



**BOJ**  
*Reports & Research Papers*

# Financial System FSR report



BANK OF JAPAN

OCTOBER 2012

11 major banks, 105 regional banks, and 262 *shinkin* banks covered in this *Report* are as follows (as of September 30, 2012).

The 11 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, Sumitomo Mitsui Trust Bank, Shinsei Bank, and Aozora Bank. The 105 regional banks comprise the 64 member banks of the Regional Banks Association of Japan (Regional banks I) and the 41 member banks of the Second Association of Regional Banks (Regional banks II). The *shinkin* banks refer to 262 banks that hold current accounts at the Bank of Japan.

This *Report* basically uses data available as of September 30, 2012.

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## Preface

### *Objective of the Financial System Report*

The Bank of Japan publishes the *Financial System Report* semiannually, with the objective of comprehensively analyzing and assessing financial system stability and facilitating communication with concerned parties in order to ensure such stability. The Bank uses the results of the analysis made in the *Report* in planning measures to ensure stability in the financial system as well as in providing guidance and advice to individual financial institutions through on-site examinations and off-site monitoring. Moreover, the Bank makes use of them in international regulatory and supervisory discussions. In relation to the monetary policy, the macro assessment of financial system stability is also an important input for the Bank to assess risks in economic and price developments from a medium- to long-term perspective.

The *Report* assesses financial system stability while bearing in mind the importance of the macroprudential perspective. In the macroprudential framework, the stability of the financial system should be ensured by analyzing and assessing risks in the financial system together with the interconnectedness of the real economy, financial markets, and behavior of financial institutions; and then planning institutional designs and policy measures on these assessments.

Specifically, this *Report* analyzes and assesses the following points. First is the analysis of the external environment surrounding Japan's financial system. Second is the analysis of financial intermediation in Japan such as financial conditions of firms and households and developments in financial and loan markets. Third is the assessment of risks in the financial system. To assess the risks, this *Report* examines indicators of macro financial risk and a wide range of risks inherent in financial markets, banks, and insurance companies. And fourth is the assessment of resilience of the financial system. To assess the resilience, this *Report* focuses on macro stress testing, which assumes a severe stress in the real economy and financial markets.

### *Features of the October 2012 issue of the Report*

In the October 2012 issue of the *Report*, the analysis has been enhanced in the following points: (1) developments in growing overseas loans by Japan's banks; (2) assessment of the capability of financial institutions' customer networks and the utilization of these networks; (3) business conditions of regional banks and *shinkin* banks; and (4) macro stress testing that reflects the adverse feedback loop between the financial system and the real economy.

The Bank will contribute further to ensuring financial system stability. To this end, the Bank will continue to enhance the *Report*.

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## I. Overview

### *The external environment surrounding Japan's financial system*

Regarding the external environment surrounding Japan's financial system, uncertainty about the future has been high.

In global financial markets, some nervousness continues to be seen, although investors' risk aversion mainly due to the European debt problem has recently been subsiding moderately. In European countries facing serious fiscal situations, an adverse feedback loop among fiscal conditions, the financial system, and the real economy has materialized. In many emerging economies including China, economic growth has been slowing. In the United States, although the burden on repayments on households has started to ease, it has continued to weigh on the economy.

Japan's economic activity is leveling off more or less. In this situation, firms have been taking a cautious stance in financing, and firms' financial conditions have generally improved. However, some small and medium-sized firms have continued to face severe financial conditions, and principal and interest repayments relative to income for households with housing loans remain generally large. In the public sector, government debt has accumulated, with a continuing fiscal deficit.

### *Financial institutions' performance of financial intermediation*

Financial conditions of firms and households in Japan are accommodative. Issuing conditions for CP and corporate bonds have remained favorable on the whole, and firms continue to see banks' lending attitudes as being on an improving trend. In these circumstances, banks' domestic loans outstanding have increased, particularly for reconstruction-related working capital and funds related to mergers and acquisitions, although loans for business fixed investment are lackluster. Major banks have increased overseas loans, and the share of their loans in the global loan market has grown. Meanwhile, although the regional financial institutions' outstanding amount of loans has increased as a whole, growth in loans to local firms in nonmetropolitan areas has been slow. In this situation, financial institutions have gradually proceeded with efforts to support local firms' exploration of new markets and business succession by utilizing their own customer networks to improve the firms' business conditions.

### *Risks in the financial system*

In the examination of the financial system to ascertain financial imbalances, there is no

indicator that warns of financial imbalances stemming from bullish expectations. Due attention should be paid, however, to a further increase in the amount outstanding of Japanese government bonds (JGBs) held by financial institutions. Moreover, although the amount of risks banks and *shinkin* banks bear as a whole has been decreasing relative to capital, their core profitability has declined. Attention should be paid to the possibility that, if the growth rate of Japan's economy continues to decline in the medium to long term due to the decreasing population and the aging of society, financial institutions' profitability will continue to decrease.

### *Resilience of the financial system*

The macro stress testing shows that the resilience of Japan's financial system is generally strong as a whole. Banks' capital bases as a whole would be able to avoid significant impairment, even if a significant economic downturn similar to that observed after the Lehman shock or an upward shift of domestic interest rates for all maturities by 1 percentage point occurs. Moreover, even if banks become unable to raise funds from some markets, they would generally hold a sufficient amount of funding liquidity both in the domestic and foreign currencies.

Nevertheless, close attention should be paid to the possibility that, if a large economic downturn occurs, capital adequacy ratios will plunge for banks whose quality of loans is relatively low. Furthermore, if domestic interest rates rise significantly by exceeding the aforementioned assumption, due attention needs to be paid to the possibility that banks' capital will decline to a noticeable extent and such effects will be amplified through an adverse feedback loop between the financial system and the real economy. Banks could require additional funding sources under a particularly severe situation in which a number of measures for foreign currency funding become inoperative simultaneously.

### *Challenges to ensure stability of the financial system*

Japan's financial system as a whole has been maintaining stability. However, in order for financial institutions to maintain smooth financial intermediation while ensuring their capability to respond to stresses on the economy and financial markets, they need to address the three major challenges discussed below.

First, financial institutions need to enhance the effectiveness of risk management. As for credit risk, it is important for financial institutions to strengthen measures to help ailing borrowing firms improve their business conditions, and at the same time appropriately manage credit risk based on the borrowers' capacity for self-reconstruction. Financial institutions need to examine market risk from multidimensional perspectives with the use of stress testing and other methods, in order to achieve balanced investment portfolios and manage risk in accordance with financial institutions' capital. Japan's financial institutions are required to continue to conduct strict risk management for funding liquidity both in domestic and foreign currencies.

Second, financial institutions need to further strengthen their capital bases. It is indispensable for them to enhance their capital not only to be prepared for various stresses but also to continue financial intermediation in areas with high risk and return through investments and loans to growing business areas at home and abroad. In addition, the new requirements for capital adequacy ratios will be applied in an orderly manner to internationally active banks from 2013. Financial institutions will be required to strengthen their capital bases steadily.

Third, financial institutions need to construct stable profit bases. Financial institutions' customer networks are large compared with other industries, and there is room for the institutions to more effectively support local firms' exploration of new markets and business succession by utilizing their own customer networks. They could strengthen their own profitability by increasing business opportunities and receiving adequate commissions through such valuable information services. In supporting firms with growth potential such as start-ups, financial institutions are expected to tap potential demand by increasing the usage of financial instruments such as asset-based lending (ABL) and utilizing the functioning of funds. Moreover, strategic business partnerships and integration among financial institutions could not only improve business efficiency but also expand their customer networks and in turn strengthen their profit bases.

## **II. Examination of the external environment**

With a view to assessing the external environment surrounding Japan's financial system, this chapter first summarizes developments in the global financial system and overseas economies, and then examines economic developments, financial conditions of firms and households, and fiscal conditions in Japan.

Regarding the external environment surrounding Japan's financial system, uncertainty about the future has been high.

In global financial markets, some nervousness continues to be seen, although investors' risk aversion mainly due to the European debt problem has recently been subsiding moderately. In European countries facing serious fiscal situations, an adverse feedback loop among fiscal conditions, the financial system, and the real economy has materialized. In many emerging economies including China, economic growth has been slowing. In the United States, although the burden on repayments on households has started to ease, it has continued to weigh on the economy.

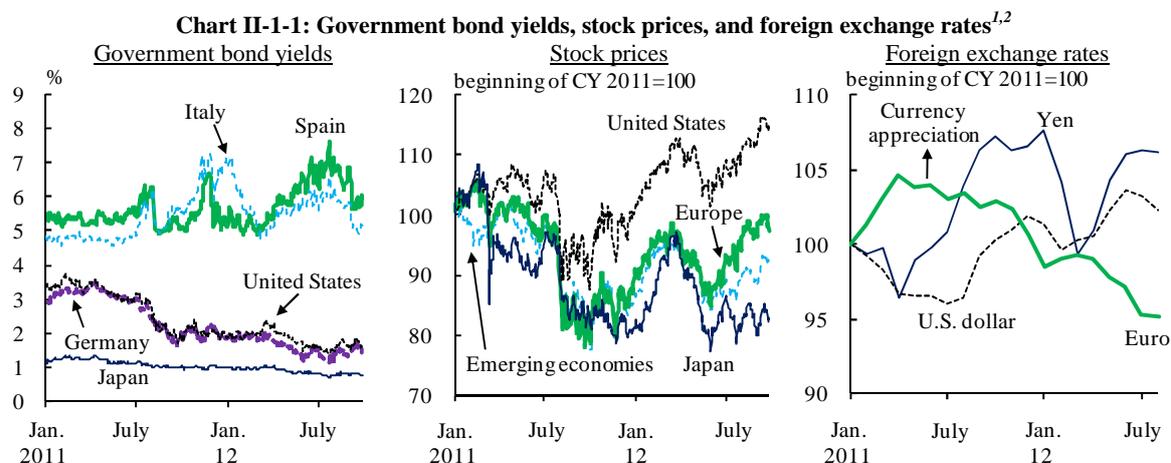
Japan's economic activity is leveling off more or less. In this situation, firms have been taking a cautious stance in financing, and firms' financial conditions have generally improved. However, some small and medium-sized firms have continued to face severe financial conditions, and principal and interest repayments relative to income for households with housing loans remain generally large. In the public sector, government debt has accumulated, with a continuing fiscal deficit.

### **A. Developments in the global financial system and overseas economies**

#### **1. Developments in global financial markets**

Investors have been increasingly risk averse in global financial markets, mainly due to concern about the European debt problem. In Europe, the fiscal imbalance in countries such as Spain was a concern even after the approval in March 2012 of the aid program that outlined a debt restructuring procedure in Greece, and government bond yields remained at high levels in some peripheral countries (the left-hand side of Chart II-1-1). Stock prices in many economies have continued to be highly volatile, and some downturns were observed (the middle of Chart II-1-1). Meanwhile, due to a strong demand for safe-haven assets, the yen and the U.S. dollar appreciated (the right-hand side of Chart II-1-1). Yields on JGBs have trended downward, while yields on U.S. and German government bonds temporarily reached historically low levels (the left-hand

side of Chart II-1-1).<sup>1</sup>



Notes: 1. The left chart shows 10-year government bond yields. The middle chart shows United States (S&P 500), emerging economies (Morgan Stanley Capital International [MSCI] index [emerging markets]), Europe (STOXX Europe 600), and Japan (TOPIX). The right chart shows nominal effective exchange rates.

2. The latest data of the left and middle charts are as of September 28, 2012, and those of the right chart are as of August 2012.

Sources: Bloomberg; BIS.

Such risk aversion among investors has recently been subsiding moderately, partly due to the policy response made by the European Central Bank (ECB) to be described later. Nevertheless, some nervousness continues to be seen in global financial markets.

Some U.K. banks were penalized by the U.K. and U.S. authorities for inappropriate reports on the London interbank offered rate (Libor) and the European interbank offered rate (Euribor), interest rate indicators used around the world. So far, this incident has not had a significant impact on the global financial system, but indicators similar to Libor have been used widely in many countries. Deliberations are progressing on ways to prevent Libor manipulation and restore the credibility of Libor as an interest rate indicator, and future developments warrant attention (see Box 1 for discussion on the reform of interest rate indicators).

### Box 1: Discussion on the reform of interest rate indicators

In June 2012, some U.K. banks were penalized by the U.K. and U.S. authorities for inappropriate reports on the Libor and the Euribor. The Libor and the Euribor are indicators of interbank money market interest rates. They consist of interest rates reported by banks, and these reported interest rates are banks' hypothetical interest rates perceived as underlying market rates rather than market transaction rates. The

<sup>1</sup> In this environment, search for yield by investors has been observed in some markets. For example, issuance of high-yield corporate bonds in the United States has gradually recovered since the end of 2011 and the spreads have been narrowing.

penalizations were imposed for manipulations of reported rates.

In these circumstances, a reform proposal to ensure transparency of interest rate indicators is under deliberation worldwide. The proposed reforms include reinforcement of the monitoring of the reporting process and utilization of market transaction rates in addition to banks' hypothetical interest rates.<sup>2</sup>

However, the volume of interbank money market transactions on some currencies and maturities is small. Therefore, transactions rates could be strongly affected by idiosyncrasies in transactions, and business days with no transactions could occur frequently. For example, in Japan's uncollateralized overnight call market, which has a large trading volume, transactions are completed daily and interest rate dispersions are small (Chart B1-1). On the other hand, for long-term transactions, there are many business days with no transactions and interest rate dispersions are large, making it difficult to develop indicators based only on actual transactions. Moreover, when market strain increases, it could be difficult to capture fundamentals due to the drying up of market liquidity, even in markets where trading volumes are normally large. These problems should be considered when using information on market transactions.

Interest rate indicators should be both transparent and fair for all market participants, securing the effective functioning of the financial system by reflecting appropriately the demand-supply conditions in the market. Since Libor is used particularly as a base interest rate in an enormous number of financial contracts around the world, it is necessary to ensure its transparency and credibility as the interest rate indicator.<sup>3</sup>

**Chart B1-1: Conditions of the uncollateralized call money market rate<sup>1</sup>**

	Overnight	3-month	6-month
Share of daily deal-making	100	15	2
Dispersion (standard deviation)	0.01	0.21	0.12

Note: 1. Sample period is from January 2009 to July 2012.  
Sources: Association of Call Loan and Discount Companies; BOJ, "Short-term money market rates."

<sup>2</sup> For details, see, for example, HM Treasury, "The Wheatley Review of LIBOR: Initial Discussion Paper," August 2012, and HM Treasury, "The Wheatley Review of LIBOR: Final Report," September 2012.

<sup>3</sup> Regarding the Tokyo interbank offered rate (Tibor), the Japanese Bankers Association (JBA) examined parties concerned as to whether they followed the procedures in the "JBA TIBOR Publication Rules."

## 2. European debt problem

### *Adverse feedback loop among fiscal conditions, the financial system, and the real economy*

In Europe, since the debt problem surfaced at the end of 2009, government bond yields have risen significantly in some peripheral countries, and the balance sheets of banks holding a large amount of these government bonds have deteriorated. Such banks have faced tighter funding conditions due to the decreased creditworthiness, and lending attitudes of many banks have grown cautious. Banks' cautious lending attitudes, together with the fiscal austerity, have exerted downward pressure on the real economy, leading to further deterioration in fiscal conditions and banks' business conditions. Thus, in European countries facing serious fiscal situations, an adverse feedback loop among fiscal conditions, the financial system, and the real economy has materialized.

Particularly in Greece -- which is experiencing prolonged economic stagnation -- uncertainty persists regarding the achievement of fiscal consolidation and the continuation of financial support from other countries on the condition of such achievement. Moreover, the prevailing concern since spring 2012 is that capital injections into troubled banks and the local governments' request for financial support will further worsen fiscal conditions in Spain, keeping Spain's government bond yields at high levels (see Box 2 for business conditions of Spanish banks).

Given these growing concerns, at the Euro Summit in June 2012, the Euro members agreed to provide financial support of up to 100 billion euros to the Spanish government and directly inject capital into banks in the euro area under the European Stability Mechanism (ESM) in the future.<sup>4</sup> In September 2012, the ECB decided to introduce a new scheme for outright purchases of government bonds.<sup>5</sup> However, a high degree of uncertainty persists over drastic reforms aimed at achieving financial system stability

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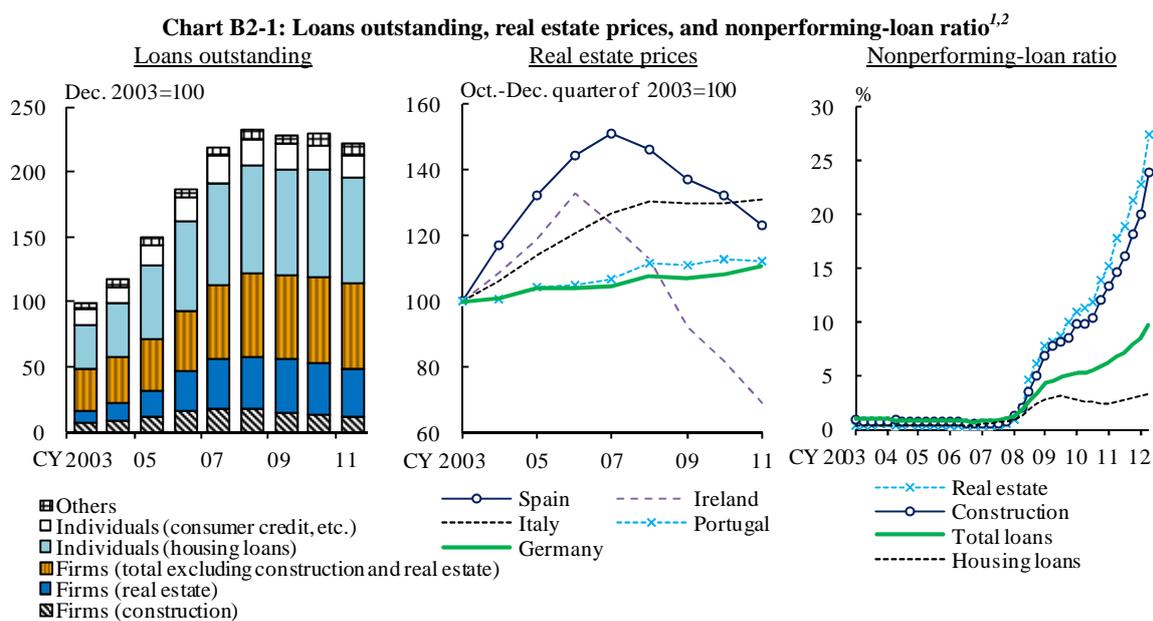
<sup>4</sup> At the Euro Summit in June 2012, it was agreed that (1) on the condition that an effective single supervisory mechanism was established for banks in the euro area, the ESM could have the possibility to recapitalize banks directly; (2) the financial assistance to Spain would be provided by the European Financial Stability Facility (EFSF) until the ESM became available, and would then be transferred to the ESM, without gaining seniority status; and (3) the existing EFSF/ESM instruments would be used in a flexible and efficient manner to ensure the financial stability of the euro area.

<sup>5</sup> The new scheme called Outright Monetary Transactions (OMTs) has several major features: (1) a necessary condition for OMTs is strict and effective conditionality attached to an appropriate EFSF/ESM programme; (2) no *ex ante* quantitative limits are set on the size of OMTs; and (3) the OMTs will be focused on the shorter part of the yield curve, and in particular on sovereign bonds with a maturity of between 1 and 3 years. The introduction of the OMTs terminates the Securities Markets Programme (SMP).

and fiscal consolidation.

### Box 2: Business conditions of Spanish banks

In Spain, the outstanding amounts of housing loans and real estate-related loans extended by banks more than doubled during the first half of the 2000s to 2008, reflecting a large increase in housing-related investment due to accommodative financial conditions following the adoption of the euro (the left-hand side of Chart B2-1). Real estate prices also surged, recording high growth among European economies (the middle of Chart B2-1). Such overheating in the housing market cooled rapidly after 2008, with a plunge in real estate prices. Moreover, many real estate-related loans turned into nonperforming loans (NPLs), and banks' business conditions deteriorated (the right-hand side of Chart B2-1). A substantial amount of NPLs arose particularly among savings banks, which had focused on housing and real estate-related lending.

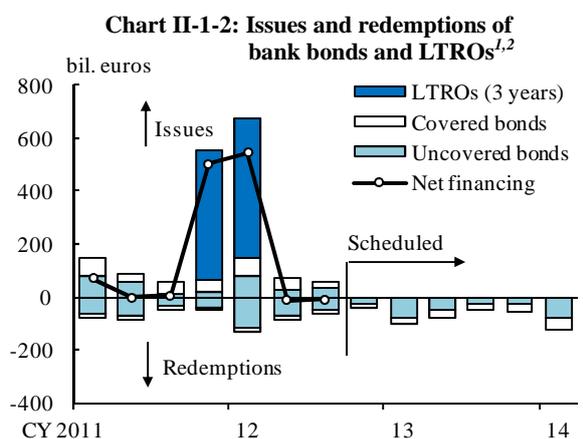


In these circumstances, Spanish monetary authorities have been proceeding with measures to stabilize the financial system. For example, since 2011 they have implemented bank restructuring through the Fund for Orderly Bank Restructuring (FROB), and 45 savings banks that existed at the end of 2008 were recently merged into

11.<sup>6</sup> Since the beginning of 2012, the monetary authorities also implemented asset assessment on banks by a third party, and called for increased loan-loss provisions for construction and real estate loans. However, injection of public funds for bank restructuring has increased government debt in Spain, together with a growing fiscal burden resulting from economic stimulus measures. The real estate market in Spain has remained sluggish, and the employment and income situation of households is also severe. In addition, deterioration in the fiscal conditions of local governments has become prominent, and high uncertainty remains about future developments in NPLs and government debt.

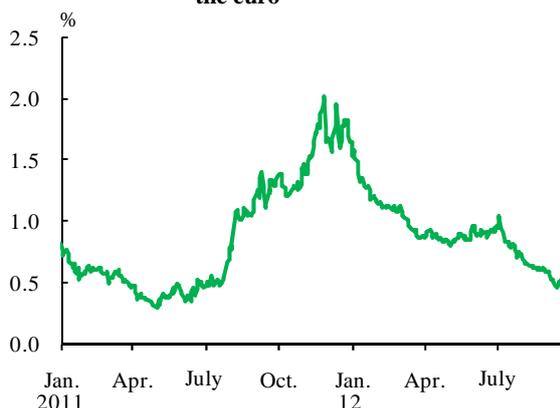
### *Banks' funding conditions*

European banks' funding conditions have generally been stable compared with the end of 2011 under heavily strained conditions. This was partly due to the fact that the 3-year longer-term refinancing operations (LTROs) with full allotment conducted twice around the end of 2011 helped strengthen market participants' confidence regarding the stability of European banks' funding conditions. In fact, European banks seem to have raised a certain amount of funds from LTROs in order to redeem their bonds issued (Chart II-1-2). Moreover, given the coordinated action by major central banks at the end of 2011, U.S. dollar funding costs have recently remained at low levels (Chart II-1-3).<sup>7</sup>



Notes: 1. Banks located in the euro area are counted.  
2. The signs on the amount of redemptions are reversed.  
Sources: Dealogic; ECB.

**Chart II-1-3: FX swap-implied U.S. dollar rate from the euro<sup>1</sup>**

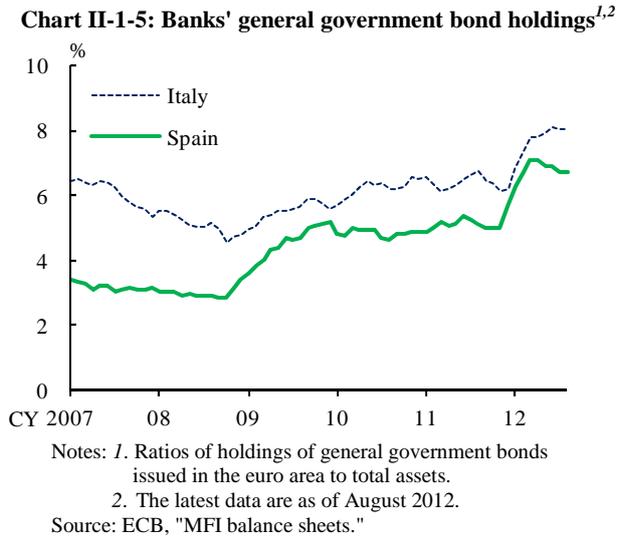
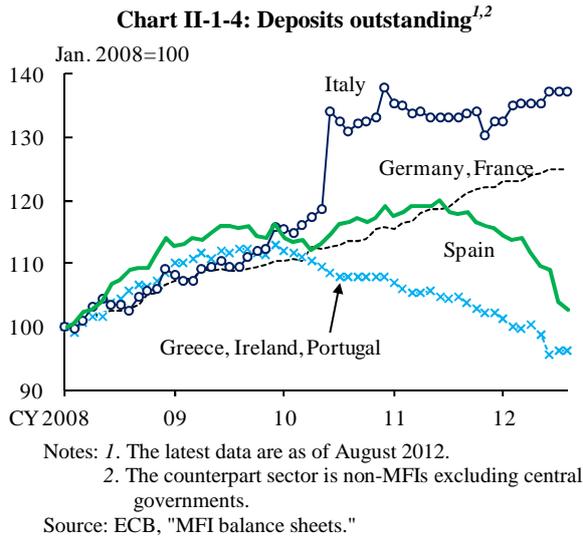


Note: 1. 3-month-term maturity. The latest data are as of September 28, 2012.  
Source: Bloomberg.

<sup>6</sup> See FROB, "Investors Presentation," April 2012.

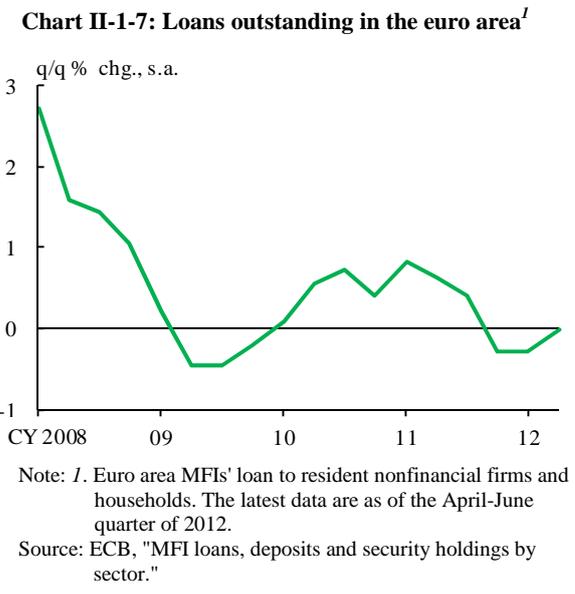
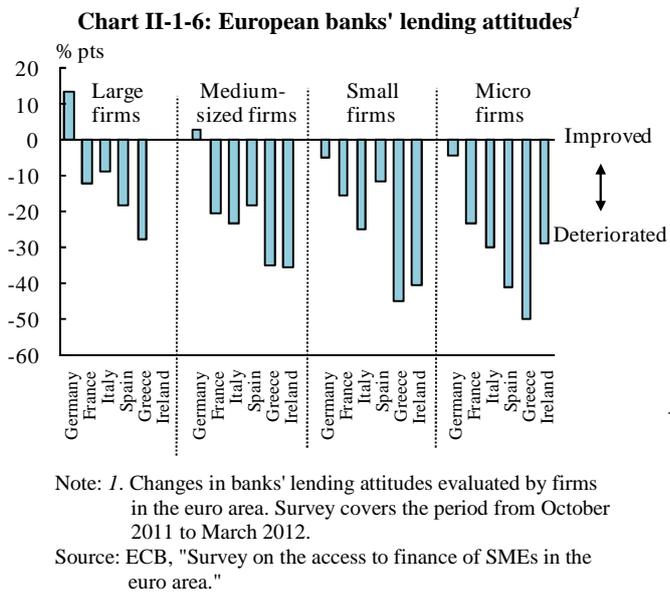
<sup>7</sup> In November 2011, the Bank of Canada, the Bank of England, the Bank of Japan, the European Central Bank, the Federal Reserve, and the Swiss National Bank agreed to lower the pricing on the existing temporary U.S. dollar liquidity swap arrangements by 50 basis points.

However, banks in countries where there is concern over the debt problem still face difficulty in market funding, and their funding conditions have been severe as seen in the declining amount outstanding of deposits (Chart II-1-4). Some banks in Spain and Italy have increased government bondholdings of their respective home countries as well as other euro area countries, and fiscal concern has tended to further undermine banks' creditworthiness (Chart II-1-5).



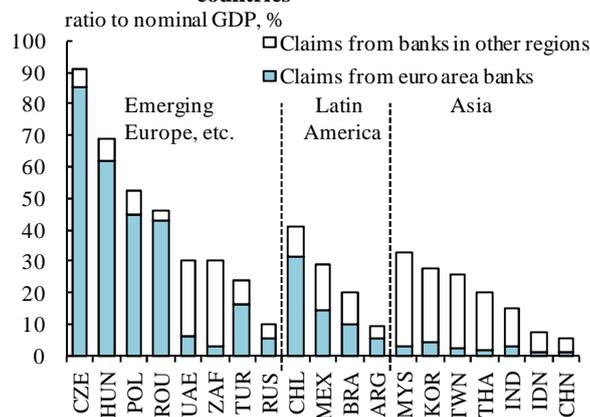
**Banks' lending attitudes**

European banks' lending attitudes have improved somewhat compared with the end of 2011, when their funding conditions deteriorated significantly. European banks, however, are still cautious in lending (Chart II-1-6). The cautious lending attitudes of banks, together with weak demand for funds due to economic stagnation, have led to sluggish growth in loans outstanding in the euro area (Chart II-1-7). Moreover, in order



to raise the capital adequacy ratio, European banks have been deleveraging, mainly by reducing the overseas assets of non-core business. Since European banks' shares of credit in some economies and regions are significant, attention should be paid to future developments in deleveraging (Chart II-1-8).

**Chart II-1-8: Cross-border claims on emerging countries<sup>1,2</sup>**



Notes: 1. Claims are as of end-March 2012. Nominal GDP is as of 2011.

2. See Annex 2 for country specification.

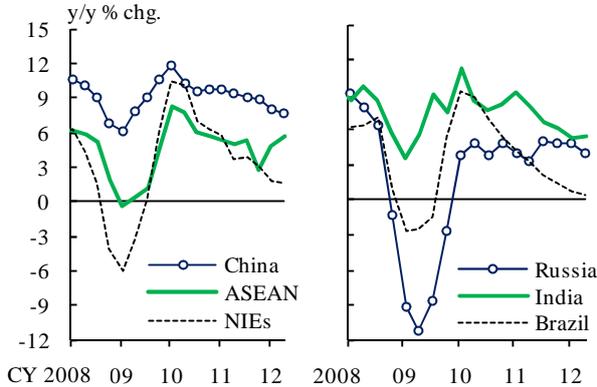
Sources: IMF, "World economic outlook"; BIS, "Consolidated banking statistics."

### 3. Developments in emerging economies

In many emerging economies including China, the pace of growth continues to slow (Chart II-1-9). This is partly because European economies' stagnation has been exerting downward pressure on those emerging economies through the trade channel in addition to the earlier monetary tightening. While credit to emerging economies from banks and investors in countries other than in Europe has been firm, credit to emerging economies from Europe has decreased (Charts II-1-10 and II-1-11). The effects of the European debt problem on emerging economies through the financial channel also warrant attention.

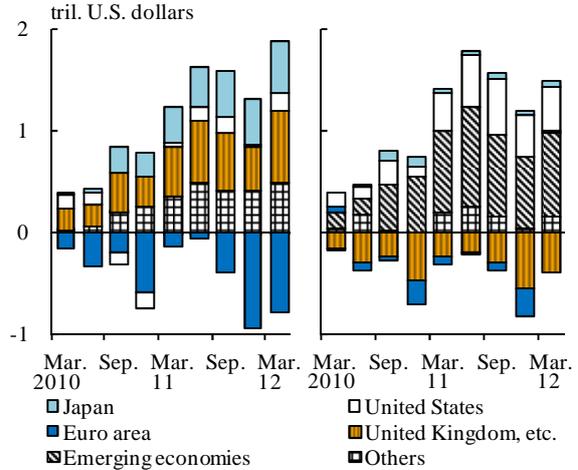
In these circumstances, monetary easing has started to take place in some emerging economies. In view of developments in European economies, however, the outlook for emerging economies remains highly uncertain (Chart II-1-12). Considering those developments and effects of the recent surge in grain prices on overall inflation rates, there is a risk as to whether emerging economies can achieve price stability and economic growth simultaneously.

**Chart II-1-9: Real GDP of emerging economies<sup>1</sup>**



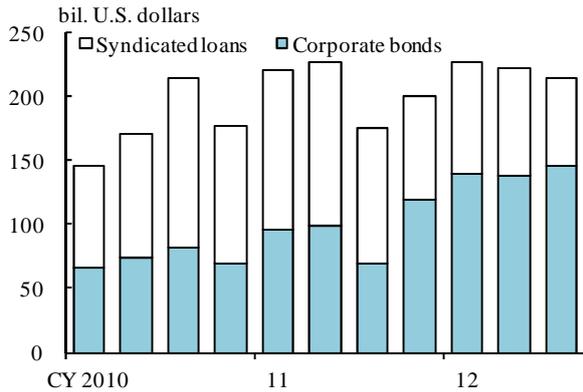
Note: 1. The latest data are as of the April-June quarter of 2012.  
Source: Bloomberg.

