, 25th, 50th (median), 75th, and 90th percentiles are shown.

Chart 3-6: Credit Cost Ratio in International Sectors

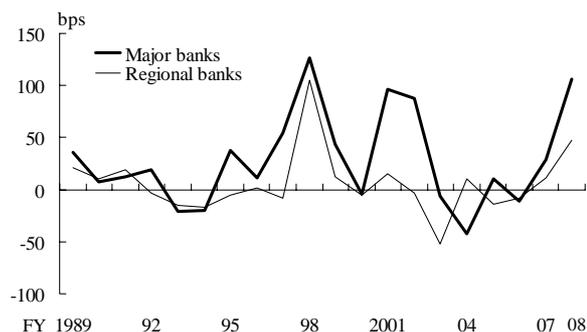


Chart 3-7: Year-on-Year Change of Loans in Domestic and International Sectors

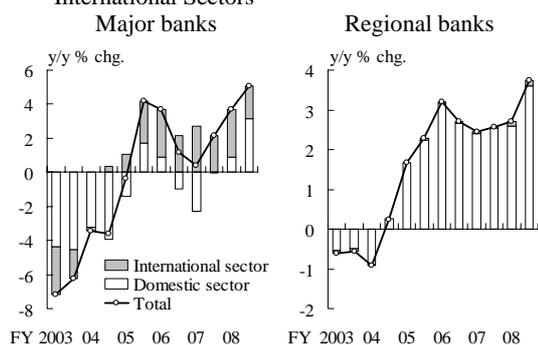


Chart 3-8: Credit Costs in Domestic and International Sectors

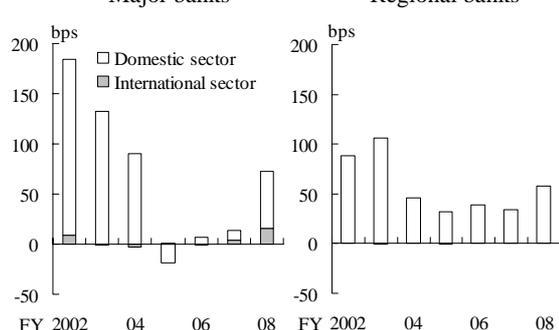
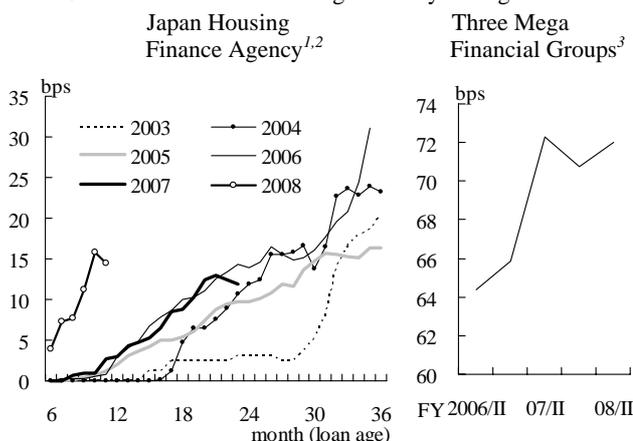


Chart 3-9: Default Rates on Housing Loans by Vintage Year



Notes: 1. Defaulted loans for the Japan Housing Finance Agency (JHFA) are defined as the loans that the JHFA requires borrowers to prepay because they are more than six months overdue, etc.

2. Twelve-month moving average of each monthly annualized default rate.

3. Average of non-default loans of the three mega financial groups.

Sources: Japan Housing Finance Agency; Published accounts.

5. Credit costs of overseas and consumer lending

Next, the current state of credit risks of overseas lending and of personal loans including home mortgages is analyzed. These are not explicitly incorporated in the simulation.

In terms of credit risk of overseas lending, the credit cost ratio of banks' international businesses already reached 106 bps for the major banks in fiscal 2008 (Chart 3-6). The major banks were rapidly increasing their overseas lending after fiscal 2005. They further increased their lending after fiscal 2007, by substituting for the lending of the U.S. and European financial institutions that faced reduced capacity for lending because of the U.S. subprime mortgage problem. It was then that the major banks confronted the current financial crisis, and credit costs from international businesses reached almost 20 percent of the total in fiscal 2008 (Charts 3-7 and 3-8). A possibility that further deterioration in the quality of overseas lending might further increase credit costs in the future warrants attention.

In terms of credit risk of home mortgages data show an increasing trend of default rates in recent times (Chart 3-9). At this moment, excess leverage in home mortgages that occurred in the United States is not observed in Japan (Chart 3-10). If the employment and income situation of consumers worsen significantly in the future, it should be noted that the default rates might further increase in mortgages which comprise almost 25 percent of bank lending.

6. Scenario analysis on market risk associated with stockholdings

The scenario analysis of market risk associated with stockholdings assumes, as in the previous report, that (1) the market value of the stockholdings of individual

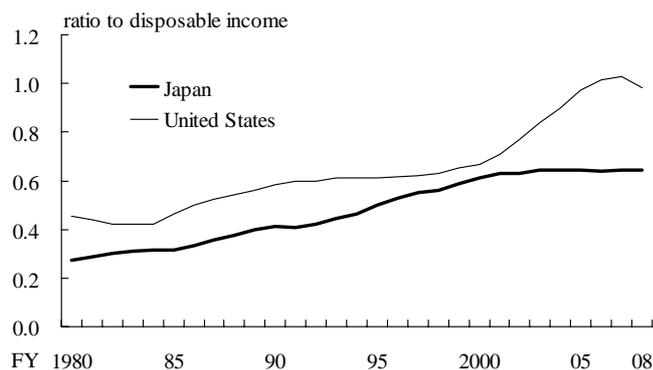
banks is 100 percent linked to the TOPIX, and (2) the stock prices at the end of fiscal 2009 will be at the same level as the bottom of the TOPIX after the collapse of the bubble economy (700 points). Under these assumptions, net unrealized losses on stocks (the difference between market value and book value) for individual banks in fiscal 2009 are estimated. Under this scenario of sluggish stock prices, the Tier I capital ratio of banks at the end of fiscal 2009 would decline by 0.5 percentage point (see Chart 1-28 for the amount of market risk associated with stockholdings relative to Tier I capital under the assumption of a substantial decline in stock prices).

7. Scenario analysis when both the credit cost increase and sluggish stock prices materialize

As seen in Chapter I, credit risk and market risk associated with stockholdings occurred simultaneously in the banks' fiscal 2008 financial results in the form of an increase in credit costs and a decline in overall gains/losses on stocks, thereby eroding capital strength of the banks (Charts 1-22 and 1-23). The correlation between the two risks appears to have been increasing since the 2000s. Given this, this report uses scenario analyses on credit risk and market risk associated with stockholdings, and estimates the development of the future Tier I capital ratio on the assumption that both the increase in credit costs and the sluggish stock prices occur.

Tier I capital ratio of the banking sector at the end of fiscal 2009 is estimated by deducting the estimates of credit costs under Scenario A and B from operating profits from core business, and deducting net unrealized losses on stocks under the scenario of sluggish stock prices (the TOPIX at 700). After fiscal 2010, estimates of Tier I capital ratios are obtained by subtracting the estimates of credit costs from the

Chart 3-10: Home Mortgages in Japan and the United States¹



Note: 1. The U.S. figures are calculated on a calendar-year basis.
Sources: Bank of Japan, "Flow of Funds Accounts"; FRB, "Flow of Funds Accounts of the United States."

Chart 3-11: Framework of the Analysis of Credit Risk and Risk Associated with Stockholdings

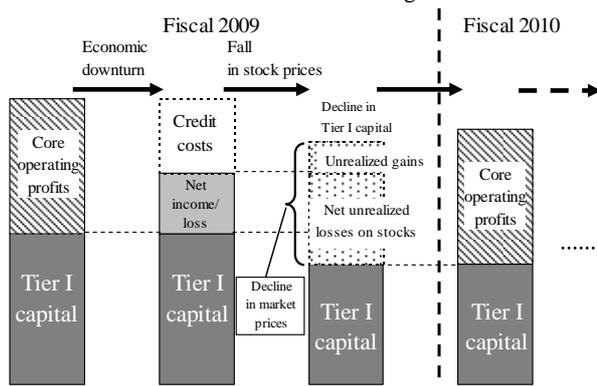
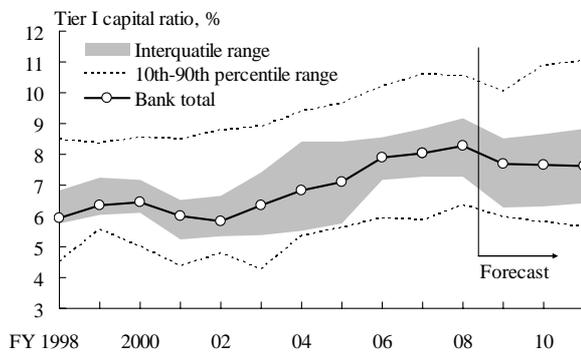
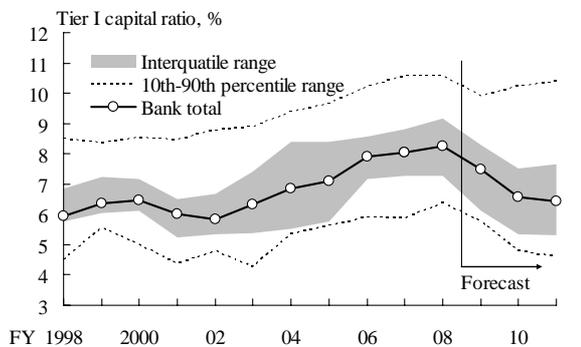


Chart 3-12: Dispersion of Tier I Capital Ratios¹
[1] Scenario A

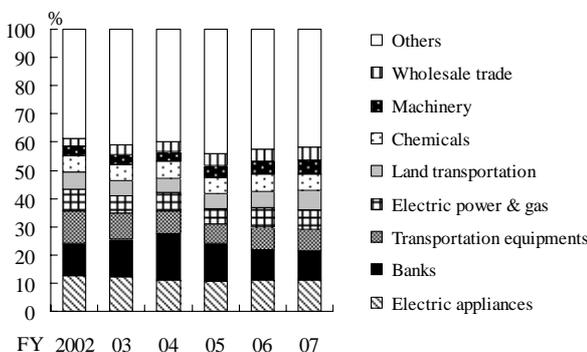


[2] Scenario B



Note: 1. Bank of Japan estimation. The dispersion is weighted by proportion of each bank's loans to total bank loans.

Chart 3-13: Composition of Banks' Stockholdings¹



Note: 1. Banks' stockholdings are the data of city banks and regional banks, etc. These data partly include stockholdings of investment trusts and annuity trusts.

Source: Tokyo Stock Exchange, "Share Ownership Survey."

operating profits from core business with an assumption of unchanged stock prices (Chart 3-11).

In Scenario A, the estimates of banks' Tier I capital ratio at the end of fiscal 2009 and 2010 are both 0.6 percentage point lower than the level at the end of fiscal 2008 (Chart 3-12). The Tier I capital ratio shows little recovery even at the end of fiscal 2011.

Next, the estimates of banks' Tier I capital ratio at the end of fiscal 2009 and fiscal 2010 under severer Scenario B are 0.8 percentage point and 1.7 percentage point lower, respectively, than the levels at the end of fiscal 2008. Focusing on the development of Tier I capital ratios of banks whose capital strength is relatively weak, the lower side of the distribution represented by the 10th percentile remains at the level of fiscal 2003 even in fiscal 2011, when a moderate economic recovery is expected to begin (Chart 3-12).

8. Knock-on effects brought about by banks' cross-shareholdings

The above scenario analyses deal only with the first-round effects when economic conditions and stock prices change. However, in gauging impacts of shocks over the financial system, the channel through which shocks would cascade among banks needs to be watched. As an example, the knock-on effects brought about by banks' cross-shareholdings are examined.

Banks' cross-shareholdings often occur when a bank anticipates enlarging its business base through business alliance with other banks next to its own business area. Banks' cross-shareholdings comprise about 10 percent of banks' total stockholdings (Chart 3-13). For some banks, the proportion of shareholdings of other banks may reach more than half of its total shareholdings. The banks with a higher proportion of banks' cross-shareholdings may be affected by cascading effects on stock prices, where a decline in the bank's

stock price may erode another bank's stock value, as well as the first-round effects of a stock price decline for banks' own stockholding.

The impact of knock-on effects is estimated for each bank on the assumption that the value of stockholdings of all banks at the end of fiscal 2007 will decline 38 percent, the same rate of decline TOPIX recorded during fiscal 2008 (see Box 4 for details).

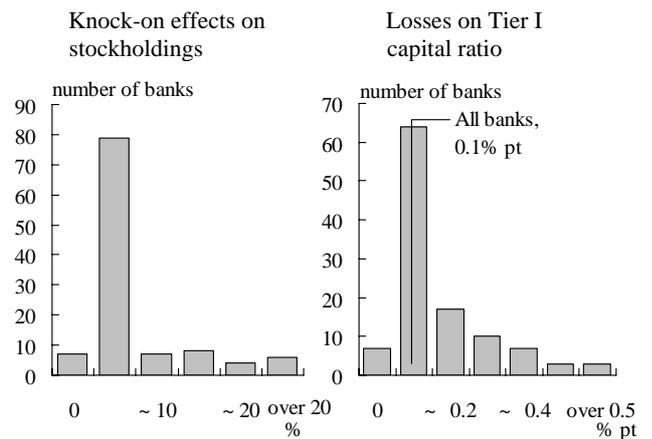
The results show that the knock-on effects are restrained for most of the banks, with the estimates less than 5 percent relative to total shareholdings. At the same time, there are some individual banks with estimates of more than 20 percent relative to total shareholdings for banks with a higher proportion of cross-shareholdings. In terms of impacts for Tier I capital, there are some individual banks that the impact exceeded 0.5 percentage point of Tier I capital (Chart 3-14).

Such results suggest that even banks that have incurred limited first-round effects from the decline in stock prices could incur substantial knock-on effects from a systemic cascade through cross-shareholding structure of the banking sector if those banks have a higher proportion of cross-shareholdings of other banks. Bearing such a possibility in mind, each bank needs to pursue risk management in a case where a bank owns the stocks of other banks in anticipation of business alliances to enhance profitability.

B. Interest Rate Risk

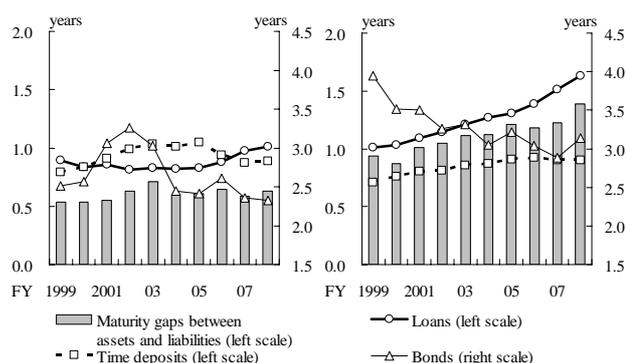
The average length of time until the renewal of the interest rate for major items on banking accounts (hereafter, average maturity) for loans has lengthened both for the major banks and the regional banks (Chart 3-15). The length of time until maturity for bonds has shortened for the major banks, but it has lengthened for

Chart 3-14: Losses on Tier I Capital Ratio by Knock-on Effects¹⁾



Note: 1. Bank of Japan estimation.

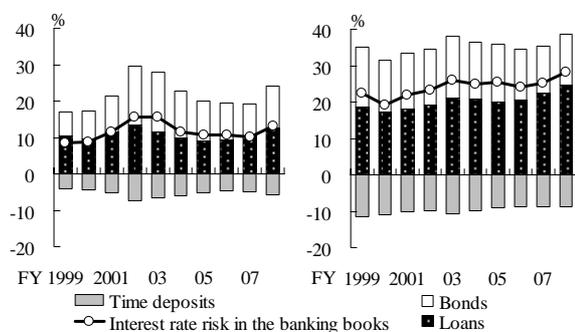
Chart 3-15: Average Maturity of Banks' Assets and Liabilities¹
Major banks Regional banks



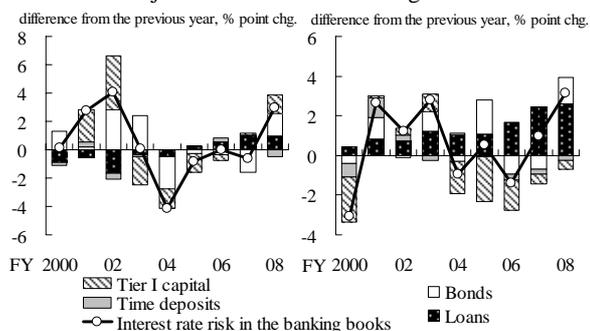
Note: 1. Bank of Japan estimation.