**Chart II-1-10: Outstanding amount of external claims<sup>1</sup>**  
By creditor By debtor



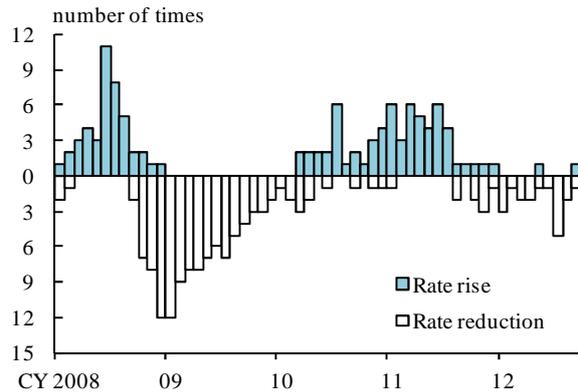
Note: 1. Cumulative changes from end-calendar 2009. "United Kingdom, etc.," includes EU countries other than the euro area. Emerging economies comprise 20 countries including the BRICs and NIEs. The latest data are as of end-March 2012.  
Source: BIS, "Consolidated banking statistics."

**Chart II-1-11: Syndicated loans and issuance of corporate bonds in emerging economies<sup>1</sup>**



Note: 1. The latest data are as of the July-September quarter of 2012. Asia, Latin America, and central and eastern Europe (excluding Russia) are counted.  
Source: Dealogic.

**Chart II-1-12: Changes in monetary policies<sup>1</sup>**



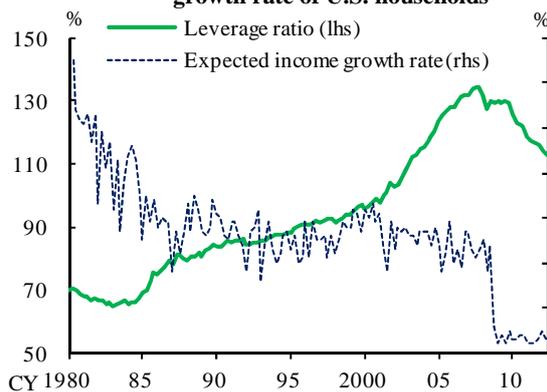
Note: 1. 15 emerging economies are counted. The latest data are as of September 2012.  
Source: Bloomberg.

#### 4. Developments in the United States

The U.S. economy has been recovering moderately. In this situation, although the burden on repayments on households has started to ease, the U.S. economy is tending to deviate downward, as households are still in the process of balance-sheet adjustments. Since 2008, households' debt outstanding relative to disposable income has gradually been adjusted, but is still higher than its historical level (Chart II-1-13). Furthermore, U.S. banks' overall NPL ratio has continued to improve, but the NPL ratio of housing loans has remained high and the foreclosure of borrowers' houses by financial institutions has remained at a high level (Chart II-1-14).

Households' disposable income has been pushed up to the level existing prior to the Lehman shock by fiscal transfers (such as tax cuts and unemployment insurance payments), but future developments in these measures are highly uncertain. Since the expected growth rate of income has been low, a burden of excessive debt by households could grow further, depending on developments in fiscal transfers.

**Chart II-1-13: Leverage ratio and expected income growth rate of U.S. households<sup>1,2</sup>**

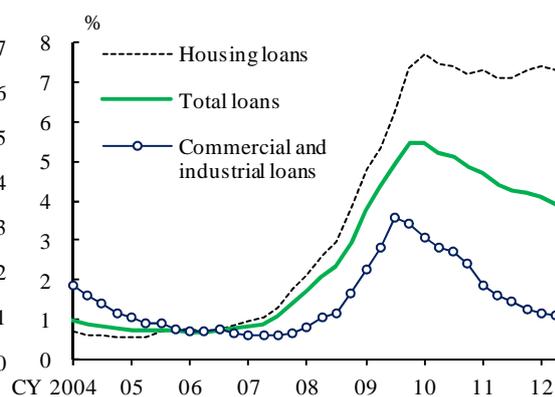


Notes: 1. The latest data are as of the April-June quarter of 2012.

2. The leverage ratio is a ratio of debt outstanding to disposable income. The expected income growth rate is based on a questionnaire on the next 12 months' expected income.

Sources: BEA, "National economic accounts"; FRB, "Flow of funds accounts of the United States"; Thomson Reuters.

**Chart II-1-14: Nonperforming-loan ratios at U.S. banks<sup>1</sup>**



Note: 1. The latest data are as of end-June 2012.

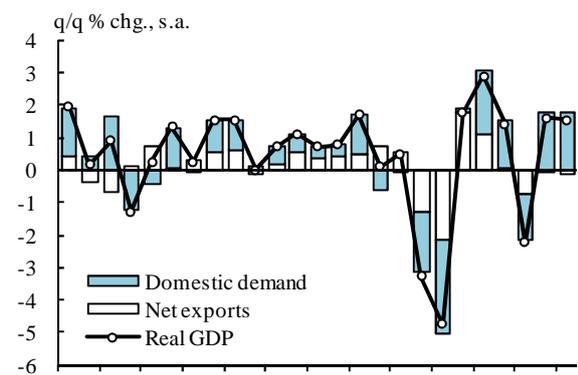
Source: FDIC, "Statistics on depository institutions."

## B. Domestic economy, financial conditions of firms and households, and fiscal conditions

### *Domestic economy and firms' financial conditions*

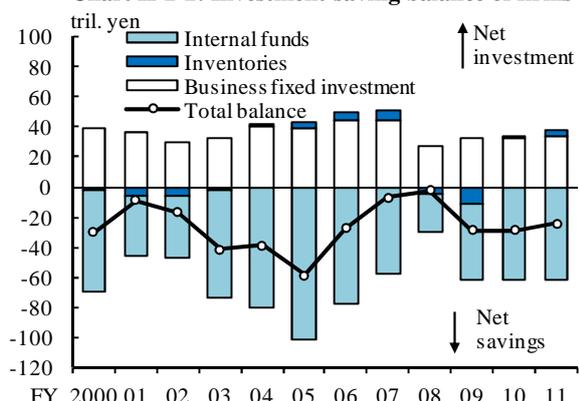
Japan's economic activity is leveling off more or less. Although domestic demand has been resilient, mainly supported by reconstruction-related demand, exports have been relatively weak (Chart II-2-1). In these circumstances, firms are maintaining their cautious stance toward financing, and their financial conditions have generally improved. Corporate profits have recently been improving, and business fixed investment has been on a moderate increasing trend. Nonetheless, the amount of business fixed investment remains obtainable through internal financing (Chart II-2-2). Firms' leverage ratio (the ratio of interest-bearing debt to net assets) has been declining, and holdings of on-hand liquidity have accumulated since the Lehman shock (Chart II-2-3).

**Chart II-2-1: Real GDP<sup>1</sup>**



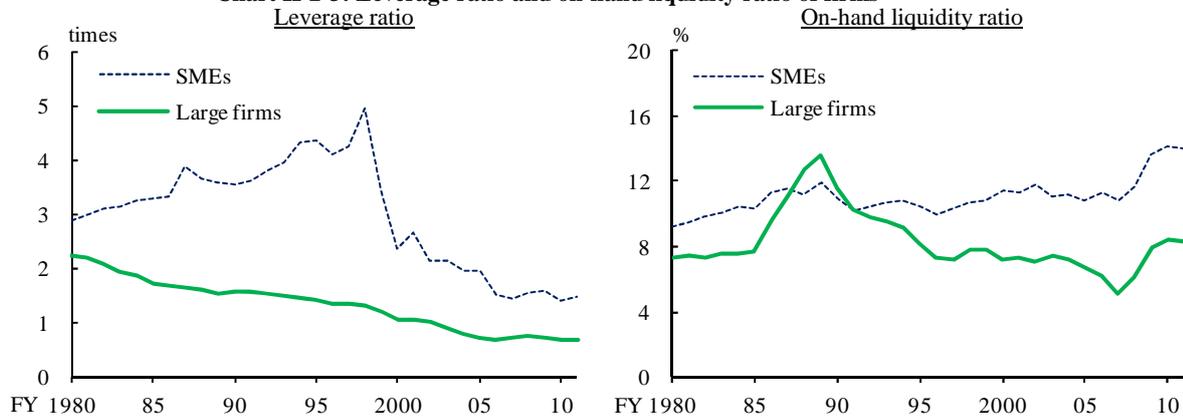
Note: 1. The latest data are as of the first half of 2012.  
Source: Cabinet Office, "National accounts."

**Chart II-2-2: Investment-saving balance of firms**



Source: Ministry of Finance, "Financial statements statistics of corporations by industry, annually."

**Chart II-2-3: Leverage ratio and on-hand liquidity ratio of firms<sup>1,2,3</sup>**



Notes: 1. The leverage ratio is a ratio of interest-bearing debt to net worth. The on-hand liquidity ratio is a ratio of cash and deposits to sales.

2. The latest data are as of fiscal 2011.

3. "SMEs" stands for small and medium-sized enterprises.

Source: Ministry of Finance, "Financial statements statistics of corporations by industry, annually."

Reflecting this cautious stance toward financing, firms' credit ratings have been on a recovery trend as a whole (Chart II-2-4). However, credit ratings of small and medium-sized firms have become further polarized, and some of these firms with low ratings continue to face severe financial conditions.

Distributions of credit ratings

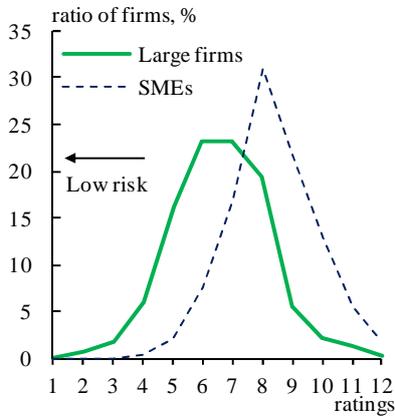
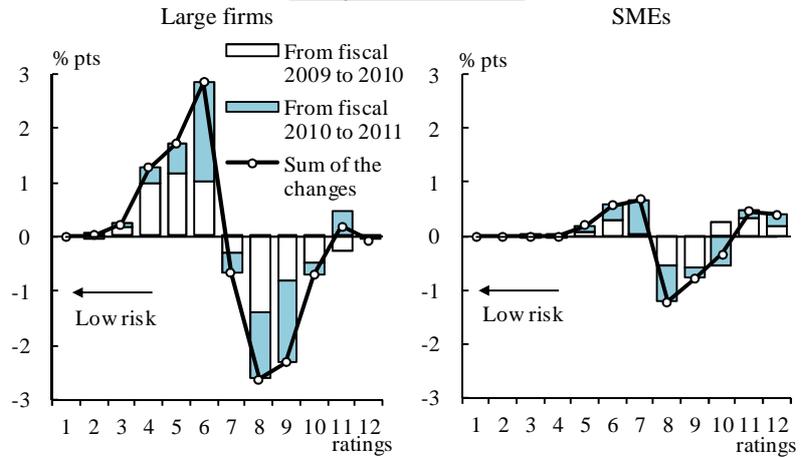


Chart II-2-4: Distributions of credit ratings<sup>1,2,3</sup>

Changes in distributions

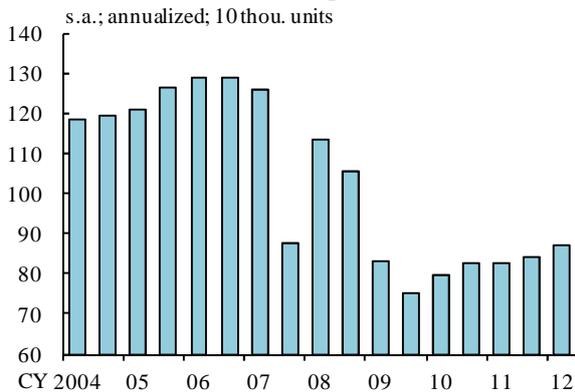


Notes: 1. The left chart is as of fiscal 2011.  
 2. The middle and right charts are yearly changes from fiscal 2009 to fiscal 2011.  
 3. See Note 3 in Chart II-2-3.  
 Source: Teikoku Databank, "SPECIA."

### Households' financial conditions

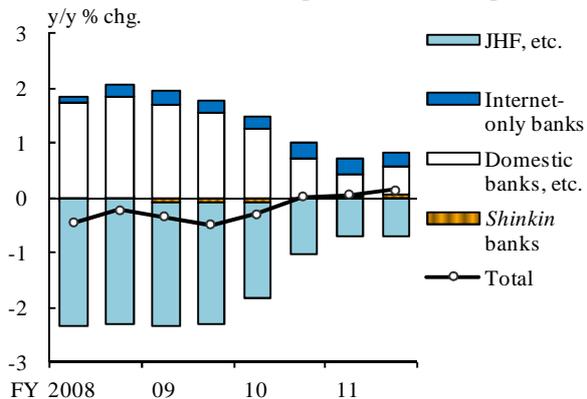
The employment and income situation has generally been improving, although it remains severe. Housing investment has generally been picking up, supported in part by reconstruction of disaster-stricken homes, and housing loans outstanding have recently begun to stop decreasing (Charts II-2-5 and II-2-6). Nevertheless, households have continued to hold cash and deposits at high levels and are still cautious about risk taking (Chart II-2-7). The burden of debt repayments on households with housing loans has not improved significantly, as principal and interest repayments relative to income have remained generally large (Chart II-2-8).

Chart II-2-5: Housing construction<sup>1</sup>

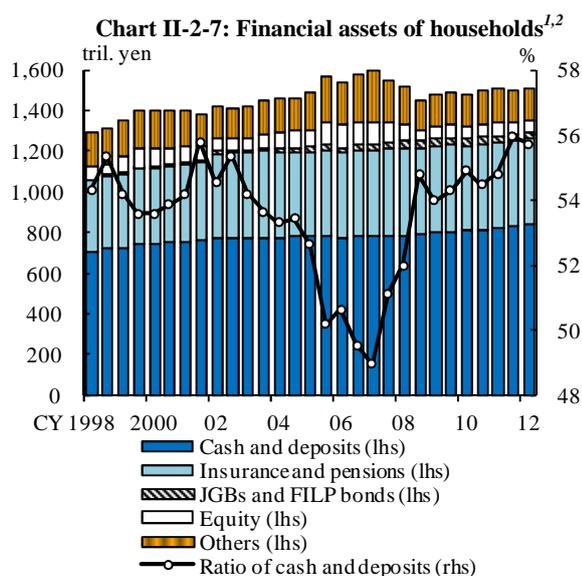


Note: 1. The latest data are as of the first half of 2012.  
 Source: Ministry of Land, Infrastructure, Transport and Tourism, "Statistics on building construction starts."

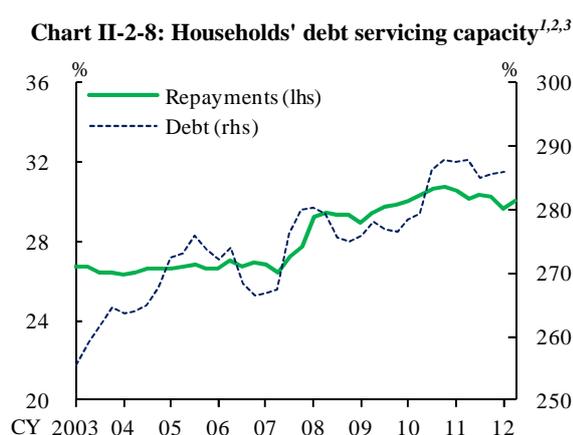
Chart II-2-6: Housing loans outstanding<sup>1,2</sup>



Notes: 1. The latest data are as of end-March 2012.  
 2. Internet-only banks are the sum of four major banks.  
 Sources: Japan Housing Finance Agency; BOJ.



Notes: 1. The latest data are as of end-June 2012.  
2. "FILP" stands for Fiscal Investment and Loan Program.  
Source: BOJ, "Flow of funds accounts."

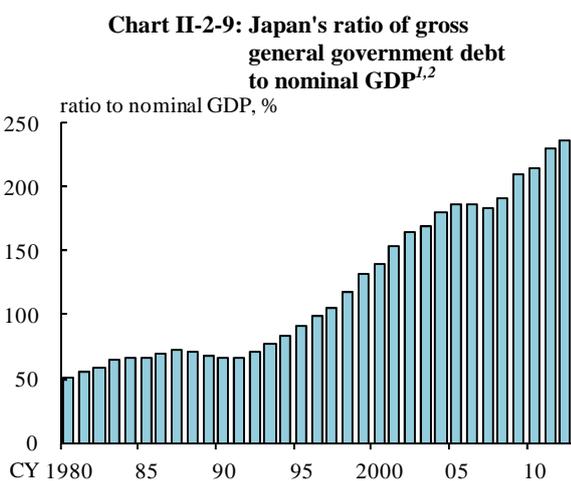


Notes: 1. The ratios to disposable income. 4-quarter moving averages.  
2. Households with housing loans are counted.  
3. The latest data are as of the April-June quarter of 2012 for repayments, and the January-March quarter of 2012 for debt.

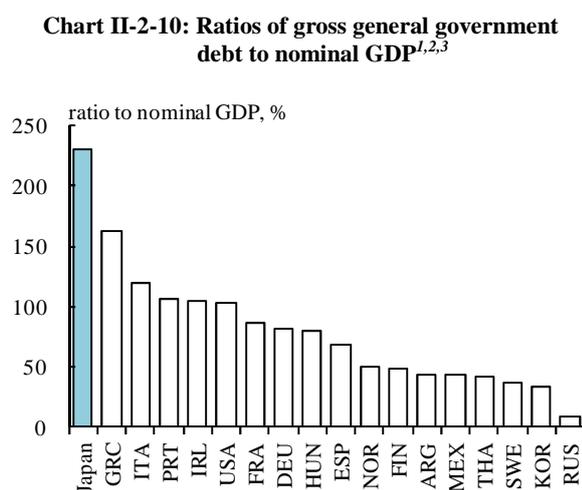
Source: Ministry of Internal Affairs and Communications, "Family income and expenditure survey."

### Fiscal conditions

The fiscal deficits have continued to be observed in Japan, and government debt has accumulated (Chart II-2-9). The ratio of gross government debt to GDP has exceeded 200 percent, a high level internationally (Chart II-2-10). This is due to the weak growth in revenue given prolonged low economic growth and an increase in social security benefits against the backdrop of rapid aging of society (Chart II-2-11).

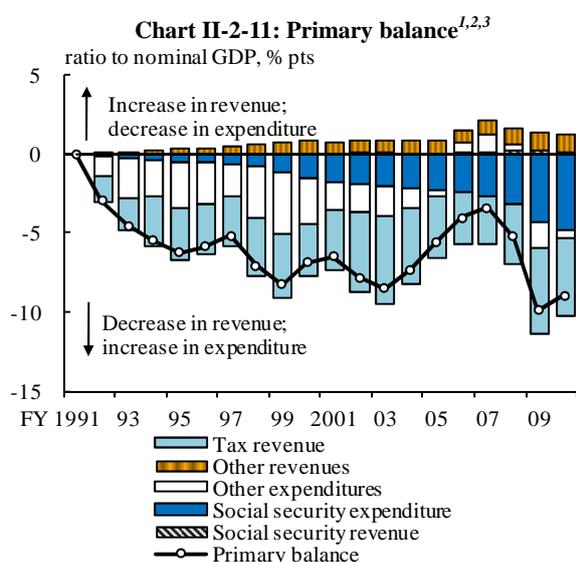


Notes: 1. The general government consists of the central government, local governments, and social security funds.  
2. Figures from 2011 are estimates by the IMF.  
Source: IMF, "World economic outlook."



Notes: 1. The general government consists of the central government, local governments, and social security funds.  
2. Figures are estimates as of 2011 by the IMF.  
3. See Annex 2 for country specification.  
Source: IMF, "World economic outlook."

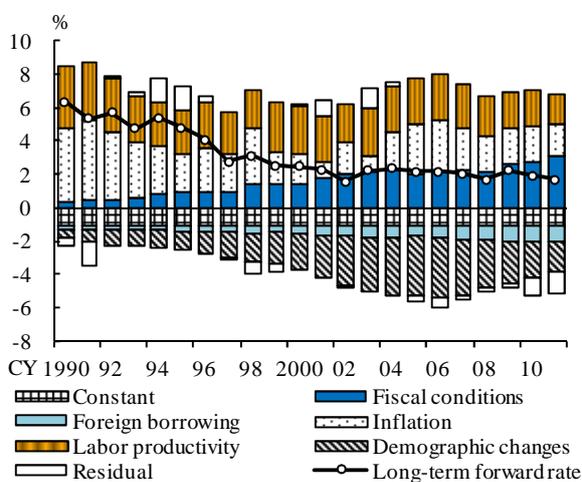
Despite an accumulation of government debt in Japan, government bond yields remain at low levels, as described in Chapter IV.B. An empirical analysis using a factor decomposition of fundamental developments in long-term interest rates based on certain assumptions implies that, although increased government debt is working as upward pressure on interest rates, demographic changes and an increase in net external assets are exerting downward pressure on the rates (Chart II-2-12).<sup>8</sup> However, as government debt in advanced economies is drawing increasing attention, future efforts to achieve fiscal consolidation remain important to maintain market confidence in fiscal sustainability.



Notes: 1. The ratios of revenues, expenditures, and the primary balance to nominal GDP are expressed as the change from the ratios as of fiscal 1991.  
2. The data are for the central and local governments.  
3. Social security expenditure comprises the following items: social benefits other than social transfers in kind; social transfers in kind; and current transfers from the central and local governments to the social security funds.

Source: Cabinet Office, "National accounts."

**Chart II-2-12: Decomposition of long-term interest rates<sup>1</sup>**



Note: 1. For details, see Footnote 8.

Source: Ichiue, Hibiki and Yuhei Shimizu, "Determinants of Long-term Yields: A Panel Data Analysis of Major Countries and Decomposition of Yields of Japan and the US," Bank of Japan Working Paper, No. 2012-E-7, May 2012.

<sup>8</sup> Downward pressure of demographic changes on interest rates could be induced by a decline in medium- to long-term growth expectations due to the aging of society and demand among the elderly for safe assets. In Chart II-2-12, the long-term forward rate (5-to-10-year forward rate) is decomposed into explanatory variables in the regression. The variables are as follows. The fiscal factors are net government debt / GDP, (gross government debt minus net government debt) / GDP, and primary balance / GDP. The external finance factors are net foreign debt / GDP (on an assumption that the ratio is unchanged from 2010 to 2011) and current account balance / GDP. The labor productivity factor is the growth rate of labor productivity. The demographic factor is the rate of change in the working-age population ratio. The inflation factors are inflation expectations and the standard deviation of inflation expectations. Data for ten countries including Japan are used in the regression. For details, see Ichiue, Hibiki and Yuhei Shimizu, "Determinants of Long-term Yields: A Panel Data Analysis of Major Countries and Decomposition of Yields of Japan and the US," Bank of Japan Working Paper, No. 2012-E-7, May 2012.

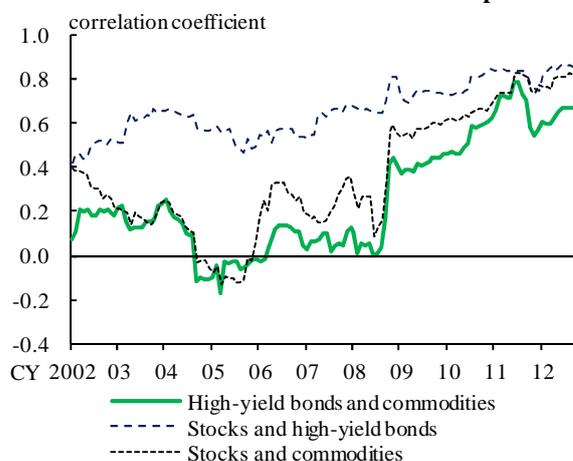
### C. Issues related to Japan's financial system

Changes in domestic and overseas economic and financial developments could affect Japan's financial system through various incidents and channels.

First, there is a possibility that shocks such as a further worsening of the European debt problem will lead to a significant downturn in the global economy. Such shocks, through the real economic channel, would lower the quality of overseas loans extended by Japan's major banks that are active in overseas lending. Moreover, if shocks in overseas economies spill over to Japan's economy through the trade channel and changes in business and household sentiment in Japan, credit costs arising from loans to small and medium-sized firms and households with severe financial conditions could increase. Meanwhile, regarding the financial channel, it is possible that shocks in, for example, overseas stock markets will spill over to Japan's financial markets, as the correlations among risk assets have been relatively high globally since the Lehman shock (Chart II-3-1). In such a case, Japan's financial institutions could incur significant losses from their stockholdings and other financial asset holdings. Furthermore, there is a possibility that, if the creditworthiness of European and U.S. banks is called into question, a heightened concern over counterparty risk will adversely affect funding conditions of Japan's banks in foreign currencies.

Second, there is a possibility that shocks such as a rise in overseas interest rates and changes in market confidence in Japan's fiscal sustainability will cause a rise in JGB yields. In such a case, financial institutions holding a large amount of government bonds could incur significant losses in the short term. In addition, such effects would be amplified through an adverse feedback loop among fiscal conditions, the financial system, and the real economy.

Chart II-3-1: Correlation between each asset price<sup>1,2,3</sup>



- Notes: 1. Correlation coefficients are calculated with a 3-year rolling window of month-to-month change rates. The latest data are as of end-September 2012.
2. Stock prices are based on the MSCI, including both advanced and emerging countries. Changes in high-yield bond prices are estimated at inverted change rates of high-yield bond option adjusted spreads. Commodity prices are based on the CRB index.
3. High-yield bond spreads cover corporate bonds under investment grade, which are issued in the United States and denominated in U.S. dollars. Bank of America Merrill Lynch, used with permission.

Source: Bloomberg.

### **III. Examination of financial intermediation**

This chapter examines financial conditions of firms and households and then scrutinizes developments in financial institutions' performance of financial intermediation in financial and loan markets.

Financial conditions of firms and households in Japan are accommodative. Issuing conditions for CP and corporate bonds have remained favorable on the whole, and firms continue to see banks' lending attitudes as being on an improving trend. In these circumstances, banks' domestic loans outstanding have increased, particularly for reconstruction-related working capital and funds related to mergers and acquisitions, although loans for business fixed investment are lackluster. Major banks have increased overseas loans, and the share of their loans in the global loan market has grown. Meanwhile, although the regional financial institutions' outstanding amount of loans has increased as a whole, growth in loans to local firms in nonmetropolitan areas has been slow. In this situation, financial institutions have gradually proceeded with efforts to support local firms' exploration of new markets and business succession by utilizing their own customer networks to improve the firms' business conditions.

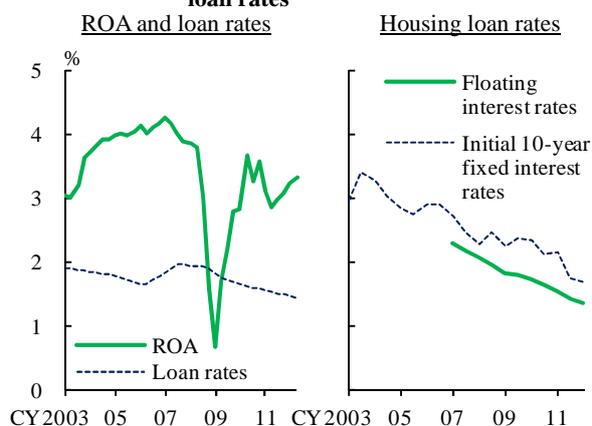
#### **A. Financial conditions of firms and households**

The Bank of Japan, as part of its comprehensive monetary easing policy, has been pursuing powerful monetary easing.<sup>9</sup> In this situation, financial conditions of both firms and households are accommodative. Firms' funding costs have been decreasing moderately, and their interest costs have been at a low level relative to corporate profits (the left-hand side of Chart III-1-1). Firms have retained their recovered financial positions on the whole (Chart III-1-2). Moreover, housing loan interest rates have continued to decline, and households have benefited from the low rates (the right-hand side of Chart III-1-1).

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<sup>9</sup> The comprehensive monetary easing policy consists of the following: (1) the virtually zero interest rate policy; (2) purchase of financial assets under the Asset Purchase Program; and (3) clarification of the policy time horizon. The Bank clarified the policy time horizon by stating as follows: for the time being, the Bank will aim to achieve the goal of 1 percent inflation in terms of the year-on-year rate of increase in the consumer price index (CPI) through the pursuit of powerful monetary easing, conducting its virtually zero interest rate policy and implementing the Asset Purchase Program mainly through the purchase of financial assets. The Bank will continue with this powerful easing until it judges the 1 percent goal to be in sight.

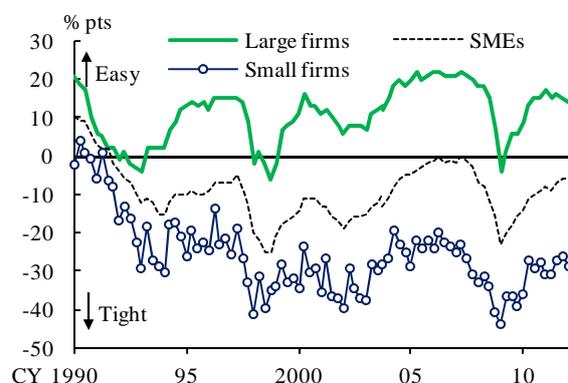
**Chart III-1-1: Firms' ROA, loan rates, and housing loan rates<sup>1,2,3</sup>**



- Notes: 1. ROA in the left chart indicates the ratio of operating profits to total assets.  
 2. Housing loan rates in the right chart indicate offered rates minus preferred discounts.  
 3. The latest data are as of the April-June quarter of 2012 for the left chart, and April 2012 for the right chart.

Sources: Ministry of Finance, "Financial statements statistics of corporations by industry, quarterly"; Japan Financial News, "Nikkin report"; BOJ, "Average contract interest rates on loans and discounts."

**Chart III-1-2: DIs of financial positions<sup>1,2</sup>**



- Notes: 1. The latest data are as of September 2012 for large firms and SMEs, and as of the April-June quarter of 2012 for small firms.  
 2. See Note 3 in Chart II-2-3.

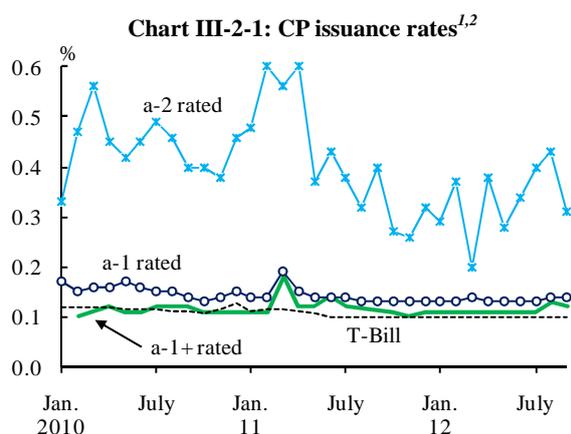
Sources: Japan Finance Corporation, "Quarterly survey of small businesses in Japan"; BOJ, "Tankan."

## B. Financial market conditions

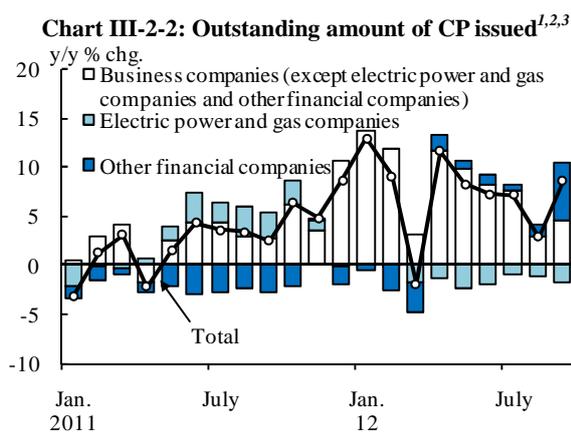
### *CP and corporate bond market conditions*

As for firms' market funding, issuing conditions for CP have remained favorable on the whole, and issuance rates on CP have been stable at low levels (Chart III-2-1). The outstanding amount of CP issued by electric power and gas companies, which temporarily increased after the disaster, has been at a level somewhat lower than the previous year, while that of CP issued by business companies (except electric power and gas companies and other financial companies) has been at a level higher than the previous year (Chart III-2-2).

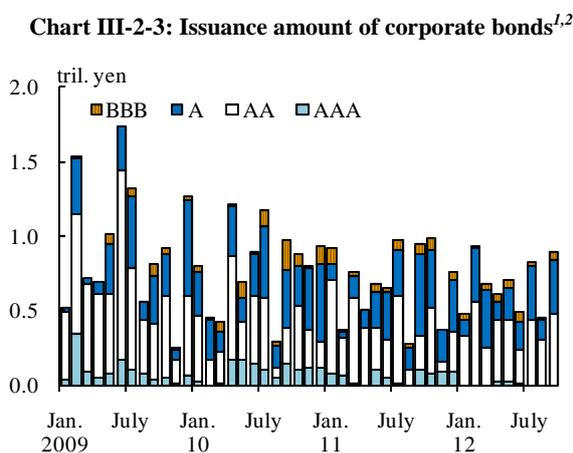
In corporate bond markets, issuing conditions have remained favorable on the whole (Chart III-2-3). Meanwhile, although the issuance spread has been wider than the pre-earthquake level for electric power company bonds -- for which issuance was suspended -- there are signs of improvement in the issuing conditions, such as the resumption of new issuance. In these circumstances, yield spreads between AA-rated corporate bonds and government bonds in Japan have been stable at lower levels than those in the United States and Europe (Chart III-2-4).



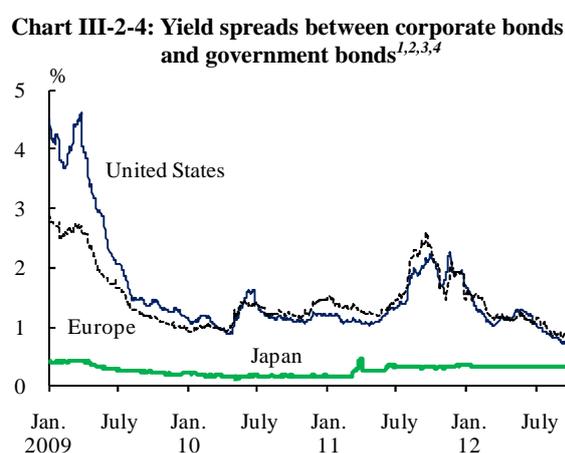
Notes: 1. Monthly average 3-month rates weighted by issuance volume.  
 2. The latest data are as of September 2012.  
 Sources: Bloomberg; Japan Bond Trading; Japan Securities Depository Center.



Notes: 1. Business companies are counted.  
 2. "Other financial companies" includes leasing companies, credit card companies, consumer finance companies, and securities finance companies.  
 3. The latest data are as of end-September 2012.  
 Source: Japan Securities Depository Center.



Notes: 1. Based on the launch date.  
 2. The latest data are as of September 2012.  
 Sources: Capital Eye; I-N Information Systems.



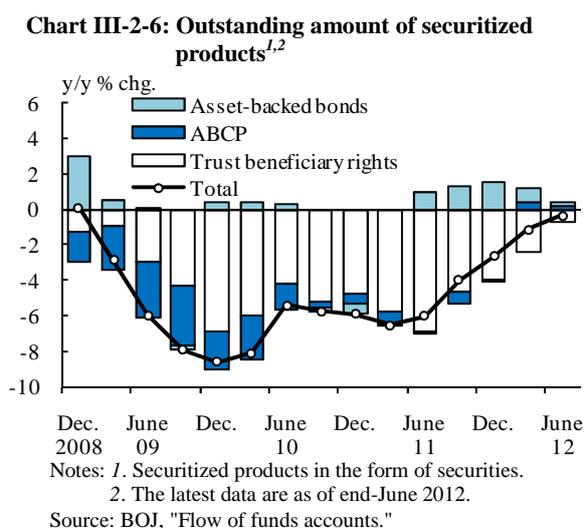
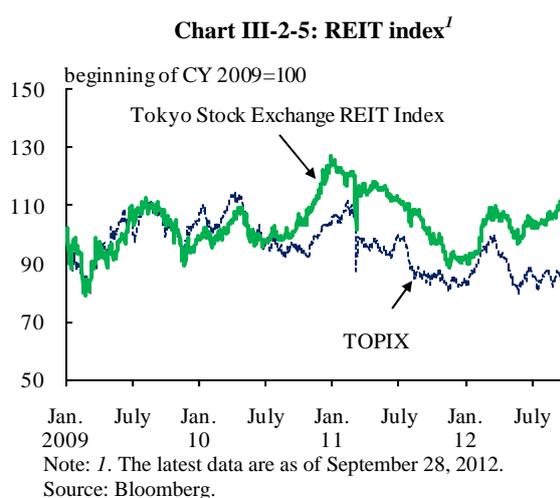
Notes: 1. Rated AA by R&I, Fitch, Moody's, and S&P.  
 2. For Japan, average yield spreads of bonds with a residual maturity of 3 years and over but less than 7 years.  
 3. For the United States and Europe, average yield spreads of bonds with a residual maturity of 3 years and over but less than 5 years. Bank of America Merrill Lynch, used with permission.  
 4. The latest data are as of September 28, 2012.  
 Sources: Bloomberg; Japan Securities Dealers Association; BOJ.

### Real estate finance and securitization market conditions

Investment unit prices of Japan real estate investment trusts (J-REITs) have been steady compared with domestic stock prices such as the Tokyo Stock Price Index (TOPIX; Chart III-2-5). Factors behind this include the relative attractiveness of dividend yields (investors assume that investment unit prices are undervalued compared with their fundamentals) and the progress in discussions on the revision of the Act on Investment Trusts and Investment Corporations.<sup>10</sup>

<sup>10</sup> Since March 2012, the Financial System Council has been holding discussions in its Working

The outstanding amount of securitized products -- mainly of trust beneficiary rights and asset-backed CP (ABCP) -- has continued to decrease since the Lehman shock. However, the pace of decrease has slowed since the beginning of fiscal 2011 partly due to a reduced rate of decline in trust beneficiary rights and an increase in mortgage-backed securities (MBSs) issued by the Japan Housing Finance Agency (JHF). The rate of decline in the outstanding amount of securitized products has recently shrunk to nearly 0 percent (Chart III-2-6).



Meanwhile, amid the prolonged low interest rate environment with historically low government bond yields in major economies, the volume of origination of high-yield structured products with embedded credit default swaps (CDSs), such as credit-linked notes and credit-linked loans, seems to have increased since the beginning of 2012. In Japan, however, the size of these credit markets is still small, and thus it appears that reference assets have remained limited to those with high credit ratings and liquidity.

## C. Loan market conditions

### *Recent developments in domestic corporate loans*

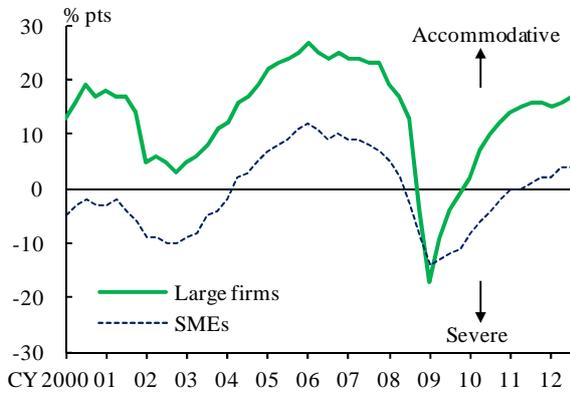
Firms continue to see banks' lending attitudes as being on an improving trend (Chart

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Group on Review of Investment Trust and Investment Corporation System, in order to revise the Act on Investment Trusts and Investment Corporations in 2013. An interim report released in early July 2012 stated that, with a view to improving the stability in the financial base including diversification of funding and capital policy measures, the working group would consider specific measures to lift the ban on an investment corporation's acquisition of its own investment equity that attracted a strong interest from foreign investors, as well as to introduce rights offerings and a reduction of capital without compensation.

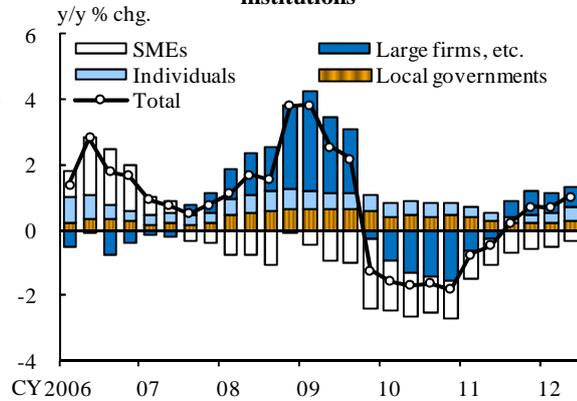
III-3-1). In this situation, financial institutions' domestic loans outstanding, particularly for corporate loans, have increased (Chart III-3-2). Behind the increase in corporate loans lies greater demand especially for working capital and funds related to mergers and acquisitions. In the disaster areas affected by the Great East Japan Earthquake, bank loans have been growing to meet firms' demand particularly for working capital necessary to continue or resume business. Furthermore, domestic firms have been active in mergers and acquisitions involving overseas firms, partly reflecting the appreciation of the yen. These firms have financed part of the necessary funds with syndicated loans and other types of borrowing (Chart III-3-3).

**Chart III-3-1: DIs of lending attitudes of financial institutions<sup>1,2</sup>**



Notes: 1. The latest data are as of September 2012.  
2. See Note 3 in Chart II-2-3.  
Source: BOJ, "Tankan."

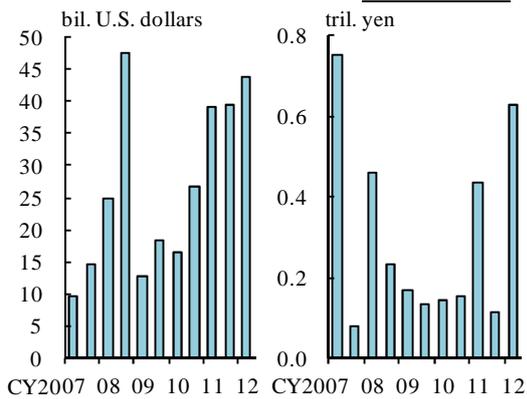
**Chart III-3-2: Loans outstanding of financial institutions<sup>1,2,3</sup>**



Notes: 1. Banks and *shinkin* banks are counted.  
2. The latest data are as of end-June 2012.  
3. See Note 3 in Chart II-2-3.  
Source: BOJ, "Loans and bills discounted by sector."

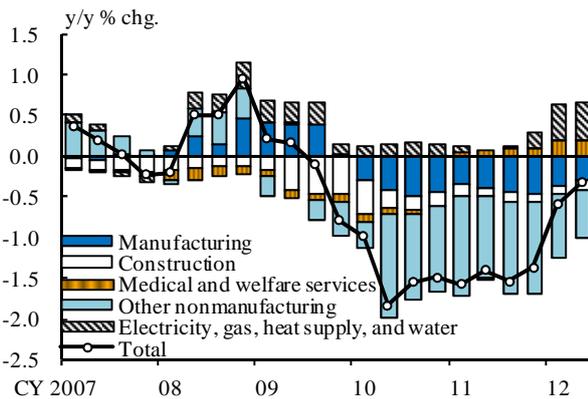
**Chart III-3-3: Corporate M&A<sup>1,2</sup>**

Amount of M&A      Amount of syndicated loans for M&A



Notes: 1. The left chart depicts total amount of M&A in which domestic firms acquired or merged with foreign firms.  
2. The right chart depicts syndicated loans extended to domestic firms.  
Sources: Bloomberg; Thomson Reuters; RECOF.

**Chart III-3-4: Loans outstanding for business fixed investment<sup>1,2</sup>**

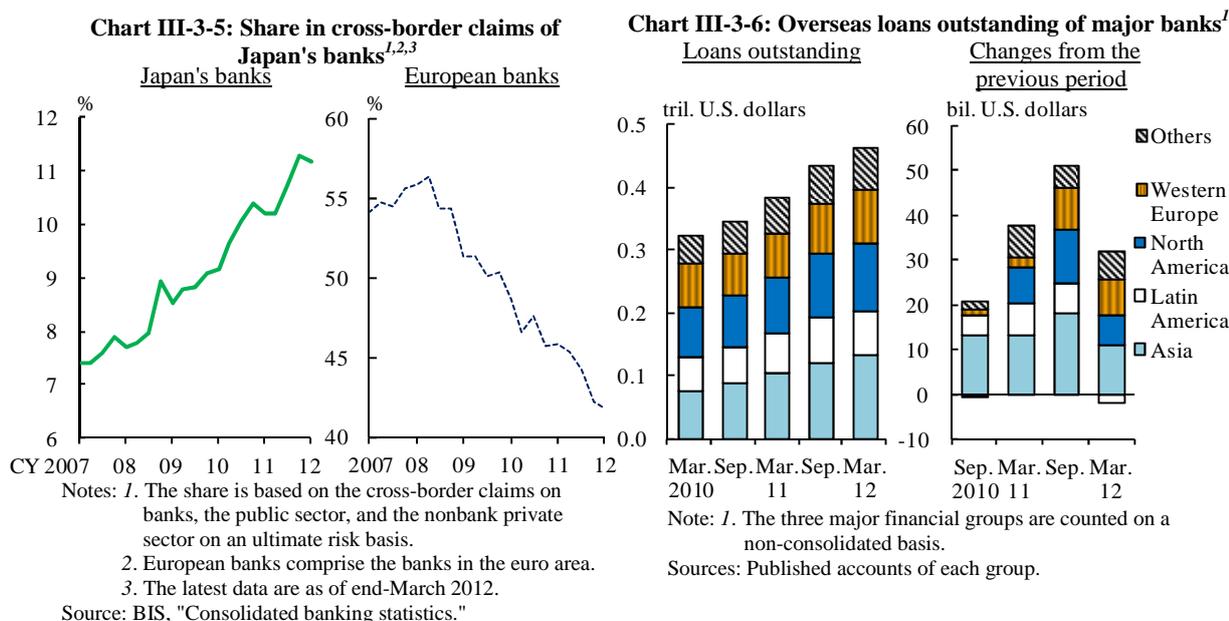


Notes: 1. Banks and *shinkin* banks are counted.  
2. The latest data are as of end-June 2012.  
Source: BOJ, "Loans and bills discounted by sector."

Nevertheless, as described in Chapter II.B, borrowing demand for business fixed investment remains sluggish due to the ample cash flow among firms (Chart III-3-4). By industry, loans for business fixed investment have increased in the electric power as well as medical care and welfare industries, while they have declined in many other industries.

### Major banks' overseas loans

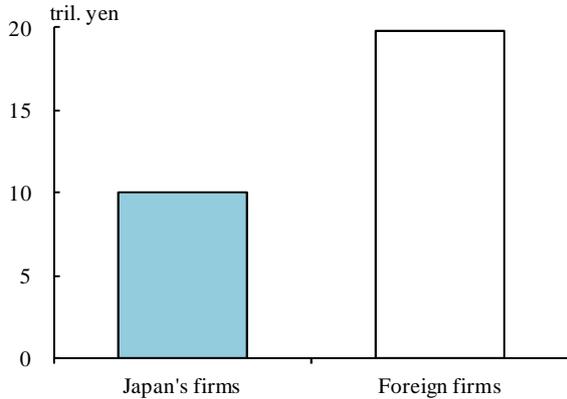
Major banks have increased overseas loans with high profitability, and the share of their loans therefore has grown in the global loan market. In the market, the share of loans by European banks has declined as they have been reducing their assets, whereas that by Japan's banks has increased since 2008 (Chart III-3-5). By region, major banks have increased their loans to a wide range of regions such as Asia, the United States, and Europe (Chart III-3-6).<sup>11</sup>



Major banks have been active in providing loans not only to Japan's firms but also to foreign firms. Loans to foreign firms have increased every year, amounting to about twice the size of those extended to Japan's firms (Chart III-3-7). Regarding syndicated loans to foreign firms in advanced economies, many of them are relatively high-rated ones (Chart III-3-8). As for syndicated loans to firms in emerging economies, many are not rated, but the proportion is significantly low compared with the global average and

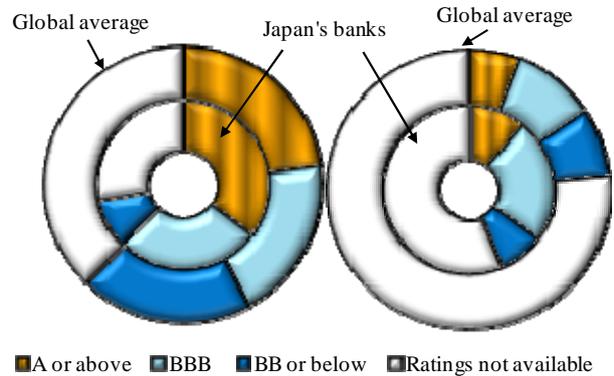
<sup>11</sup> Calculations are based on three major financial groups: Mitsubishi UFJ Financial Group, Sumitomo Mitsui Financial Group, and Mizuho Financial Group.

**Chart III-3-7: Overseas loans outstanding to Japan's and foreign firms<sup>1,2</sup>**



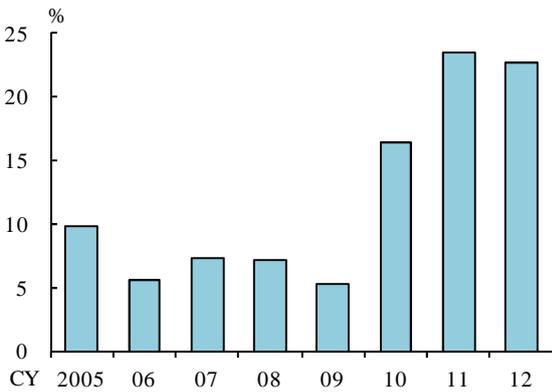
Notes: 1. The three major financial groups are counted.  
2. The data are as of end-March 2011.  
Sources: Published accounts of each group.

**Chart III-3-8: Syndicated loans by credit rating<sup>1,2</sup>**  
To firms in advanced countries To firms in emerging countries



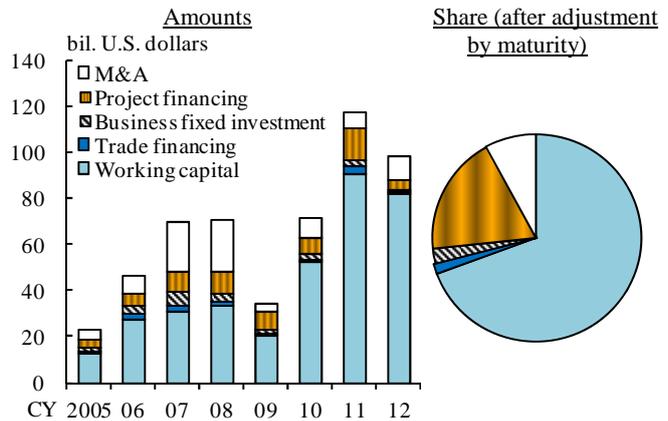
Notes: 1. Loans extended from financial institutions other than banks are included.  
2. The data are from January 2010 to June 2012.  
Source: Thomson Reuters, "DealScan."

**Chart III-3-9: Ratio of syndicated loans with covenants<sup>1,2</sup>**



Notes: 1. Loans extended from Japan's banks to firms in emerging countries are counted.  
2. The latest data are as of the first half of 2012.  
Source: Thomson Reuters, "DealScan."

**Chart III-3-10: Syndicated loan amounts and share<sup>1,2,3</sup>**



Notes: 1. Loans extended from Japan's banks to foreign firms are counted.  
2. The latest data for the left chart are annualized as of the first half of 2012.  
3. The right chart depicts the ratio of the loan amounts multiplied by maturity. For details, see Footnote 13. The data are from January 2010 to June 2012.  
Source: Thomson Reuters, "DealScan."

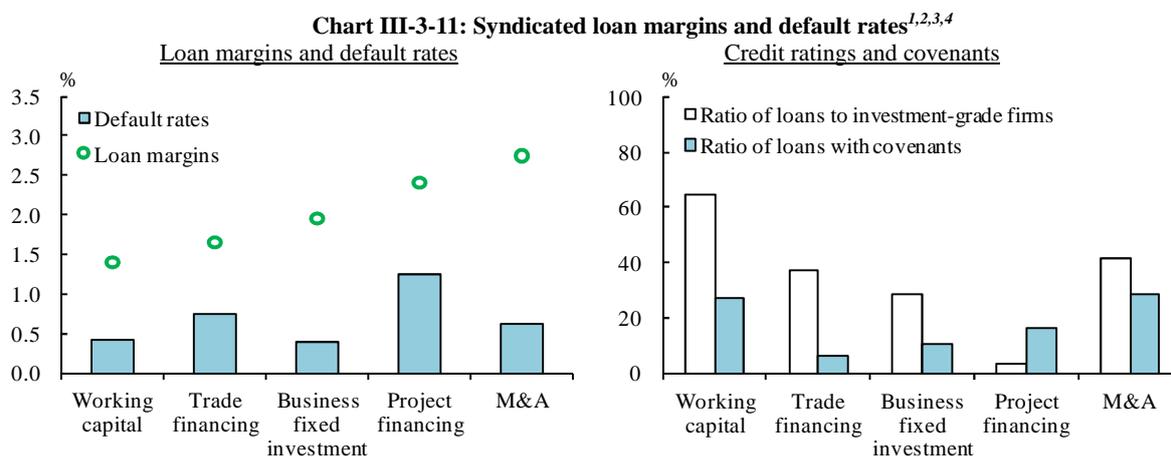
the proportion of loans with covenants has increased (Chart III-3-9).<sup>12</sup>

Meanwhile, looking at overseas syndicated loans extended by Japan's banks by lending purpose, most of them are for working capital with low risk, although some are for project financing with relatively high risk and return (Chart III-3-10).<sup>13</sup> Regarding the

<sup>12</sup> A covenant is the special provision of a loan contract. An example is the requirement to keep certain financial indicators such as profits and net assets at a certain level or higher, and borrowers are obliged to repay loans when the requirement is not met.

<sup>13</sup> On the right-hand side of Chart III-3-10, the amount of newly extended loans (total amount of 2010 to 2012) is multiplied by the maturity of loans to compare the scale of loans, taking into account the difference in the length of maturities (the number of rollovers and the amount of newly extended loans increase as the maturity shortens). The maturity of loans by lending purpose (the

loans for working capital, interest rate margins on loans have been small because a large amount of loans are investment grade and their default rates are relatively low (Chart III-3-11).<sup>14</sup> These developments show that banks are increasing overseas loans, while they are relatively careful in choosing overseas loan extension and setting loan conditions.<sup>15</sup>



Notes: 1. Loans extended from Japan's banks to foreign firms are counted.  
 2. Loan margins, the default rate, the ratio of loans to investment-grade firms (BBB and above), and the ratio of loans with covenants are averages weighted by the transaction amount of each deal.  
 3. For details of the left chart, see Footnote 14.  
 4. The data are from January 2010 to June 2012.  
 Sources: Thomson Reuters, "DealScan"; Moody's; BOJ.

### *Financial conditions of regional financial institutions and their lending attitudes toward existing firms*

Although the regional financial institutions' outstanding amount of loans has increased as a whole, growth in loans to local firms in nonmetropolitan areas has been slow (Chart III-3-12). This is because active investment spending by firms and households has been sluggish in the nonmetropolitan areas facing the decreasing population and the aging of society. Meanwhile, as described in Chapter II.B, the proportion of cash and deposit holdings remains high among firms and households, and the inflow of deposits to financial institutions has been steady. As a result, the loan-to-deposit ratio (the ratio of the amount of deposits to the amounts outstanding of loans for small and medium-sized firms and housing) at regional financial institutions has declined significantly,

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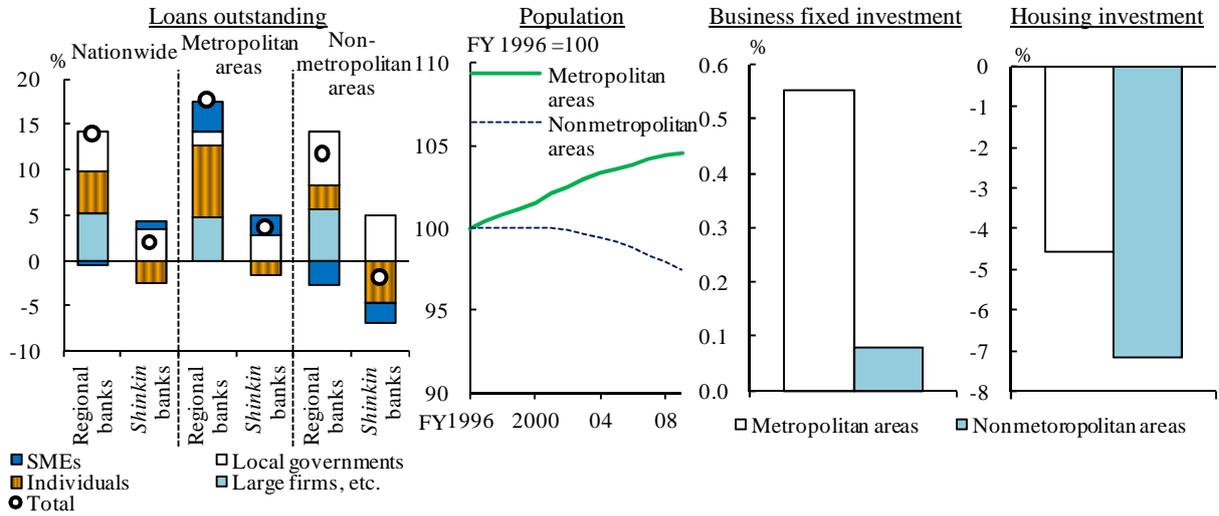
weighted average) is as follows: 4.2 years for working capital; 3.5 years for trade financing; 4.7 years for business fixed investment; 10.9 years for project financing; and 4.5 years for mergers and acquisitions.

<sup>14</sup> Default rates on the left-hand side of Chart III-3-11 are calculated using the default rates by rating (average figures for 1983 to 2010) released by Moody's based on each rating of deals.

<sup>15</sup> When some private financial institutions extend overseas loans, the loans are covered by public financial institutions' credit guarantees.

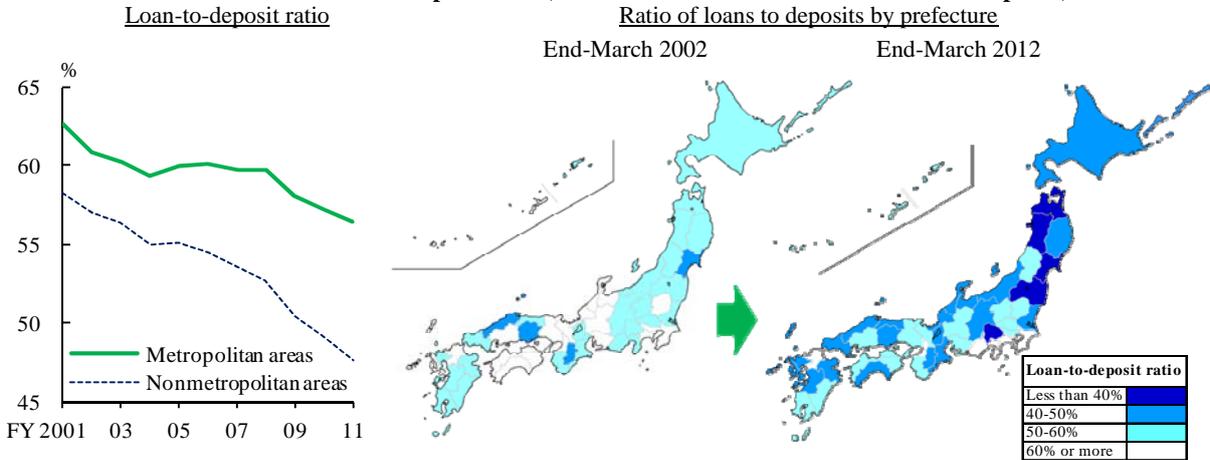
especially in nonmetropolitan areas, and the sense of an abundance of liquidity has increased (Chart III-3-13).

**Chart III-3-12: Loans outstanding, population, business fixed investment, and housing investment<sup>1,2,3</sup>**



Notes: 1. Metropolitan areas comprise the southern Kanto region, Tokai region, and Kinki region. Nonmetropolitan areas comprise the other regions.  
 2. Loans outstanding are the rate of change from fiscal 2005 to fiscal 2011. Business fixed investment and housing investment are annualized rates of change between fiscal 1996 and fiscal 2009.  
 3. See Note 3 in Chart II-2-3.  
 Sources: Cabinet Office, "Prefectural accounts"; BOJ.

**Chart III-3-13: Loan-to-deposit ratio (ratio of loans to individuals and SMEs to deposits)<sup>1,2,3,4</sup>**

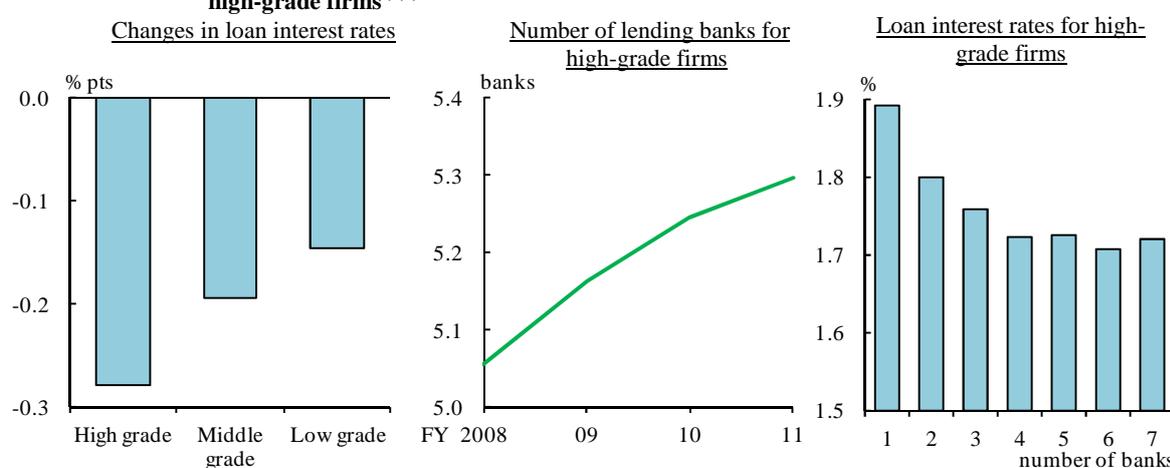


Notes: 1. For metropolitan areas, the total of figures for financial institutions of which head offices are located in the southern Kanto region, Tokai region, and Kinki region. For nonmetropolitan areas, the total of figures for financial institutions in the other regions.  
 2. Regional banks and shinkin banks are counted.  
 3. The latest data are as of end-March 2012.  
 4. See Note 3 in Chart II-2-3.  
 Source: BOJ.

Regional financial institutions have allocated their expanding operating funds to credit to the public sector such as JGB investment and loans to local governments. They also have boosted loans outside their home prefectures, by increasing loans to large firms from branches and offices in metropolitan areas and by expanding their business to

neighboring prefectures.<sup>16</sup> Such lending attitudes of regional financial institutions have intensified competition in lending to existing firms that are top rated, and have partly induced a decline in loan interest rates, especially for high-rated firms (the left-hand side of Chart III-3-14).<sup>17</sup> In fact, at high-rated borrowing firms for which lending competition is intense among financial institutions, the number of financial institutions extending loans to these firms has increased. Loan interest rates tend to decline when high-rated borrowing firms have a greater number of financial institutions extending loans (the middle and right-hand sides of Chart III-3-14).<sup>18</sup>

**Chart III-3-14: Changes in loan interest rates, and number of lending banks per firm and loan interest rates for high-grade firms<sup>1,2,3,4</sup>**



Notes: 1. The high-grade firms are in the upper 25th percentile in credit rating, the low-grade firms are in the lower 25th percentile, and the middle-grade firms are in the other percentiles.  
 2. The left chart is yearly changes of loan interest rates from fiscal 2009 to fiscal 2011.  
 3. The number of lending banks for high-grade firms in the middle chart is the average per firm.  
 4. The right chart is the average from fiscal 2008 to fiscal 2011.

Sources: Teikoku Databank, "SPECIA"; BOJ.

In addition, although the default rates for high-rated borrowing firms are lower than the overall default rate, as the number of financial institutions increases, the default rates rise even at high-rated borrowing firms (Chart III-3-15). Firms have an advantage in increasing the number of financial institutions with business ties, in that they can boost the amount of borrowing and reduce the adverse effects of deterioration in business

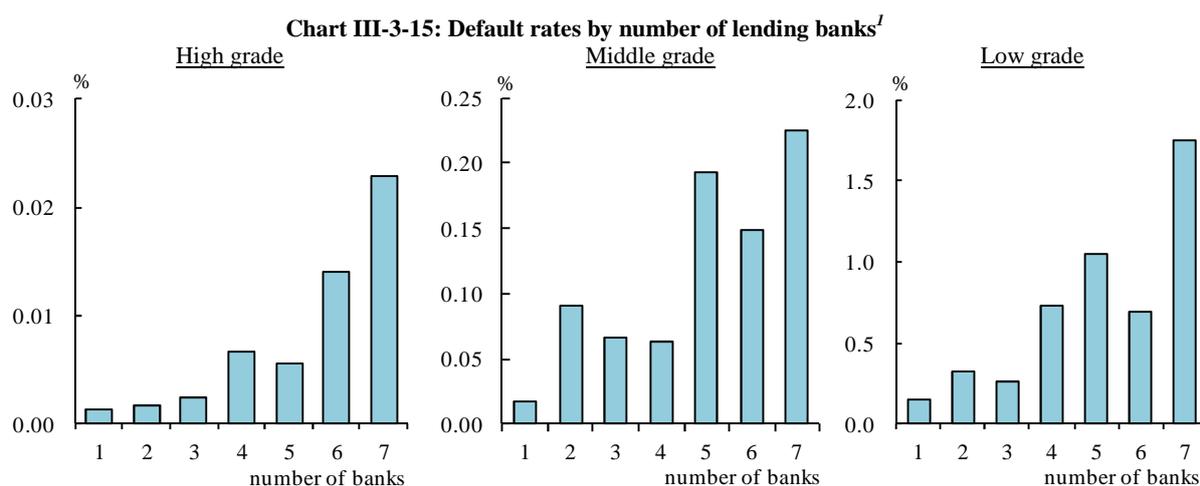
<sup>16</sup> For regional banks' loans outside their home prefectures, see the October 2011 issue of the *Report*.

<sup>17</sup> For a decline in loan interest rates, particularly those for high-rated firms, see the April 2012 issue of the *Report*.

<sup>18</sup> The number of financial institutions extending loans and the levels of loan interest rates can change due to industry-specific characters. In order to exclude such effects, the relation between the number of financial institutions and loan interest rates is estimated by regressing the loan interest rates on dummy variables for the number of financial institutions and industries. The relation between the number of financial institutions and the default rates is also estimated by the same method to exclude the effects of the differences by industry.

conditions of a main financial institution. Meanwhile, close monitoring is important for financial institutions after loan disbursement since they cannot obtain sufficient information on financial conditions and profits for some firms. If the number of financial institutions that extend loans increases without such monitoring, the governance on firms' activity from the financial side might weaken. Moreover, financial institutions would not be able to respond quickly to changes in borrowing firms' business conditions. It would take time for financial institutions to implement drastic measures after time-consuming and complex adjustments among them when borrowing firms' business conditions worsen. The aforementioned relation between the increase in the number of financial institutions extending loans and the default rates might have reflected such a problem.<sup>19</sup>

Therefore, attention should be paid to the possibility that excessive lending competition will result in deterioration in profits on loans even at high-rated firms through a decline in loan interest rates and an increase in credit costs.



Note: 1. Averages from fiscal 2008 to fiscal 2011. The high-grade firms are in the upper 25th percentile in credit rating, the low-grade firms are in the lower 25th percentile, and the middle-grade firms are in the other percentiles.  
Sources: Teikoku Databank, "SPECIA"; BOJ.