Chart 3-16: Interest Rate Risk in the Banking Books (100 bpv)^{1,2}

[1] Ratio of Interest Rate Risk to Banks' Tier I Capital
Major banks Regional banks



[2] Contributions to Changes in Ratio of Interest Rate Risk to Banks' Tier I Capital
Major banks Regional banks



Notes: 1. The risk is estimated based on the assumption that market interest rates rise by 100 basis points at all maturities.
2. Bank of Japan estimation.

the regional banks, and the ratio of interest rate risk to Tier I capital has reached 28.3 percent for the regional banks and 13.1 percent for the major banks.

An examination of components of year-on-year differences in the ratios of interest rate risk relative to Tier I capital shows that, at present, increases in bond interest rate risk have contributed to the overall increase in the ratio for the major banks, while increases in loan interest rate risk and a turnaround in bond interest rate risk have been contributing factors for the increase in the ratio for the regional banks (Chart 3-16).

1. Simulation analysis

For the periodical assessment of the interest rate risk of the banks as in the previous issues of the *Report*, a simulation model that incorporates the balance-sheet structure of the major banks and the regional banks at the base point in time (the end of fiscal 2008) as well as their interest-rate-setting behavior in the past was employed for the analysis.

With respect to the future path of market interest rates, four scenarios are considered: (1) a baseline scenario that the future short-term interest rate follows the path implied by the yield curve of the base point; (2) a parallel shift scenario; (3) a steepening scenario; and (4) a flattening scenario (see Chart 3-17 for specific assumptions of each scenario). In the estimation of the future interest income under these scenarios, it is assumed that (1) the spread between time deposit/lending rates and the corresponding market rate with a similar maturity converges on its historical average in the long term; and (2) based on the past rates, the ordinary deposit rates hover around the 25 percent level of 1-month LIBOR. It should be noted that future capital gains/losses on bond holdings are based on the estimates of the theoretical price instead

of the market price.

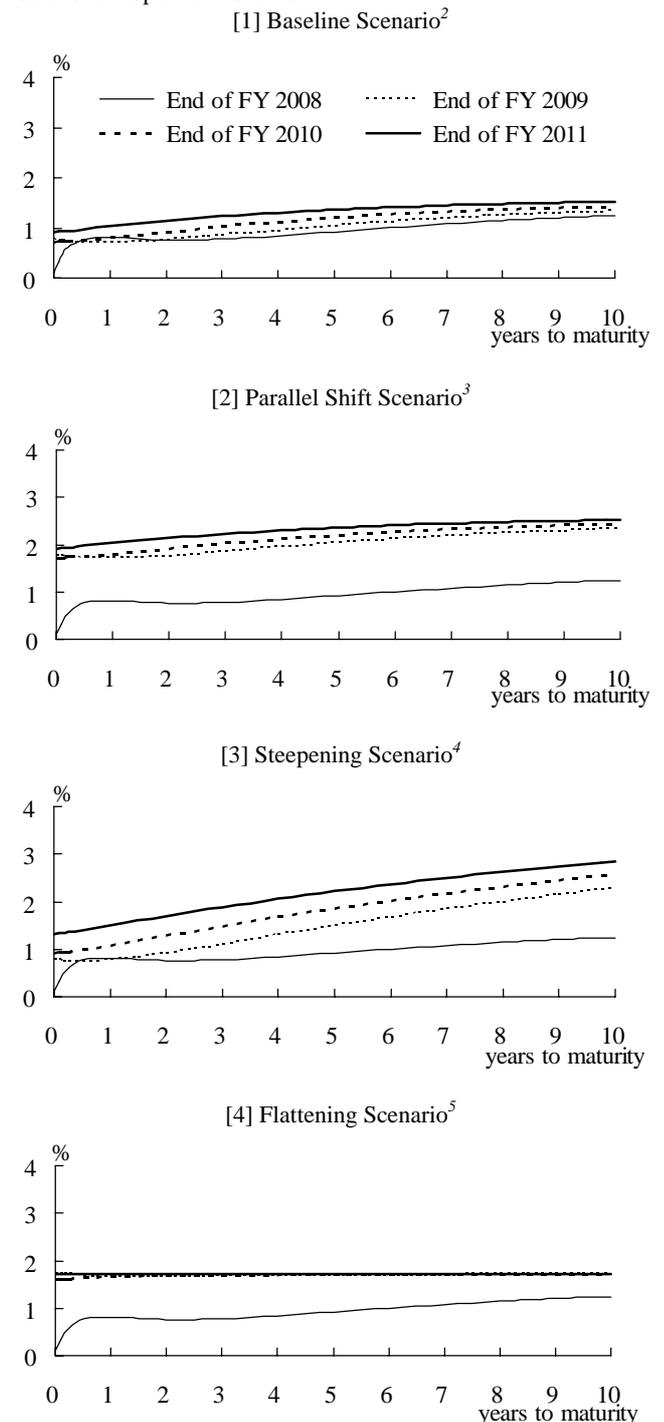
The overall picture of the simulation results can be summarized as follows (Chart 3-18). When the yield curve shifts upward gradually, an increase in interest payments on short-term debt such as deposits and market-based financing exceeds an increase in interest income from lending and bond holdings in the short term. Therefore, in all the scenarios, net interest income for both the major banks and the regional banks declines compared with the second half of fiscal 2008. In scenarios assuming an upward shift in yield curves, capital losses of bond holdings occur in the short term. The size of the capital losses is larger for the parallel shift and flattening scenarios than for the steepening scenario, because hedging effects of floating-rate government bonds are more pronounced under the steepening scenario.

Because the yield curve assumed in this simulation has shifted downward compared to those in the previous issue of the *Report*, the future recovery of net interest income will be slower than in the previous simulation (Chart 3-19).

Next, the impact on net income of the higher response rate of the ordinary deposit rates against market rates is examined (Chart 3-20). Ordinary deposits account for approximately 40 percent of the liabilities of Japanese banks, and the higher response rate will have a significant impact on interest income. For the major banks, a response rate of 50 percent would bring interest income in three years to a level that is lower than the actual results of fiscal 2008 in all scenarios. For the regional banks, a response rate of 30 percent would bring interest income in three years to a level that is lower than the actual results of fiscal 2008 in all scenarios.

These findings indicate that the large interest rate risk

Chart 3-17: Spot Rate Curves¹



Notes: 1. Bank of Japan estimation.

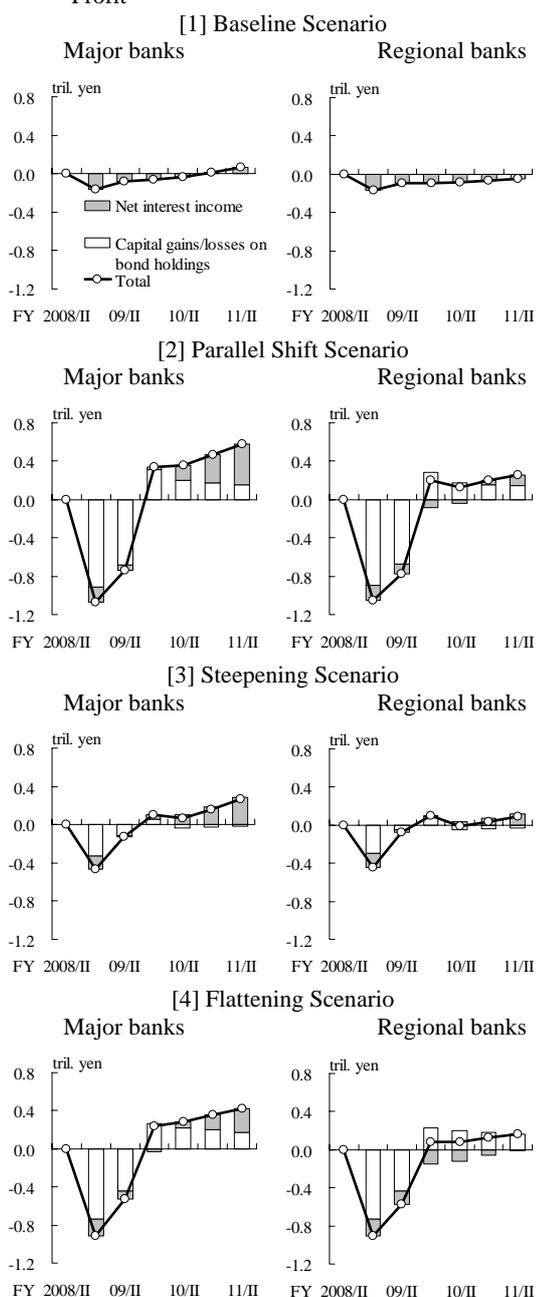
2. The baseline scenario is that future short-term interest rates follow the path implied by the forward rate curve at the end of March 2009.

3. The parallel shift scenario is that interest rates at all maturities shift upward compared with the baseline scenario by 1 percentage point over the year.

4. The steepening scenario is that the 10-year spot rate shifts upward compared with the baseline scenario by 1 percentage point, and the upward shift becomes smaller as time-to-maturity shortens.

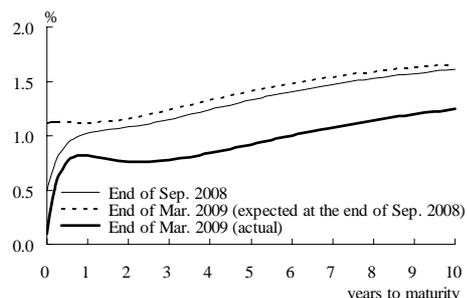
5. The flattening scenario is that the overnight rate shifts upward compared with the baseline scenario by 1 percentage point, and the upward shift becomes smaller as time-to-maturity lengthens, thereby flattening at the level of the long-term forward rate.

Chart 3-18: Impact of Rises in Market Interest Rates on Banks' Profit^{1,2}



Notes: 1. Bank of Japan estimation. Figures for net interest income are changes from actual results in the second half of fiscal 2008.
2. Net interest income from domestic operations in the second half of fiscal 2008 was 1.9 trillion yen for the major banks and 2.1 trillion yen for the regional banks.

Chart 3-19: Spot Rate Curves¹



Note: 1. Bank of Japan estimation.

inherent in mortgage lending and ordinary deposit financing remains mainly for the regional banks. Banks need to manage interest rate risk of the entire portfolio properly, through larger long-term funding or off-balancing of the loans, based on banks' own expectation of the future course of interest rates.

C. Funding Liquidity Risk

1. Funding liquidity risk in yen currency

The asset/liability structure of banks' balance sheets shows that the deposits continue to exceed lending both for the major banks and the regional banks (Chart 3-21). Nevertheless, for the major banks, lending and investment on securities have been exceeding deposits. At present, the proportion of short-term funding other than deposits, such as call money and repo transactions, has been increasing (Chart 3-22).

Looking at banks' liquidity ratio, an indicator that shows how much liquidity a bank holds relative to funding other than deposits, it is more than one for the major banks, higher than that for U.S. commercial banks. The liquidity ratio is even higher for the regional banks, compared to that for the major banks, given the low dependence of the regional banks on market funding (Chart 3-23).

As a way to measure the robustness of Japanese banks against funding liquidity risk, a scenario is prepared in which short-term funding via the markets is completely terminated. Under such a stress scenario, the extent to which funding demand can be covered with secured finances, such as borrowings from the central bank or reductions in short-term surplus fund investments, is estimated. The results show that most Japanese banks appear to have sufficient collateral margin to meet all of their short-term market funding demand (Chart 3-24). This is partly because of the large quantities of

government bonds that they hold.

Finally, transaction of funds through the Bank of Japan Financial Network System (BOJ-NET) is examined. The extent to which funding liquidity risk that surfaced at other banks affects a bank's funding through fund transactions through the payment and settlement system and others may depend on the structure of the network as well as the liquidity buffer of each bank. The average number of trading partners per participant in the BOJ-NET decreases after the autumn of 2008 (Chart 3-25). Factors behind this downtrend may be a squeeze in funds transactions due to counterparty risk, and a decrease in transactions due to worsening economic activity.

A decrease in the number of trading partners may cause two contrasting effects: the effect of weaker transmission of shortage of funds from one participant to others; and the effect of stronger transmission for two participants who continue to maintain their transactions in any case.

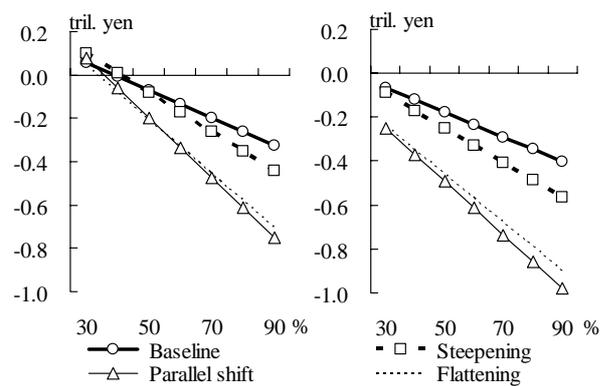
A simulation is conducted to examine which effect is larger than the other, based on data of realized transactions and liquidity buffer (see Box 5 for details). The result shows that the effect on liquidity position by way of network structure gradually weakened around fiscal 2007 and 2008 (Chart 3-26).

In sum, the banks maintain sufficient liquid assets to meet their short-term market funding demand, although there is a tendency mainly among the major banks in which reliance on market liquidity has been somewhat increasing. It could be interpreted from this that the funding liquidity risk of Japanese banks continues to be restrained on the whole.

2. Funding liquidity risk in foreign currency

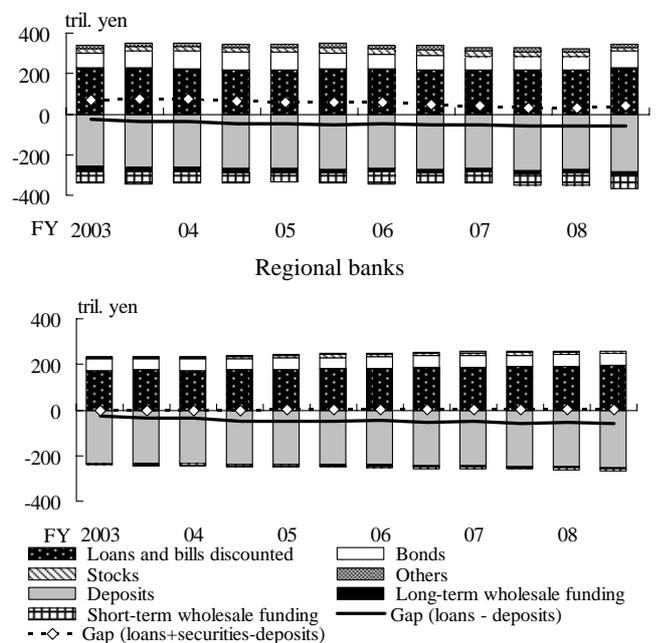
Toward the end of 2008 when the current liquidity

Chart 3-20: Impact of the Ratio of the Ordinary Deposit Rate to 1-Month LIBOR on Banks' Profit¹



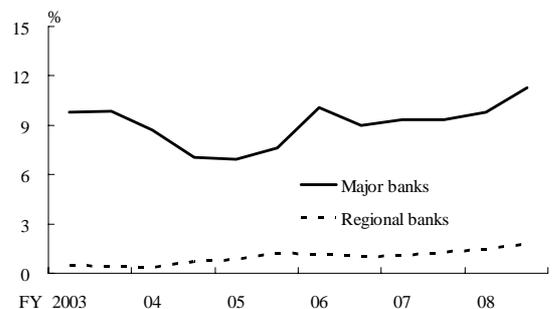
Note: 1. Bank of Japan estimation. Figures for net interest income in fiscal 2011 are changes from actual results in fiscal 2008.

Chart 3-21: Domestic Interest-Bearing Assets and Liabilities^{1,2}



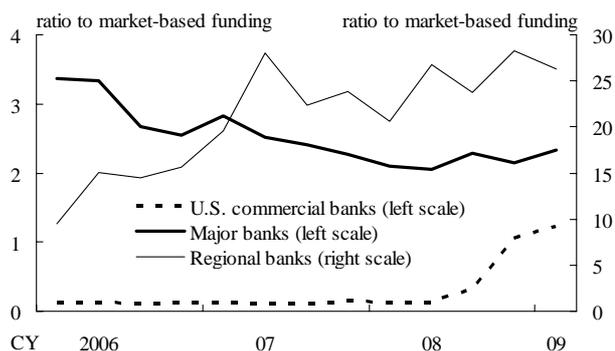
Notes: 1. Long-term wholesale funding = bonds and notes + borrowed money (excluding borrowed money from the Bank of Japan).
2. Short-term wholesale funding = CDs + call money + payables under repurchase agreements + payables under securities lending transactions + short-term corporate bonds + borrowed money from the Bank of Japan.