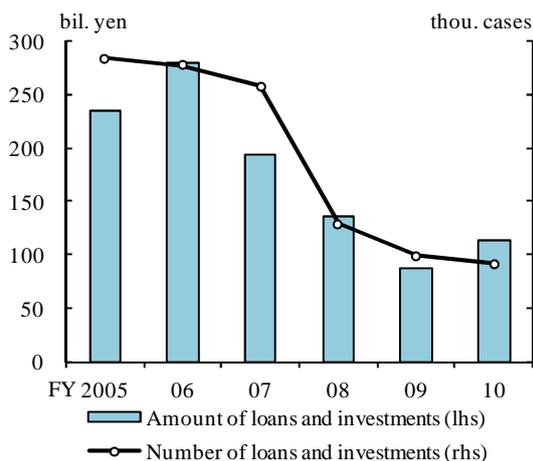
### *Financial conditions of start-ups*

Lending competition involving existing firms has become extremely intense among financial institutions, while their support for start-ups has been relatively insufficient. In fact, the amount of funds invested by venture capital funds has been small partly because the number of start-ups becoming listed on a stock exchange has been small

<sup>19</sup> The reason for the rise in the default rate with the higher number of financial institutions extending loans could be that firms with poor business performance tend to have a greater number of banks for financing.

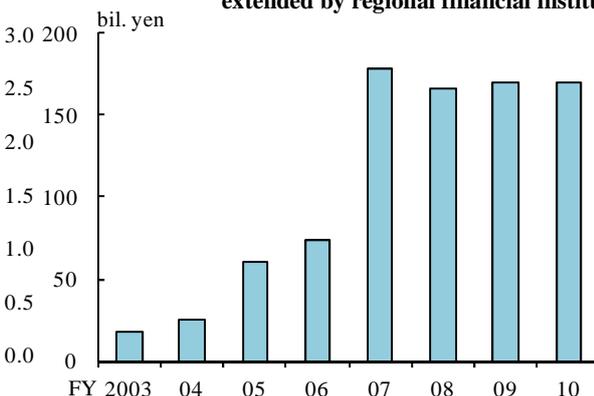
(Chart III-3-16). The amount of loans extended to start-ups by financial institutions has been increasing gradually, but the pace is moderate (Chart III-3-17). This is because financial institutions perceive start-ups as borrowers having a high risk, given that many start-ups were unable to eliminate deficits and ended in shutdown or bankruptcy (Chart III-3-18).<sup>20</sup>

**Chart III-3-16: Funds invested by venture capital funds**



Source: Venture Enterprise Center.

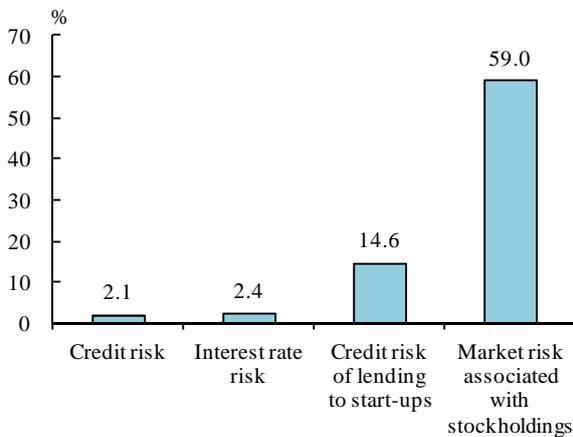
**Chart III-3-17: Loans to start-ups and new projects extended by regional financial institutions<sup>1</sup>**



Note: 1. Regional banks, *shinkin* banks, and credit unions are counted.

Sources: Financial Services Agency; Regional Banks Association of Japan; Second Association of Regional Banks; National Association of Shinkin Banks; Community Bank Shinyo Kumiai.

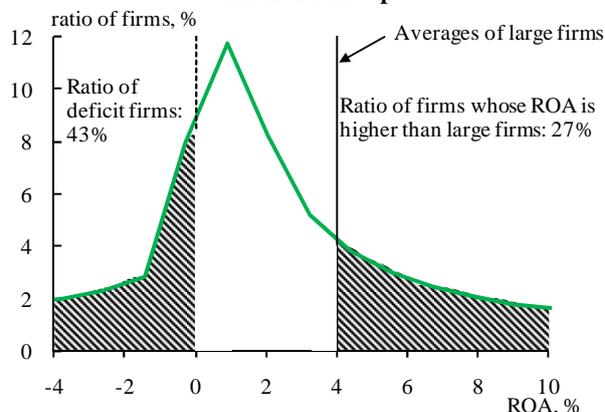
**Chart III-3-18: Risks per unit of investment<sup>1</sup>**



Note: 1. For details, see Footnote 20.

Sources: Teikoku Databank, "SPECIA"; Bloomberg; BOJ.

**Chart III-3-19: Distribution of current profit ROA of start-ups<sup>1,2,3</sup>**



Notes: 1. The data are as of fiscal 2010.

2. SMEs inaugurated 5 years ago or less are counted.

3. See Note 3 in Chart II-2-3.

Sources: CRD; Ministry of Finance, "Financial statements statistics of corporations by industry, annually."

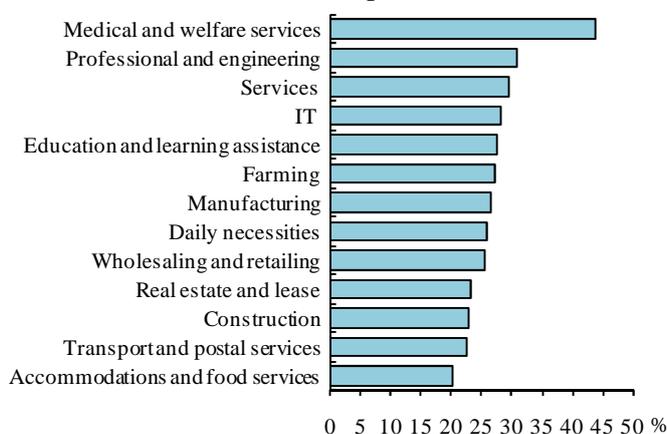
<sup>20</sup> In Chart III-3-18, each amount of risk is standardized by each amount of investment/loans, which is assumed to be 100 percent. The amount of risks is assumed to be the amount of unexpected losses (the maximum amount of losses with 99 percent probability of occurrence minus the average amount of losses). Start-ups are firms that have business relationships with regional banks and that were inaugurated 5 years ago or less. The rate of recovery is assumed to be 57 percent for credit risk (excluding loans for start-ups) and 0 percent for other risks.

Nevertheless, the profitability of nearly 30 percent of start-ups (firms inaugurated 5 years ago or less) has exceeded that of large firms, and there are many examples of successful start-ups in Japan (Chart III-3-19). An even larger proportion of start-ups has high profitability, depending on the industry (Chart III-3-20). Therefore, an important issue regarding financial intermediation in Japan is that financial institutions smoothly provide funds to firms and projects with growth potential, despite the high risk.

There is also room for financial institutions to better grasp firms' growth potential and devise lending measures for them. Start-ups generally have little real estate collateral and hold relatively large amounts of receivables and inventories (Chart III-3-21). Therefore, if small and medium-sized firms, including start-ups, are allowed to use their movable assets and monetary claims as collateral for smoother financing, their borrowing constraints would ease.

Considering these factors, the Bank of Japan has implemented a funds-provisioning measure to support strengthening the foundations for economic growth (hereafter "the Growth-Supporting Funding Facility") and established a credit line for ABL.<sup>21</sup> The amount outstanding of ABL was 109.4 billion yen as of the end of September 2012. In

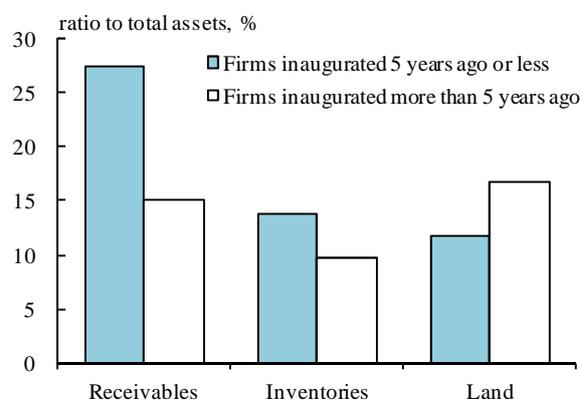
**Chart III-3-20: Ratio of start-ups with higher current profit ROA than large firms<sup>1,2,3</sup>**



Notes: 1. The data are as of fiscal 2010.  
 2. SMEs inaugurated 5 years ago or less whose current profit ROA is 4 percent or more are counted.  
 3. See Note 3 in Chart II-2-3.

Source: CRD.

**Chart III-3-21 Asset composition of start-ups<sup>1</sup>**



Note: 1. Averages from fiscal 2008 to fiscal 2011.  
 Sources: CRD; Teikoku Databank, "SPECIA."

<sup>21</sup> Through the Growth-Supporting Funding Facility, the Bank supplies long-term funds (4 years at maximum) at a low interest rate (currently 0.1 percent) to financial institutions that make loans and investment to strengthen the foundations for Japan's economic growth. The outstanding balances for each lending arrangement are as follows: (1) 3.5 trillion yen under the main rules introduced in June 2010; (2) 500 billion yen under the special rules for equity investments and ABL introduced in June 2011; (3) 500 billion yen under the special rules for small-lot investments and loans (1 million yen or more but less than 10 million yen) introduced in March 2012; and (4) 12 billion U.S. dollars under the special rules for the U.S. dollar lending arrangement introduced in March 2012.

March 2012, the Bank also established special rules for a new lending arrangement for small-lot investments and loans, and disbursed loans twice under the special rules.

### *Financial institutions' efforts to utilize their customer networks*

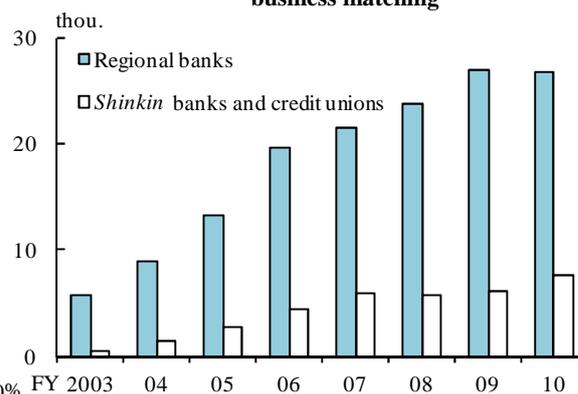
As growth in loans to local firms has been slow particularly in nonmetropolitan areas, some financial institutions have gradually begun to work on business operations other than lending in an effort to improve business conditions of local firms. This is because small and medium-sized firms face various challenges not limited to financing. In the survey for small and medium-sized firms, these firms cited securing enough salespersons and exploring new markets as top-priority tasks, and emphasized the need to strengthen their sales (Chart III-3-22). Many firms also raised fostering successors as a challenge, reflecting the aging of owners.

**Chart III-3-22: Management challenges faced by SMEs<sup>1,2</sup>**



Notes: 1. The data are as of 2008. Multiple answers are included.  
 2. See Note 3 in Chart II-2-3.  
 Source: Tokyo Chamber of Commerce and Industry, "Surveys on SMEs' management challenges."

**Chart III-3-23: Number of contracts made via business matching<sup>1</sup>**



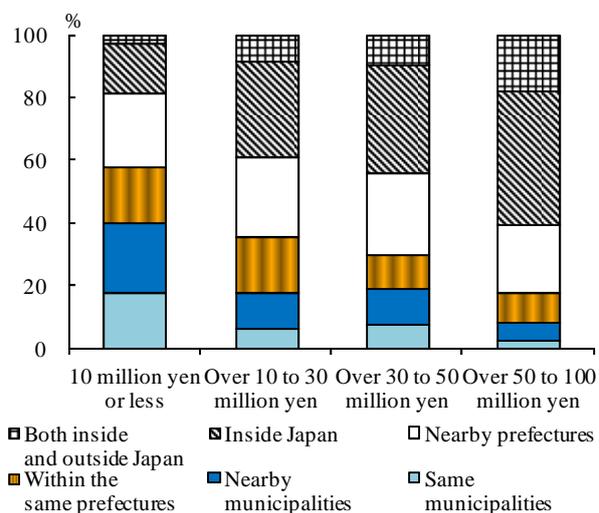
Note: 1. The figures until fiscal 2009 are sourced from the Financial Services Agency. The figures in fiscal 2010 are calculated by adding up the figures released by each association.

Sources: Financial Services Agency; Regional Banks Association of Japan; Second Association of Regional Banks; National Association of Shinkin Banks; Community Bank Shinyo Kumiai.

Given these circumstances, financial institutions have been making efforts to resolve issues faced by small and medium-sized firms by utilizing these institutions' customer networks (see Box 3 for financial institutions' customer networks). For example, financial institutions have begun to strengthen the provision of information services with which small and medium-sized firms can find potential business partners in order to explore new markets (Chart III-3-23). Moreover, some institutions have started to work to enhance the quality of their information through cooperation with other financial institutions. Buyers of many small and medium-sized firms' products are located within the same prefectures or nearby municipalities, and their small sales

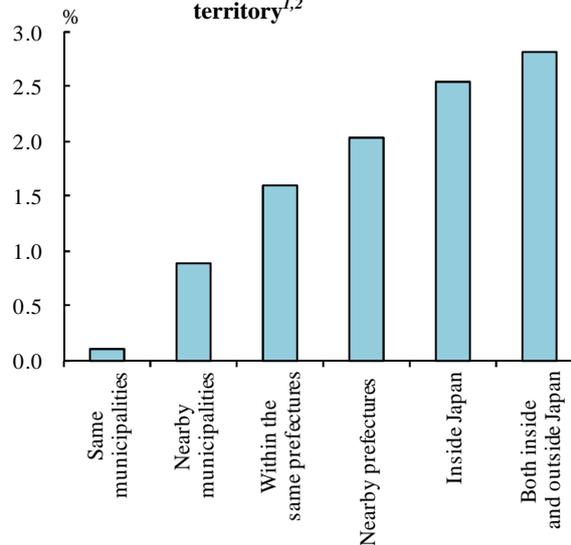
territory could have been one factor behind low profitability (Charts III-3-24 and III-3-25). Therefore, financial institutions' efforts to support market expansion for borrowing firms by assessing these firms' growth potential could help enhance the profitability of small and medium-sized firms.

Chart III-3-24: SMEs' sales by territory<sup>1,2</sup>



Notes: 1. The latest data are as of fiscal 2010.  
2. See Note 3 in Chart II-2-3.  
Source: Small and Medium Enterprise Agency, "Basic survey on small and medium enterprises."

Chart III-3-25: SMEs' operating profit ROA by sales territory<sup>1,2</sup>



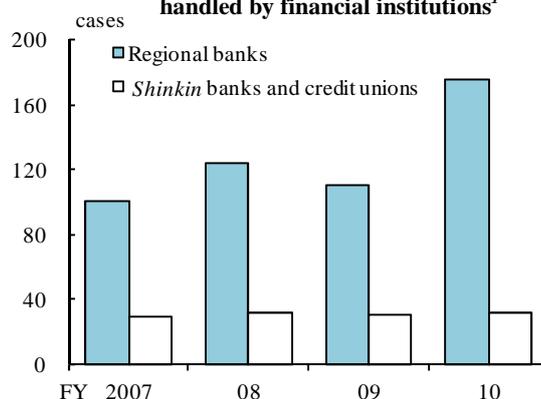
Notes: 1. The latest data are as of fiscal 2010.  
2. See Note 3 in Chart II-2-3.  
Sources: Small and Medium Enterprise Agency, "Basic survey on small and medium enterprises"; BOJ.

Furthermore, financial institutions have started to support business succession of firms with elderly owners through, for example, mergers and acquisitions (Chart III-3-26; see Box 4 for the aging of firms' owners and support of business succession). In Japan, an increasing number of firms lack successors even though their owners are elderly. It appears that there is room to utilize financial institutions' customer networks to proceed smoothly with business succession of firms possessing specialized skill and knowledge.<sup>22</sup>

Financial institutions could further improve firms' business conditions by enhancing their functioning of information production and intermediation, making use of advantages such as their customer networks. This includes establishing information infrastructure and securing staff in charge of external relations. Moreover, they could expand their networks by cooperating with each other regardless of their type of business or region, and further enhance the quality of their services that meet firms' demand, for example, by supporting the firms' overseas business expansions.

<sup>22</sup> Some financial institutions provide services for identifying appropriate firms for business succession by forming business partnerships with consulting firms that specialize in supporting business succession.

**Chart III-3-26: M&A for business succession handled by financial institutions<sup>1</sup>**



Note: 1. The figure for regional banks in fiscal 2010 is calculated by the BOJ.

Sources: Financial Services Agency; Regional Banks Association of Japan; Second Association of Regional Banks; National Association of Shinkin Banks; Community Bank Shinyo Kumiai.

### Box 3: Financial institutions' customer networks

Financial institutions' customer networks are clearly large compared with other industries. For example, the number of firms' business partners of sales and purchases is large at major trading firms, but the number of clients for financial institutions ranges from thousands to tens of thousands, exceeding that for many other industries (Chart B3-1).<sup>23</sup> Financial institutions' ties with clients are comparable with other industries, as evidenced by a considerable amount of financial transactions per client.

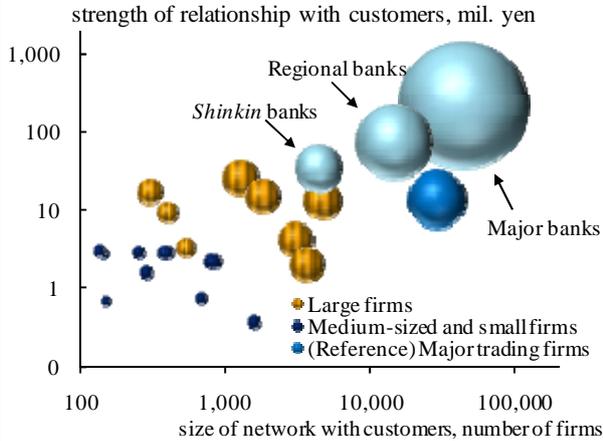
If financial institutions' customer networks are used efficiently, the business networks of individual firms could expand. For example, a firm in a prefecture must go through four to six links between other firms in its transaction network to find a business partner (Chart B3-2).<sup>24</sup> Whereas if the firm uses financial institutions' customer networks, the

<sup>23</sup> In Chart B3-1, the "strength of relationship with customers" (the vertical axis) is the average amount of credit per customer. The "size of networks with customers" (the horizontal axis) is the average number of customers per firm or financial institution. The size of circles indicates the average amount of credit per firm or financial institution. Customers are business partners of sales and purchases for firms and borrowers for financial institutions. Major trading firms have more than 10,000 customers and capital of 1 billion yen or more.

<sup>24</sup> Chart B3-2 shows the estimates of the Bank of Japan. The definitions and analytical methodology of Chart B3-2 are as follows. The "number of links" indicates how many firms are required for Firm *i* to have a business connection with Firm *j* with the fewest links. This calculation uses the customer data of 1,503 firms in one prefecture. The "average number of links" indicates the average number of transaction links between Firm *i* located in the prefecture and Firm *j* (excluding Firm *i*). The left-hand side of Chart B3-2 shows the frequency distribution of the average number of transaction links for each firm. "Under the assumption that the customer networks of financial institutions were not used" indicates the average number of transaction links calculated by excluding financial institutions' transaction links. "Under the assumption that the customer networks of financial

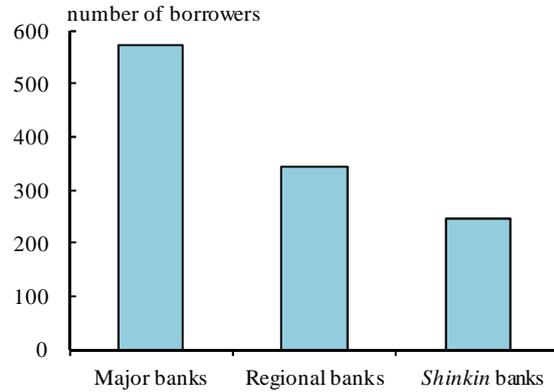
process of finding business partners among firms would be shortened to two or three links. This suggests that new business relationships could be established more

**Chart B3-1: Customer networks of firms and financial institutions<sup>1</sup>**



Note: 1. For details, see Footnote 23.  
Sources: Teikoku Databank, "SPECIA"; BOJ.

**Chart B3-3: Number of borrowing firms per branch<sup>1,2,3</sup>**

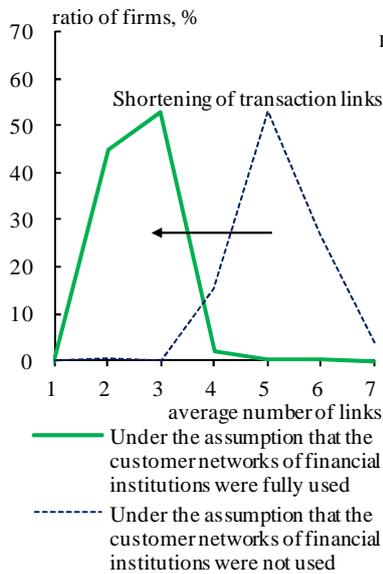


Notes: 1. Borrowing firms only refer to SMEs.  
2. The data are as of end-March 2012.  
3. See Note 3 in Chart II-2-3.

Source: BOJ.

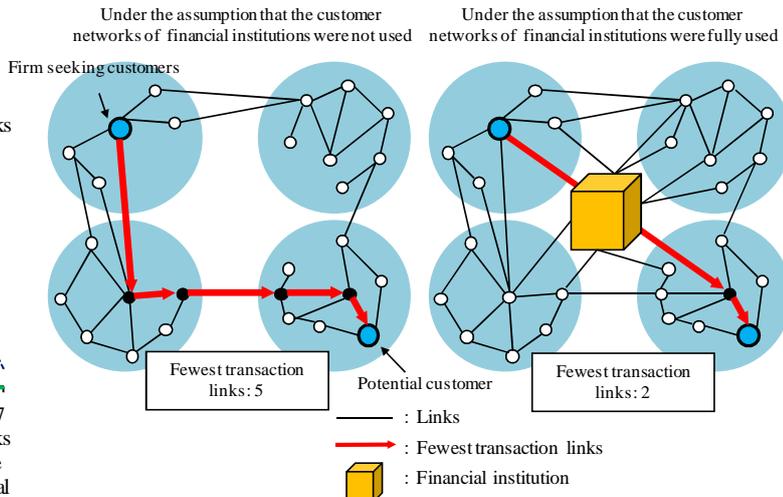
**Chart B3-2: Relation between firms through transaction networks<sup>1,2,3</sup>**

Distributions of the average number of links



Notes: 1. The average number of links in the left chart indicates the average number of the fewest links that a firm must go through to find a customer through business transactions.  
2. The right chart is drawn by the BOJ. Circles in the right chart indicate firms. Black dots indicate firms that a firm must have business relationships with to find a customer through the fewest links.  
3. Firms, banks, and *shinkin* banks located in one prefecture are counted.  
Source: Teikoku Databank, "SPECIA."

Customer networks of firms and financial institutions



institutions were fully used" shows the average number of transaction links calculated by including financial institutions' transaction links. Transaction links are assumed to exist between financial institutions and firms when firms are borrowers.

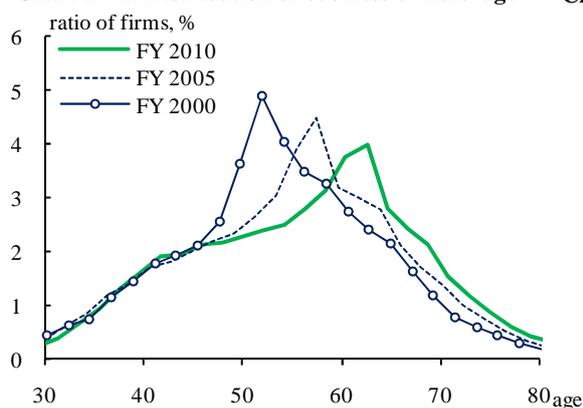
efficiently if financial institutions effectively utilize their customer networks and intermediate information regarding their customers and transactions.

Customer networks for *shinkin* banks, whose business areas are limited, tend to be relatively small. Nevertheless, since the number of clients per branch and the business areas are small, *shinkin* banks can establish close relationships with their clients (Chart B3-3). In order to make use of such relationships and strengthen profit bases, it is important for them to expand their networks by cooperating with other financial institutions.

#### Box 4: Aging of firms' owners and support of business succession

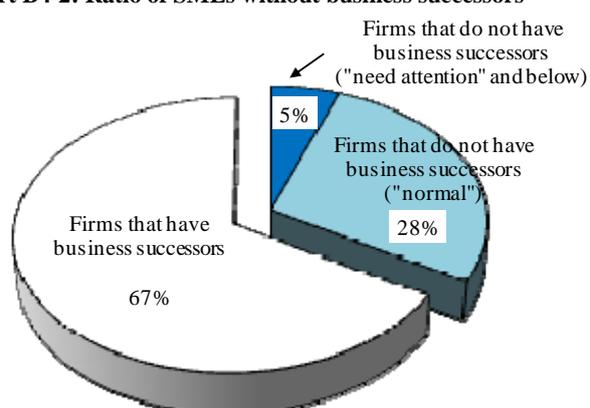
In Japan, the aging of owners of small and medium-sized firms has continued (Chart B4-1). The proportion of small and medium-sized firms with owners over 60 years old reached 21 percent in fiscal 2010, up 8 percentage points from 13 percent in fiscal 2000. The number of firms without successors has also risen over the years, and the share of such firms among total small and medium-sized firms increased to about 30 percent in fiscal 2010 (Charts B4-2 and B4-3). Many of these firms are top rated in their sectors, enjoying high profitability and high credit ratings corresponding to normal in the borrower classification. However, many of such top-rated firms have been forced to close their business due to the lack of successors.

Chart B4-1: Distribution of business owners' age<sup>1,2</sup>



Notes: 1. SMEs are counted.  
2. See Note 3 in Chart II-2-3.  
Source: CRD.

Chart B4-2: Ratio of SMEs without business successors<sup>1,2,3</sup>



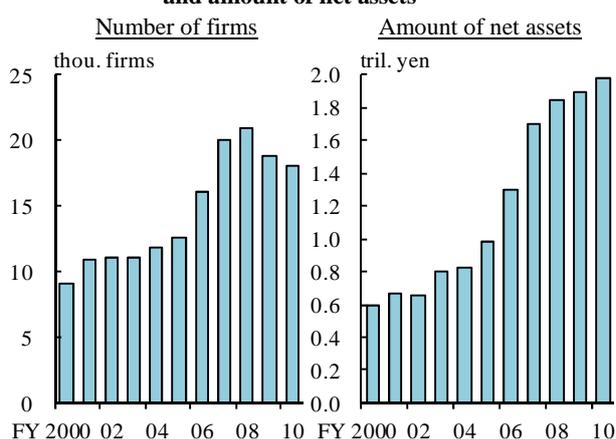
Notes: 1. SMEs with owners over 60 years old are counted.  
2. The data are as of fiscal 2010.  
3. See Note 3 in Chart II-2-3.  
Sources: CRD; BOJ.

The business succession of small and medium-sized firms has not progressed well partly because the financial conditions of the firms and those of their owners are closely related. In many cases, owners of small and medium-sized firms make large amounts of equity investments and loans to their own firms and personally guarantee a large portion

of the loans from banks (Chart B4-4). These features help facilitate the smooth funding of firms that are still in the process of development. However, such close ties of financing between firms and their owners could be obstacles for business succession. In many cases where financial conditions are stable but no successors are available among relatives of owners, employees are assumed to be candidates for business successors. In order to become new owners, employees need to take over owners' equity investments and guarantees by themselves, but they do not have sufficient funds to do so. This restrains the business succession at small and medium-sized firms.

In these circumstances, financial institutions have recently begun to support mergers and acquisitions and management buyouts (MBOs) to promote business succession.<sup>25</sup> It is important for financial institutions to establish a support system for this, given the strong potential need for business succession owing to the aging of society.

**Chart B4-3: Number of firms without business successors and amount of net assets<sup>1,2</sup>**

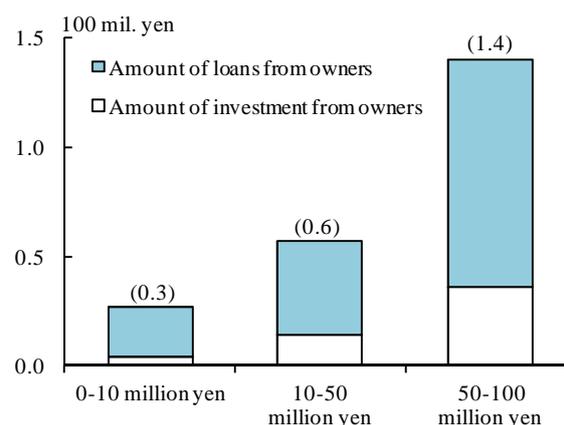


Notes: 1. SMEs that do not have excess debt and whose owners are over 60 years old without business successors are counted.

2. See Note 3 in Chart II-2-3.

Source: CRD.

**Chart B4-4: Costs borne by firms' owners<sup>1,2</sup>**



Notes: 1. Figures in parentheses are the sum of amounts of loans and investment from firms' owners.

2. The data are as of fiscal 2010.

Source: Teikoku Databank, "SPECIA."

<sup>25</sup> MBOs refer to a situation when the existing managers or employees of a company who are not owners acquire a subsidiary or the operating section of the company and establish a new company.

## IV. Risks in the financial system

This chapter examines several indicators of macro financial risk and then considers risks observed in financial markets. It also summarizes risks to which banks, *shinkin* banks, and other types of financial institutions are exposed.

In the examination of the financial system to ascertain financial imbalances, there is no indicator that warns of financial imbalances stemming from bullish expectations. Due attention should be paid, however, to a further increase in the amount outstanding of JGBs held by financial institutions. Moreover, although the amount of risks banks and *shinkin* banks bear as a whole has been decreasing relative to capital, their core profitability has declined. Attention should be paid to the possibility that, if the growth rate of Japan's economy continues to decline in the medium to long term due to the decreasing population and the aging of society, financial institutions' profitability will continue to decrease.

### A. Macro risk indicators

In Japan, total credit from financial institutions to firms and households relative to GDP continues to hover around its long-term trend (Chart IV-1-1). Risk-taking indicators are examined to assess the macro risk associated with the investment behavior of firms and households.<sup>26</sup> The risk-taking indicators for firms and households have been more or less unchanged at low levels, showing that they are cautious in risk-taking (the vertical axis in Chart IV-1-2). The indicator for banks has recently risen slightly due to the increase in loans outstanding, but has generally been restrained (the horizontal axis in Chart IV-1-2).

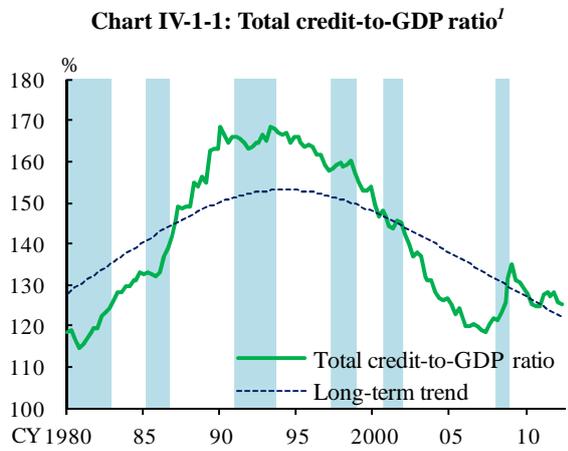
The Financial Activity Index (FAIX), which covers a variety of financial indicators such as the total credit-to-GDP ratio, does not show any sign of financial overheating (Chart IV-1-3).<sup>27</sup> The FAIX consists of ten financial indicators and judges whether financial

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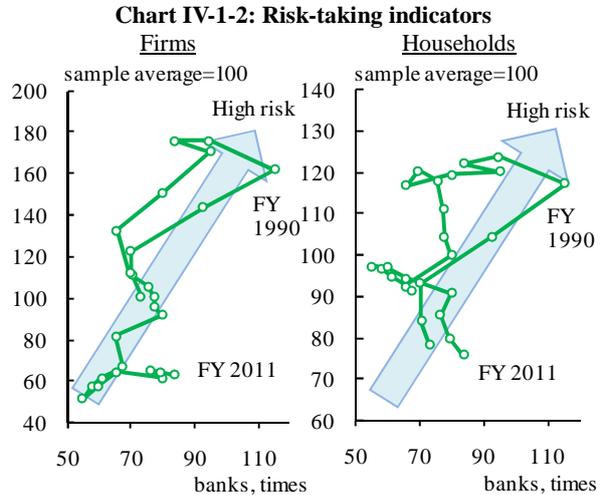
<sup>26</sup> The risk-taking indicator for firms is calculated by multiplying the ratio of corporate investment spending to operating profits by the amount of corporate spending. The indicator for households is calculated by multiplying the ratio of household investment spending (housing investment and durable goods consumption) to disposable income by the amount of household spending. The indicator for banks is the ratio of loans outstanding to operating profits from core business. In all the cases, the larger the risk-taking indicators, the more active the risk-taking in investment. In Chart IV-1-2, a move to the upper right side implies that both firms/households and banks are actively taking on risks and thus the macro financial risk is accumulating.

<sup>27</sup> Shaded areas in Chart IV-1-3 represent the following: (1) areas shaded in red (the darkest shaded areas) show that an indicator has risen by more than one standard deviation from the trend, that is, it

activity is overheating or overcooling, based on how far individual indicators deviate from their historical trend. No indicators show any sign of overheating of financial activity at present.



Note: 1. Shaded areas indicate recession periods. The latest data are as of the April-June quarter of 2012.  
Sources: Cabinet Office, "National accounts"; BOJ, "Flow of funds accounts."



Sources: Cabinet Office, "National accounts"; Ministry of Finance, "Financial statements statistics of corporations by industry, quarterly"; BOJ.