Chart 3-22: Ratio of Funding¹



Note: 1. Ratio of funding = (call money + payables under repurchase agreements + payables under securities lending transactions + borrowed money from the Bank of Japan) / financial liabilities

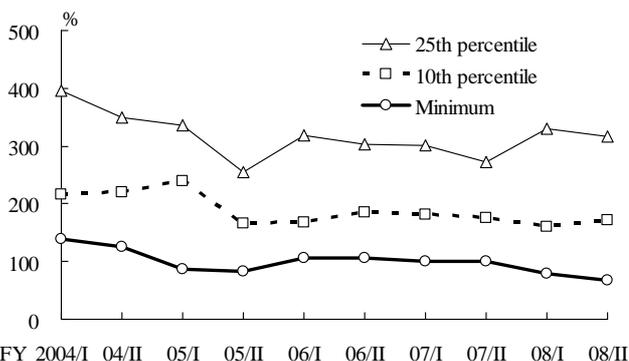
Chart 3-23: Ratio of Liquid Assets^{1,2,3,4}



- Notes: 1. Ratio of liquid assets = liquid assets / market-based funding.
 2. Liquid assets = cash + reserve deposits + government bond holding.
 3. Market-based funding of the major banks and the regional banks = call money (net) + payables under repurchase agreements + payables under securities lending transactions.
 4. Market-based funding of U.S. commercial banks = interbank liability (net) + federal funds and security RPs (net).

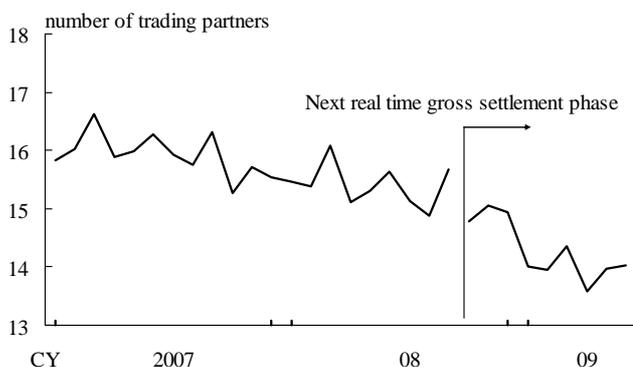
Source: FRB, "Flow of Funds Accounts of the United States."

Chart 3-24: Ratio of Banks' Funding Capacity to their Market Borrowing^{1,2,3,4}



- Notes: 1. Ratio of banks' funding capacity to their market borrowing = (Market lending up to three months + reserve deposits + government bond holding) / market borrowing up to three months.
 2. Ratios of banks' funding capacity to their market borrowing are sorted in ascending order. The minimum, 10th percentile, and 25th percentile are shown.
 3. Government bond holding is adjusted according to the ratio of the collateral value to the face value of the government bonds accepted by the Bank of Japan at the end of September 2008.
 4. Banks consolidated by another bank or one holding company are summed up to one banking group. Data exclude banks with no market borrowing.

Chart 3-25: Network Structure of Fund Transactions¹



Note: 1. Transactions in the BOJ-NET.

crisis was aggravated, market participants became extremely cautious about taking on counterparty risk. This led to a worldwide liquidity contraction in the U.S. dollar market and foreign exchange swap market, and Japanese financial institutions faced difficulties in their dollar funding. Against such a backdrop, Japanese banks have relied on yen investment funds and interbank transactions for dollar-denominated funding, and since September 2008 they have made use of the dollar-funds supplying operations by the Bank of Japan as a source of foreign currency. Recently, since Japanese banks' overseas lending has been leveling off and financial markets have started to restore stability, the banks' reliance on the dollar-funds supplying operations has been rapidly declining (Chart 3-27).

Looking at the asset/liability structure in foreign currency, there has recently been an increase in foreign currency-denominated assets as a result of increases in overseas lending (Chart 3-28). Those assets peaked in the October-December quarter of 2008, while the net position of foreign currency-denominated assets/liabilities continues to be substantially in net assets. Therefore, Japanese financial institutions have a balance-sheet structure that made them relatively immune, compared with U.S. and European financial institutions, from the adverse effects of turmoil in foreign currency transaction markets.

Characteristics of interbank fund transactions are also gauged in terms of the network of international financial markets. The Japanese banking sector has transactions with many regions, but connections with other markets and the size of transactions are not so great relative to international banks active in European markets (Chart 3-29). Together with the above-mentioned observation that Japanese banks have been in a net asset position in foreign currency, it appears that the Japanese banking sector has secured a

certain tolerance against liquidity shock originating abroad.

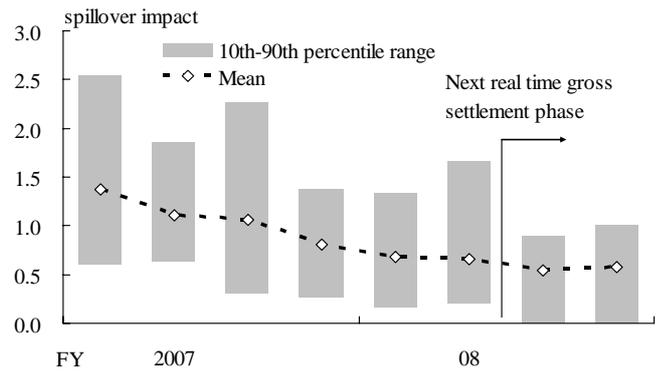
However, in terms of foreign currency denominated assets/liabilities on a gross basis, Japanese financial institutions hold a certain amount of foreign liabilities. They also maintain considerable interbank transactions with European banks, which hold a net liability position denominated in dollars in international financial markets (Charts 3-28 and 3-30). Therefore, funding liquidity risk in foreign currency should be carefully managed with an assumption that a large shock could be imposed on as was the case in the current financial crisis.

3. Funding liquidity risk and the Bank of Japan's approach

The nature and magnitude of financial institutions' funding liquidity risk could change in the future reflecting changes in financial institutions' business scope and the surrounding environment. It is important for financial institutions to properly gauge their funding liquidity risk profile and pursue adequate liquidity risk management.

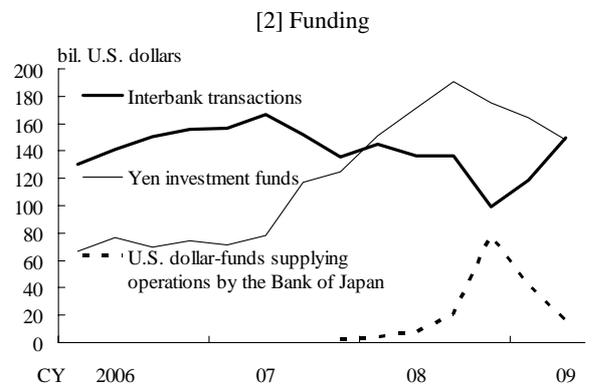
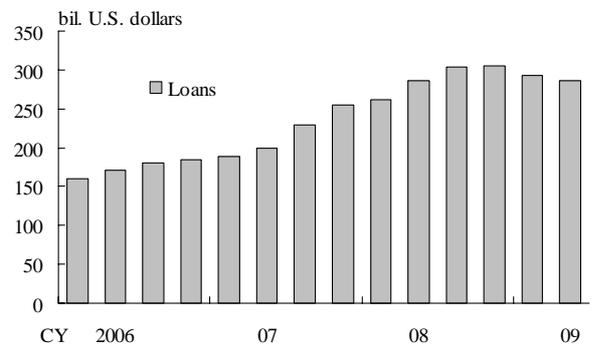
Through the experience of the current financial crisis, the importance of monitoring and supervising financial institutions' liquidity risk management by central banks has become recognized worldwide. The Bank of Japan has been closely monitoring financial institutions' liquidity risk management, and intends to continue its monitoring carefully, and encourage improvement by financial institutions in their risk management as necessary (see Box 6 for the Bank's approaches).

Chart 3-26: Spillover of Funding Difficulties in BOJ-NET¹



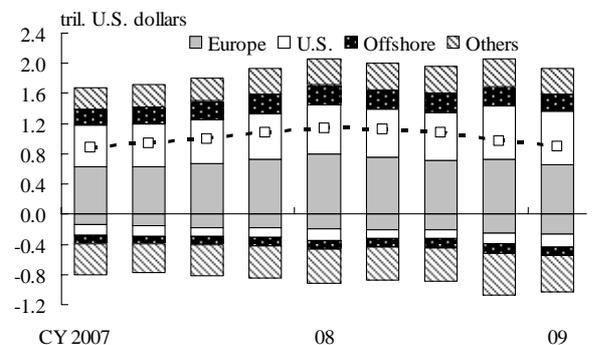
Note: 1. Spillover impact means the number of banks with funding difficulties.

Chart 3-27: Foreign Currency Investment and Funding¹
[1] Investment



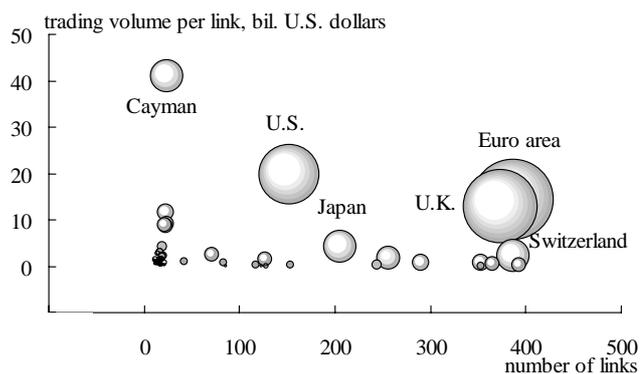
Note: 1. The figures in the chart are those of five major banks.

Chart 3-28: Foreign-Currency Denominated Claims and Liabilities of Banks in Japan¹



Note: 1. Positive and negative value indicates gross claims and liabilities, respectively. Line chart shows net foreign claims.
Source: BIS, "Locational International Banking Statistics."

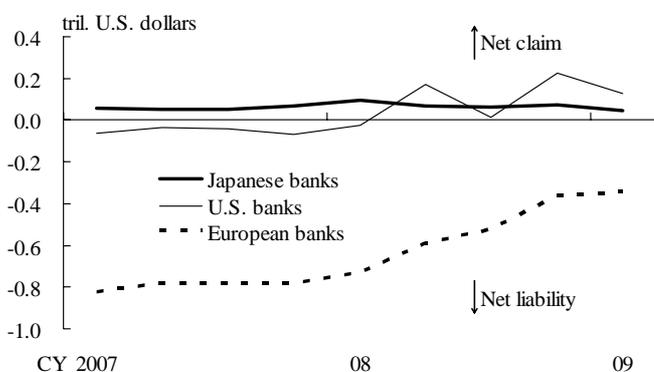
Chart 3-29: International Financial Network¹



Note: 1. Outstanding amounts of each banking sector's international financial transactions on all currencies, as of end-June 2009. Size of a circle indicates the trading volume of its sector.

Source: BIS, "Locational International Banking Statistics."

Chart 3-30: Interbank Net Foreign U.S. Dollar-Denominated Claims



Source: BIS, "Locational International Banking Statistics."

D. Assessment of the Robustness of the Financial System

The results of various scenario analyses across each category of risks are summarized as follows. In the situation where credit costs rise and stock prices stagnate, banks' capital bases are not likely to decline substantially. Accordingly, the robustness of Japan's financial system is not impaired as a whole.

Nevertheless, banks' expected losses for the next several years could exceed their operating profits from core business, and the capital bases of banks whose capital strength is relatively weak might remain at low levels. Going forward, uncertainty appears to exist as to the sustainability of the robustness of the financial system.

The funding liquidity risk of Japan's financial institutions remains contained in terms of yen currency. This alleviated the impact of the turmoil in the financial system that occurred in the United States and Europe. In terms of foreign currency, while Japan's financial institutions do not have a large gap in the asset/liability structures, those institutions need to stay vigilant as to managing the funding liquidity risk properly, bearing in mind that the functioning of financial markets could worsen.

As for interest rate risk, the difference in maturity of funding and investment has been on an increasing trend, in particular among the regional banks, as a result of increasing home mortgages on the asset side and ordinary deposits on the liability side. Banks need to manage interest rate risk properly, taking those points into consideration.

IV. Challenges for the Financial System

This chapter considers challenges for Japan's financial institutions in developing sufficient capital strength, and in smoothly performing the financial intermediation function.

First, the characteristics of bank profits from medium- to long-term perspectives are reviewed, and it is found that the management of market risk associated with stockholdings continues to be a critical business challenge for Japanese financial institutions. Then, discussions on the review of international financial regulations and supervisions, in particular the quality of capital, are introduced. Finally, challenges for Japan's financial institutions are summarized.

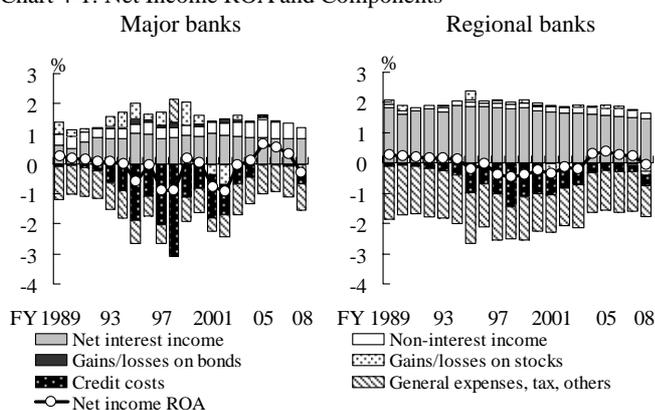
A. Stability of Bank Profits

1. Banks' medium- to long-term profitability

In the past 20 years, banks' net income ROA often fell into negative territory both for the major banks and the regional banks. In addition, the average of net income ROA for the past 20 years is slightly negative both for the major banks and the regional banks, indicating their low core-profitability (Chart 4-1). Standard deviation of net income ROA is large.

In the periods of negative net income, there were many cases where the net losses of the sum of gains/losses on stocks and the credit costs exceeded the "adjusted operating profits from core business," the operating profits from core business excluding items such as realized gains/losses on trading securities and return on pension assets (Chart 4-2). Net stock-related losses (i.e., net losses of realized gains/losses on stocks) and credit costs were rather volatile compared with the adjusted operating profits. As such, from a macro perspective, Japanese banks have a profit structure that

Chart 4-1: Net Income ROA and Components¹

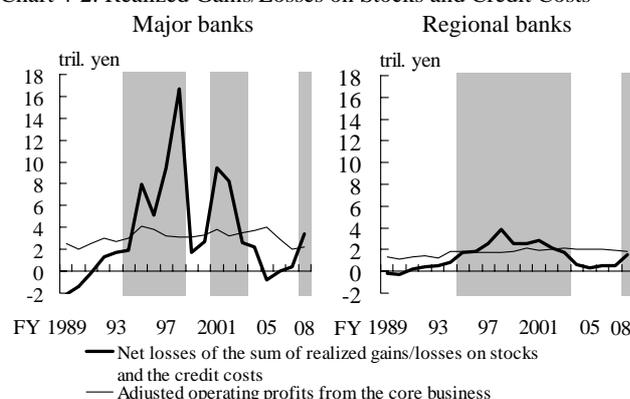


Statistics between fiscal 1989 and 2008

	Average	Standard deviation	Max	Min
Major banks				
Net income/loss	-0.1	+0.5	+0.7	-0.9
Net interest income	+0.9	+0.1	+1.1	+0.6
Non-interest income	+0.4	+0.1	+0.6	+0.3
Realized gains/losses on bonds	+0.0	+0.1	+0.2	-0.0
Realized gains/losses on stocks	+0.1	+0.3	+0.7	-0.7
Credit costs	-0.8	+0.8	+0.1	-3.0
Regional banks				
Net income/loss	-0.0	+0.3	+0.4	-0.5
Net interest income	+1.7	+0.1	+1.9	+1.5
Non-interest income	+0.2	+0.0	+0.2	+0.1
Realized gains/losses on bonds	-0.0	+0.1	+0.1	-0.2
Realized gains/losses on stocks	+0.0	+0.1	+0.3	-0.2
Credit costs	-0.5	+0.4	-0.0	-1.4

Note: 1. The credit costs in the statistics above are shown as negative. Net reversal of allowances is shown as positive.

Chart 4-2: Realized Gains/Losses on Stocks and Credit Costs^{1,2}



Notes: 1. Shaded areas indicate the periods of negative net income.
2. Realized gains/losses on stocks, as well as the credit costs, are shown as positive in case of net losses.