**Chart IV-1-3: Heat map of Financial Activity Index<sup>1</sup>**

	CY	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12		
DI of financial institutions' lending attitudes		Blue	Green	Red	Red	Red	Green																													
Total credit to GDP ratio		Green																																		
Equity weighting in institutional investors' portfolios		Green																																		
Money multiplier (ratio of M2 to the monetary base)		Green																																		
Gross rent multiplier (ratio of land prices to rent)		Green																																		
Stock price		Green																																		
Spread between expected equity yields and government bond yields		Green																																		
Ratio of business investments to operating profits		Green																																		
Ratio of firms' CP outstanding to their liabilities		Green																																		
Households' debt-to-cash ratio		Green																																		

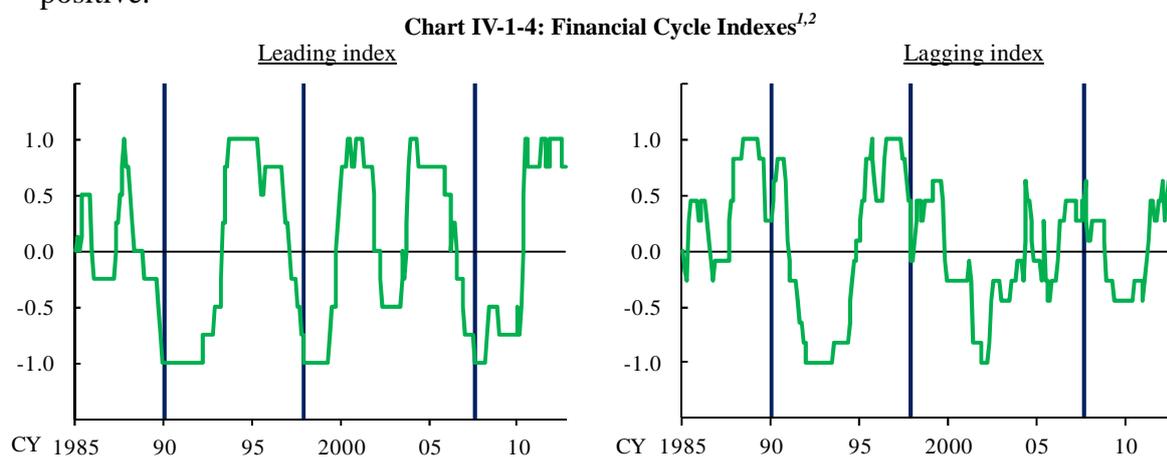
Note: 1. The latest data are as of the January-March quarter of 2012.  
Sources: Cabinet Office, "National accounts"; Japan Post Holdings, "The former Japan Post statistical data"; Japan Real Estate Institute, "Urban land price index"; Ministry of Finance, "Financial statements statistics of corporations by industry, quarterly"; Ministry of Internal Affairs and Communications, "Consumer price index"; Ministry of Postal Services, "Annual statistical report of postal services," "Annual statistical report of postal service administrations"; Bloomberg; Thomson Reuters; BOJ, "Flow of funds accounts," "Monetary base," "Money stock," "Tankan."

The Financial Cycle Indexes also show no sign of instability in the financial system (Chart IV-1-4).<sup>28</sup> The Financial Cycle Indexes are diffusion indexes (DIs) used to

is tilted to overheating; (2) areas shaded in blue (the second darkest shaded areas) show that an indicator has declined by more than one standard deviation from the trend, that is, it is tilted to overcooling; (3) areas shaded in green (the most lightly shaded areas) show everything in between; and (4) areas in white show the periods without data. For details on the FAIX, see Ishikawa, Atsushi, Koichiro Kamada, Kazutoshi Kan, Ryota Kojima, Yoshiyuki Kurachi, Kentaro Nasu, and Yuki Teranishi, "The Financial Activity Index," Bank of Japan Working Paper, No. 2012-E-4, April 2012. See also Box 1 in the April 2012 issue of the *Report*.

<sup>28</sup> The Financial Cycle Indexes have been developed by the Bank of Japan's Financial System and

identify signs of future instability in the financial system. A change in the leading index from a positive figure to a negative one indicates that the financial system may become unstable in the near future. The same movement in the lagging index indicates that the financial system might have already become unstable. Recently, both indexes have been positive.



Notes: 1. The left, middle, and right vertical lines indicate the collapse of Japan's asset price bubble, the default of Sanyo Securities, and the outbreak of the U.S. subprime problem, respectively.

2. The latest data are as of September 2012.

Source: BOJ.

Moreover, stock markets have not shown an increase in awareness of systemic risk in the financial sector (Chart IV-1-5). The conditional value-at-risk (CoVaR) and marginal expected shortfall (MES) show how stock market participants recognize the extent of contagion effects of the risk that a financial institution bears on other financial institutions. As CoVaR increases, propagation of stresses occurring at individual financial institutions to the entire financial sector becomes stronger.<sup>29</sup> On the other hand, as MES rises, adverse effects of the entire financial sector's stresses on individual

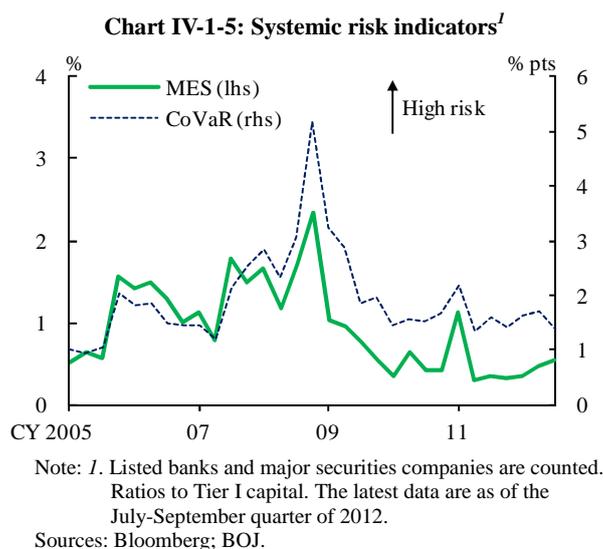
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Bank Examination Department, based on a concept similar to that of the Indexes of Business Conditions. The indexes combine a number of financial and economic indicators, such as stock prices and DIs for lending attitudes of financial institutions, to assess the phase of the financial cycle. For details on the indexes, see Kamada, Koichiro and Kentaro Nasu, "The Financial Cycle Indexes for Early Warning Exercise," Bank of Japan Working Paper, No. 2011-E-1, April 2011.

<sup>29</sup> CoVaR shows changes in VaR of aggregate financial stocks, if a stock price of a financial institution plunges. Specifically, the following are estimated: (1) how much of an extraordinary risk that a financial institution bears would spill over to the entire financial sector (the effects of VaR of the institution's stocks with a 5 percent probability of occurrence on VaR of aggregate financial stocks); and (2) how much of a normal risk that the institution bears would spill over to the entire financial sector (the effects of VaR of the institution's stocks with a 50 percent probability of occurrence on VaR of aggregate financial stocks). CoVaR of the financial institution is the amount of (1) minus that of (2). CoVaR in Chart IV-1-5 is the average of CoVaR of all financial institutions. The estimation period is from January 1997 to June 2012 under the quantile regression. For details, see Adrian, Tobias and Markus K. Brunnermeier, "CoVaR," Federal Reserve Bank of New York Staff Report, No. 348, September 2011.

financial institutions' corporate value increase.<sup>30</sup> Both indicators have recently been at low levels.

No solid evidence of instability in the financial system is observed in these indicators. However, the above macro risk indicators are designed to capture potential financial imbalances mainly in Japan's private sector. It should be noted that they do not cover all financial activities, such as activities of the foreign sector and the public sector.



## B. Risks observed in financial markets

### 1. Risks implied in stock markets

Market participants' uneasiness subsided toward early spring 2012, but grew again toward June 2012 in response to the heightening concern over the situation in Europe. Such market participants' uneasiness -- which is gauged by the volatility index (VIX) in the United States and the model-free implied volatilities (MFIVs) of European and domestic stock prices -- recently declined again to the level of early spring 2012, mainly due to market expectations toward policies regarding the European debt problem (Chart IV-2-1).<sup>31</sup>

<sup>30</sup> MES shows expected losses at an individual financial institution if the VaR of aggregate financial stocks exceeds a certain threshold. Specifically, an individual financial institution's MES is the average rate of change in market value of the stocks on the day when the market value of aggregate financial stocks falls below the value with the lowest 5 percent probability of occurrence. MES in Chart IV-1-5 is the average of MES of all financial institutions. For details, see Acharya, Viral V., Lasse H. Pedersen, Thomas Philippon, and Matthew Richardson, "Measuring systemic risk," Federal Reserve Bank of Cleveland Working Paper, No. 10-02, March 2010.

<sup>31</sup> The VIX of the Chicago Board Options Exchange, the VSTOXX of the Eurex, and the Nikkei

The negative value of risk reversals (the difference in implied volatilities between call and put options) of stock prices in Japan, the United States, and Europe -- which indicate the direction of future stock fluctuations recognized by options market participants -- expanded somewhat through June 2012. This shows that the market participants had increasingly taken positions in anticipation of a decline in stock prices. Recently the decline in risk reversals diminished again, to slightly above the level of early spring 2012 (Chart IV-2-2).

Market participants' risk recognition observed in such indicators is highly correlated globally, and this implies that domestic stock prices remain susceptible to developments in U.S. and European stock markets.

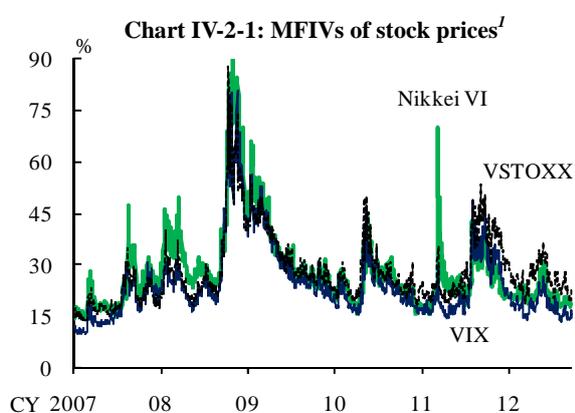


Chart IV-2-1: MFIVs of stock prices<sup>1</sup>  
 Note: 1. The latest data are as of September 28, 2012.  
 Source: Bloomberg.

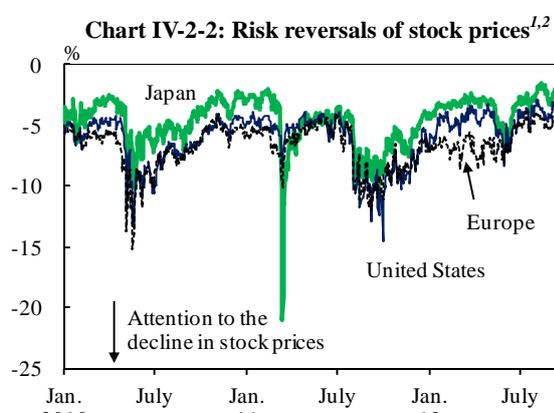


Chart IV-2-2: Risk reversals of stock prices<sup>1,2</sup>  
 Notes: 1. Nikkei 225 options for Japan; S&P 500 options for the United States; EURO STOXX 50 options for Europe.  
 2. The latest data are as of September 28, 2012.  
 Source: Bloomberg.

## 2. Risks implied in government bond markets

### *Decline in and global correlations of government bond yields*

Since the beginning of fiscal 2012, U.S., U.K., and German government bond yields have shown similar developments, and they have declined to historically low levels. The common component (first principal component) behind fluctuations in these government bond yields is obtained using principal component analysis. The result suggests that more than 90 percent of these fluctuations can be explained by the

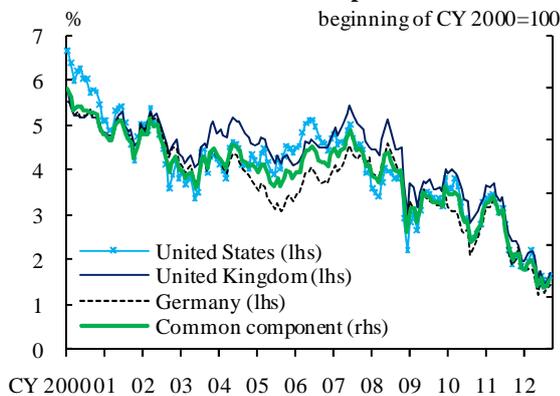
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Stock Average Volatility Index (VI) of Nikkei Inc. are MFIVs calculated by using the price information on S&P 500 options, EURO STOXX 50 options, and Nikkei 225 options, respectively. They correspond to options market participants' expected rate of change in stock prices for the next month. Unlike the standard implied volatility, MFIVs capture the recognition of tail risk.

common component (Chart IV-2-3).<sup>32</sup> In what follows, this common component is called the "global component."

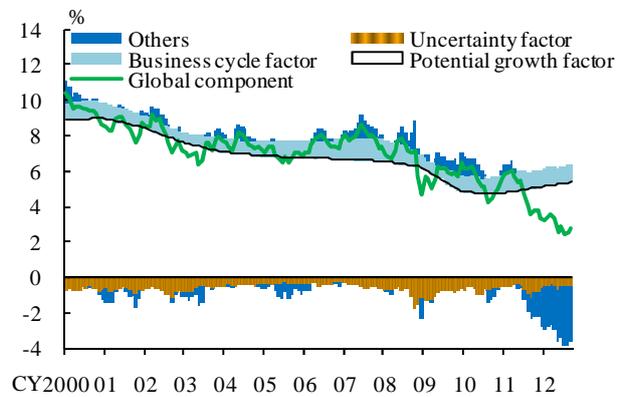
This global component is decomposed into a potential growth factor that indicates medium- to long-term growth expectations, a business cycle factor that indicates the short-term global business cycle, and an uncertainty factor that indicates short-term changes in market sentiment. By the middle of 2011, the global component can be explained mostly by these decomposed factors, but since autumn 2011, when uncertainty about the European debt problem rose sharply, residuals ("others") that cannot be explained by these decomposed factors have increased significantly (Chart IV-2-4).

**Chart IV-2-3: Government bond yields and common component<sup>1,2,3</sup>**



Notes: 1. Government bonds are 10-year bonds.  
 2. "Common component" is defined as the first principal component of government bond yields.  
 3. The latest data are as of end-September 2012.  
 Source: Bloomberg.

**Chart IV-2-4: Decomposition of global component<sup>1,2,3</sup>**



Notes: 1. "Potential growth factor," "business cycle factor," and "uncertainty factor" indicate potential growth rates of all OECD members, the MSCI, including both advanced and emerging countries, and the VIX, respectively.  
 2. Global component = 3.239 \* potential growth factor + 0.003 \* business cycle factor - 0.028 \* uncertainty factor. All estimates are significantly different from zero at the 1 percent level, and R-squared is 0.77.  
 3. The latest data are as of end-September 2012.  
 Sources: Bloomberg; OECD.

One explanation for the residuals is the possibility of a downward deviation of medium- to long-term growth expectations (which has not yet been observed).<sup>33</sup> Another explanation is the possibility of an increased "scarcity premium" on safe-haven assets

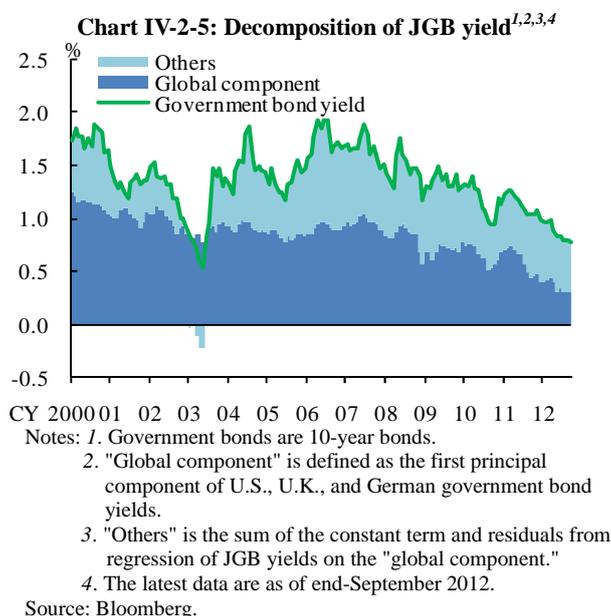
<sup>32</sup> Principal component analysis is a method to summarize data into a smaller number of vectors (principal components) formed by a linear combination of variables. Eigenvalues (numerical values that indicate how much variation each principal component explains) of first, second, and third principal components are 2.85, 0.11, and 0.05, respectively, and thus the first principal component explains more than 90 percent of the total fluctuations.

<sup>33</sup> Looking back at the Lehman shock, a decline in the potential growth rate was hardly observed at that time, but *ex post* analysis shows a decline in the potential growth rate from 2008 to 2009. Based on this, there is a possibility that a decline in the potential growth rate which is not currently observed could be retrospectively revealed.

such as government bonds. As a scarcity premium is determined by the supply-demand balance of safe-haven assets, strengthened financial regulations, a growing demand for secured funding, or central banks' purchases of safe-haven assets would tighten the supply-demand balance of government bonds, raising the scarcity premium. Attention should be paid to the possible upward pressure on government bond yields if the effects of some of these factors wane.

### *Volatility risk of JGB yields*

In July 2012, JGB yields fell to the 0.70-0.75 percent level for the first time since the VaR shock in June 2003, while government bond yields in other advanced economies, including the United States, the United Kingdom, and Germany, declined to historical lows. The decomposition of JGB yields into the aforementioned global component and other components shows that the recent decline in JGB yields is caused mainly by the global component (Chart IV-2-5).<sup>34</sup> This implies that JGB yields correlate to a considerable degree with U.S., U.K., and German government bond yields. According to the survey of market participants, about 40 percent of the respondents noted a surge in overseas interest rates as a factor that could cause Japan's long-term interest rates to



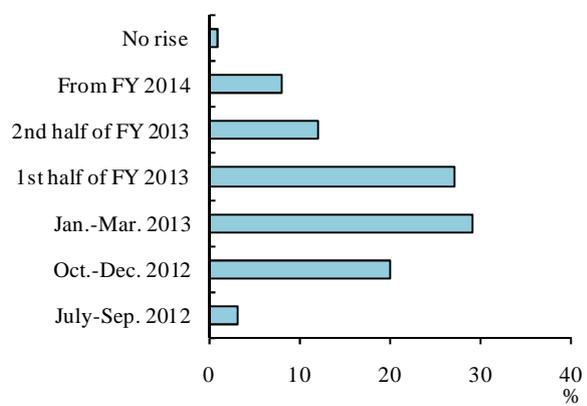
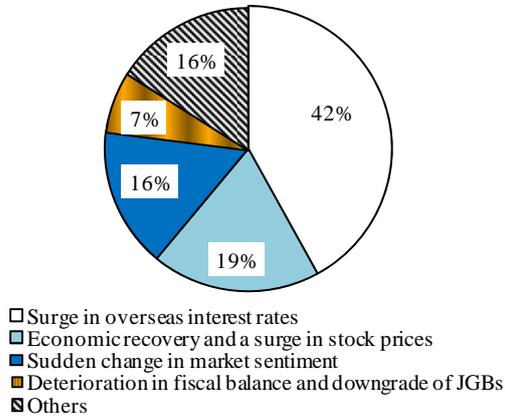
<sup>34</sup> In Chart IV-2-5, "others" was negative toward the middle of 2003. This corresponds to the time when JGB yields dropped to a historical low of the 0.4-0.5 percent level, as investors, mainly banks, actively invested in JGBs just before the VaR shock, given the uncertainty over Japan's economic outlook and a decline in U.S. Treasury yields.

rise to around 1 percent (Chart IV-2-6).<sup>35</sup> This result is consistent with such comovements.

**Chart IV-2-6: Perspectives of JGB market participants on a rise in long-term interest rates<sup>1</sup>**

Triggers for a rise in interest rates to around 1 percent

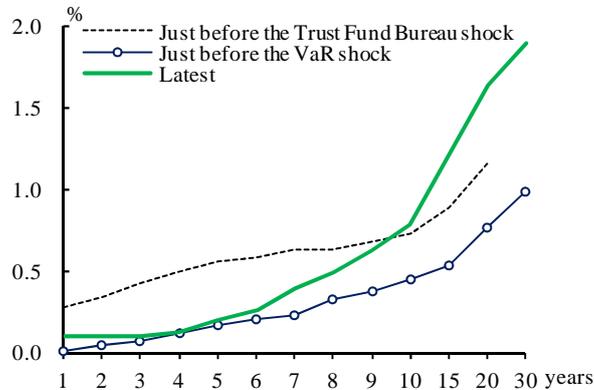
Timing of a rise in interest rates to around 1 percent



Note: 1. The data are as of July 2012.  
Source: QSS Report <Bond>.

On the other hand, a comparison of the current JGB yield curve with the curve in June 2003 shows that longer-term yields are relatively higher, primarily because investors, mainly major banks, are cautious about lengthening the duration of their securities portfolio (Chart IV-2-7).

**Chart IV-2-7: JGB yield curves<sup>1</sup>**



Note: 1. The latest data are as of September 28, 2012. "Just before the VaR shock" is June 12, 2003, and "just before the Trust Fund Bureau shock" is October 2, 1998.

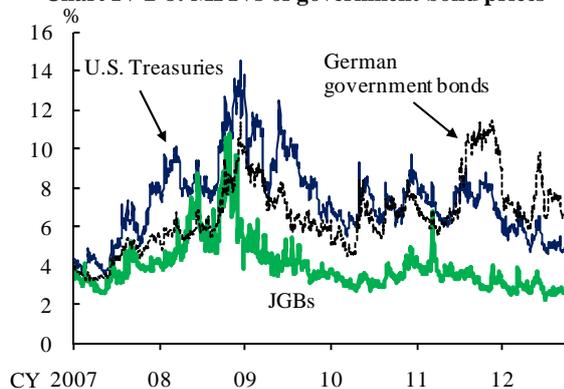
Source: Bloomberg.

Next, the MFIV of JGB prices -- which captures market participants' risk recognition of future government bond price fluctuations in the short term -- has been stable at a low level compared with the MFIVs of U.S. and German government bond prices, and no

<sup>35</sup> According to the same survey, many market participants expect the timing of this rise to around 1 percent to be from the end of fiscal 2012 to the first half of fiscal 2013.

large fluctuations are expected (Chart IV-2-8).<sup>36</sup> A factor behind this is that only a small portion of JGBs is held by foreign investors. Domestic investors hold more than 90 percent of JGBs.<sup>37</sup> In particular, institutional investors such as life insurance companies and pension funds are stable holders of JGBs as long-term investments (Chart IV-2-9).

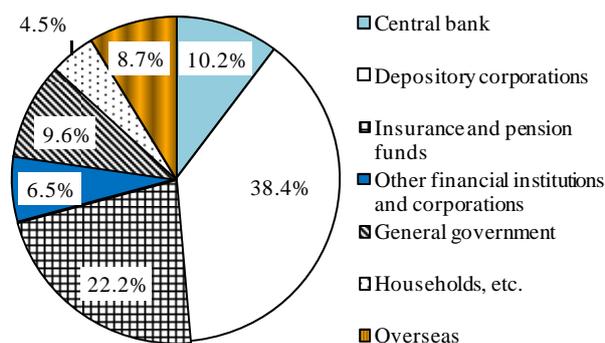
**Chart IV-2-8: MFIVs of government bond prices<sup>1,2</sup>**



Notes: 1. Options on JGB futures traded on the Tokyo Stock Exchange for JGBs; options on U.S. Treasury futures traded on the Chicago Board of Trade for the United States; options on Euro-Bund futures traded on Eurex for Germany.  
2. The latest data are as of September 28, 2012.

Source: Bloomberg.

**Chart IV-2-9: JGB holdings by type of investor<sup>1</sup>**



Note: 1. The data are as of end-June 2012.  
Source: BOJ, "Flow of funds accounts."

Moreover, market participants' risk recognition of JGB price (yield) volatility is examined from a longer-term perspective of several years ahead. The probability that the 6-month Libor 2 years ahead would be 3 percent or higher (the probability of a high interest rate) -- calculated by using an interest rate cap (an option to hedge the future interest rate rise) -- is extremely low and remains below 1 percent. On the other hand, the probability that the 6-month Libor 2 years ahead would be 0.5 percent or lower (the probability of a low interest rate) recently reached nearly 90 percent (Chart IV-2-10). This shows that in Japan's markets for interest rate derivatives, expectations that low interest rates will continue remain dominant. The implied volatility of swaptions (options on future interest rate swaps), which captures foreign investors' positions on future fluctuations in Japan's interest rates, has generally been on a declining trend (Chart IV-2-11).

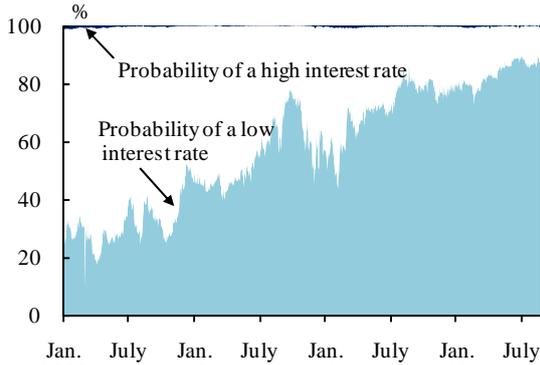
Furthermore, Japan's sovereign CDS premiums, which capture the recognition of interest rate risk arising from concern over fiscal imbalances, remain at a low level

<sup>36</sup> MFIVs of government bond prices are calculated by using price information from futures options markets. The results correspond to options market participants' expected change in government bond prices for the next 3 months.

<sup>37</sup> The share of JGBs, Fiscal Investment and Loan Program (FILP) agency bonds, and treasury discount bills (T-Bills) held by domestic investors.

compared with those in European countries other than Germany. Moreover, they are slightly lower than those in the United States and Germany, adjusting for the effects of low market liquidity of sovereign CDSs, which have been incorporated into CDS premiums (Chart IV-2-12; see Box 5 for a discussion of factors that are incorporated into sovereign CDS premiums).

**Chart IV-2-10: Probability of high and low interest rates<sup>1,2</sup>**



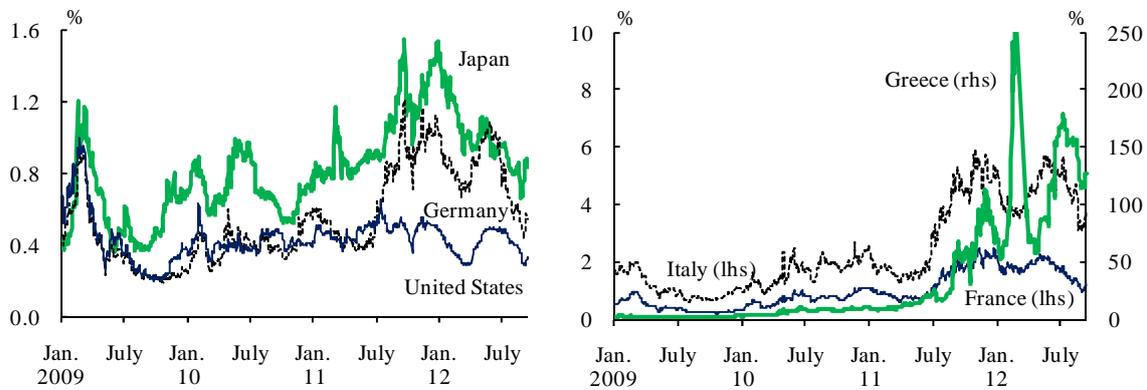
Notes: 1. Probability of 2-year-ahead 6-month Libor to be 0.5 percent or lower is defined as the probability of a low interest rate, and that to be 3 percent or higher is defined as the probability of a high interest rate.  
2. The latest data are as of September 28, 2012.  
Sources: Bloomberg; Japan Bond Trading.

**Chart IV-2-11: Implied volatility of swaptions<sup>1,2</sup>**



Notes: 1.  $m$ -year/ $n$ -year means the implied volatility of a swaption (options to enter into swap contracts) with  $m$ -year expiry period and  $n$ -year swap tenor.  
2. The latest data are as of September 28, 2012.  
Source: Bloomberg.

**Chart IV-2-12: Sovereign CDS premiums<sup>1,2</sup>**



Notes: 1. 5-year CDSs.  
2. The latest data are as of September 28, 2012.  
Source: Bloomberg.

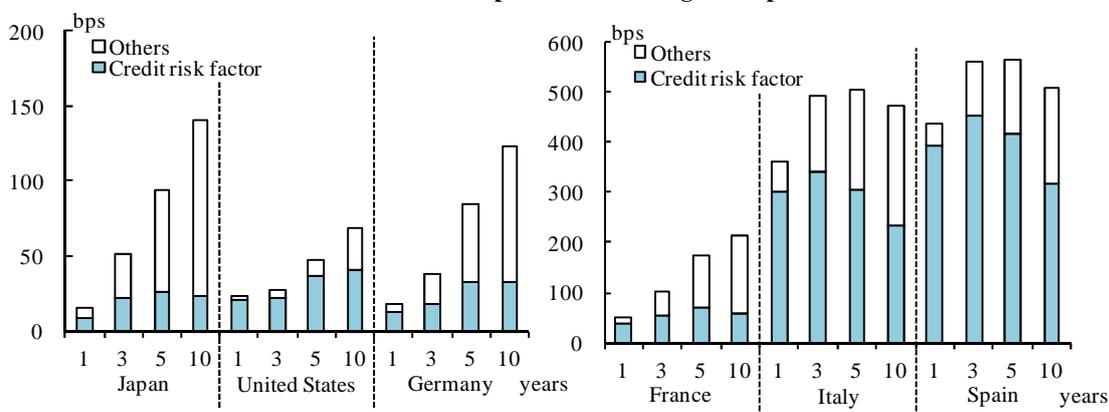
**Box 5: Factor decomposition of sovereign CDS premiums**

Japan's sovereign CDS premiums have been lower than those in peripheral European countries and France, but have remained somewhat higher than those in the United States and Germany, which are perceived as safe-haven countries (Chart IV-2-12).

Under certain assumptions, a factor decomposition of Japan's sovereign CDS premiums -- by using the data for sovereign CDSs and government bond yields -- suggests that a "credit risk factor," which is equivalent to the default premium of government bonds,

has contributed to less than half of sovereign CDS premiums, and the level might have been raised mainly by other factors such as low liquidity in the sovereign CDS market (Chart B5-1).

**Chart B5-1: Decomposition of sovereign CDS premiums<sup>1,2</sup>**



Notes: 1. Averages from August 1, 2008 to March 30, 2012.

2. Credit risk factor for each country and term is extracted by using information from sovereign CDSs and government bond yields that are assumed to be the risk-free rate.

Source: Hiraki, Kazuhiro, Kei Ikeda, and Takeshi Yamada, "Decomposition of Sovereign CDS Premiums," Bank of Japan Working Paper, No. 12-J-9, September 2012 (available only in Japanese).

It should be noted that, in countries whose government bonds are considered as safe-haven assets, such as Japan, the United States, and Germany, the contribution of the aforementioned "credit risk factor" is small, generally 40 basis points or lower. On the contrary, in Italy and Spain, the contribution of the "credit risk factor" is large, and the shorter the maturity, the higher the level of contribution.

Although the market indicators discussed above have limitations due to low liquidity in the markets, they suggest that there is currently no sign of growing vigilance against large fluctuations, particularly a surge, in JGB yields.

Recently, however, foreign investors' holdings of JGBs have been increasing gradually, albeit remaining at a low level (Chart IV-2-13). Foreign investors account for around 40 percent of the trading volume in JGB futures (Chart IV-2-14). Although it can be interpreted that market confidence regarding fiscal sustainability in Japan has been maintained thus far,<sup>38</sup> as foreign investors are considered to be paying close attention to fiscal conditions in advanced economies, careful monitoring is required regarding the possibility that the degree of their confidence in fiscal sustainability in Japan will be

<sup>38</sup> While efforts to achieve fiscal consolidation have been made, the survey of market participants shows that less than 10 percent of the respondents noted the deterioration in the fiscal balance and downgrading of JGBs as one of the factors that could cause Japan's long-term interest rates to rise (Chart IV-2-6).

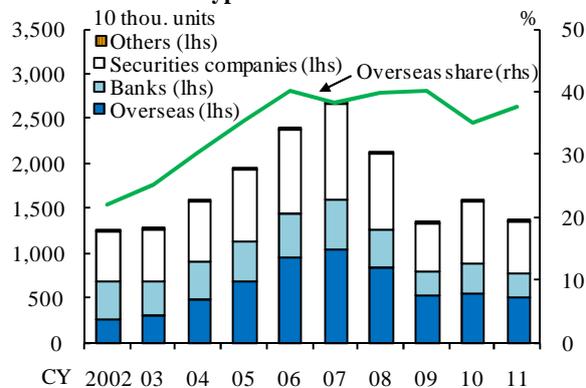
more rapidly reflected in JGB yields.

**Chart IV-2-13: Share of JGB holdings by overseas investors<sup>1</sup>**



Note: 1. The latest data are as of end-June 2012.  
Source: BOJ, "Flow of funds accounts."

**Chart IV-2-14: Trading volume of JGB futures by type of investor<sup>1</sup>**



Note: 1. The standard medium-, long-, and super-long-term JGB futures are counted.  
Source: Tokyo Stock Exchange, "Investment trends by investor category."