Chart 4-3: Realized Gains/Losses on Stocks and Credit Costs Relative to Net Income/Loss

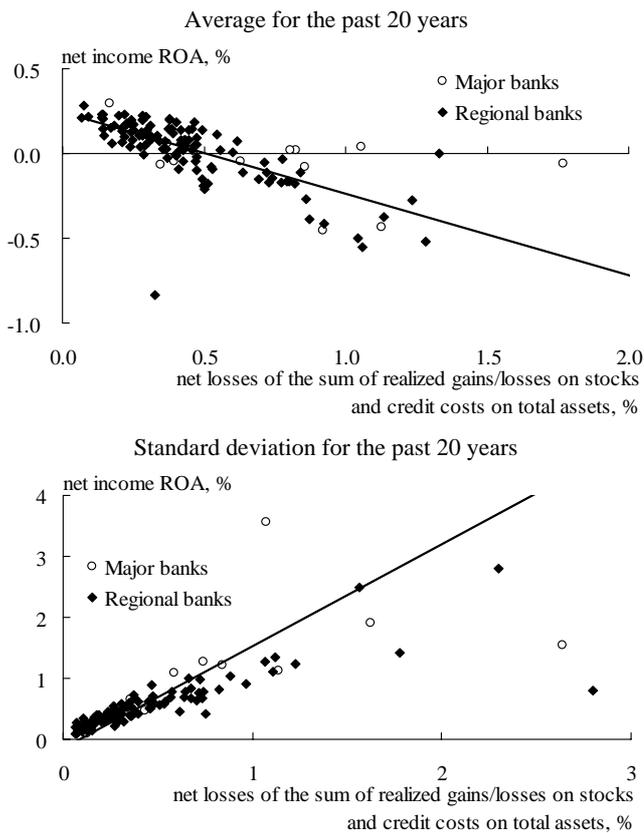
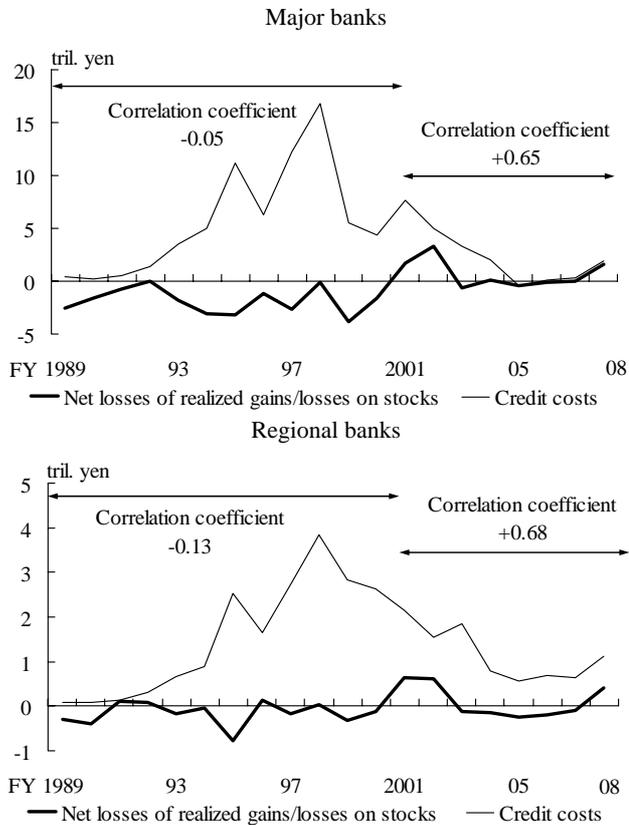


Chart 4-4: Correlation between Realized Gains/Losses on Stocks and Credit Costs



is susceptible, both in terms of profit level and change, to developments in net stock-related losses and the credit costs.

Such a tendency can also be confirmed at an individual bank level. The averages of various financial indicators of each bank for the past 20 years show that, banks with more losses in the sum of net stock-related losses and the credit costs relative to total assets tend to record smaller net income ROA, and such a relationship is statistically significant (Chart 4-3). In terms of standard deviation, banks with higher volatility in net stock-related losses and the credit costs tend to have more volatility in net income ROA.

2. Increased correlation between realized gains/losses on stocks and the credit costs

It has recently become more likely that deterioration in net stock-related losses and the credit costs occurs simultaneously (Chart 4-4). One factor is that realized gains/losses on stocks have become more influenced directly by a fall in stock prices, reflecting a decline in unrealized gains on stockholdings and the adoption of more conservative impairment procedures.

Such a positive correlation between changes in net stock-related losses and credit costs increases the volatility of bank profits. To identify the relationship, upon dividing variance of net income into variance and covariance of gains/losses on stocks, credit costs, and operating profits from core business, phases prior to fiscal 2000 and after fiscal 2001 are compared. The results confirm the following: (1) the covariance between the gains/losses on stocks and the credit costs contributed to reducing the variance of the net income before fiscal 2000, while the covariance between the two contributed to increasing the variance of the net income after fiscal 2001; and (2) in the phase after fiscal 2001, the covariance between the gains/losses on

stocks and the credit costs, in addition to the variance of the credit costs, became a significant contributing factor to the net income (Chart 4-5). Those results suggest that recent synchronization of changes in net stock-related losses and credit costs has been a factor that increased the volatility of bank profits.

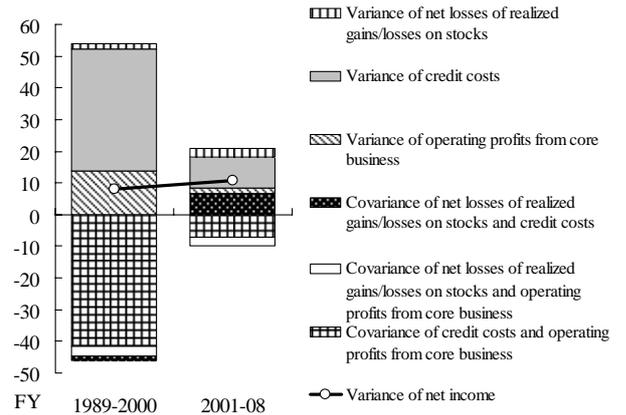
To gauge the size of volatility risk of net stock-related losses and credit costs relative to core profitability, the sum of variance and covariance of gains/losses on stocks and credit costs is compared with adjusted operating profits from core business for the period after fiscal 2001. The results show that deterioration of gains/losses on stocks and credit costs by one standard deviation reaches a level that could almost exhaust the current adjusted operating profits from core business (Chart 4-6).

3. Banks' core profitability and market risk associated with stockholdings

Banks' outstanding stockholdings have remained nearly unchanged, and some banks' stockholdings have even shown an increase. These suggest little progress in reducing banks' stockholdings (Chart 4-7). The level of banks' overall gains/losses on stocks has reached about twice of the level of operating profits from core business for two consecutive years. Some banks recorded overall gains/losses on stocks three times larger than core profits (Charts 1-22 and 4-8). These findings indicate that market risk associated with stockholdings is not sufficiently reduced in comparison to core profitability.

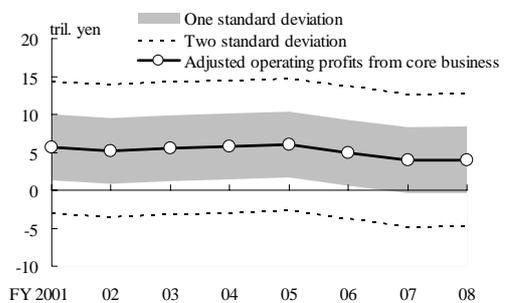
Furthermore, the extent to which the strengthened relationship with firms by stockholdings has contributed to an increase in banks' core profitability through expansion of lending business and fee business should be checked. Outstanding stockholdings relative to total assets and to adjusted operating profits from

Chart 4-5: Variance and Covariance of Net Income¹



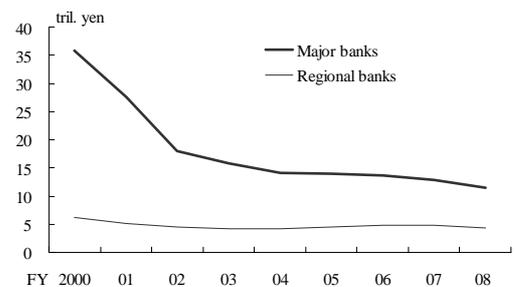
Note: 1. Dividing variance of net income into variance and covariance of realized gains/losses on stocks, credit costs, and operating profits from core business which include the residual.

Chart 4-6: Variance and Covariance of Realized Gains/Losses on Stocks and Credit Costs and Adjusted Operating profits from Core Business¹



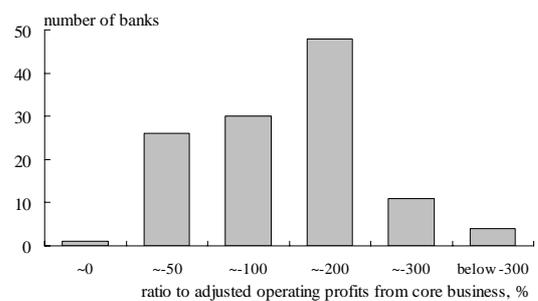
Note: 1. One standard deviation shows variations of realized gains/losses on stocks and credit costs by one standard deviation compared with the level of adjusted operating profits from core business.

Chart 4-7: Banks' Stockholdings^{1,2}



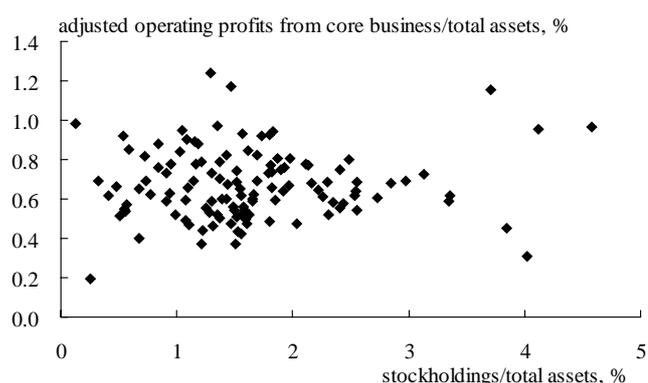
Notes: 1. Figures are based on acquisition prices.
2. On a consolidated basis.

Chart 4-8: Ratio of Overall Gains/Losses on Stocks¹



Note: 1. Ratio of overall gains/losses on stocks = overall gains and losses on stocks/adjusted operating profits from core business. As of fiscal 2008.

Chart 4-9: Banks' Stockholdings and Operating Profits from Core Business¹



Note: 1. Plots are the averages from fiscal 2004 to fiscal 2008.

core business in the past five years are compared for each individual bank, but no statistically significant relationship is observed between the two (Chart 4-9). Such results suggest that banks' stockholdings might not necessarily result in increasing banks' core profitability.

4. Review of accounting standards and stockholdings

Comprehensive income, which is adopted by the International Financial Reporting Standards (IFRS) and generally accepted accounting principles in the United States (U.S. GAAP), adds changes in unrealized gains/losses on stocks, as well as realized gains/losses on stocks, to current net income. According to Japan's accounting standards, information necessary to estimate comprehensive income is disclosed, while comprehensive income is not required to be shown in profit and loss statements. However, the Accounting Standards Board of Japan (ASBJ) is considering introduction of the disclosure of comprehensive income in addition to continued disclosure of current net income. If comprehensive income, as one of the financial indicators, is considered as important by market participants, banks' market risk associated with stockholdings will be recognized more clearly.

In addition, the International Accounting Standards Board (IASB), which compiles the IFRS, proposed the following in its draft "Financial Instruments: Classification and Measurement" issued in July 2009: (1) of the classifications of financial instruments, "available for sale" will be abolished; (2) all equity instruments, except for those designated at initial recognition, should be measured at fair value and reflected in current net income; and (3) equities designated at initial recognition should also be measured at fair value and reflected in comprehensive

income. The accounting standards of financial instruments have been under consideration. It should be noted that changes in the accounting procedure for stocks may bring changes in the role of strategic stockholdings or the market view for stockholdings in Japan.

B. International Discussions to Review the Financial Regulatory and Supervisory System

Based on the experience of the current financial crisis, major countries have been discussing reforming their financial regulatory and supervisory frameworks, while addressing the financial crisis (see Box 7 for the details on international developments in financial supervisory reforms). Based on the recognition that the fundamental causes of the crisis were failures in financial regulation and supervision, the Leaders of the Group of Twenty meeting, held in April 2009, stated the necessity to build a stronger and more consistent supervisory and regulatory framework. Behind the reform of the supervisory frameworks lies the supervisors' awareness of the significance of taking a macroprudential perspective in analyzing and assessing risks in the financial system, and adopting measures to stabilize the financial system. In terms of regulatory framework, they agreed to take action, once recovery is assured, to improve the quality, quantity, and international consistency of capital in the banking system. They also stated that future regulation must prevent excessive leverage and require buffers of resources to be built up in good times.

Also, in the Group of Twenty Meeting of Finance Ministers and Central Bank Governors held in September 2009, the necessity of further actions was emphasized. The actions include: (1) framework preventing excessive short-term risk taking such as standard on compensation practice consistent with

long-term value creation and financial stability; (2) stronger regulation and oversight for systemically important firms; (3) requiring banks to hold more and better quality capital; and (4) consistent and coordinated implementation of international standards.

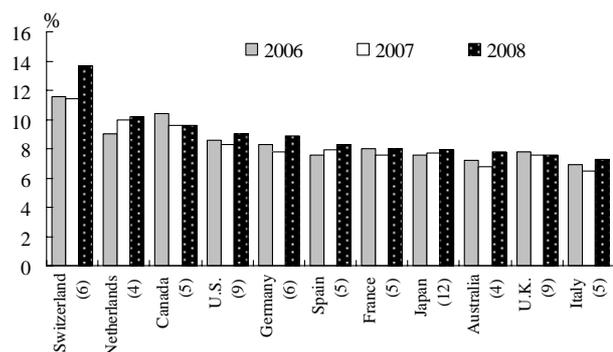
1. Review of capital adequacy requirements

The strengthening of regulatory capital frameworks has been under review by the Basel Committee on Banking Supervision (BCBS). The BCBS will issue concrete proposals on these measures by the end of 2009. Appropriate implementation standards will be developed by the BCBS to ensure a phase-in of these new measures that does not impede the recovery of the real economy.

There have been concrete discussions toward developing regulations in the United States and major European countries. For example, the Turner Review by the U.K. Financial Services Authority, based on a concept of "Core Tier I ratio," proposed that a possible future regime might be one in which the minimum Core Tier I ratio throughout the economic cycle is 4 percent and 6-7 percent at the top of the cycle. "Financial Regulatory Reform: A New Foundation" released by the U.S. Treasury laid out plans to require conservative and robust capital for systemically important institutions.

These discussions may be key issues for the bank management because they are likely to constitute the institutional framework within which business international businesses of Japanese financial institutions will be conducted after the global financial markets have regained stability. Based on international discussions on strengthening the quality of banks' capital, the current state of Japanese banks' capital is outlined in the following.

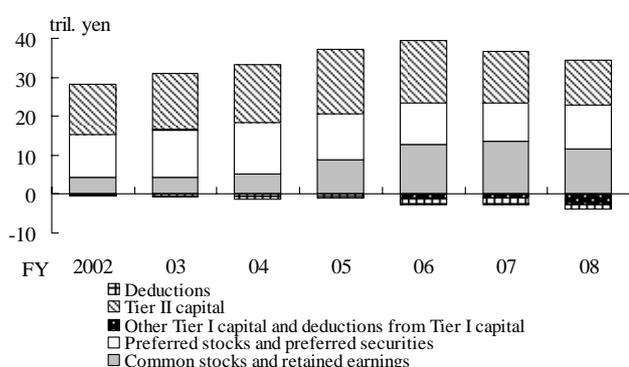
Chart 4-10: Tier I Capital Ratio of Major Banks¹



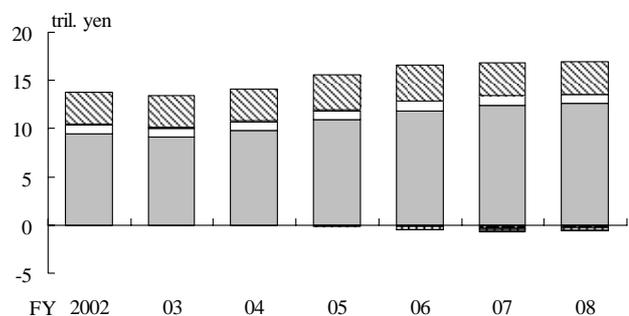
Note: 1. Figures in parentheses indicate the number of samples for each country at the end of 2008 (fiscal 2008 for Japan).

Sources: BIS, "79th Annual Report"; published accounts.

Chart 4-11: Composition of Capital of Japanese Banks¹
Major banks

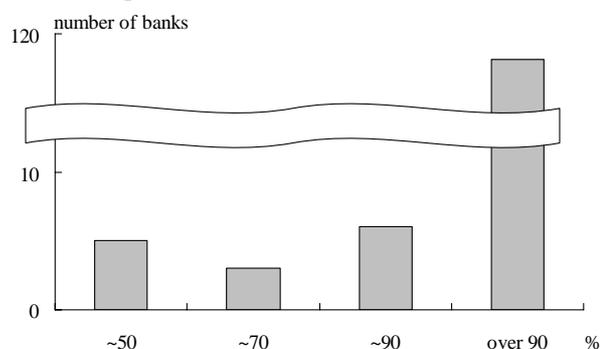


Regional banks



Notes: 1. On a consolidated basis.

Chart 4-12: Ratio of "Narrowly Defined Tier I Capital" to Tier I Capital (As of the End of Fiscal 2008)^{1,2}



Notes: 1. On a consolidated basis.

2. "Narrowly defined Tier I capital" = common stocks + retained earnings + preferred stocks with options for conversion to common stocks.

2. Current state of Japanese banks' capital

Japanese banks' capital adequacy ratios and Tier I capital ratios have been on a moderately increasing trend since fiscal 2004 both for the major banks and the regional banks, and have reached levels comparable to those of major overseas financial institutions (Charts 1-25 and 4-10).

In the meantime, based on the experience of the global financial crisis, a view to place more importance on "high-quality capital," which is narrower than Tier I, as a component of banks' capital has been rapidly prevailing in international financial markets. Compared with the existing Tier I, there are several issues for discussion such as: (1) application of more strict eligibility for capital instruments (Tier I hybrid products) such as preferred stocks and preferred securities; and (2) expansion of the range of items to be deducted from accounting capital (net assets) such as deferred tax assets and investments for other financial institution (Chart 4-11; see Box 8 for international developments in the quality of banks' capital).

In Japan, the FSA's supervision guidelines state that "narrowly defined Tier I capital" be a primary part of Tier I capital. At present, this "narrowly defined Tier I capital" relative to Tier I capital is at a high level, at about 73 percent for the major banks and about 99 percent for the regional banks. However, some banks do not reach 50 percent (Chart 4-12).

3. Inclusion of capital instruments

Of the total 11 trillion yen of hybrid capital instruments (Tier I hybrid products) issued by Japanese banks, a little less than 50 percent is preferred stocks and a little more than 50 percent is preferred securities issued through overseas special purpose entities (Chart 4-13). In addition, almost 50 percent of preferred

stocks are public funds and almost 40 percent of preferred securities are with step-up interest rates, which have a high possibility of redemption. Only one-third of all banks issue such Tier I hybrid products.

There are some hybrid products such as convertible preferred stocks, which have better capital quality in terms of subordination and loss absorption. Preferred stocks functioned effectively as capital reinforcement measures around the world especially during the stress period. To maintain a situation that enables investors with a variety of needs to provide funds to banks, Tier I hybrid products are expected to continue to play a certain role as capital, especially in a period of stress.

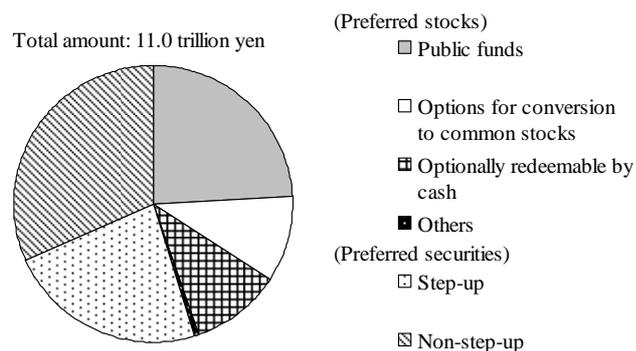
In the meantime, hybrid products have weak points as well in terms of loss absorption under stress in comparison to common stocks. In this regard, it is important especially for the management of internationally active banks to continually make efforts to enhance the quality and quantity of their capital, in light of the current international discussions.

4. Deductions from capital

In the recent international discussions on the clarification of deductions from capital, there are increasing requests for deducting most items in calculating "high-quality capital." In addition to intangible assets such as goodwill, items to be harmonized are deferred tax assets, intentional holding of other financial institutions' instruments (double-gearing) and investments falling outside of the scope of consolidation.

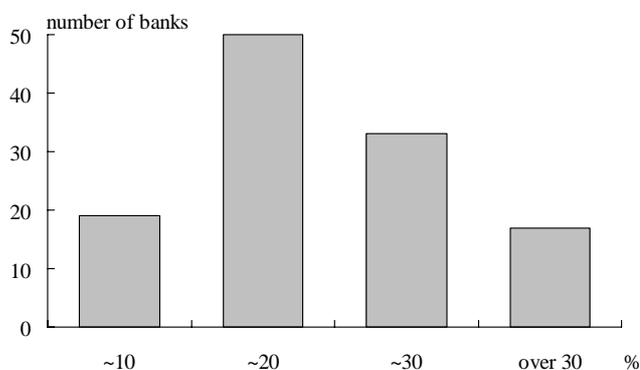
As for deferred tax assets, while there is currently no clear international agreement, many countries set certain limits for their inclusion in capital. For example, Japan deducts from Tier I capital any amount of deferred tax assets in excess of 20 percent of Tier I

Chart 4-13: Tier I Hybrid Products in Japanese Banks (As of the End of Fiscal 2008) ^{1,2}



- Notes: 1. On a consolidated basis. If hybrid products issued by the subsidiary banks are held by the holding corporation of them, the amount of hybrid products that the holding corporation finally issues to the market is used.
2. Preferred stocks with options for conversion to common stocks are those whose stockholders possess the right to convert them to common stocks within a specific time frame and that will be forced to be converted to common stocks together at the end of the time frame. Preferred stocks that are optionally redeemable by cash are those whose issuer possesses the right to get them back from stockholders in exchange for cash at a specific date or later.

Chart 4-14: Ratio of Net Deferred Tax Assets to Tier I Capital
(As of the End of Fiscal 2008)¹



Note: 1. On a consolidated basis.

in the case of major banks.

In the financial results of Japanese banks for fiscal 2008, net deferred tax assets (after deducting deferred tax liabilities) marked an increase for two consecutive years both for the major banks and the regional banks. In terms of individual banks, there was a large dispersion among banks, and some banks had a high dependence on deferred tax assets, with 50 banks reaching a ratio of net deferred tax assets to Tier I capital of more than 20 percent (Chart 4-14).

Since the treatment of the deferred tax assets is related to the accounting systems and tax systems of individual countries, it remains a challenge to apply internationally unified rules. Nevertheless, capital eligibility of the deferred tax assets has been questioned because its amount depends on future profitability and taxable income.

As for double-gearing and investments falling outside on the scope of consolidation, it is also under discussion that vulnerability through banks' capital ties may surface. Some Japanese banks recorded amount of such deductions at more than 10 percent relative to Tier I capital.

C. Challenges for Japan's Financial Institutions

For the past 20 years, banks' profits have been heavily influenced by credit costs and realized gains/losses on securities. Behind this is the fact that Japanese banks' core profitability has not been large enough to absorb the fluctuation in realized losses on stocks and credit costs, as repeatedly mentioned in the previous issues of the *Financial System Report*. Before the economic bubble collapsed, Japanese banks had a profit structure characterized by low interest rate margin, low credit costs, and maintenance of unrealized gains on stocks. If there were unexpected credit costs, net loss could be

avoided by reporting realized gains on sale of stocks. In this regard, stockholdings effectively played a role of a buffer against losses that capital would play. As Japan's economy has shifted to a period of low-growth, however, the credit costs occurring every year have been on an uptrend, and unrealized gains on stocks have virtually disappeared. In the meantime, the profit margin has remained at a low level as the competition in loan markets intensifies. Japanese banks' financial results for fiscal 2008 have once again shed light on the challenges facing Japan's financial system.

Based on the above recognition, this section summarizes future challenges for Japanese financial institutions.

1. Securing stable profitability

It is vital for Japanese banks, which focus on deposit and loan business, to properly manage credit risk and profitability of loans in order to secure stable profitability and to strengthen business base. Regarding this point, Chapter II pointed out that lending rates may not sufficiently reflect creditworthiness of borrowing firms. While banks may be able to increase their profits by increasing the lending volume in the short term, banks' profitability may be worsened in the medium and long term, due to depressed business conditions of firms with low creditworthiness. It is necessary for banks to secure stable profitability and strengthen their business base by properly managing credit risk to borrowers and reflecting the assessment in lending rates.

In order to enhance the added value to financial services in the low-growth economy, it is essential not only to provide funds to high-growth firms but also to assess struggling firms' management and provide liquidity assistance and restructuring support based on banks' own assessment. Considering changes in the

global demand structure after the global financial crisis, some Japanese firms are expected to move ahead to transform their business model in various ways, regardless of their size. From banks' point of view, in order to enhance their profitability, it is important for them to address changes and properly support firms.

2. Reduction in market risk associated with stockholdings

As for market risk associated with stockholdings, the losses on stocks recorded in the past two years roughly amounted to the operating profits from core business in the past four years. The market risk has been increasing along with increased volatility of stock prices, while the market value of stockholdings has declined considerably and the book value has also declined due to the write-off.

There exists a persistent view that banks' stockholdings are inevitable to maintain lending relationship with their customers. Meanwhile, there is also an empirical analysis showing that (1) banks with larger market risk associated with stockholdings do not necessarily achieve a higher level of core profitability, and (2) the average and individual-firm-level profitability of corporate financial transactions based on long-term stockholdings may be negative (see *Financial System Report*, September 2007).

Currently, the government and the Bank of Japan have restarted the purchase of stocks held by banks. Taking account of the magnitude of the risk, banks need to reduce market risk associated with stockholdings by effectively utilizing the aforementioned framework.

3. Toward strengthening capital bases

It is also important for the management of financial institutions to continue efforts to strengthen their

capital bases in light of volatility of profits.

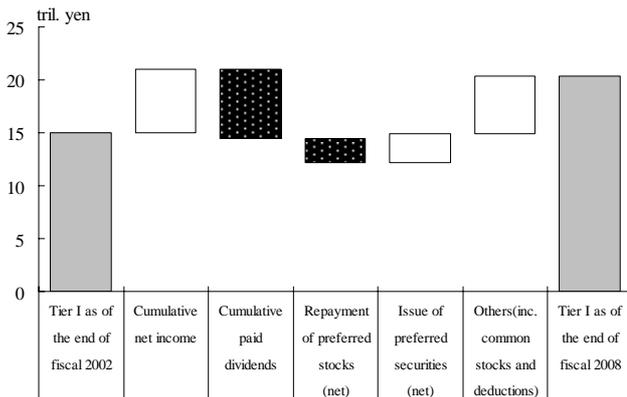
International discussions on the review of capital adequacy requirements in response to the current financial crisis are still in progress. Against such a background, Japanese banks have been taking actions to implement capital plans such as increasing their capital in common stocks, among others. These actions would not only contribute to fortifying the business bases of individual banks but also lead to enhancing stability of the financial system as a whole.

In strengthening the capital base, internal finance through accumulating retained earnings becomes quite important in addition to external finance.

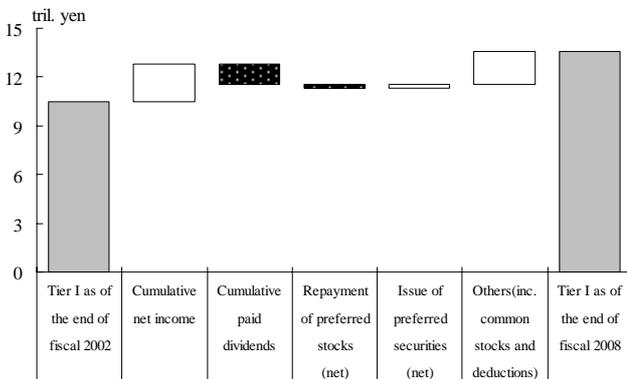
Looking at factors that contributed to changes in Japanese banks' Tier I capital from fiscal 2002 to fiscal 2008 based on available data, the following two points are noteworthy. First, as for external finance, both for the major banks and the regional banks, preferred stocks declined due mainly to repayment of public funds, while preferred securities and common stocks increased, pushing Tier I capital upward. Second, as for internal finance, for the major banks, cumulative net income was only 6 trillion yen, while cumulative dividends reached 6.5 trillion yen, pushing Tier I capital downward (Chart 4-15). In particular, ratio of paid dividends to total funding costs reached almost 50 percent for the major banks in fiscal 2005, and the paid dividends were almost equivalent to the interest expenses, the funding cost of liabilities as a whole (Chart 4-16). This indicates that the shareholder return, including banks' cash leakage through stock buybacks, exceeded the banks' income.

In this regard, in order to strengthen banks' capital bases, the banks need to strike the right balance between cash distributions through dividends and stock buybacks, and accumulation of retained earnings.

Chart 4-15: Contributions to Changes in Tier I Capital¹
Major banks

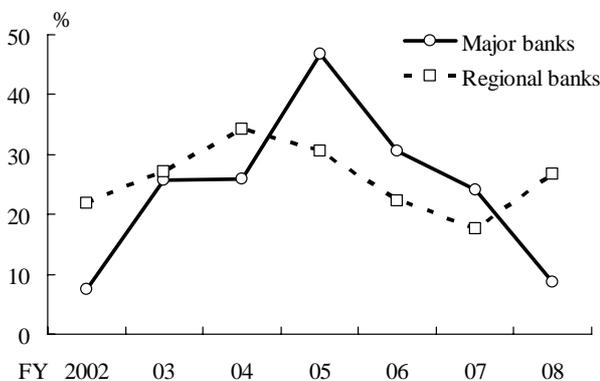


Regional banks



Note: 1. Changes from the end of fiscal 2002 to the end of fiscal 2008.

Chart 4-16: Paid Dividends to Total Funding Cost¹



Note: 1. Paid dividends to total funding cost = paid dividends / (paid dividends + interest expenses).

4. Performing the autonomous financial intermediation function

It is essential that Japan's financial institutions prepare a solid foundation for the autonomous financial intermediation function without relying on the public support that aims to alleviate the strains in firms' funding conditions. In assessing the financial intermediation function, Chapter II showed that banks' lending to small and medium-sized firms has been underpinned by the credit guarantee system. The credit guarantee system has currently complemented the financial intermediation function of the private financial institutions and seems to have been effective in containing bankruptcies. However, from a medium- to long-term perspective, it will become vital to examine how to encourage the autonomous financial intermediation function by the financial institutions, while carefully observing the impact of such public involvement on financial institutions' actions. For example, the financial institutions' own abilities to produce borrowers' information could be impaired if they maintain their lending outstanding by relying on the credit guarantee system.

Financial institutions play an important role in achieving efficient resource allocation of the economy in the medium to long term by properly assessing firms' creditworthiness and growth potential. By fulfilling such a role, they are expected to contribute to the sustained growth of Japan's economy.

D. Concluding Remarks

The Bank of Japan carries out the on-site examination and off-site monitoring by gauging individual financial institutions' business conditions and verifying their risk management. As for liquidity risk management, the Bank monitors detailed conditions including daily funding and encourages improvement where necessary.

The current global financial crisis has once again indicated that inadequate management of liquidity risk may be directly linked to banks' operating difficulties, and that the actions taken by the Bank of Japan have played an important role in securing Japan's financial system stability.

The Bank has also conducted research and analyses of the financial system stability by using not only information on individual banks' actions and financial market developments — obtained through daily money market operations and payment system operations as well as through on-site examination and off-site monitoring — but also information on the real economy obtained from research and analysis conducted by its head office and branches. The analyses and assessment on the financial system stability from a macro perspective have been used in its implementation of the financial system policy. The resumption of stock purchases held by financial institutions and the provision of subordinated loans are just a few examples of how the Bank has been able to act under the current financial crisis, based on the analyses and assessment on the financial system stability. Furthermore, the assessment of the financial system stability from a macro perspective is one of the important factors for monetary policy in assessing risks to medium- and long-term developments in economic activity and prices.

The Bank of Japan gives advice and guidance to individual financial institutions with respect to, for example, risk management. Furthermore, the Bank, from a macroprudential perspective, intends to properly assess the current state of the financial system and the challenges facing it. From the Bank's viewpoint, its assessment provides an insight into its policy making, thereby contributing to the stability of Japan's financial system.

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Box 1: Methodology Used to Create Financial Indicators for a Group of Borrowers

This Box explains the methodology used to create financial indicators for a group of borrowers and describes some of their features.

(Methodology)

The aggregated value X_k , which is a financial indicator x_{ij} for bank k 's group of borrowers, is defined as follows.

$$X_k = \sum_i \sum_j w_{ijk} x_{ij}$$

i : index of firm size (large, medium - sized, and small)

j : index of industry (26 industries)

k : index of banks

w_{ijk} : bank k 's share of loans for firm size i and industry j (uses "Loans and Discounts Outstanding by Sector")

x_{ij} : firm size i and industry j financial variables (uses "Financial Statements Statistics of Corporations by Industry")

X_k is an average of financial indicators by firm size and type of industry that is weighted with loan outstanding by firm size and type of industry. In other words, X_k represents the average of financial indicators for bank k 's group of borrowers.

(Features of borrower's financial indicators)

There are two primary benefits in constructing an average of financial indicators.

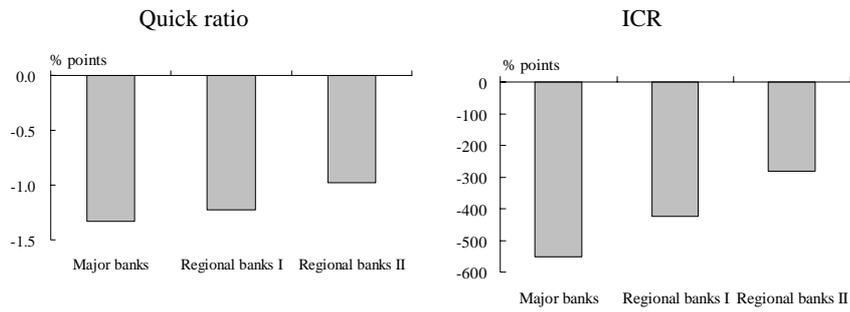
(1) In terms of the financial performance of a bank's group of borrowers, the aggregated variable allows comparisons between banks and between groups of each firm size.