### 3. Risks implied in foreign exchange markets

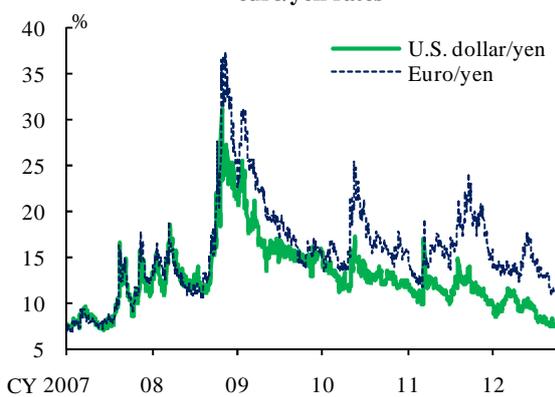
The MFIVs of the U.S. dollar/yen rate and the euro/yen rate are calculated to explore market participants' risk recognition of future foreign exchange rate fluctuations. The MFIVs of these exchange rates have been on a declining trend since the second half of 2011, albeit with some fluctuations, and the heightening of market participants' uneasiness has not been observed.<sup>39</sup> In particular, the MFIV of the dollar/yen rate recently declined to the level recorded in the middle of 2007, prior to the Lehman shock (Chart IV-2-15). The 1-month dollar/yen risk reversal -- which indicates the direction of future currency rate changes recognized by options market participants -- has remained stable and skewed slightly toward dollar calls (concern over the dollar's appreciation and the yen's depreciation) since the beginning of 2012 (Chart IV-2-16). Meanwhile, the 1-month euro/yen risk reversal had skewed considerably toward euro puts (concern over the euro's depreciation and the yen's appreciation) when market participants were anxious about a Greek exit from the euro, but euro-put positions have been unwound recently.

Next, the International Monetary Market (IMM) futures net positions showed that market participants had significantly increased their short positions in the yen when the yen depreciated against the U.S. dollar in the spot market toward early spring 2012 in

<sup>39</sup> MFIVs of the U.S. dollar/yen rate and the euro/yen rate are calculated by using data on 3-month over-the-counter option prices. The results correspond to options market participants' expected change in foreign exchange rates for the next 3 months.

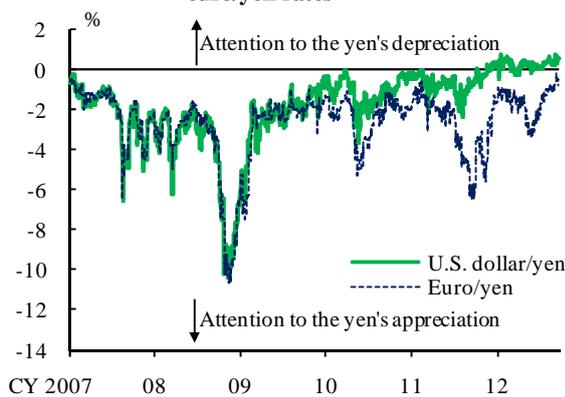
tandem with the weakened risk aversion.<sup>40</sup> Thereafter, since concern over the European debt problem remains, market participants unwound their positions to neutral (Chart IV-2-17). Regarding the euro/dollar, market participants significantly increased their short positions in the euro toward June 2012 due to growing concern over the situation in Europe. Recently, as developments in the spot market for the euro have become steady, short positions of market participants in the euro have remained on a decreasing trend.

**Chart IV-2-15: MFIVs of U.S. dollar/yen and euro/yen rates<sup>1</sup>**



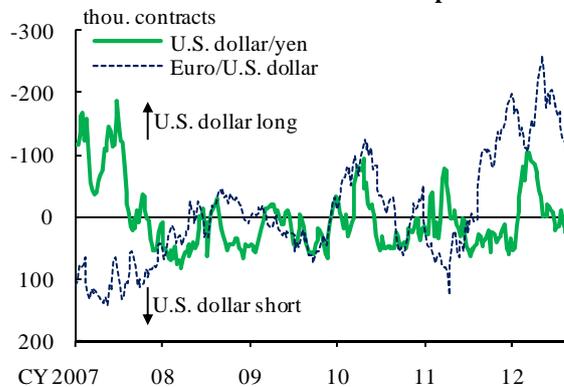
CY 2007 08 09 10 11 12  
 Note: 1. The latest data are as of September 28, 2012.  
 Source: Bloomberg.

**Chart IV-2-16: Risk reversals of U.S. dollar/yen and euro/yen rates<sup>1</sup>**



CY 2007 08 09 10 11 12  
 Note: 1. The latest data are as of September 28, 2012.  
 Source: Bloomberg.

**Chart IV-2-17: IMM futures net positions<sup>1</sup>**



CY 2007 08 09 10 11 12  
 Note: 1. The latest data are as of the week starting September 24, 2012.  
 Source: Bloomberg.

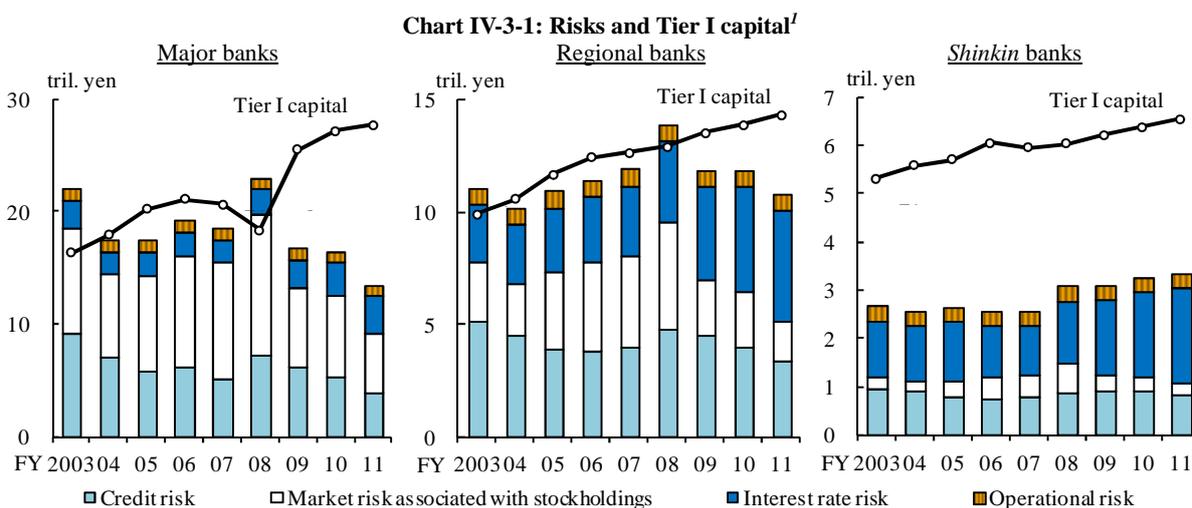
## C. Risks at banks and *shinkin* banks

### 1. Overview

The amount of risks banks and *shinkin* banks bear as a whole has been decreasing

<sup>40</sup> IMM futures net positions are the difference between long positions and short positions held by speculators of currency futures that are traded on the IMM, a division of the Chicago Mercantile Exchange. They show changes in speculators' positions and are used to grasp market trends.

relative to capital (Chart IV-3-1). However, as described below, the quality of bank loans has not improved substantially, despite the low credit costs. Moreover, while major banks are still exposed to a high degree of market risk associated with stockholdings, interest rate risk has been rising at regional banks and *shinkin* banks reflecting the increase in JGB investment.



Note: 1. Credit risk: unexpected losses with a 99 percent confidence level. Market risk associated with stockholdings: value-at-risk with a 99 percent confidence level and 1-year holding. Interest rate risk: 100 basis point value (bpv). Operational risk: 15 percent of gross profits.

Source: BOJ.

## 2. Credit risk

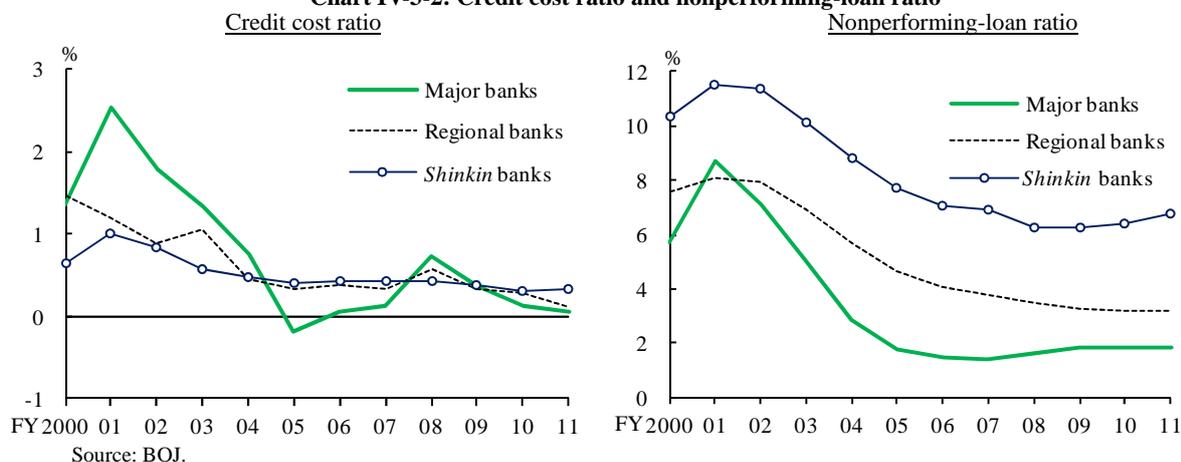
### Credit costs

The credit cost ratios of banks and *shinkin* banks remain at low levels (the left-hand side of Chart IV-3-2). Moreover, the NPL ratio has generally remained at a low level, although that for *shinkin* banks has increased moderately (the right-hand side of Chart IV-3-2). A factor behind this is the decrease in the number of corporate bankruptcies (Chart IV-3-3).<sup>41</sup> As described in Chapter II.B, the improvement in firms' financial conditions has led to the decreased number of corporate bankruptcies. Furthermore, financial institutions have been actively supporting funding among small and

<sup>41</sup> The relaxed requirements for restructured loans in 2008 also contributed to the low credit costs. The Financial Services Agency relaxed requirements for restructured loans in November 2008 as follows. Restructured loans are not treated as loans requiring "special attention" if borrowing firms have reasonable and feasible fundamental reconstruction programs. Furthermore, in December 2009 the requirements were relaxed for restructured loans to borrowers without such programs. That is, loans to borrowers that satisfied certain conditions are not treated as restructured loans during the first year of restructuring. The latter was extended until end-March 2012 and again until end-March 2013.

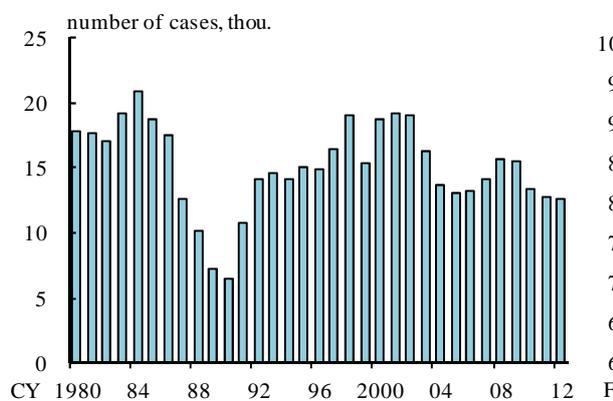
medium-sized firms by using loan guarantees from the Credit Guarantee Corporations (CGCs), and this has also contributed to restraining corporate bankruptcies.

**Chart IV-3-2: Credit cost ratio and nonperforming-loan ratio**



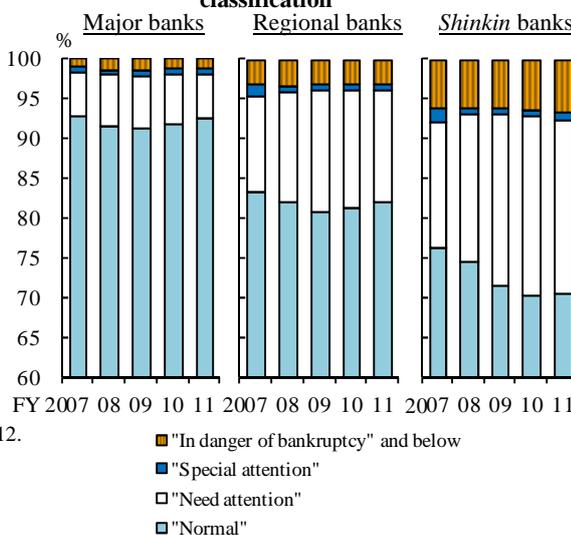
However, although corporate bankruptcies have been restrained, the quality of regional banks' loans has not improved substantially (Chart IV-3-4). The ratio of "normal" loans to total loans has increased moderately at regional banks, but has not yet recovered to the level immediately before the Lehman shock. That for *shinkin* banks has been decreasing. Financial institutions need to further support borrowing firms to improve business conditions and enhance the effectiveness of the firms' reconstruction plans. Moreover, it is important for financial institutions to manage credit risk appropriately, revising their borrower classification and loan-loss provisions, based on the assessment of the borrowers' capacity for self-reconstruction.

**Chart IV-3-3: Corporate bankruptcies<sup>1</sup>**



Note: 1. The latest data are annualized as of the first half of 2012.  
Source: Tokyo Shoko Research Ltd., "Tosan Geppo (Monthly review of corporate bankruptcies)."

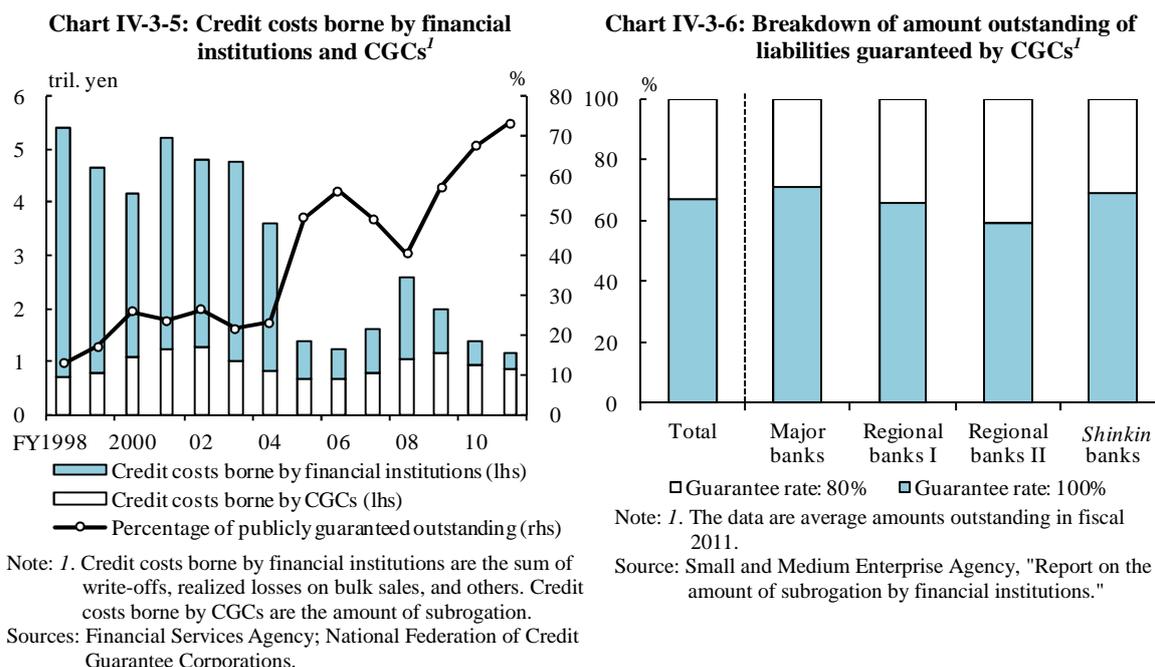
**Chart IV-3-4: Loans outstanding by borrower classification**



Source: BOJ.

### Credit costs of the Credit Guarantee Corporations

As described above, the share of credit costs borne directly by financial institutions in the total credit cost of their loans has been decreasing and currently remains low. However, the amount of such credit costs borne by CGCs (the amount of subrogation) remains relatively high after the Lehman shock (Chart IV-3-5). As a result, the share of credit costs borne by CGCs recently exceeded 70 percent.

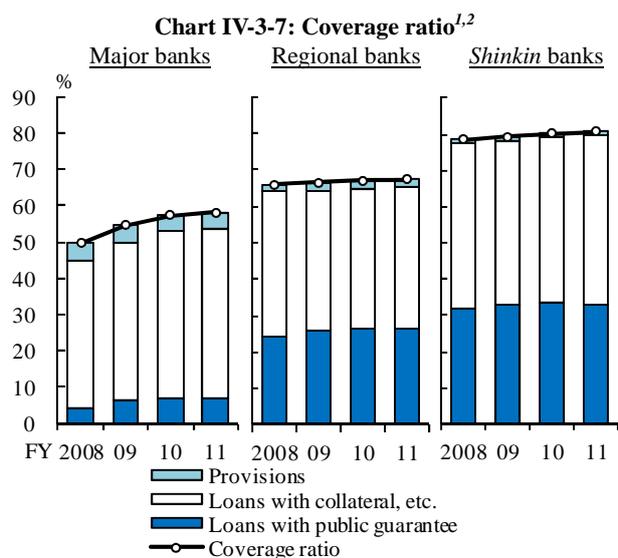


Moreover, the share of full guarantees on banks' credit by CGCs is slightly less than 70 percent of total guarantees by CGCs (Chart IV-3-6). This reflects the introduction of the Emergency Guarantee Program in 2008 at the time of the Lehman shock.<sup>42</sup> This program fully guarantees losses on credit of financial institutions, unlike the normal guarantee program in which basically 80 percent is borne by CGCs and 20 percent is borne by financial institutions. The Emergency Guarantee Program appears to have reduced the downward pressure on Japan's economy after the Lehman shock by increasing coverage ratios and thus lending of financial institutions (Chart IV-3-7).

Nonetheless, the quality of banks' loans that have guarantees from CGCs is relatively low, and the subrogation ratio (the amount of subrogation relative to outstanding guaranteed loans) of full guarantees is higher than that of 80 percent guarantees (Chart

<sup>42</sup> The Emergency Guarantee Program concluded at the end of March 2011. From April 2011, the CGCs continue to provide full guarantees through small loan guarantee programs targeting small firms and a safety net guarantee program.

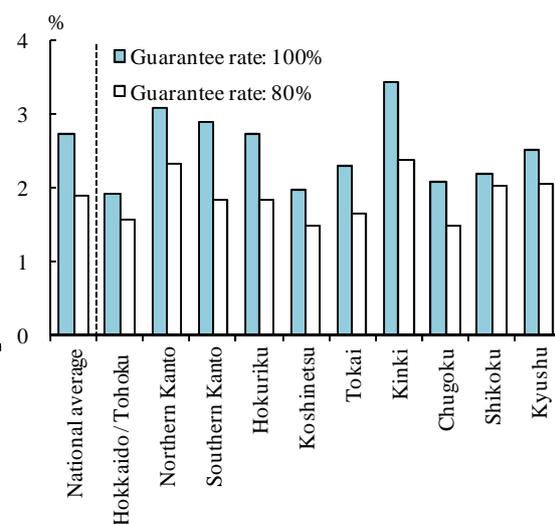
IV-3-8). Particularly in some large metropolitan areas, the gap in the subrogation ratios between full guarantees and 80 percent guarantees is large. Attention should be paid to the possibility that, if firms with loan guarantees under the Emergency Guarantee Program fail to improve their business conditions, the associated costs will ultimately become a burden on the public sector (see Box 6 for the credit costs of public financial institutions).



Notes: 1. The coverage ratio for loans that "need attention."  
 2. "Loans with collateral etc.," includes loans with guarantee.

Source: BOJ.

**Chart IV-3-8: Subrogation rate<sup>1,2,3</sup>**



Notes: 1. The subrogation rate is the ratio of the amount of subrogation payment to the outstanding amount of guaranteed liabilities.

2. The amount of subrogation payment is the cumulative amount in fiscal 2011. The outstanding amount of guaranteed liabilities is the average amount in fiscal 2011.

3. Counted based on the regions in which financial institutions' head offices are located.

Source: Small and Medium Enterprise Agency, "Report on the amount of subrogation by financial institutions."

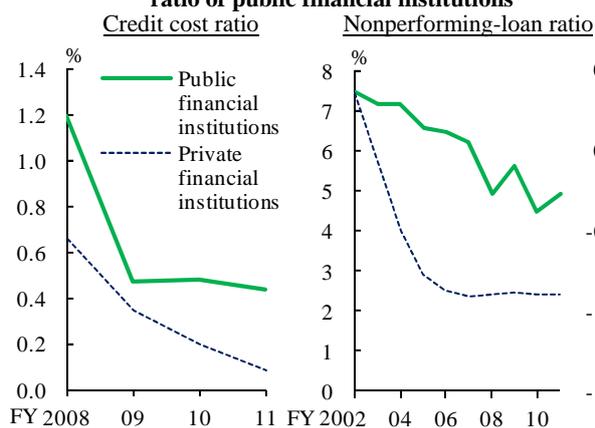
### Box 6: Credit costs of public financial institutions

Public financial institutions have been providing loans or credit guarantees mainly to the areas where private financial institutions' credit is restrained due to the high uncertainty of projects, such as loans to start-ups or overseas project financing. During a recession, loans or credit guarantees to small and medium-sized firms and individuals are often provided as part of the government's economic policies. Such credit extension of public financial institutions has underpinned Japan's economic growth and mitigated economic recession.

Although public financial institutions have been integrated since the middle of the

2000s, the amount outstanding of their credit extension over the years (the total amounts outstanding of loans and credit guarantees) is about 87 trillion yen, 16 percent of total credit (as of the end of March 2011). Since public financial institutions extend credit mainly to areas with high risk, their credit cost ratios and NPL ratios are generally high in comparison with those of private financial institutions (Chart B6-1). Moreover, some public financial institutions incur most of the subrogation of CGCs.<sup>43</sup> Partly due to such burdens of credit costs, public financial institutions held large deficits at the time of the Lehman shock (Chart B6-2). Their deficits will eventually be compensated by the government. Recently their deficits were reduced, but if borrowing firms fail to improve their business conditions, the government's fiscal burden will increase further. Since financial intermediation by public financial institutions might expand Japan's fiscal burden, it is important to examine the role of public financial institutions and accompanying side effects.

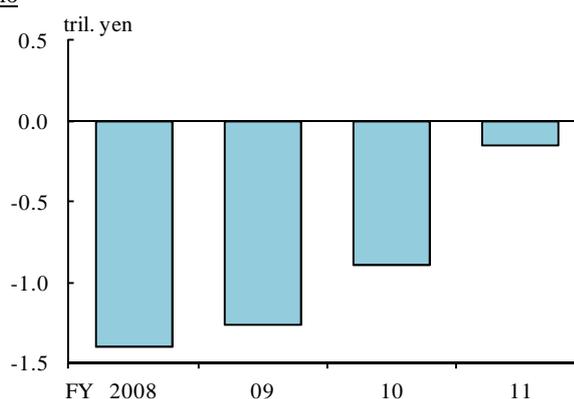
**Chart B6-1: Credit cost ratio and nonperforming-loan ratio of public financial institutions<sup>1,2</sup>**



Notes: 1. Private financial institutions are major banks and regional banks.  
2. Public financial institutions are Development Bank of Japan, Shoko Chukin Bank, and Japan Finance Corporation (excluding Japan Bank for International Cooperation).

Sources: Published accounts of each institution; BOJ.

**Chart B6-2: Net income of public financial institutions<sup>1</sup>**



Note: 1. Development Bank of Japan, Shoko Chukin Bank, and Japan Finance Corporation (excluding Japan Bank for International Cooperation) are counted.

Sources: Published accounts of each institution.

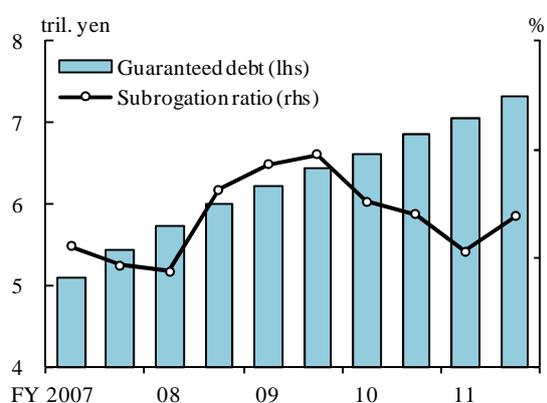
### *Credit risk on housing loans*

Credit costs arising from housing loans have been marginal so far. Although housing

<sup>43</sup> All credit guarantees by CGCs that meet certain conditions are, in principle, insured by the Japan Finance Corporation (JFC). If the CGCs implement subrogation for financial institutions, the JFC pays to the CGCs a certain part of the amount of subrogation (70-90 percent, depending on the type of guarantees) as insurance.

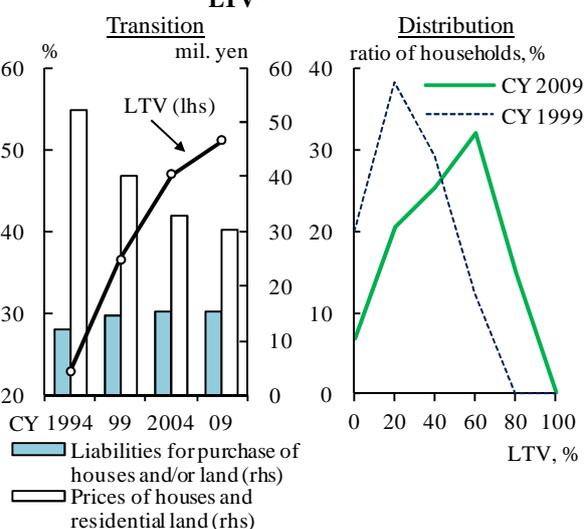
guarantee corporations' subrogation ratio (the amount of subrogation relative to outstanding guaranteed loans) has recently risen moderately, the level remains low (Chart IV-3-9). Moreover, the collateral coverage of housing loans is secured to a certain extent. The loan-to-value (LTV) ratio for housing loans based on the assets and liabilities of households with housing loans, which indicates the degree of collateral coverage, is significantly below 100 percent at present (the left-hand side of Chart IV-3-10).<sup>44</sup> The LTV ratio of a small portion of households exceeds 100 percent in terms of its distribution (the right-hand side of Chart IV-3-10).

**Chart IV-3-9: Subrogation ratio on housing loans**



Source: Zenkoku Hoshō.

**Chart IV-3-10: Transition and distribution of LTV<sup>1,2</sup>**



Notes: 1. The LTV comprises the liabilities for purchase of houses and/or land divided by the prices of houses and residential land.  
2. Two-or-more person households with housing loans are counted.

Sources: Ministry of Internal Affairs and Communications, "National survey of family income and expenditure"; BOJ.

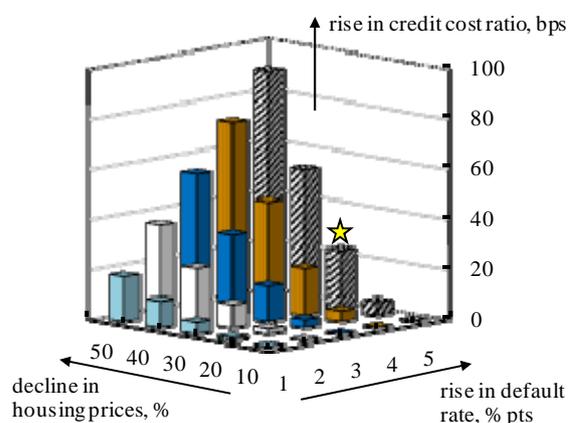
Reflecting such developments in the collateral coverage, even if the default rate of housing loans rises, credit costs incurred by financial institutions would be marginal as long as the decline in housing prices remains within a certain range (Chart IV-3-11). For example, even in a relatively severe case where the default rate increases by 5 percentage points and housing prices decline by 30 percent, the extra credit cost ratio for housing loans is estimated to be around 0.2 percentage point, which is within the

<sup>44</sup> The LTV ratio is defined as the amount outstanding of housing loans divided by the market value of houses and land used as collateral. The degree of collateral coverage of loans declines as the LTV ratio increases because the collateral value declines for housing loans. When the LTV ratio exceeds 100 percent, financial institutions will incur losses due to uncollectible loans at default.

range of profits.<sup>45</sup>

However, residential land prices have been on a downtrend and the LTV ratio has continued to rise (Chart IV-3-12; see Box 7 for collateral for housing loans and changes in the default rate over the years). As described in Chapter II.B, the burden of debt repayments on households with housing loans has not improved noticeably (Chart II-2-8). Moreover, since housing loans with floating interest rates have increased recently, if market interest rates rise, this would increase the burden of households' loan repayment and would induce defaults. Attention should thus be paid to the possibility that credit costs of financial institutions will increase, depending on developments in residential land prices, income, and interest rates.

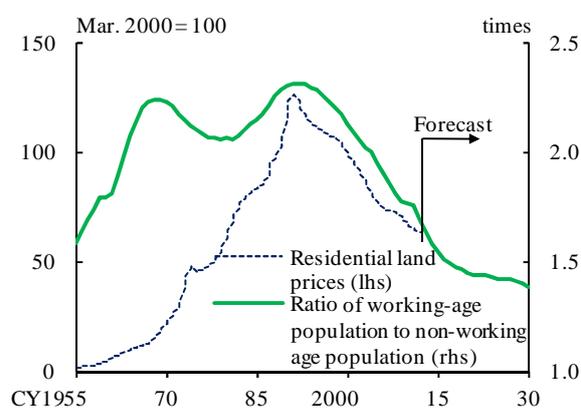
**Chart IV-3-11: Relation among credit cost ratio, default rate, and housing prices<sup>1,2</sup>**



Notes: 1. The credit cost ratio is defined as the additional credit costs divided by the housing loans outstanding.  
2. The star indicates the case of a rise of 5 percentage points in the default rate and a 30 percent decline in housing prices.

Sources: Ministry of Internal Affairs and Communications, "National survey of family income and expenditure"; Japan Housing Finance Agency; BOJ.

**Chart IV-3-12: Residential land prices and working-age population**



Sources: Japan Real Estate Institute, "Urban land price index"; National Institute of Population and Social Security Research, "Population projections for Japan."

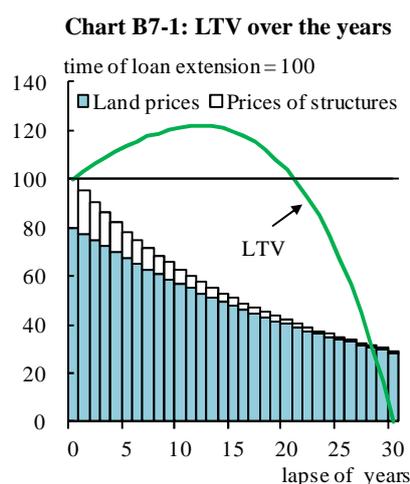
### Box 7: Collateral for housing loans and changes in the default rate over the years

The LTV ratio for housing loans has been on an uptrend as a whole. The increase could be caused by an easing in the lending standards of financial institutions such as a

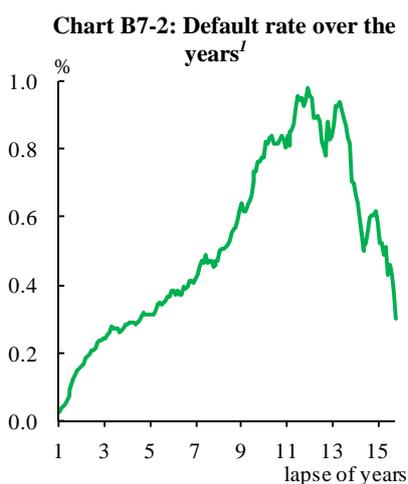
<sup>45</sup> An assumption that the default rate would rise by 5 percentage points corresponds to a rise in the ratio of principal and interest repayments to income (principal and interest repayments divided by income) of households by about 5 percentage points, from 24 percent to 29 percent, which is estimated based on the data of the JHF. This implies a reduction in income of about 20 percent or an increase in repayments of about 20 percent. An assumption that housing prices would decline by 30 percent corresponds to the rate of decline in residential land prices in the last ten years, which is estimated based on data in *Public Notice of Land Prices*.

reduction of the down payment ratio for home purchase. The LTV ratio might also rise when prices of houses, which are used as collateral, decline after the extension of housing loans. Since structures depreciate, the housing value falls over time. Furthermore, land prices have been falling in Japan, and therefore the collateral value of housing loans tends to decline after loan extension.

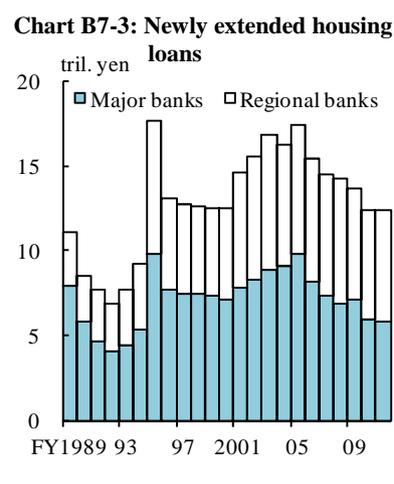
For example, in the case of 30-year loans with equal repayments of principal and interest, reflecting the recent decreasing rate in housing prices, the LTV ratio would rise after the loan extension and reach a peak after ten years (Chart B7-1).<sup>46</sup> This is because the pace of decline in housing prices would exceed that in repayment of principal. Meanwhile, the default rate of housing loans would reach a peak about ten years after the loan extension, a development called the seasoning effect (Chart B7-2). Thus, credit costs could increase because of simultaneous rises in the LTV ratio and the default rate at some point after the loan extension.



Sources: Ministry of Internal Affairs and Communications, "National survey of family income and expenditure"; Ministry of Land, Infrastructure, Transport and Tourism, "Public notice of land prices"; BOJ.



Note: 1. Fiscal 1996-2007 average.  
12-month moving averages.  
Source: Japan Housing Finance Agency.



Sources: Japan Housing Finance Agency; BOJ.