(2) Cross-sectional variations across banks and time-series variations enable a panel analysis of the effect of the financial conditions of a group of borrowers on bank variables.

With respect to (1), there may be deviation of financial indicators between each group of borrowers and aggregated groups, reflecting the different degree of dependence on bank borrowings according to firm size and type of industry. For example, it is the large manufacturing industry that has mainly experienced a deterioration of their business performance in the current downturn, while after the rupture of the bubble the performance changes were observed mostly in the real estate industry. A comparison of the two situations shows that even if the size of the macro shock is the same, there will be a different impact on banks because the two industrial sectors have different dependencies on bank borrowings. In addition, the impact of these macro shocks will vary across individual banks according to the firm size and type of industry of their counterpart borrowers. It is important to take account of these differences when considering the impact of macro shock on banks. Chart B1-1 shows changes in borrowers' quick ratios and ICRs for each banking sector during the period from January-March 2008 through January-March 2009. It can be seen that the degree of deterioration in borrowers' financial performance was larger for the major banks, which have higher ratios of lending to large firms. From this point, the impact of macro shocks is not symmetrical among banks.

With respect to (2), differences in the financial conditions among groups of borrowers are important to examine intertemporal or interbank differences in credit costs of banks. These indicators enable the panel analysis of the impact on lending and interest rate setting in response to financial conditions of a group of borrowers.

Chart B1-1: Changes in Financial Indicators for a Group of Borrowers
(January-March 2008 to January-March 2009)



In the current cycle, bank loans to local governments have increased along with those to large firms. This pattern is observed in the past economic downturns as well and common to the city banks and the regional banks I (Chart B2-4). Lending to large firms and local governments indicates that the loans, regardless of category of originating banks, are likely to be shifted to relatively credible borrowers in the economic downturn.

(Summary)

Based on the additional results of lending behaviors to large firms and local governments as well as the results of those to small firms, which are described in Chapter II, it is highly likely that the cyclical lending behaviors are determined by not the characteristics of lenders, such as bank category, but the characteristics of borrowers, such as large/small firms and local governments.² This also implies that fluctuations with

Chart B2-3: Bank Loans to Large Firms

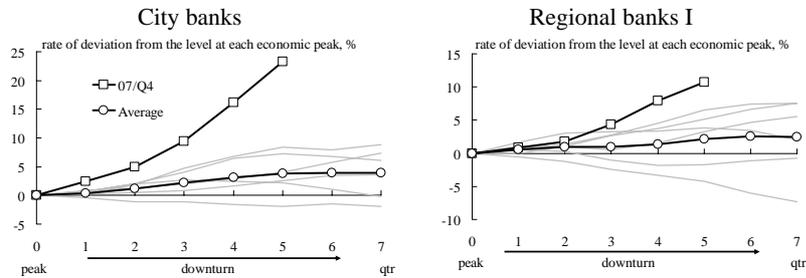
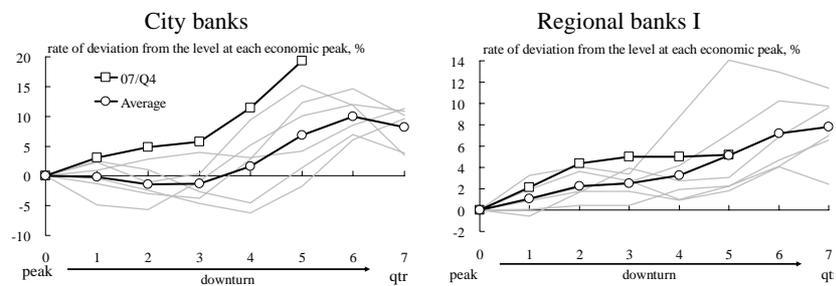


Chart B2-4: Bank Loans to Local Governments



business cycles of lending by bank category may vary according to banks' loan portfolios across bank categories.

¹ Gertler and Gilchrist (1994) reports that bank loans to large firms increased but those to small firms decreased in response to monetary policy shocks of tightening. It should be noted that the analysis conducted here, unlike the previous studies, focuses on the phase of economic downturn.

² Transmission mechanisms of monetary policy shocks of tightening through effects on liquidity/funding conditions of lending banks are referred to as "bank lending channels" and analyzed in Kashyap and Stein (2000) and others.

References:

Gertler, Mark and Simon Gilchrist, "Monetary Policy, Business Cycles, and the Behavior of Small Manufacturing Firms," *Quarterly Journal of Economics*, 109(2), 1994, pp. 309-340.
 Kashyap, Anil K. and Jeremy C. Stein, "What Do a Million Observations on Banks Say about the Transmission of Monetary Policy?" *American Economic Review*, 90(3), 2000, pp. 407-428.

Box 3: Extension of Credit Cost Scenario Analysis

The previous issues of the *Financial System Report* calculated the future credit costs (cc) by i) estimating equation (1) which explains transition probability (p) from borrowers' rating category m to n in period t for bank i by the contemporaneous real GDP growth ($rgdp$), and ii) multiplying predicted values for transition probabilities by net loss rates at transition ($lossrate$) and by exposures (exr) as shown in equation (2).

$$p_{i,t}^{mn} = f_i^{mn}(rgdp_t) + v_{i,t}^{mn} \quad (1)$$

$$cc_{i,t+l} = \sum_m \sum_n \hat{p}_{i,t+l}^{mn} \cdot lossrate_{i,t}^{mn} \cdot exr_{i,t}^{mn} \quad (l > 1, \text{ hereafter, } \hat{\cdot} \text{ denotes predicted values}) \quad (2)$$

The model expressed by equations (1) and (2) has potential to omit important effects. These include: i) dependence of the changes in the quality of loans to the changes in the real GDP growth on the borrowers' financial conditions; ii) lagged effects of the changes in the real GDP growth on the changes in the quality of loans; and iii) effects of downsizing of the defaulted loans. To address these issues, the following four points are extended from the previous analyses.

- (a) Real GDP growth is replaced by nominal GDP growth to incorporate deterioration in borrowers' creditworthiness due to a worsening of their terms of trade and a rise in their real debt outstanding.
- (b) Cross-terms between nominal GDP growth and borrowers' financial indicators are added as explanatory variables in equation (1) to capture the mechanism that the downward transition due to economic downturns is susceptible to deterioration in firms' financial conditions,
- (c) Lagged terms are added as explanatory variables in equation (1) to capture dynamic effect of changes in business conditions and firms' financial conditions on the changes in transition probabilities.
- (d) A function (δ) is estimated to connect the transition probability based on the number of borrowers (p) to that based on the liabilities (q) to capture the effect by which a higher growth in amount of loans per borrower subsequently induces the larger size of defaulted loans over a certain period of time.

(Introduction of lag structure and borrowers' financial conditions)

To address the above points (a) to (c), equation (1) is modified as follows.

$$g(p_{i,t}^{mn}) = \alpha_i^{mn} + \sum_{s=0}^2 \left(\beta_s^{mn} ngdp_{t-s} + \sum_{j=1}^k \gamma_{j,s}^{mn} ngdp_{t-s} \cdot fs_{i,j,t-s} \right) + u_{i,t}^{mn} \quad (3)$$

Note that $g(x)$ denotes the logit transformation of variable x , i.e., $g(x) = \ln\{x/(1-x)\}$. In equation (3), transition probability based on the number of borrowers (p) is explained by the nominal GDP growth for the past two periods and the cross-terms between the nominal GDP growth and the borrowers' financial indicators (fs_j where j indicates type of financial variable; see Box 1 for the methodology used to create fs_j). In this specification, partial effects of the past and present changes in the nominal GDP growth on the changes in the current transition probability depend on the past and present financial conditions of borrowers if γ s are non-zero.

The quick ratio, interest coverage ratio (ICR), and net worth ratio analyzed in Chapter II are chosen to capture the borrowers' financial conditions. It turns out none of the parameter estimates for the cross-terms of net worth ratios are jointly statistically significant. In most cases, they did not even satisfy sign conditions. For seven out of sixteen estimations, parameter estimates without the net worth ratios satisfy sign conditions and are jointly statistically significant (Chart B3-1). In light of this, the following analysis treats i) seven transition probabilities as responding to the nominal GDP growth, quick ratio, and ICR, and ii) other nine transition probabilities as constant. In addition, iii) the diagonal elements in transition matrices are adjusted so that the sum of each row of the matrices always becomes unity.

Chart B3-1: Estimated Functions of Transition Probability^{1,2}

(term: t)	(term: t+1)	Normal		Need attention		Special attention		In danger of bankruptcy		bankrupt/ de facto bankrupt	
		coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	p-value
Normal	Nominal GDP	-175.35	0.00	-80.01	0.17	-171.32	0.00	-152.45	0.01		
	Quick ratio	145.26	0.01	90.24	0.18	140.45	0.03	134.87	0.05		
	ICR	14.94	0.00	-1.70	0.67	-13.82	0.00	9.27	0.01		
Need Attention	Nominal GDP	106.84	0.01	-20.57	0.75	146.02	0.01	-120.69	0.01	-124.06	0.00
	Quick ratio	-97.25	0.07	23.94	0.77	-64.16	0.32	105.31	0.05	127.43	0.01
	ICR	-6.98	0.00	-0.50	0.90	-25.20	0.00	8.42	0.00	2.68	0.19
Special Attention	Nominal GDP	-76.85	0.21	74.59	0.17	225.08	0.00	36.52	0.48	19.22	0.71
	Quick ratio	43.59	0.58	-105.25	0.14	-159.55	0.11	-24.68	0.70	-107.73	0.10
	ICR	10.09	0.01	2.09	0.53	-23.78	0.00	-2.23	0.46	12.15	0.00
In danger of bankruptcy	Nominal GDP	-94.11	0.29	74.59	0.17	225.08	0.00	36.52	0.48	19.22	0.71
	Quick ratio	133.55	0.26	-105.25	0.14	-159.55	0.11	-24.68	0.70	-107.73	0.10
	ICR	-3.20	0.54	2.09	0.53	-23.78	0.00	-2.23	0.46	12.15	0.00

Estimation period: from FY 2002/I to FY 2008/II.

Estimation method: fixed effect model.

Notes: 1. The quick ratio and ICR are estimated cross-terms with the nominal GDP growth rate.

2. The figures presented are the sum of estimated parameters lagged by two periods and their p-values.

(Estimated transition probability deviation between loan-volume and borrower-number bases)

To address the point (d), equation (2) is replaced by equation (4), which uses the transition probability based on the liabilities (q). Moreover, a function (δ) specified as equation (5) are estimated for all non-diagonal elements in transition matrices to connect the transition probability based on the number of borrowers (p) to that based on the liabilities (q), attempting to capture the effect by which an increase in the growth rate of the loan size per borrower ($dlpb$) causes an increase in the size of loans downgraded over the next one to three years (Charts B3-2 and B3-3).¹

$$cc_{i,t+1} = \sum_m \sum_n \hat{q}_{i,t+1}^{mn} \cdot lossrate_{i,t}^{mn} \cdot ex_{i,t}^{mn} \quad (4)$$

$$g(\hat{q}_{i,t+1}^{mn}) = g(\hat{p}_{i,t+1}^{mn}) + \delta_{i,t}^{mn}$$

$$\delta_{i,t}^{mn} = \theta_i^{mn} + \sum_{s=2}^5 \chi_s^{mn} dlpb_{i,t-s} + \varepsilon_{i,t}^{mn} \quad (5)$$

$$\delta_{i,t}^{mn} \equiv g(q_{i,t}^{mn}) - g(p_{i,t}^{mn})$$

(Results of back-testing using fiscal 2008 data)

To check whether the extension actually contributed to improving the performance of the model, predictions for the previous and extended models in fiscal 2008 are compared to the benchmark credit cost ratios in fiscal 2008, which are calculated by substituting the transition probability based on the liabilities (q) in fiscal 2008 into equation (4). Chart B3-4 shows that the number of banks for which the predictions overestimate the benchmarks by 50 to 100 basis points

Chart B3-2: Growth Rate of Loan Size per Borrower

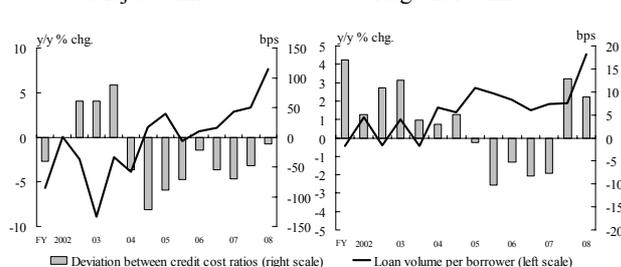


Chart B3-3: Estimated Growth Rates of Loan Size

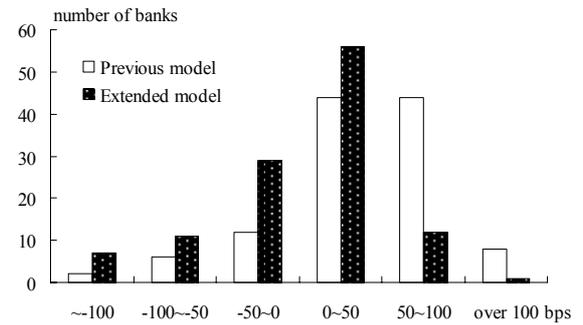
Explained variable	$\delta(\text{Normal} \rightarrow \text{in danger of bankruptcy})$		$\delta(\text{Need attention} \rightarrow \text{in danger of bankruptcy})$	
	Coefficient	p-value	Coefficient	p-value
Growth rate of the loan (-2)	1.67	0.05	0.58	0.45
volume per borrower (-3)	1.75	0.06	1.41	0.04
(-4)	0.72	0.33	0.65	0.30
(-5)	1.37	0.09	0.94	0.14
(-2)+(-3)+(-4)+(-5)	5.50	0.00	3.58	0.02

Estimation period: FY2002/I to FY2008/II.

Estimation method: fixed effect model.

significantly decreases to about 10 in the extended model from almost 50 in the previous model (Chart B3-4). Although the differences in the predicted values for the extended model and the benchmark are still large for some banks, the overall bias of the prediction has been significantly reduced. This improvement may be attributed to the followings: (1) by strengthening borrowers' financial conditions, downgrade becomes less likely to occur in response to worsening economic activity; (2) it takes more time for the lagged effects of the fiscal 2008 decline in the nominal GDP growth to thoroughly materialize; and (3) the size of defaulted loans was smaller because of the constrained upsizing of loans before fiscal 2008.

Chart B3-4: Difference in Predicted and the Benchmark Credit Cost Ratio¹



Note: 1. Horizontal axis indicates the differences in the predictions and the benchmark.

¹ Jimenez and Saurina (2006) reports a positive correlation between the lending growth rate and the nonperforming-loan (NPL) ratio as well as a long lag before increases in the lending growth rate result in increases in the NPL ratio.

Reference:

Jimenez, Gabriel, and Jesus Saurina, "Credit Cycles, Credit Risk, and Prudential Regulation," *International Journal of Central Banking*, 2 (2), 2006, pp.65-98.

Box 4: Cross-Shareholdings among Banks

This Box describes the analytical framework to calculate knock-on effects on individual banks through cross-shareholdings among banks.

First, a matrix is constructed to express cross-shareholdings between issuers and holders (Chart B4-1). Of the

Chart B4-1: Cross-Shareholding Matrix

		Holding banks			Other entities	Total shares outstanding
		Bank 1	Bank 2	Bank 3		
Issuing banks	Bank 1	y_{11}	y_{12}	y_{13}	y_1	E_1
	Bank 2	y_{21}	y_{22}	y_{23}	y_2	E_2
	Bank 3	y_{31}	y_{32}	y_{33}	y_3	E_3
Other assets		S_1	S_2	S_3		
Total		A_1	A_2	A_3		

total shares issued by bank i , E_i , the amount of shares held by bank j is denoted by y_{ij} , and that by the entities other than banks is denoted by y_i . Of the total assets owned by bank j , A_j , the assets other than shares are denoted by S_j . Next, it is assumed (1) the impairment of assets A is fully absorbed by capital E , and changes in capital E are equal to those in

stock prices, and (2) bank's debt never exceeds its assets, namely that $A - D = E > 0$ always holds, where D stands for the amount of debt. Under these assumptions, the knock-on effects of the stock price declines triggered by the impairment of assets are calculated.

For simplicity, suppose there are three banks, bank 2 only holds y_{12} issued by bank 1, and bank 3 holds y_{13} and y_{23} issued by banks 1 and 2 respectively, meaning $y_{11} = y_{21} = y_{22} = y_{31} = y_{32} = y_{33} = 0$. The losses ΔE^* suffered by banks 1, 2, and 3 in response to the impairment of bank 1's assets, ΔS , are given by the following equations (Chart B4-2).

$$\Delta E_1^* = \Delta S_1$$

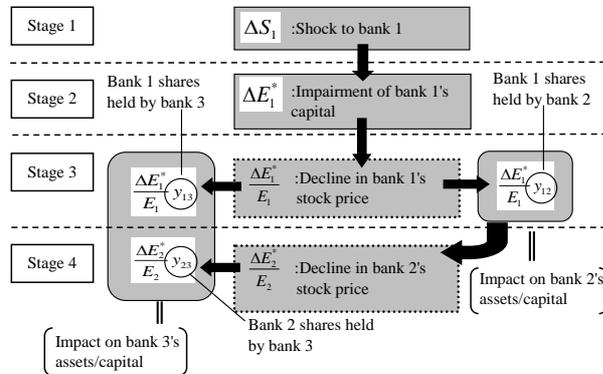
$$\Delta E_2^* = \Delta S_1 \frac{y_{12}}{E_1} = \frac{\Delta E_1^*}{E_1} y_{12}$$

$$\Delta E_3^* = \Delta S_1 \frac{y_{13}}{E_1} + \Delta S_1 \frac{y_{12}}{E_1} \frac{y_{23}}{E_2} = \frac{\Delta E_1^*}{E_1} y_{13} + \frac{\Delta E_2^*}{E_2} y_{23}$$

In this example, since bank 1 does not hold shares issued by other banks, its losses are limited to the impairment of its own assets. In contrast, bank 3's assets are not impaired in the first round, but it suffers the second-round negative effects on its capital due to a decline in the value of its holding shares issued by banks 1 and 2.

Suppose the general case of cross-shareholdings among n banks. Changes in capital, ΔE^* , in response to those in assets, ΔS , are represented as follows.

Chart B4-2: Transmission Mechanism



$$\Delta E^* = (I - B)^{-1} \Delta S = (I + B + B^2 + \dots) \Delta S = \underbrace{\Delta S}_{\text{direct effects}} + \underbrace{(B + B^2 + \dots) \Delta S}_{\text{knock-on effects}}$$

$$\Delta E^* \equiv \begin{pmatrix} \Delta E_1^* \\ \vdots \\ \Delta E_n^* \end{pmatrix}, \Delta S \equiv \begin{pmatrix} \Delta S_1 \\ \vdots \\ \Delta S_n \end{pmatrix}, B \equiv \begin{pmatrix} y_{11}/E_1 & \dots & y_{n1}/E_n \\ \vdots & \ddots & \vdots \\ y_{1n}/E_1 & \dots & y_{nn}/E_n \end{pmatrix}$$

The number of stages in the transmission process is finite in the former simplified case but infinite in the general case. The size of effects in each round decays step by step, and the aggregated knock-on effects on converge to a specific level.

Box 5: Framework of Simulation Analysis on Funding Liquidity Position

In considering funding liquidity position, it is important to examine not only individual bank's gap between investment and funding but also the spillover by which the effects of liquidity shortage occurring at one bank spread over to the other bank's funding through fund transfers in payment and settlement systems. The extent of spillover effects depends on the structure of fund transaction network and the amount of liquid assets held by each bank. Although it is difficult to derive the spillover effects of liquidity shortage analytically, a simulation analysis is conducted to derive the effects numerically in this issue of the *Financial System Report*. Following the method described in Eisenberg and Noe (2001), it is calculated how many banks fall into a shortage position of liquidity in the interbank payment network.

It is necessary for the analysis to correctly describe the structure of fund transaction network, i.e., a receipt/payment matrix. Here, a daily receipt/payment matrix is directly derived from the BOJ-NET payment data. Some of the previous studies, which gave up deriving a receipt/payment matrix from actual data due to data constraints, estimated a matrix from banks' balance sheets by using the maximum entropy (ME) method. One of the merits of this analysis over the previous studies is to construct a receipt/payment matrix without using the ME method.

Assume in the simulation that even if a bank falls in liquidity shortage, other banks never change their payment behaviors and make their scheduled payments. The simulation framework, therefore, does not contain systemic risk induced by increased counterparty risk or deteriorated credibility of market trades, resulting in underestimated outcome relative to the possible impact. The number of banks with liquidity shortage derived from the simulation should be smaller than that in the real world. Because of this, the size of spillover effects of liquidity shortage itself, shown in the simulation results of Chart 3-26, is not assessable. A detailed framework of this simulation is as follows.

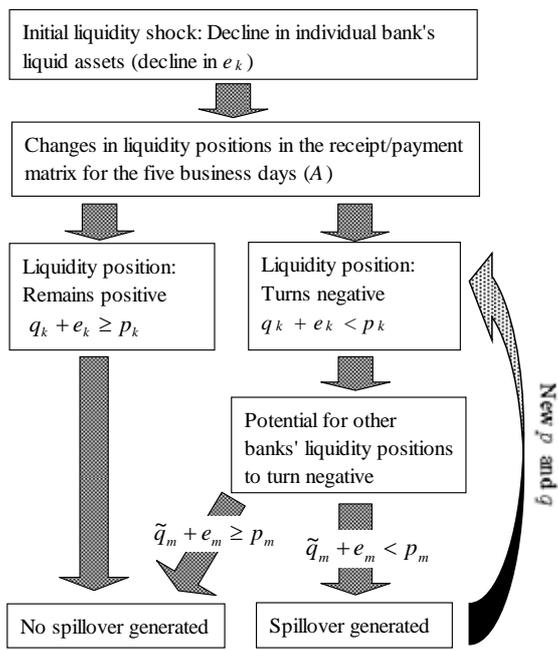
The receipt/payment matrix aggregated for five business days (A) is obtained from the BOJ-NET payment data comprising transaction volume and counterparties (Chart B5-1). The matrix includes domestic banks, foreign bank branches in Japan, and the consolidated institution with *shinkin* banks and securities companies. Suppose that liquid assets consist of reserve balances at the Bank of Japan, call money, cash, and government bond holding. For simplicity, net positions of liquidity are checked not at the end of each day but at the end of the sample five business days. The simulation provides the number of banks with shortage positions in response to the initial shock of a decline in bank k 's liquid assets.

Chart B5-1: Receipt/Payment Matrix¹

$$A = \begin{pmatrix} 0 & a_{12} & a_{13} & \cdots & a_{1j} & \cdots & a_{1N} \\ a_{21} & 0 & a_{23} & & & & \vdots \\ a_{31} & a_{32} & \ddots & & \ddots & & \vdots \\ \vdots & & & \ddots & & & \vdots \\ a_{i1} & & \ddots & & \ddots & & a_{iN} \\ \vdots & & & & & 0 & \vdots \\ a_{N1} & \cdots & \cdots & \cdots & a_{Nj} & \cdots & 0 \end{pmatrix}$$

Note: 1. a_{ij} denotes the amount paid from bank i to j . The sum of the row components, $p_k = a_{k1} + a_{k2} + \dots + a_{kN}$, is the total payments made by bank k ; while the sum of the column components, $q_k = a_{1k} + a_{2k} + \dots + a_{Nk}$, is the total payments received by bank k .

Chart B5-2: Simulation Scenario



If bank k 's liquidity position turns negative -- the sum of its total receipts q_k and liquid assets e_k is less than its total payments to others p_k , $q_k + e_k < p_k$ -- bank k is considered to be in liquidity shortage (Chart B5-2). In a normal situation, e_k is large enough for bank k to continue making its payments. If e_k significantly declines due to a shock, however, bank k cannot make its scheduled payments. It should be noted that bank k allocates its remaining funds to others according to its scheduled payments, and others make their payments to bank k , even when bank k cannot make its scheduled payments, as in Eisenberg and Noe (2001).

In case bank k falls in liquidity shortage, the total payments received by bank m , which is scheduled to receive payments from bank k , decrease from the initially scheduled value q_m to the revised value q'_m . If

the sum of the revised value of receipts q'_m and the liquid assets e_m is less than p_m , $q'_m + e_m < p_m$, bank m also falls into liquidity shortage. The number of banks with shortage positions can be derived from repeating calculation until the additional spillover of liquidity shortage comes to a stop.

The calculation is repeatedly conducted by rolling the sample periods, and the average number of banks with shortage positions is obtained for each quarter. In addition, by changing the bank that suffers an initial shock, another set of simulation results can be obtained. In the simulation, the major banks with relatively large transaction volume are extracted as an initial-shock receiver.

Even if bank k 's liquid assets evaporate, bank k does not fall into liquidity shortage as long as its total receipts exceed its total payments in the receipt/payment matrix. Moreover, the effect of liquidity shortage at bank k does not spread over as long as bank m has sufficient liquid assets. It depends on the receipt/payment matrix and the amount of liquid assets held by each bank to what extent the effect of liquidity shortage spills over.

Reference:
Eisenberg, Larry and Thomas H. Noe, "Systemic Risk in Financial Systems," *Management Science*, 47 (2), 2001, pp. 236-249.

Box 6: Bank of Japan's Approach to Liquidity Risk Management in Financial Institutions

The turmoil in global financial markets since the summer of 2007 has once again highlighted the importance of liquidity risk management in financial institutions. In the United States and Europe, some banks faced a sharp deterioration in financial positions especially of U.S. dollar funding and the collapse of financial institutions. Given that Japanese financial institutions have avoided a liquidity crisis amid the recent turmoil in the global financial markets, however, the Bank of Japan's framework for liquidity monitoring of financial institutions has worked effectively so far. The following describes the Bank's approach.¹

(Nature of liquidity risk for financial institutions)

Given the nature of its business, a financial institution inherently carries liquidity risk that stems from the maturity mismatch between investment and funding. Factors that may prompt liquidity risk to surface exist in every area of management of financial institutions, and the appearance and magnitude of liquidity risk vary widely and change as time passes according to the business model or management environment. Consequently, where the risk lies and how significant it is cannot be necessarily assessed from a uniform financial indicator. It is important to take into account a broad range of factors associated with liquidity.

(Bank of Japan's liquidity monitoring)

Because of the essential role of securing liquidity in maintaining the stability of financial markets and systems, the Bank comprehends and analyzes the overall trend of liquidity from a macro perspective and monitors closely individual financial institutions' liquidity positions on a daily basis (Chart B6-1). Against the background that a trigger of deterioration in financial positions was U.S. dollar funding, the Bank has responded with more detailed monitoring of foreign-currency funding as well as yen funding. The Bank has also been in close communication with other central banks and domestic and foreign regulatory authorities.

Chart B6-1: Bank of Japan's Framework for Liquidity Monitoring

Scope	Channels/approaches		Operations
Macro-level	To comprehend and analyze, by using data, the trend of overall liquidity in the financial system from a macro perspective.		To put together the results of the examinations and analyses in the form of the <i>Financial System Report</i> .
Individual institution-level	Off-site monitoring	A constant survey through interviews and regular information gathering.	To examine the current situation and provide guidance and advice on the following items. (1) profile of liquidity risk and administration (2) balance sheet management (3) daily cash management (4) action plan in case of emergency
	On-site examination	To visit financial institutions at regular intervals and investigate in terms of liquidity positions the internal control mechanism and the preparation of contingency plans.	

(Liquidity monitoring operations toward financial institutions)

The Bank examines the current situation and, where necessary, provides guidance and advice to the financial institutions on the following items.

(1) Profile of liquidity risk and administration

The Bank probes into the following points.

- Whether or not the understanding of the profile of liquidity risk in line with the nature of business and management policy is adequate

- Whether or not the commitment by management to upgrade the internal control system is sufficient
- Whether or not the contingency plan that includes the framework for transition to a more proper control system, reflecting the tightness of liquidity and a mechanism for incorporating the impact to liquidity in case of emergency, is adequate
- Whether or not due attention is given to the potential factors that may influence liquidity from the perspective of risk management

(2) Balance sheet management

The Bank regularly gathers financial institutions' data, including their financial positions mostly on a monthly basis, and seeks to grasp their qualitative information as well. Based on those data and qualitative information, mainly through its off-site monitoring, the Bank explores the following points.

- Whether or not the asset and liability structure itself, such as the balance between investment and funding, the maturity mismatch between assets and liabilities, and the dependence on funding from the market, is adequate for its funding ability
- Whether or not the size of contingent liabilities is excessively large, compared with its funding ability
- Whether or not there is tolerance in future investment/funding policy to build up assets without due consideration to its funding ability

(3) Daily cash management

The Bank obtains information on daily finance operations from financial institutions. Based on the collected information, the Bank, mainly through its off-site monitoring, inquires into the following points.

- Whether or not the financial institution secures necessary funding stably and facilitates smooth settlement
- Whether or not there are irregular movements in trading rates, including a surge in funding rates
- Whether or not the daily fund requirements exceed its funding capacity
- Whether or not there are problems in managing collateral, including the Bank's eligible collateral

(4) Action plan in case of emergency

If a financial institution is viewed to have been impacted in its funding or suffers increased risk due to the occurrence of trouble in fund-raising from the market and/or a massive drain of deposits or any other funds, the Bank will strengthen monitoring, conduct flexible on-site examination, and investigate whether appropriate measures are being taken in the following areas.

- In the area of internal governance, whether or not the institution has proper recognition of the changing funding environment and moves to a control system that matches the tightness of the market
- Whether or not the mechanism for incorporating intensified liquidity constraints into business operations is effectively functioning
- In operational areas, whether or not adequate liquidity management is in place to control positions according to the tightness of funding and also whether or not there are measures to secure additional funds by diversifying funding sources and methods and through the sale of assets

(Remarks)

The nature and size of liquidity risk can change significantly as a result of business developments in financial institutions and changes in the circumstances surrounding financial institutions. The Bank will ensure that individual financial institutions properly grasp their own liquidity risk profile and take appropriate measures, and encourage improvement if necessary.

¹For details, see "The Bank of Japan's Approach to Liquidity Risk Management in Financial Institutions," published in June 2009.

Box 7: International Developments in Financial Supervisory Reforms

In the United States, Europe, and international conferences, based on the experiences of the current financial crisis, there have been investigations into system enhancements to ensure the stability of the financial system, and into approaches to address the failure of financial institutions that could have a substantial impact on the financial system. This box provides a summary of the recent reforms in financial supervision.

The G20 Financial Summit held in November 2008 and April 2009 reached a consensus among heads of state regarding the need for improvements in supervisory forms for systemically important financial institutions, and for early warning frameworks to identify risks to the global financial system. In response, the United States, the European Union, and the United Kingdom have entered into specific investigations. Legislative bodies are now in the process of deliberating and enacting reform plans proposed by governments. Charts B7-1 and B7-2 contain summaries of the developments and the key points in the proposed reform plans.

Chart B7-1: Progress of Financial Supervisory Reforms in the United States and Europe

United States	European Union	United Kingdom
<p>Mar. 2009: Release of the reform framework by the Treasury.</p> <p>Jun. 2009: Release of the comprehensive reform proposal by the Treasury. Submission to Congress of a series of relevant bills.</p>	<p>Feb. 2009: Release of the "de Larosière Report" ¹ by a consultative body to the European Commission.</p> <p>May 2009: Release of the reform proposal by the European Commission.</p> <p>Jun. 2009: Endorsement of the Commission's proposal by the European Council.</p>	<p>Feb. 2009: Amendment of the Banking Act and the Bank of England (BOE) Act.</p> <p>Mar. 2009: Release of the "Turner Review" ² by the U.K. Financial Services Authority (FSA).</p> <p>Jul. 2009: Release of the consultation document on the reform plan by the Treasury.</p>

Notes: 1. The report on the financial regulatory and supervisory reform prepared by the consultative body of eight experts, chaired by Jacques de Larosière, former IMF General Manager and Banque de France Governor, and known as the "de Larosière Group," to the European Commission.

2. The report on the financial regulatory and supervisory reform named after Lord Turner, current chairman of the FSA.

Chart B7-2: Summary of Financial Supervisory Reform Plans in the United States and Europe

<p>United States: Treasury's reform proposal released in June 2009</p> <p><i>Expansion of the Federal Reserve's supervisory scope</i></p> <ul style="list-style-type: none"> • The Federal Reserve has the authority for consolidated regulation and supervision of Tier I financial holding companies, including nonbank firms, such as securities firms, insurance companies, and hedge funds. <p><i>Creation of the Financial Services Oversight Council (FSOC)</i></p> <ul style="list-style-type: none"> • The FSOC is to identify risk to the entire financial system, advise the Federal Reserve on identification of financial firms whose failure could pose a threat to financial stability, "Tier I financial holding companies," and provide a forum for information sharing and coordination between regulators. The membership includes the Secretary of the Treasury, who shall serve as the Chairman, and the heads of seven supervisors, including the Chairman of the Federal Reserve. <p><i>Creation of the National Bank Supervisor (NBS)</i></p> <ul style="list-style-type: none"> • The NBS inherits the authorities of the Office of the Comptroller of the Currency (OCC) and the Office of Thrift Supervision (OTS). It is dedicated to both the chartering and supervision of federally chartered depository institutions. <p><i>Creation of the Consumer Financial Protection Agency (CFPA)</i></p> <ul style="list-style-type: none"> • The CFPA is dedicated to consolidated consumer protection regulations in financial products and services that have been under multiple-sector regulators before the crisis.
<p>European Union: European Commission's proposal endorsed by the European Council in June 2009</p> <p><i>Creation of the European Systemic Risk Board (ESRB)</i></p> <ul style="list-style-type: none"> • Based on information on individual financial institutions collected by the European System of Financial Supervisors (ESFS, see below), the ESRB is to identify risk to the entire EU financial system, issue risk warnings and action recommendations to the ESFS and the European Economic and Financial Affairs Council, and monitor their implementation. The chairman is chosen by the president, vice presidents, and board members of the European Central

Bank (ECB) and the governors of national central banks of EU countries. The ECB serves as the secretariat.