Housing loans extended by Japan's banks peaked out around 2003 to 2005, and an increase is expected in loans for which ten years have passed since the extension (Chart

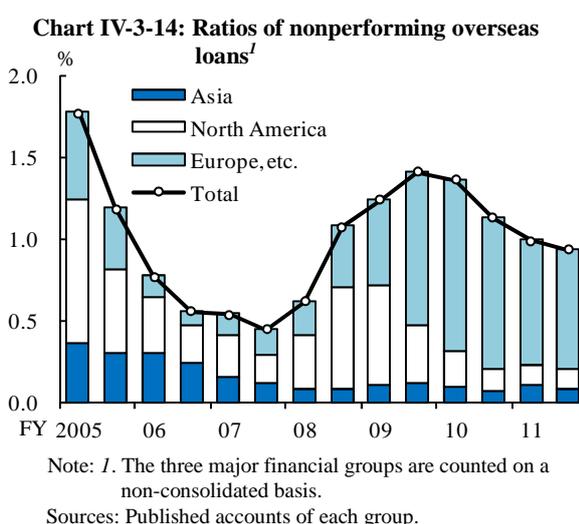
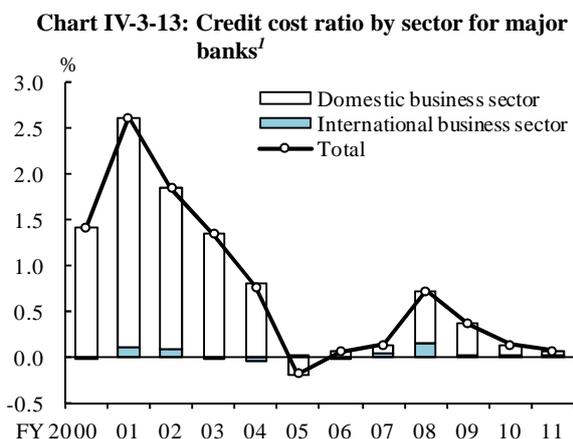
<sup>46</sup> The example assumes a single-family detached house with land. The interest rate is assumed to be 3 percent, which is fixed for 30 years. In calculating the LTV ratio of housing prices over time, it is assumed that the structures depreciate by 11.4 percent per annum (based on the *National Survey of Family Income and Expenditure*) and that land prices decline by 3.4 percent per annum (the average rate of decline during the last 20 years). Attention should be paid to the fact that the pattern of changes in the LTV ratio over the years is based on such assumptions.

B7-3). It is important for financial institutions to conduct risk management by paying due attention to the characteristics of their housing loan portfolios, including management of loans utilizing the LTV ratio or the periods of extension.

### Credit risk on overseas loans

As described in Chapter III.C, banks have so far been relatively careful in choosing overseas loan extension and setting loan conditions. In these circumstances, the ratio of banks' credit costs from overseas loans was recently at a low level (Chart IV-3-13). In addition, after the temporal increase at the time of the Lehman shock, the ratio of nonperforming overseas loans declined gradually to around 1 percent recently, which is lower than the NPL ratio of around 2 percent for major banks' total loans (Chart IV-3-14). As for nonperforming overseas loans by region, the NPL ratios of loans to Europe and other areas, where uncertainty has grown over financial and economic conditions, have been relatively large, whereas those of loans to the United States and Asia have been at low levels.

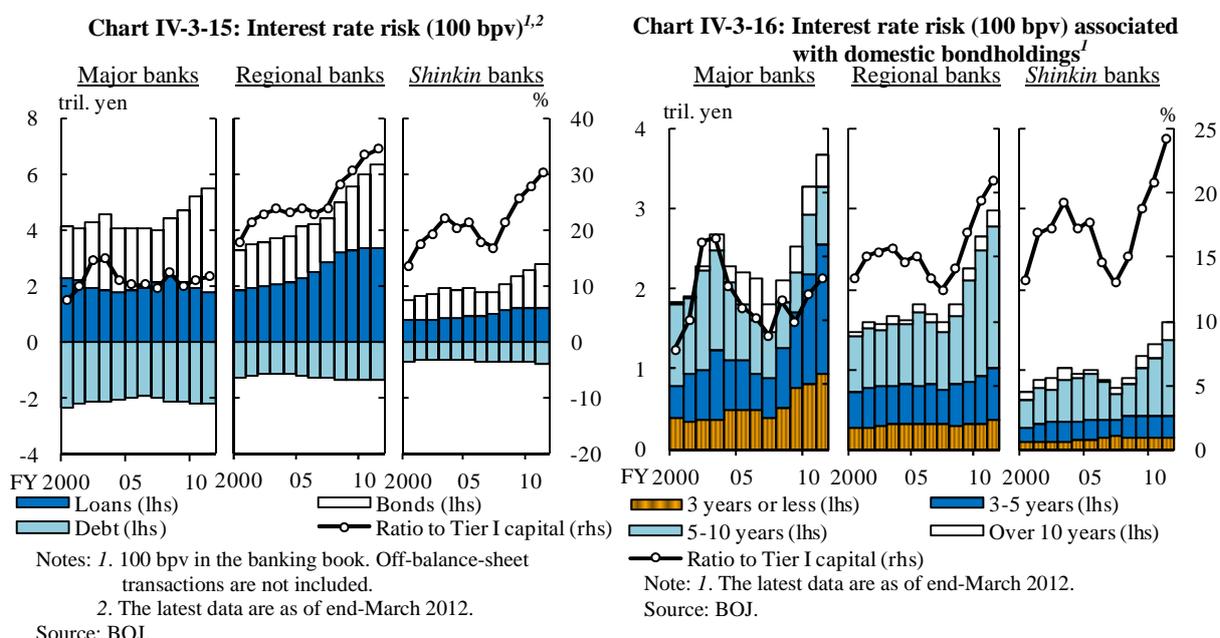
However, the share of overseas loans in overall loans has been increasing. Attention should therefore be paid to a decline in loan quality due to an overseas economic slowdown in a situation where overseas loans extended by Japan's banks tend to be boosted by the deleveraging by European banks.



### 3. Market risk

#### Developments in interest rate risk

The amount of interest rate risk borne by banks and *shinkin* banks has been increasing. The 100 basis point value of interest rate risk, calculated under the assumption that interest rates of all maturities would rise simultaneously by 1 percentage point, tends to increase mainly for the risk associated with domestic bond investment (Chart IV-3-15).<sup>47</sup> The amount of interest rate risk associated with domestic bond investment would be 3.7 trillion yen for major banks, 3.0 trillion yen for regional banks, and 1.6 trillion yen for *shinkin* banks as of end-March 2012 (Chart IV-3-16). The amount of interest rate risk relative to Tier I capital would be about 13 percent for major banks, whereas the amounts for regional banks and *shinkin* banks are above 20 percent.

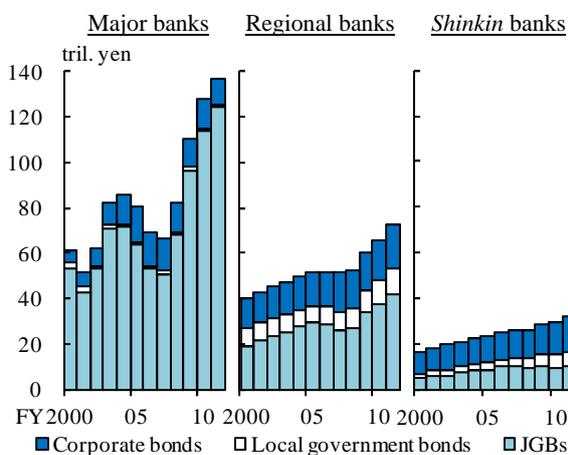


Increases in interest rate risk associated with domestic bond investment are due to an increased amount of bond investment and a lengthened average remaining maturity of the investment. As described in Chapter III.C, the loan-to-deposit ratios of banks and *shinkin* banks have declined, and excess deposits have been partly invested in domestic bonds (Chart IV-3-17). The average remaining maturity of domestic bond investment has remained at around 2.5 years at major banks, and has lengthened to around 4 years

<sup>47</sup> The amount of interest rate risk includes risk associated with holding assets and liabilities in the yen, and excludes risk associated with holding assets and liabilities in foreign currencies. In addition, in measuring interest rate risk associated with funding, outflows of demand deposits are assumed to take place within 3 months from the rise in interest rates.

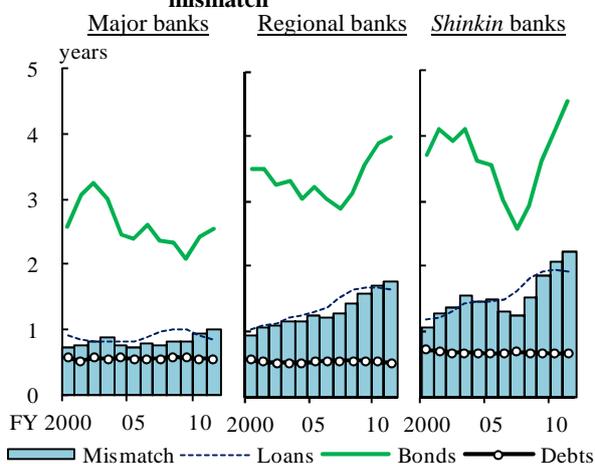
at regional banks, which invest large amounts in long-term bonds, and to about 4.5 years at *shinkin* banks (Chart IV-3-18).<sup>48</sup>

Chart IV-3-17: Domestic bondholdings<sup>1</sup>



Note: 1. The latest data are as of end-March 2012.  
Source: BOJ.

Chart IV-3-18: Average remaining maturity and maturity mismatch<sup>1</sup>



Note: 1. The latest data are as of end-March 2012.  
Source: BOJ.

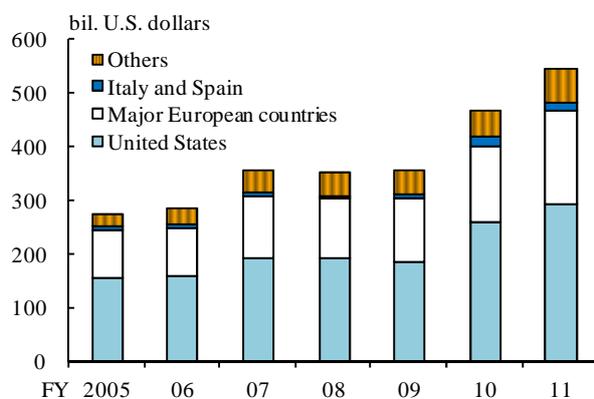
### Developments in foreign bond investment

Banks have also increased the outstanding amount of foreign bond investment. Their investment is composed mainly of government bonds of advanced economies, such as the United States and Germany, with relatively little in the bonds of European countries with fiscal concern (Chart IV-3-19). At the three major financial groups, the average remaining maturity of foreign bonds is about 5.5 years, which is longer than that of JGBs, but the pace of increase in the amount of foreign bonds is slower than that of JGBs (the left-hand side of Chart IV-3-20).<sup>49</sup> Thus, the 100 basis point value of interest rate risk in foreign bonds has not increased as much as JGBs (the right-hand side of Chart IV-3-20). However, attention should be paid to the fact that yields on foreign bonds tend to be more volatile than those on JGBs.

<sup>48</sup> In Chart IV-3-18, the mismatch is the difference between the average remaining maturity of assets and that of liabilities. The average remaining maturity of assets is the weighted average of loans and bonds.

<sup>49</sup> The three major financial groups are Mitsubishi UFJ Financial Group, Sumitomo Mitsui Financial Group, and Mizuho Financial Group.

**Chart IV-3-19: Amount outstanding of foreign bonds<sup>1,2,3</sup>**

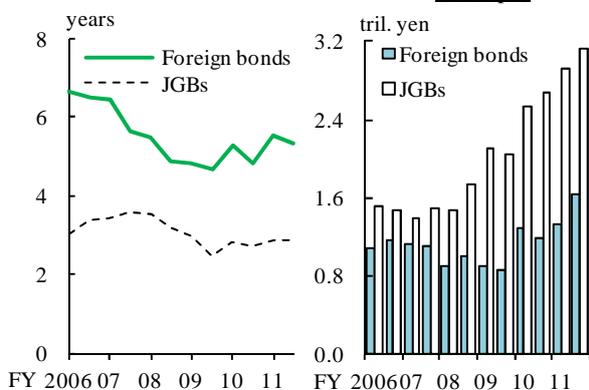


- Notes: 1. Major banks and regional banks are counted.  
 2. The amounts outstanding are converted to U.S. dollars using the exchange rate at end-March of each fiscal year.  
 3. The amounts outstanding and regional breakdowns are estimated by using the banking sector's debt securities investment in OECD countries in "Regional portfolio investment and financial derivatives position (assets)." Major European countries consist of Germany, the United Kingdom, France, the Netherlands, Belgium, Switzerland, Luxembourg, and Sweden.

Source: BOJ, "Balance of payments statistics."

**Chart IV-3-20: Average remaining maturity and interest rate risk<sup>1</sup>**

Average remaining maturity      Interest rate risk  
(100 bpv)



- Note: 1. The three major financial groups except for Mizuho Trust and Banking Company are counted on a non-consolidated basis.

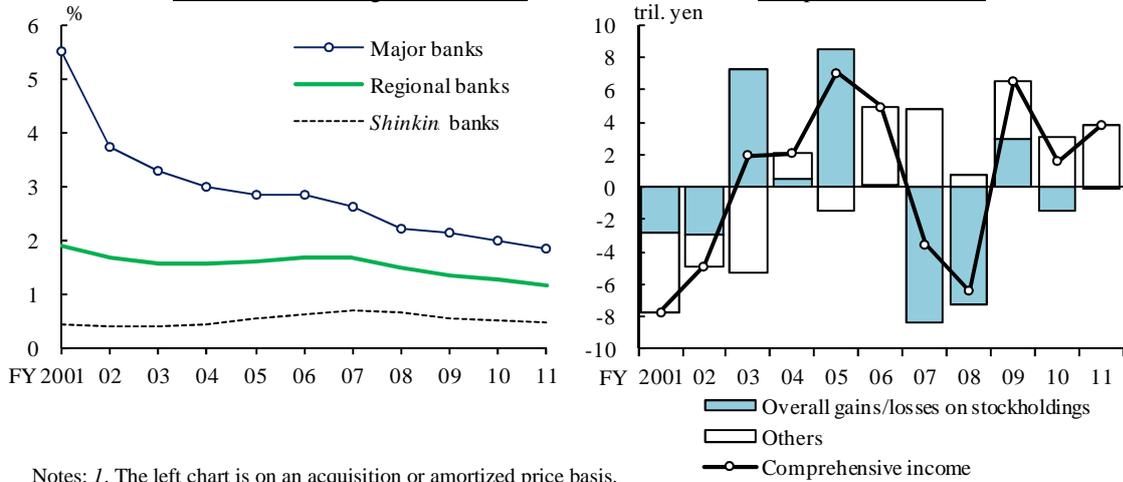
Sources: Data released by each group; BOJ.

### *Developments in market risk associated with stockholdings*

Many banks and *shinkin* banks have regarded a reduction in market risk associated with stockholdings as an important management challenge and have been making efforts to reduce such risk. However, the pace of reduction in banks' market risk associated with stockholdings has been slower than planned, partly due to sluggish stock prices (the left-hand side of Chart IV-3-21). Banks' profits have tended to be greatly influenced by gains/losses from sales/purchases of stocks or unrealized gains/losses on stockholdings (the right-hand side of Chart IV-3-21). Attention should be paid to the fact that Japan's banks bear higher credit concentration risk because they hold a large amount of stocks issued by firms with which they have close business ties and to which they have also extended a large amount of loans.<sup>50</sup>

<sup>50</sup> For details, see the April 2012 issue of the *Report*, and Kan, Kazutoshi, Yoshiyuki Fukuda, Yoshihiko Sugihara, and Shinichi Nishioka, "Correlation Risk between Stockholdings and Loans or Bondholdings at Japan's Banks," *Bank of Japan Review*, No. 2012-E-5, June 2012.

**Chart IV-3-21: Amount outstanding of stockholdings and financial institutions' comprehensive income<sup>1,2</sup>**  
 Ratio of stockholdings to total assets      Comprehensive income

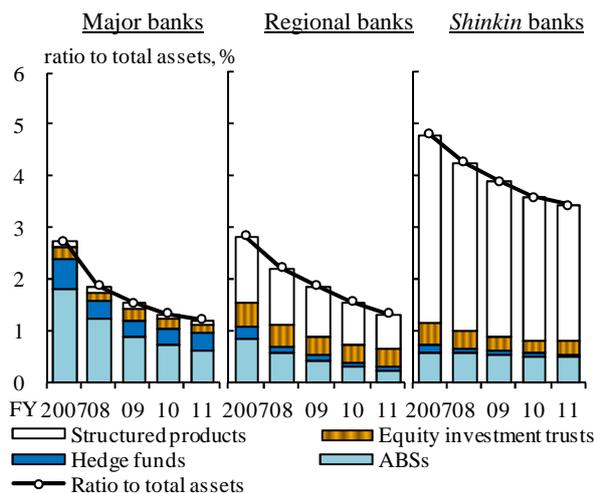


Notes: 1. The left chart is on an acquisition or amortized price basis.  
 2. In the right chart, banks and *shinkin* banks are counted. Overall gains/losses on stockholdings are the sum of realized gains/losses multiplied by 0.6 and changes in unrealized gains/losses on stockholdings.  
 Source: BOJ.

*Developments in alternative investment*

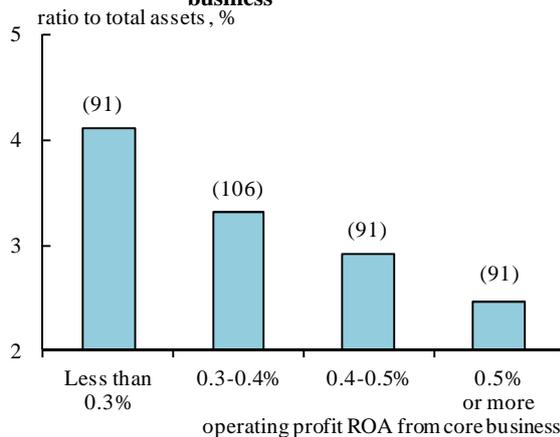
The amount outstanding of alternative investment has been decreasing at banks and *shinkin* banks since the Lehman shock. However, the amount outstanding of alternative investment is relatively high at *shinkin* banks, partly due to structured products that were bought in the past (Chart IV-3-22). The structured products could incur significant losses depending on market variations since the product design is complex and market liquidity is low. It should be noted that financial institutions with lower profitability tend to hold a higher ratio of alternative investment (Chart IV-3-23).

**Chart IV-3-22: Alternative investment<sup>1</sup>**



Note: 1. ABSs exclude RMBSs.  
 Source: BOJ.

**Chart IV-3-23: Share of alternative investment and operating profit ROA from core business<sup>1,2,3</sup>**

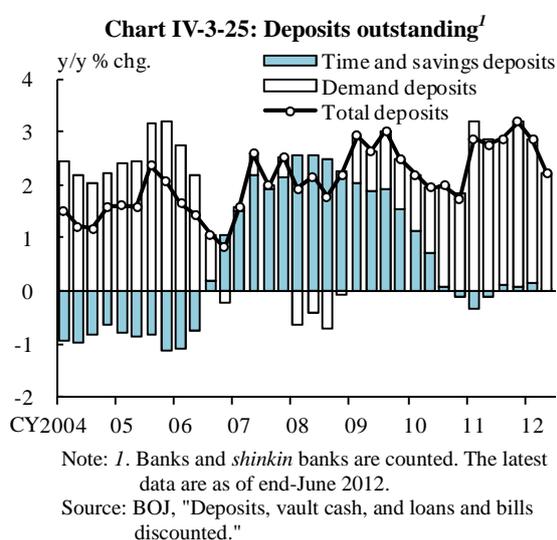
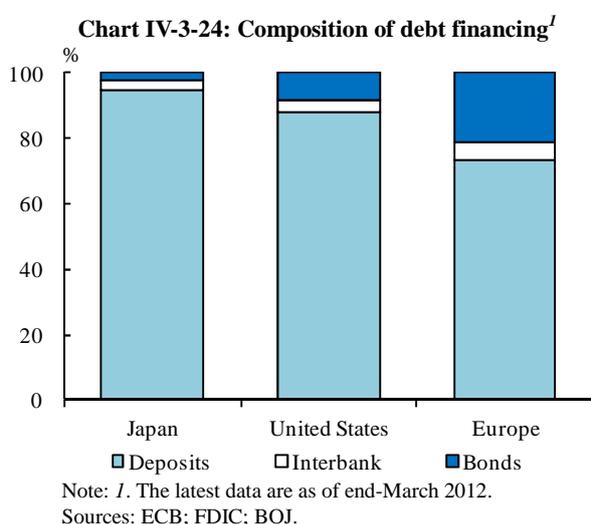


Notes: 1. Banks and *shinkin* banks are counted.  
 2. RMBSs are excluded from alternative investment.  
 3. Operating profit ROA from core business is the 5-year average. Numbers in parentheses are the number of financial institutions.  
 Source: BOJ.

## 4. Funding liquidity risk

### *Funding conditions for the yen*

The inflow of deposits into banks and *shinkin* banks has been steady, and funding conditions for the yen have been stable. The share of deposits in their debt financing is more than 90 percent, substantially larger than the shares for U.S. and European banks (Chart IV-3-24). In addition, banks' short- and long-term market funding, through the issuance of bonds, CP, and certificates of deposit (CDs), indicates that funding conditions have been favorable. However, attention should be paid to the slower growth rate of time deposits in view of a decline in interest rates on these deposits to near 0 percent (Chart IV-3-25).



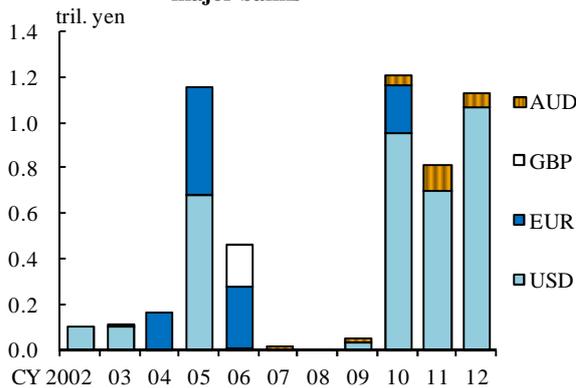
### *Funding conditions for foreign currencies*

Ensuring stable funding sources of foreign currencies has become a primary challenge for major banks, which have been increasing overseas loans. Therefore, they have gradually increased funding sources with a high degree of stability by raising the amount of customers' deposits and increasing the issuance of medium- to long-term corporate bonds denominated in foreign currencies (Chart IV-3-26). Nonetheless, the increasing pace in such funding sources has been slower than that in overseas loans. As a result, the share of the short-term market funding has been increasing (Chart IV-3-27).

Funding conditions in the short-term market have been stable in comparison with the end of 2011, and banks' funding for foreign currencies has functioned properly without any serious problem. For example, U.S. money market funds (MMFs) -- the major

providers of U.S. dollars -- have increased dollar investment in Japan's banks, while they have restrained such investment in European banks (Chart IV-3-28). In the foreign exchange swap market, dollar funding costs have been low in comparison with the end of 2011 (Chart IV-3-29). Nonetheless, developments in market conditions continue to warrant vigilance since uncertainty over the situation in Europe is high.

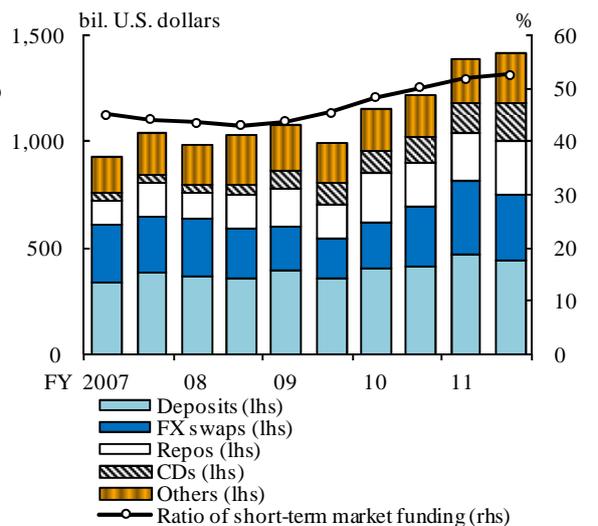
**Chart IV-3-26: Issuance of corporate bonds denominated in foreign currencies by major banks<sup>1</sup>**



Note: 1. The amounts of issuance are converted to the yen using the exchange rate on the issuance date. The latest data are as of September 28, 2012.

Source: Bloomberg.

**Chart IV-3-27: Amount outstanding of foreign currency funding and ratio of short-term market funding<sup>1,2</sup>**

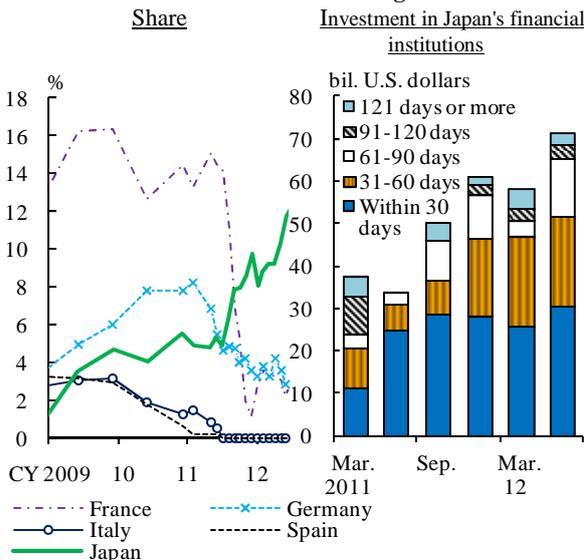


Notes: 1. Major banks and regional banks are counted.

2. Short-term market funding is the sum of FX swaps, repos, and CDs.

Source: BOJ.

**Chart IV-3-28: U.S. MMFs' share of investment and amount outstanding<sup>1,2</sup>**

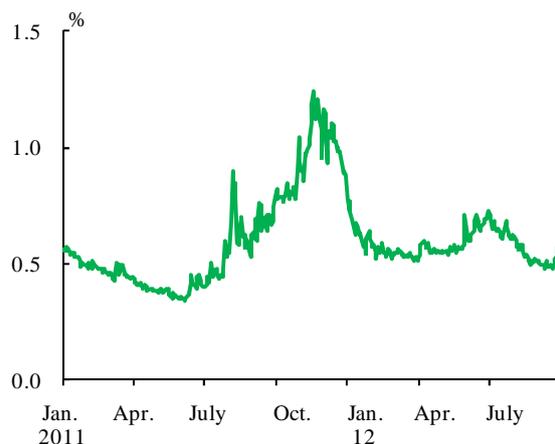


Notes: 1. The latest data of the left chart are as of August 2012.

2. The right chart shows the amount outstanding of U.S. major MMFs' investment in Japan's financial institutions.

Sources: Fitch ratings; published accounts of U.S. major MMFs.

**Chart IV-3-29: FX swap-implied U.S. dollar funding rate from the yen<sup>1</sup>**



Note: 1. 3-month-term maturity. The latest data are as of September 28, 2012.

Source: Bloomberg.

## 5. Banks' capital and profitability

### *Developments in banks' capital adequacy ratios*

The Tier I capital ratios of banks and *shinkin* banks (under the Basel II requirements) have increased, reflecting accumulation of retained earnings (the left-hand side of Chart IV-3-30). In addition, the ratio of Tier I capital to banks' total assets, which indicates their leverage, is increasing moderately with the increase in Tier I capital (the right-hand side of Chart IV-3-30).<sup>51</sup>

New Basel requirements (Basel III requirements) will stipulate the minimum level of common equity Tier I capital, which is the highest-quality capital.<sup>52</sup> Moreover, tighter criteria for inclusion of various instruments in the capital will be introduced. If preferred investment securities and hybrid debt capital instruments, which will be disallowed from capital, are not refinanced by eligible capital instruments under the Basel III requirements, the category of "other Tier I capital," including preferred investment securities, can decrease (Chart IV-3-31).<sup>53</sup> Furthermore, the Basel III requirements stipulate that -- among instruments excluded from capital -- intangible fixed assets and deferred tax assets are to be deducted from the common equity Tier I capital, instead of Tier I capital. Tier I capital will decrease accordingly on the assumption that the above instruments are not refinanced, although the pace of the annual decline will be slow because of the grandfathering measures.<sup>54</sup>

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<sup>51</sup> Under the Basel III requirements, the leverage ratio is planned to be introduced to supplement the capital adequacy ratio that sets capital requirements on risk by type of asset and transaction. It is expected that the leverage ratio will be calculated as the ratio of Tier I capital to overall exposures consisting of total assets and off-balance-sheet items such as commitments. Under the Basel III requirements, the treatment of the capital adequacy ratio is reviewed. Moreover, regulatory levels are planned to be set for the newly introduced leverage ratio, and for the liquidity coverage ratio and the stable funding ratio, both of which are new indicators of funding liquidity.

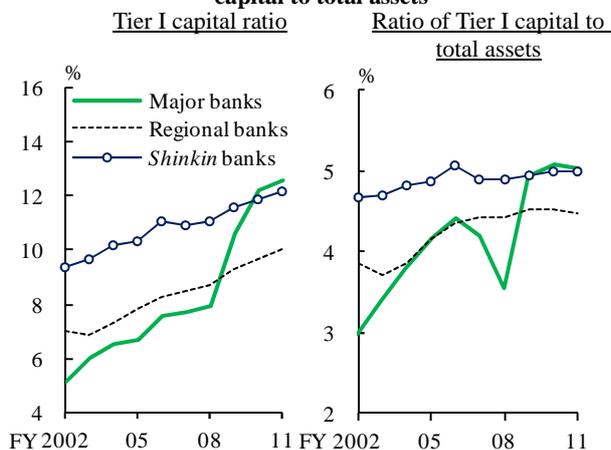
<sup>52</sup> Partial revision to risk-weighted assets used as a denominator in the calculation under the existing Basel requirements (the so-called Basel 2.5) had already been implemented at the end of December 2011.

<sup>53</sup> Chart IV-3-31 is estimated based on Tier I capital as of the end of March 2012. The Basel III requirements state prerequisites for including hybrid debt capital instruments in other Tier I capital as follows. When the common equity Tier I capital ratio falls below a certain threshold, the terms and conditions for the issuance of the instruments have a provision that requires them to be either written off or converted into common equities. If the authority concludes that financial institutions are not viable, the terms and conditions for the issuance have a provision that requires the instruments to be either written off or converted into common equities, or the jurisdiction over resolution to conform to the clause.

<sup>54</sup> In the calculation of risk assets, the coverage of counterparty risk will be strengthened. When the Basel III requirements are applied to the amount of risk assets as of the end of March 2012, the amount is likely to increase by around 10 percent on average, which would contribute to a reduction

To prepare for the Basel III requirements, banks need to continue to strengthen their capital bases in a planned manner by, for example, accumulating retained earnings, in order to improve the quality of their capital and raise their capital adequacy ratios.

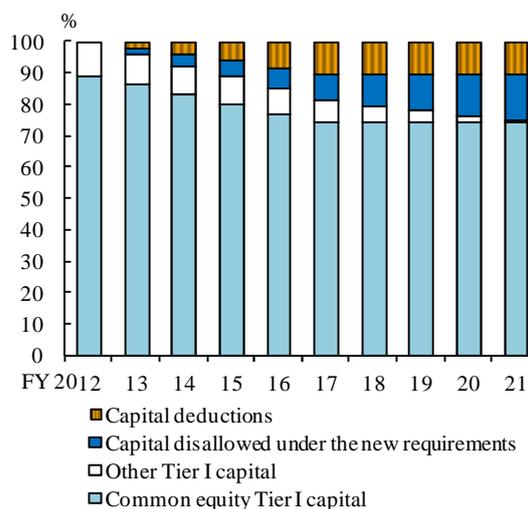
**Chart IV-3-30: Tier I capital ratio and ratio of Tier I capital to total assets<sup>1,2</sup>**



Notes: 1. Based on the Basel II requirements. The Tier I capital ratios of major banks and regional banks are counted on a consolidated basis.  
2. The ratio of Tier I capital to total assets is counted on a non-consolidated basis.

Source: BOJ.

**Chart IV-3-31: Tier I capital under Basel III requirements<sup>1,2</sup>**



Notes: 1. Internationally active banks are counted.  
2. BOJ estimates based on questionnaires about financial conditions at end-March 2012. Grandfathering measures are taken into account based on the "amendment to administrative notice on capital adequacy rules for internationally active banks based on Basel III" issued by the Financial Services Agency in March 2012.

Source: BOJ.

### Developments in banks' profitability

The charge-off of deferred tax assets following the lowering of corporate tax worked to decrease net income of banks and *shinkin* banks for fiscal 2011, while the decrease in credit costs and the improvement in realized gains/losses on securities holdings contributed to the increase in income (see Annex 3).<sup>55</sup> As a result, net income was at more or less the same level as the previous year. However, financial institutions' core profitability (the ratio of operating profits from core business to total assets) has steadily decreased mainly due to the sluggish domestic business.

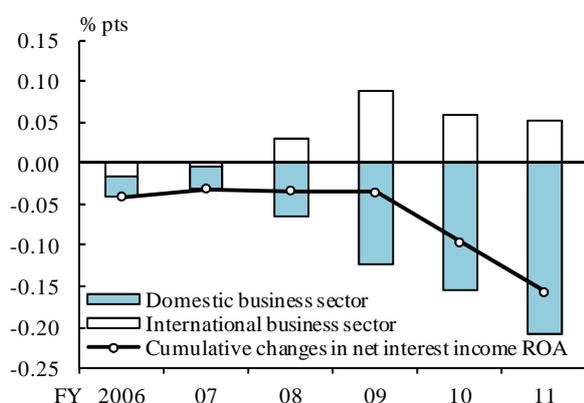
As mentioned in Chapter III.C, major banks have enhanced their profitability by actively expanding overseas business. At major banks, profits from overseas business have gradually increased relative to overall business and have contributed to overall earnings. However, the profits have not increased sufficiently to fully compensate for

in the capital adequacy ratio.