Creation of the European System of Financial Supervisors (ESFS)

- The ESFS comprises the national supervisors of the EU countries and the European Supervisory Authorities (ESAs) for the banking, securities, and insurance sectors. It improves the effectiveness of supervision of individual financial institutions. The ESAs upgrade the consistency of national supervision, establish regulations and supervisory rules, and ensure a response in crisis situations.

United Kingdom: BOE Act amended in February 2009 and Treasury's reform plan released in July 2009

Strengthening the BOE's role in financial system stability

- Introduction of the BOE's statutory objective of ensuring the stability of the financial system, and definition of the BOE's responsibility for the macro-level stability of the financial system.

Creation of the Council for Financial Stability (CFS)

- The CFS is established to replace the existing Standing Committee held by the Treasury, BOE, and FSA. It holds regular meetings to discuss risk assessments of the entire financial system and, if there is a significant increase in risk, holds *ad hoc* meetings to coordinate the measures taken by regulators. It is chaired by the Chancellor of the Exchequer.
- In the semiannual "Financial Stability Report" (FSR), the BOE is to express its views on (1) risks to the financial system and real economy; (2) specific measures to address those risks; (3) estimation of effects of such measures; and (4) whether the BOE, FSA, or government should take such measures, or whether they require international cooperation.

The following common issues are behind the supervisory reform in the United States and Europe.

- (1) Ensuring the financial system stability requires not only the soundness of individual financial institutions but measures in a macro-prudential view that analyzes and assesses risks to the entire system.
- (2) Related to this point, the reforms are required so that gaps do not emerge in the regulatory and supervisory framework for systemically important financial institutions, whether or not they are typical banks.
- (3) When incorporating these perspectives into the financial supervisory framework, it is important to increase the role of the central bank so as to fully utilize its effectiveness, and this requires ensuring access to necessary information on individual financial institutions.

Below are the unique features and roles of the central bank that are being referred to.

- (1) As the entity responsible for monetary policy, the central bank should take a broad view in its analysis and assessment of the financial and economic environment.
- (2) Through its money market operations and the payment and settlement system operations, the central bank should constantly monitor financial markets and settlement activities, and therefore possess "market intelligence."
- (3) The central bank should function as the "lender of last resort" to prevent the emergence of systemic risk.
- (4) The central bank with a high degree of independence should have medium- and long-term perspectives.

However, it should also be noted that there are inherent historical and institutional factors leading to the overhauls of financial supervisory frameworks in the United States and Europe. In the case of the United States, there have historically been multiple agencies supervising financial institutions, and the Federal Reserve has been limited to its supervisory authority to bank holding companies. In Europe, there have been a large number of financial institutions active across multiple borders in Europe, and the ECB and BOE, without financial supervisory functions, have limited access to information on individual financial institutions.

Box 8: Recent International Discussions on the Quality of Capital

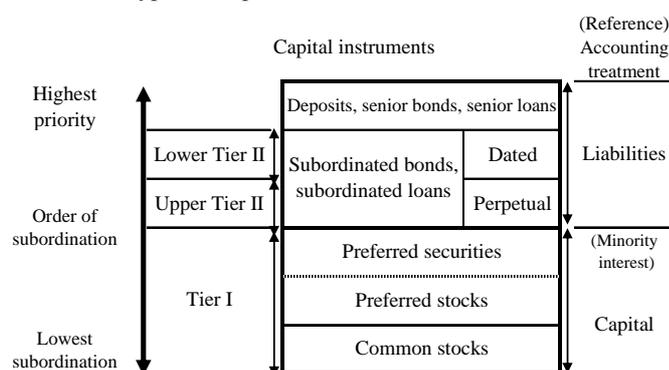
A press release issued by the Basel Committee on Banking Supervision in 1998 verified three elements required for eligible Tier I capital instruments: (1) subordination, (2) capacity to absorb losses on a going-concern basis and, (3) permanence (Chart B8-1).

Chart B8-1: Core Elements Required for Eligible Tier I Capital Instruments

		Explanation	Main objectives	Major contractual terms and conditions
a	Subordination	Subordinated to depositors and other general creditors in the allocation of remaining assets at the time of liquidation	Protection of depositors in liquidation (to prevent losses to depositors)	Subordination clause Residual asset allocation clause
b	Capacity to absorb losses on a going-concern basis	Losses to be covered by continuing business are absorbed without burdening depositors and general creditors.	Absorption of realized losses Conservation of the bank's resources in times of stress Avoidance of defaults and insolvency	Coupon/dividend deferral clauses Coupon/dividend non-cumulative clauses
c	Permanence	Ability to use resources in times of stress, no obligations to repay	Quantitative stability as a source of funding for loss absorption	Maturity date Call option Step-up clause

As Chart B8-2 indicates, capital instruments subordinated to deposits can absorb losses, protecting depositors in liquidation. The fact that some of capital instruments with inferior loss-absorption capacity on a going-concern basis and permanence relative to common stocks are accepted for inclusion in Tier I suggests that the existing regime for regulatory capital has implicitly placed a particular emphasis on subordination.

Chart B8-2: Types of Capital Instruments and Their Subordination



(Recent developments in international discussions on "high-quality capital")

Subsequent financial innovations led to a significant growth in the market for a wide range of Tier I capital instruments and the need for the re-evaluation of i) capital eligibility for the instruments and ii) fairness in terms of competition among financial institutions in different countries emerged. In October 2006, the Basel Committee initiated a review of the definition of regulatory capital. In the process of the review, the capacity to absorb losses on a going-concern basis is reappraised as a key element that constitutes "high-quality capital."

Chart B8-3 shows examples for the definitions of "high-quality capital" that are referred by some banks and supervisors. While common stocks and retained earnings are regarded as the key component of "high-quality capital" in every case, rules for the inclusions of Tier I capital instruments other than common stocks and the deductions are not uniform among those definitions.

The review process was accelerated by the failure of Lehman Brothers, which proved the substantial cost of negative externalities from the large financial institution's failure to the international community. For example, the U.K. Financial Services Authority (U.K. FSA), which actively furnishes information on the quality of capital,

argued that "banks' capital resources are particularly important because the closure of a bank can cause considerable consequential damage beyond its owners, employees and creditors due to its role in the payments system and as a provider of financing to business and consumers." In order to internalize and mitigate the cost of negative externalities, the U.K. FSA seems to view that shareholders must bear costs above those borne by the current regime to raise the capacity to absorb losses on a going-concern basis while restraining moral hazards among managers. However, it should be reminded that some recent study shows that the welfare loss of capital adequacy regulation even at current levels of regulatory required capital can be very large.

Preparing a robust public safety net can be considered as another option to mitigate the cost of negative externalities. For example, Japan's Deposit Insurance Law (Article 102) allows maintaining the smooth functioning of the financial system in times of financial stress. It should be noted, however, that understanding of taxpayers and prevention of regulatory arbitrage are essential to the institutional design for the public safety net.

Recent experience of the financial crisis shows that the most important challenge to ensure financial stability is how credit underwriting discipline and liquidity management can be strengthened, which, after all, provides the most reliable protection for the sound financial system. Formulation of the appropriate future regulatory capital framework requires comparison between the cost and benefit of particular choices. One needs to think twice what kind of combination of public regulation and self-discipline is desirable, and what kind of combination of capital adequacy regulation and other forms of public regulation is desirable.

Chart B8-3: Definition of "High-quality Capital"

		<i>Predominant ratio</i> in the 1998 press release issued by the Basel Committee	<i>Tangible common equity</i> used by some U.S. banks	<i>Tier I common capital</i> on the U.S. SCAP	<i>Core Tier I</i> defined by U.K. FSA	
Tier I Instruments	Common stocks / ordinary shares					
	Preferred stocks	Compulsory converted into common stocks				
		Others				
	Retained earnings (OCI ¹ included)					
	Other Tier I instruments					
AFS	Unrealized gains (Equity, bonds, loans)					
	Unrealized losses (bonds)					
	Unrealized losses (loans)					
Deductions	Goodwill	Not established. Rules for the deductions differ among countries.				
	Other intangible assets		MSR ²			
			Non-mortgage servicing etc.			
			others			
	Deferred tax assets				In excess of 10% of Tier I	
Other Tier I deductions						
50:50 deductions ³						

Add-ons
 Deductions

- Notes: 1. Other comprehensive income including unrealized gains/losses on available for sales (AFS) assets.
 2. Mortgage servicing rights.
 3. Deductions taken 50% from Tier I and 50% from Tier II.

References:
 Financial Services Authority, "A Regulatory Response to the Global Banking Crisis," Discussion Paper 09/2, March 2009.
 Shirakawa, Masaaki, "International Policy Response to Financial Crises," Remarks at the Symposium Sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August 2009.
 Van den Heuvel, Skander. J., "The Welfare Cost of Bank Capital Requirements," *Journal of Monetary Economics*, 55(2), 2008, pp. 298-320.

Chart A-1: Major Events in the Financial System (Since January 2009)

Jan. 16, 2009	U.S.: The government and the Federal Reserve Board (FRB) announced measures to support Bank of America. ----- The Basel Committee on Banking Supervision released consultative documents concerning the enhancements to the Basel II framework.
Jan. 19	U.K.: The government announced further initiatives to stabilize the financial system.
Feb. 3	Japan: The Bank of Japan (BOJ) announced the reintroduction of purchasing of stocks held by financial institutions.
Feb. 10	U.S.: The government and the FRB announced a new framework to stabilize the financial system.
Feb. 14	The G-7 released a joint statement.
Feb. 27	U.S.: The government announced further measures to support Citigroup.
Mar. 2	U.S.: The government and the FRB announced further measures to support AIG.
Mar. 4	Japan: Act on Limits on Shareholdings, etc. of Banks, etc. was partially amended. (On Mar. 12, The Bank's Shareholdings Purchase Corporation started to purchase stocks.)
Mar. 12	The Basel Committee on Banking Supervision announced that the level of capital in the banking system needed to be strengthened.
Mar. 13	Japan: The Financial Services Agency announced the public fund injections into three regional banks based on Act on Special Measures for Strengthening Financial Functions.
Mar. 17	Japan: The BOJ announced the introduction of provisions of subordinated loans.
Mar. 23	U.S.: The government announced details on the Public Private Partnership Investment Program (PPIP).
Mar. 28	Germany: The government announced capital injection into Hypo Real Estate Holding AG.
Apr. 2	The G-20 issued a communiqué. ----- The Financial Stability Forum (FSF) released "Recommendations and principles to strengthen financial systems." (The expanded FSF has been reestablished as the Financial Stability Board on the same day.)
Apr. 7	Ireland: The government announced the establishment of the National Assets Management Agency.
Apr. 24	The G-7 released a joint statement.
Apr. 29	EU: The European Commission issued "Directive on Alternative Investment Fund Managers."
May 7	U.S.: The government and the FRB published results of the Supervisory Capital Assessment Program for the 19 largest U.S. bank holding companies.
May 13	U.S.: The government proposed reforms of the over-the-counter derivatives markets.
May 20	The Basel Committee on Banking Supervision issued "Principles for sound stress testing practices and supervision."
Jun. 9	U.S.: The government announced the approval of the TARP repayments from 10 financial institutions.
Jun. 10	U.S.: Citigroup announced an agreement with the U.S. government about conversion of preferred stocks into common stocks. ----- The Basel Committee on Banking Supervision announced its membership expansion.
Jun. 22	IOSCO published "Hedge Funds Oversight: Final Report."
Jul. 2	Germany: The government announced further capital injection into Hypo Real Estate Holding AG.
Jul. 8	U.S.: The government and the FRB announced details on Legacy Securities Program.
Jul. 10	Germany: The bill related to a "bad bank" scheme was passed.
Jul. 13	The Basel Committee on Banking Supervision announced a final package of measures to enhance the Basel II framework.
Jul. 31	U.S.: The FDIC announced the launch of the test of the Legacy Loans Program.
Aug. 19	Switzerland: The government announced termination of capital injection to UBS.
Sep. 5	The G-20 released a joint statement.
Sep. 6	The Group of Central Bank Governors and Heads of Supervision released "Comprehensive Response to the Global Banking Crisis."

Chart A-2: Initiatives to Stabilize the Financial System in Selected Countries¹

As of September 1, 2009

		U.S. (GDP: 14 trillion dollars) ²	U.K. (1.4 trillion pounds)	Germany (2.5 trillion euros)	France (1.9 trillion euros)	Japan's measures in and after the 1990s (-2006) (GDP: 508 trillion yen)
Support for liquidity and financing	A. Guarantee for market-based funding	Yes Senior unsecured debt whose maturity is 30 days or more	Yes Short- and medium-term bonds	Yes Mainly medium-term debt	Yes Mainly medium-term debt	Yes Full protection for all debts including deposits ³ (from 1996 to 2002)
	B. Expansion for deposit protection	Yes 100,000 dollars→ 250,000 dollars Full protection for a certain deposit transaction account	Yes 35,000 pounds→ 50,000 pounds	Yes Full protection for personal deposits	— (maintaining the ceiling of 70,000 euros)	
Write-off of nonperforming assets and recapitalization	C. Public capital injection Size of funds	Yes Up to 700 billion dollars	Yes 50 billion pounds	Yes Up to 80 billion euros	Yes Up to 40 billion euros	Total 12.4 trillion yen (results)
	Example	The government: Injected approximately 204 billion dollars into about 650 institutions as preemptive measures. Injected capital as measures to support individual institutions Conducted supervisory capital assessment for 19 large bank holding companies.	The government injected 50 billion pounds into three major banks.	The SoFFin (the Financial Market Stabilization Fund) injects public funds on request.	The government: Injected 10.5 billion euros into six major banks at once as preemptive measures. Prepared public funds for capital injection on request (maximum of 13.5 billion euros).	Financial Function Stabilization Law: 1.8 trillion yen into 21 banks Early Strengthening Law: 8.6 trillion yen into 32 banks Deposit Insurance Law: 2 trillion yen into one bank Law on Organizational Restructuring: 6 billion yen into one bank Law on Strengthening Financial Functions: 40.5 billion yen into 2 banks
	D. Measures to determine the amount of losses	Yes Financed by the funds stated in C above	Yes	Yes Financed by the funds stated in C above	—	Yes
	Example	(Asset purchase) Originally considered asset purchase plan under the Bush Administration was retracted. Establishment of the public-private investment program was announced under the Obama Administration. Test of the Legacy Loans Program was launched. (Loss guarantee) The government provides loss guarantee as measures to support individual institutions.	(Loss guarantee) The government provides loss guarantee program for nonperforming assets.	(Asset purchase, Loss guarantee) The special law for the scheme to remove nonperforming assets from banks' balance sheets was passed.	—	(Asset purchase) Cooperative Credit Purchase Corporation: 15.4 trillion yen Asset purchase based on the Financial Revitalization Law, Article 53: 4 trillion yen (The amounts are those of loans purchased [principal].)
E. Temporary nationalization and public management	—	Two banks were nationalized based on the special law.	One bank was nationalized based on the special law.	—	Three banks were nationalized based on the special laws.	

Notes: 1. For initiatives to stabilize the global financial system and comparison with Japan's measures in and after the 1990s, see the appendix of *Financial System Report* (March, 2009).

2. Nominal GDP of 2008 (the source is the IMF).

3. Full protection for a certain deposit transaction account as a permanent measure from April, 2003.

Chart A-3: Glossary

A. Financial statements of banks and *shinkin* banks

Operating profits from core business = net interest income + non-interest income – general and administrative expenses.

Net interest income = interest income – interest expenses.

Non-interest income = net fees and commissions + profits on specified transactions + other operating profits – realized gains/losses on bonds.

Adjusted operating profits from the core business = operating profits from core business – realized gains/losses on trading securities and pension assets.

Overall gains/losses on securities = realized gains/losses on securities + changes in unrealized gains/losses on securities.

Realized gains/losses on securities = realized gains/losses on stocks + realized gains/losses on bonds.

Realized gains/losses on stocks = gains on sales of stocks – losses on sales of stocks – losses on devaluation of stocks.

Realized gains/losses on bonds = gains on sales of bonds + gains on redemption of bonds – losses on sales of bonds – losses on redemption of bonds – losses on devaluation of stocks.

Credit costs = loan loss provisions + write-offs – recoveries of write-offs.

Credit cost ratio = credit costs / total loans outstanding.

Capital adequacy ratio = capital / risk-weighted assets.

Tier I capital ratio = Tier I capital / risk-weighted assets.

Net income ROA = net income / total assets.

B. Financial statements of firms

Net worth ratio = net assets / total assets.

Quick ratio = quick assets / short-term debt.

Interest coverage ratio = (operating income + interest and dividends received) / interest expenses.

Ratio of break-even point to sales = (fixed cost / marginal profit ratio) / sales.