<sup>55</sup> In Annex 3, the charge-off of deferred tax assets is included in "expenses."

the decline in ROA from domestic business (Chart IV-3-32). On the other hand, regional financial institutions, whose source of earnings is mostly domestic business, have continued to face severe business conditions. As mentioned in Chapter III.C, the slow growth in loans to local firms reflecting the decreasing population and the aging of society observed particularly in nonmetropolitan areas has led to a decline in the regional financial institutions' profitability (Chart IV-3-33).

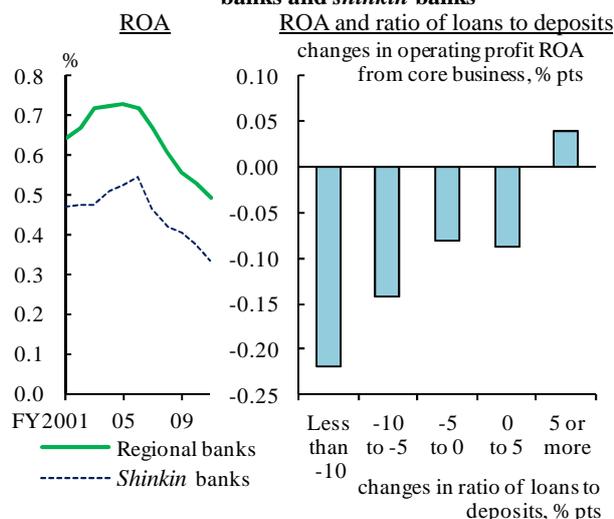
**Chart IV-3-32: Cumulative changes in net interest income ROA of major banks<sup>1</sup>**



Note: 1. Cumulative changes in net interest income ROA from fiscal 2005.

Source: BOJ.

**Chart IV-3-33: Operating profit ROA from core business and ratio of loans to deposits for regional banks and *shinkin* banks<sup>1,2,3,4</sup>**



Notes: 1. Regional banks and *shinkin* banks are counted.

2. The right chart shows changes in the ratio of loans to deposits and operating profit ROA from core business from fiscal 2001 to fiscal 2011.

3. The ratio of loans to deposits is a ratio of loans to SMEs and individuals to total deposits.

4. See Note 3 in Chart II-2-3.

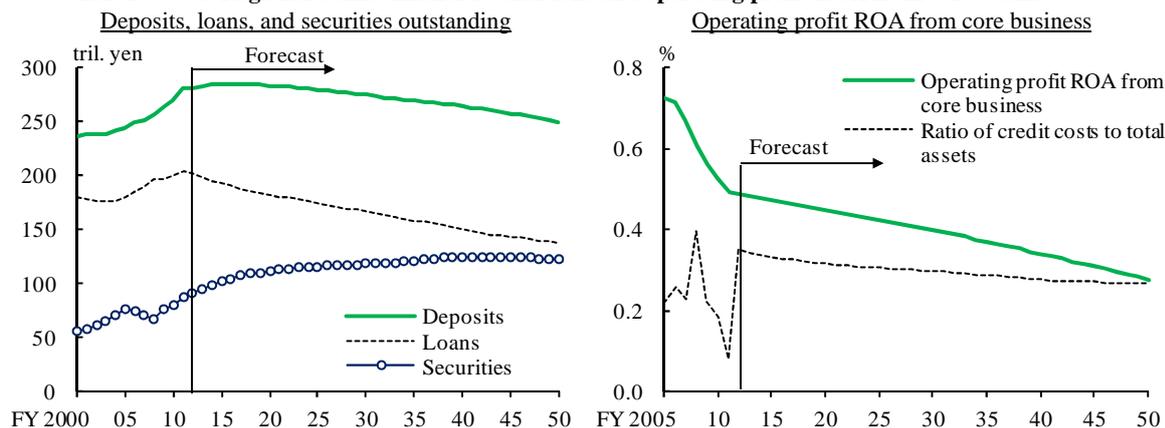
Source: BOJ.

If such situation does not change, core profitability of regional financial institutions could decline further in the future. For example, in a simple calculation based on the assumption that financial institutions will respond passively to developments in the external environment such as demographic changes, the amount of deposits at regional financial institutions would stop increasing due to the decreasing population (the left-hand side of Chart IV-3-34).<sup>56</sup> Moreover, housing loans would be sluggish

<sup>56</sup> Calculation is based on the following assumptions: (1) the amount outstanding of individual deposits in estimation is calculated by multiplying that of each age group at the end of 2009 by each group's estimated future population; (2) the amount outstanding of corporate deposits is assumed to be level at fiscal 2011; (3) the amount outstanding of housing loans in estimation is calculated by multiplying that of each age group at the end of 2009 by each group's estimated future population; (4) the amount outstanding of loans to small and medium-sized firms is assumed to decline by 1.6 percent per year, which is the average pace of decline recorded from fiscal 2001 to fiscal 2011; (5)

reflecting a decline in the number of people acquiring homes. Furthermore, on the assumption that loans to small and medium-sized firms decrease at the current pace, financial institutions' loan-to-deposit ratio would continue to decline and it is estimated that the operating profit ROA from core business would decline gradually to the level of credit costs (the right-hand side of Chart IV-3-34).

**Chart IV-3-34: Regional banks' financial conditions and operating profit ROA from core business**



Sources: Ministry of Internal Affairs and Communications, "National survey of family income and expenditure"; National Institute of Population and Social Security Research, "Population projection for Japan"; BOJ.

Given the above points, it is indispensable for financial institutions to explore potential demand for funds amid the aging of society and stimulate demand for other financial services to enhance their profitability. To this end, as mentioned in Chapter III.C, financial institutions could provide information services to contribute to borrowers' market expansion at home and abroad and facilitate smooth business succession by drawing on their customer networks. It is also important for them to strengthen their own profitability by increasing business opportunities and receiving adequate commissions through their services.

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the amount outstanding of loans to large firms and local governments is assumed to be level at fiscal 2011; (6) securities investment is assumed to be adjusted by the net surplus between the deposit flow and the lending flow; and (7) interest margins on loans, interest margins on securities, non-interest income, and the ratio of general and administrative expenses to deposits are assumed to be level at fiscal 2011. In addition, credit costs relative to total assets shown on the right-hand side of Chart IV-3-34 are calculated under the assumption that future credit cost ratios (credit costs / total loans outstanding) remain at the same level as the average credit cost ratio recorded from fiscal 2001 to fiscal 2011, and are then divided by the estimated total assets.

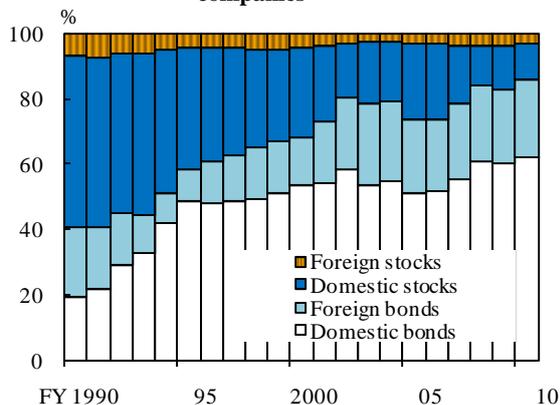
## D. Risks borne by the financial sector other than banks and *shinkin* banks

### 1. Insurance companies

#### *Super-long-term JGB investment by life insurance companies*

Life insurance companies have substantially increased the amount outstanding of their bondholdings, especially of super-long-term JGBs, whose maturity exceeds 10 years (Charts IV-4-1 and IV-4-2). As a result, the amount of interest rate risk borne by the life insurance companies has been increasing. Within the financial sector, life insurance companies take on the greatest amount of risk in the JGB market (see Box 8 for the amount of interest rate risk borne by life insurance companies).

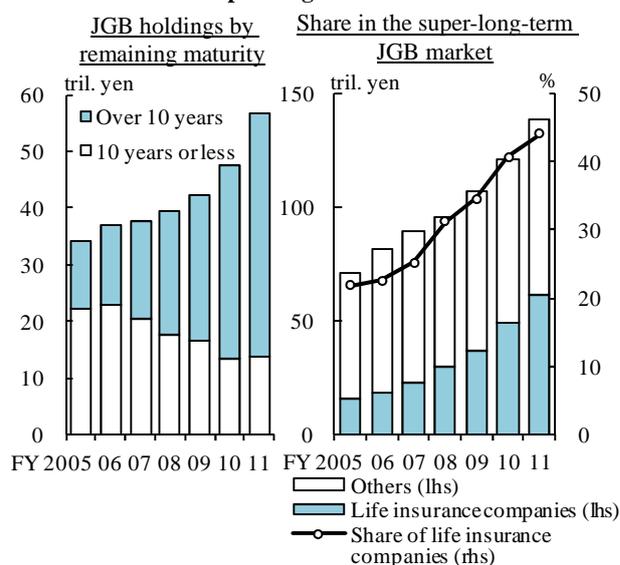
**Chart IV-4-1: Composition of assets under management of life insurance companies<sup>1</sup>**



Note: 1. Members of the Life Insurance Association of Japan except for Japan Post Insurance are counted.

Sources: Japan Post Insurance; Life Insurance Association of Japan.

**Chart IV-4-2: JGB holdings and share of life insurance companies in the super-long-term JGB market<sup>1,2</sup>**

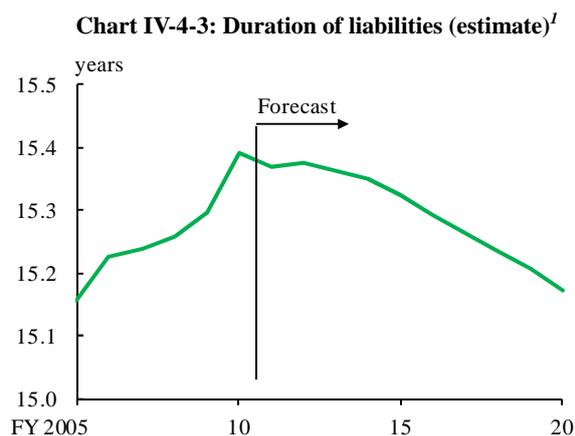


Notes: 1. In the left chart, the nine major life insurance companies are counted.  
 2. In the right chart, members of the Life Insurance Association of Japan except for Japan Post Insurance are counted. The term composition of JGB holdings of the member companies noted above is assumed to be the same as those of the nine major life insurance companies. The figure for fiscal 2011 is the BOJ's estimate using changes in the nine major life insurance companies.

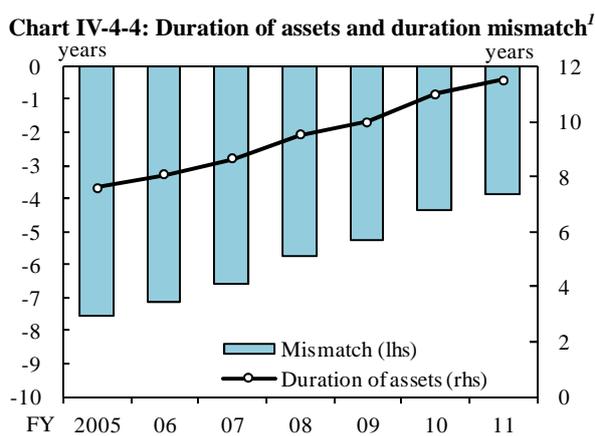
Sources: Japan Post Insurance; Ministry of Finance; Life Insurance Association of Japan.

The increase in life insurance companies' super-long-term JGB holdings has been induced by duration mismatch. Specifically, the maturity of liabilities of insurance policies has exceeded the maturity of assets at life insurance companies, and thus clearing the mismatch is a challenge in their asset management. The maturity of their

liabilities has lengthened, albeit very moderately, and it is estimated to be about 15 years at present (Chart IV-4-3).<sup>57</sup> Meanwhile, the maturity of their assets has also lengthened with increased investment in super-long-term JGBs, and reached nearly 12 years recently (Chart IV-4-4). Consequently, the mismatch is narrowing, but remains to a noticeable extent.



Note: 1. The nine major life insurance companies are counted.  
Sources: National Institute of Population and Social Security Research, "Population projections for Japan"; Ministry of Internal Affairs and Communications, "Population census"; Japan Institute of Life Insurance, "Life insurance survey"; BOJ.



Note: 1. The nine major life insurance companies are counted.  
Sources: Published accounts of life insurance companies; National Institute of Population and Social Security Research, "Population projections for Japan"; Ministry of Internal Affairs and Communications, "Population census"; Japan Institute of Life Insurance, "Life insurance survey"; BOJ.

As a result of such JGB investment, the share of life insurance companies' investment in the super-long-term JGB market has exceeded 40 percent, and they are stable holders of these bonds (the right-hand side of Chart IV-4-2). Given the duration mismatch, potential demand for investment in super-long-term JGBs is expected to be strong for the time being. Nonetheless, taking account solely of the effects of demographic changes, the maturity of life insurance companies' liabilities could shorten moderately (Chart IV-4-3).<sup>58</sup> Therefore, demand for super-long-term JGBs from life insurance

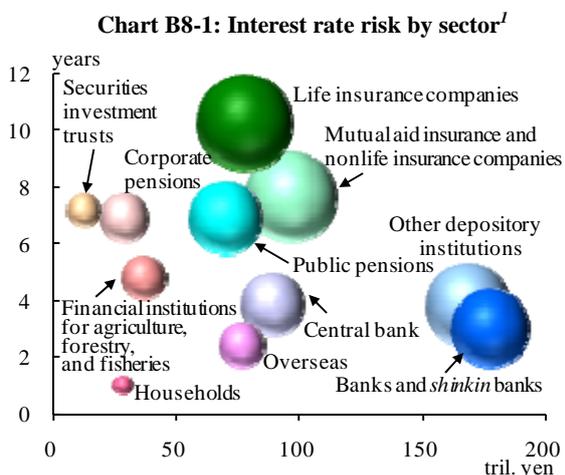
<sup>57</sup> The duration of liabilities is calculated by the weighted average of maturity by age and insurance product. The duration is calculated as follows: (1) the insurance payment from present to the death of insured persons; (2) the life expectancy at present; and (3) the insured mortality rate for each age. For example, the maturity of whole life insurance is long at around 32 years on average, because an insurance payment is made only once when an insured person dies (based on data as of 2010). On the other hand, in the case of life pension insurance, a certain amount of insurance payment is made continuously while an insured person is alive, making the duration shorter than that of whole life insurance at around 20 years (based on data as of 2010). The future duration of liabilities is calculated by multiplying the duration by age and insurance product as of 2010 by the estimated future population by age.

<sup>58</sup> The moderate shortening of the maturity of liabilities is attributable to the fact that, because the average life expectancy of insured persons has shortened with a decrease in young new policyholders reflecting the declining birthrate, the period of insurance payment has shortened

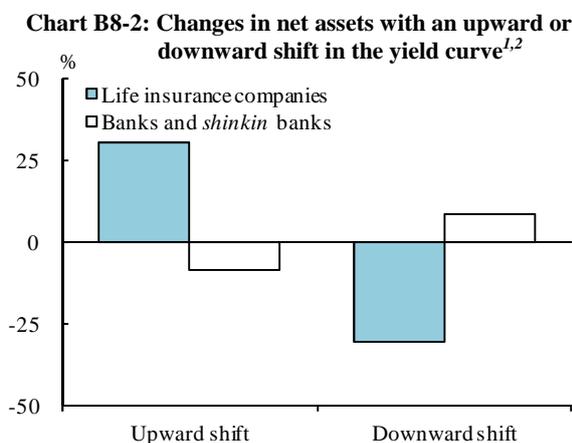
companies in terms of management of their assets and liabilities is likely to change.

### Box 8: The amount of interest rate risk borne by life insurance companies

The amount outstanding of JGBs has reached 919 trillion yen, and the amount of interest rate risk associated with holding JGBs (capital losses on bondholdings when interest rates rise by 1 percentage point) is equivalent to 51 trillion yen.<sup>59</sup> The risk is shared by various types of investors holding JGBs. By industry, life insurance companies, in which the maturity of holding securities is long, bear the largest amount of risk (Chart B8-1).<sup>60</sup> Although the amount outstanding of JGBs held by banks is larger than that held by life insurance companies, the amount of interest rate risk borne by banks is smaller. This is because the maturity of JGBs held by banks is shorter than that held by life insurance companies.



Note: 1. The horizontal axis indicates JGB holdings. The vertical axis indicates the duration of the JGBs. The size of circles shows the amount of interest rate risk associated with JGB holdings. The data are as of end-March 2012.  
Sources: Ministry of Finance; Japan Securities Dealers Association; published accounts of each entity; QSS Report <Bond>; BOJ.



Notes: 1. A parallel shift scenario in which interest rates for all maturities shift upward or downward from the current yield curve by 0.5 percentage point is assumed. The data are as of end-March 2012.  
2. The vertical axis indicates the ratio of net assets to real net assets for life insurance companies and the ratio of net assets to Tier I capital for banks and shinkin banks.  
Sources: Published accounts of each entity; BOJ.

Nonetheless, due attention should be paid to the fact that only the interest rate risk of

accordingly. However, the composition of insurance products is assumed to remain unchanged in this calculation. Therefore, if the number of policyholders with whole life insurance with long duration continues to increase, the maturity of liabilities could become longer than the estimation.

<sup>59</sup> The amount of interest rate risk is defined as capital losses from bondholdings when interest rates on invested bonds of all maturities rise by 1 percentage point simultaneously. The calculation is for all JGBs as of end-March 2012. Bonds other than JGBs, such as municipal bonds, corporate bonds, and foreign bonds, are excluded from the calculation.

<sup>60</sup> In Chart B8-1, other depository institutions represent the sum of Japan Post Bank and financial institutions for small and medium-sized firms (excluding shinkin banks). Mutual aid insurance and nonlife insurance companies are Japan Post Insurance, mutual aid insurance, and nonlife insurance companies.

JGB holdings is considered in this estimation. It has been argued that, to assess the interest rate risk of the overall balance sheet, both assets and liabilities should be evaluated at market value. In this case, if interest rates rise, the value of assets would decrease at a faster rate than that of liabilities and the value of banks' net assets would decline (Chart B8-2).<sup>61</sup> This is because the maturity of assets is longer than that of liabilities for banks. Contrarily, the maturity of liabilities is longer than that of assets for life insurance companies. Thus, while the value of net assets would increase with the rise in interest rates, the value of net assets would decrease with the fall in interest rates.<sup>62</sup>

In calculating solvency margin ratios of Japan's life insurance companies, liabilities are not evaluated at market value and assets are only partially evaluated at market value based on the current accounting standards (see Box 9 in Chapter V.A for the accounting standards for bondholdings). Meanwhile, in the European Union, regulation of life insurance companies has changed, and the solvency margin ratio (Solvency II, which will be implemented by the beginning of 2014) is calculated under mark-to-market accounting for both assets and liabilities. In Japan, regulatory reforms for insurance companies, such as introduction of mark-to-market valuation of assets and liabilities, have also been under discussion.

## 2. Securities companies

Some securities companies have expanded their overseas business to enhance their profitability since the Lehman shock. Nevertheless, their overseas business expansion has not necessarily boosted profits, partly because of lackluster trading in domestic and overseas financial markets, and major securities companies recorded net losses for two consecutive years (Chart IV-4-5; see Annex 3 for details of profits).<sup>63</sup> As a result, they have not accumulated retained earnings as fast as the growth in total assets, and hence their leverage ratios have increased gradually (Chart IV-4-6). Securities companies need to improve the profitability of their business such as by restructuring unprofitable divisions. Furthermore, given the heightened uncertainty overseas, they should continue

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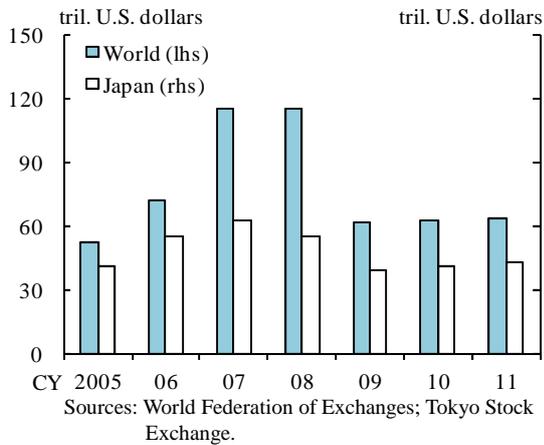
<sup>61</sup> It is assumed that all the yields of assets and liabilities increase at the same pace as market interest rates. The net asset value is also affected by the pace of increase in interest rates of assets and liabilities along with market interest rates.

<sup>62</sup> This estimate assumes that there is no new application or surrender of insurance policy. However, due attention should be paid to the possibility that insured persons would surrender their insurance policy at the time of rising interest rates.

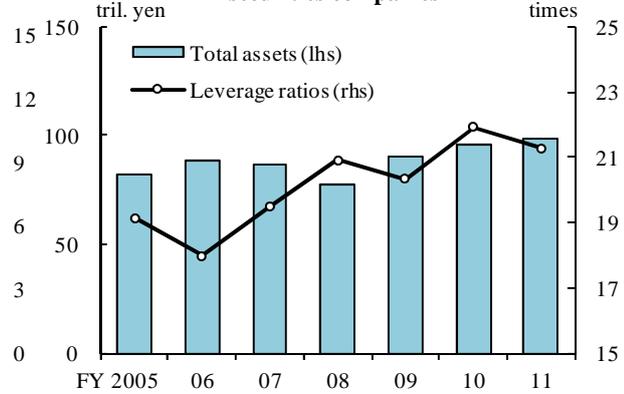
<sup>63</sup> Major securities companies include Nomura Holdings, the Daiwa Securities Group, Mitsubishi UFJ Securities Holdings, and Mizuho Securities.

to strictly manage market risk, counterparty risk, and liquidity risk.

**Chart IV-4-5: Value of stock trading**



**Chart IV-4-6: Total assets and leverage ratios of securities companies<sup>1,2</sup>**



Notes: 1. The four groups of major securities companies are counted on a consolidated basis.

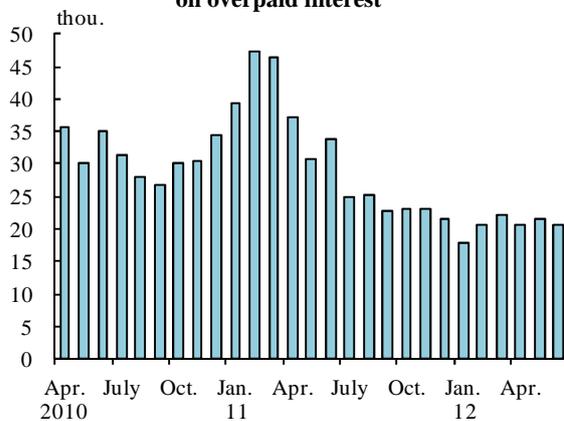
2. Leverage ratios are the ratios of total assets to net assets.

Sources: Published accounts of each securities company.

### 3. Consumer finance companies and credit card companies

Consumer finance companies' business conditions remain severe. Since the amendment of the Money Lending Business Act in 2006, they have suffered net losses (see Annex 3). However, the net losses recently started to decrease. This was because the amount of provisions for borrowers' claims for refunds on overpaid interest was limited after such claims started to decline (Chart IV-4-7). The number of nonbank finance companies has diminished significantly, and attention should be paid to whether the remaining companies could establish stable profit bases (Chart IV-4-8). Meanwhile, credit card companies have recorded net profits with only small provisions for borrowers' claims for refunds on overpaid interest, but their profits are being squeezed as interest rate margins edge down (see Annex 3).

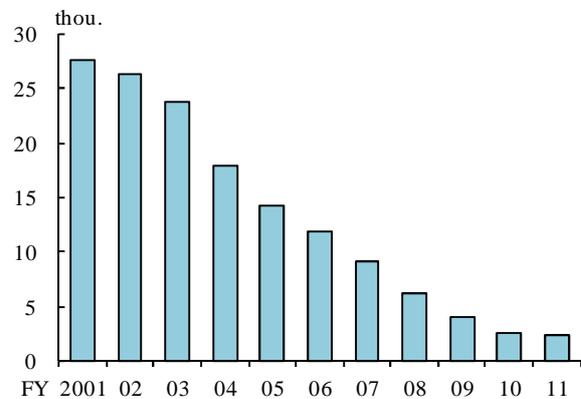
**Chart IV-4-7: Number of borrowers' claims for refunds on overpaid interest<sup>1</sup>**



Note: 1. The three major consumer finance companies are counted.

Sources: Published accounts of each consumer finance company.

**Chart IV-4-8: Number of nonbank finance companies**



Source: Financial Services Agency.

## **V. Resilience of the financial system**

This chapter assesses the resilience of the financial system and the possible future consequences on financial intermediation by conducting macro stress testing under scenarios of, for example, fluctuations in the economy and financial markets.

The macro stress testing shows that the resilience of Japan's financial system is generally strong as a whole. Banks' capital bases as a whole would be able to avoid significant impairment, even if a significant economic downturn similar to that observed after the Lehman shock or an upward shift of domestic interest rates for all maturities by 1 percentage point occurs. Moreover, even if banks become unable to raise funds from some markets, they would generally hold a sufficient amount of funding liquidity both in the domestic and foreign currencies.

Nevertheless, close attention should be paid to the possibility that, if a large economic downturn occurs, capital adequacy ratios will plunge for banks whose quality of loans is relatively low. Furthermore, if domestic interest rates rise significantly by exceeding the aforementioned assumption, due attention needs to be paid to the possibility that banks' capital will decline to a noticeable extent and such effects will be amplified through an adverse feedback loop between the financial system and the real economy. Banks could require additional funding sources under a particularly severe situation in which a number of measures for foreign currency funding become inoperative simultaneously.

It should be noted that the macro stress testing conducted in this chapter does not show the most likely scenario of Japan's economy and asset prices. Rather, it seeks to clarify the characteristics of risks banks face and assess the resilience of the financial system. The results of stress testing in this chapter should be interpreted with some latitude, since they are calculated based on certain assumptions and omit some elements.

### **A. Resilience against shocks in the economy and financial markets**

#### **1. Baseline scenario**

##### *Assumptions for macro stress testing*

As assumptions for macro stress testing, a baseline scenario -- the starting point of analysis -- and two stress scenarios are set. One stress scenario assumes that severe stresses equivalent to the Lehman shock in 2008 occur in overseas economies and financial markets (an economic downturn scenario), and the other stress scenario

assumes that market interest rates in Japan rise (an upward shift scenario of interest rates). The subjects of macro stress testing are major banks and regional banks, and their capital adequacy ratios are calculated based on the Basel II requirements. These scenarios set the end of fiscal 2011 as the base point and estimate changes basically over the next 3 years. The previous macro stress testing had only focused on the effects on the financial side of changes in the external environment such as the real economy, stock prices, and interest rates. The new estimation in this *Report* has a distinctive feature, in that it also takes account of the effects of changes in financial institutions' lending attitudes on the real economy by using the Financial Macro-econometric Model (FMM), including a feedback loop between the financial system and the real economy.<sup>64</sup>

### *Baseline scenario*

The baseline scenario assumes that the overseas real GDP growth rate would be 3.5-4.0 percent in 2012, and then improve moderately to 4.0-4.5 percent through 2014 (the left-hand side of Chart V-1-1).<sup>65</sup> It also assumes that stock prices (TOPIX) and JGB yields would remain at the levels observed at the end of fiscal 2011, and that the domestic nominal GDP growth rate would be 1.7 percent in fiscal 2012 after negative growth in fiscal 2011 and then 1.0-1.5 percent through fiscal 2014 (the right-hand side of Chart V-1-1).<sup>66</sup> Meanwhile, loan interest rates would rise moderately by 0.2 percentage point through fiscal 2014, and real estate prices would be on a moderate downtrend (minus 1.8 percent per annum).<sup>67</sup>

Under these assumptions, the estimated credit cost ratios would be around 0.5 percent from fiscal 2012 to fiscal 2014, remaining within the range of profits (the left-hand side of Chart V-1-2). As a result, Tier I capital ratios would remain more or less unchanged since fiscal 2011 (the right-hand side of Chart V-1-2).

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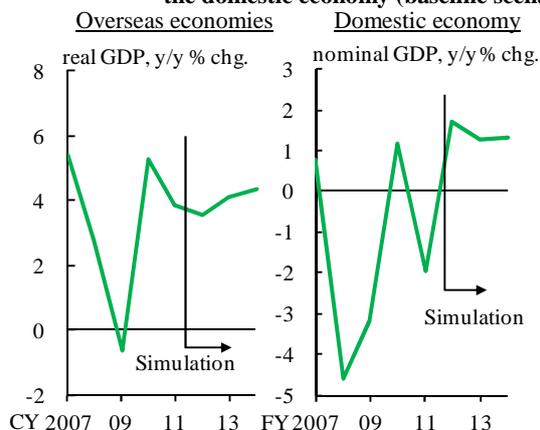
<sup>64</sup> See Annex 4 for the framework of macro stress testing. For details on the FMM, see Ishikawa, Atsushi, Koichiro Kamada, Yoshiyuki Kurachi, Kentaro Nasu, and Yuki Teranishi, "Introduction to the Financial Macro-econometric Model," Bank of Japan Working Paper, No. 2012-E-1, January 2012.

<sup>65</sup> This assumption is based on the forecasts made by the International Monetary Fund (IMF) as of April 2012.

<sup>66</sup> This assumption is based on private-sector forecasts made as of June 2012.

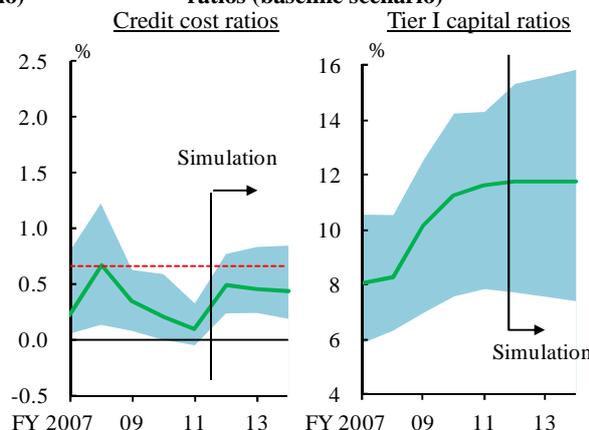
<sup>67</sup> A fall in real estate prices induces an increase in credit costs through a decline in the collateral value of bank loans.

**Chart V-1-1: Assumptions for overseas economies and the domestic economy (baseline scenario)**



Sources: IMF, "World economic outlook"; Japan Center for Economic Research, "ESP forecasts"; Cabinet Office, "National accounts."

**Chart V-1-2: Credit cost ratios and Tier I capital ratios (baseline scenario)<sup>1</sup>**



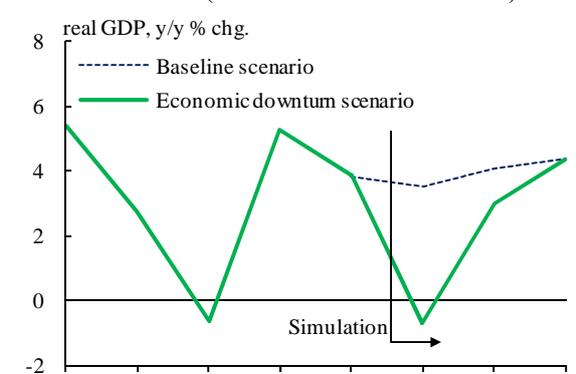
Note: 1. Major banks and regional banks are counted. Shaded areas indicate the 10th-90th percentile range. The horizontal dashed line indicates the break-even point in fiscal 2011.

Source: BOJ.

## 2. Economic downturn scenario

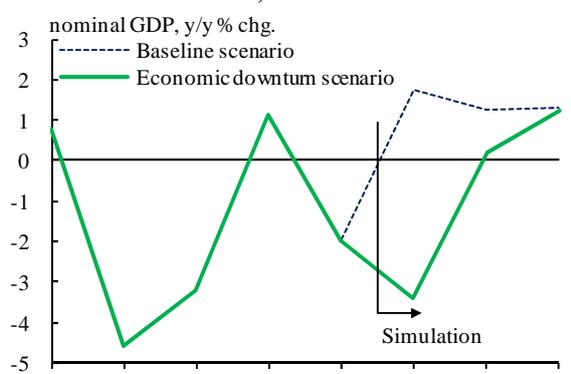
The economic downturn scenario assumes that the stress equivalent to the Lehman shock arises in overseas economies and global financial markets. It assumes that the overseas economic growth rate would be minus 0.7 percent in fiscal 2012 and recover to the level of the baseline scenario through fiscal 2014 (Chart V-1-3). It also assumes that stock prices (TOPIX) would decline from 854 points at the end of fiscal 2011 to 398 points at the end of fiscal 2012, and the JGB yields would decline toward the end of fiscal 2014 by about 0.3 percentage point. Under these assumptions, the domestic economic growth rate would be around minus 3.4 percent in fiscal 2012, exhibiting negative growth for two consecutive years, and would then turn positive and be around 1 percent through fiscal 2014 (Chart V-1-4). Loan interest rates would decline toward

**Chart V-1-3: Assumptions for overseas economies (economic downturn scenario)**



Sources: IMF, "World economic outlook"; BOJ.

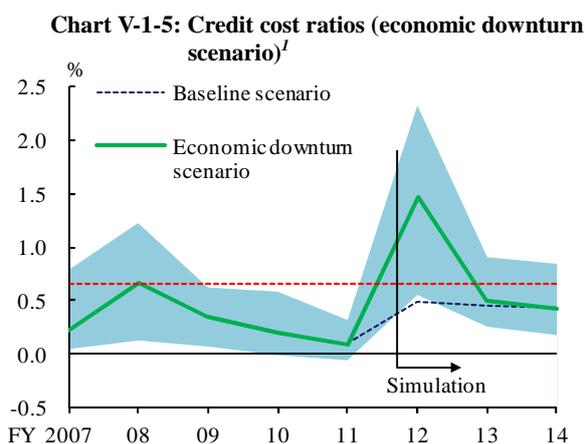
**Chart V-1-4: Domestic economy (economic downturn scenario)**



Sources: Japan Center for Economic Research, "ESP forecasts"; Cabinet Office, "National accounts"; BOJ.

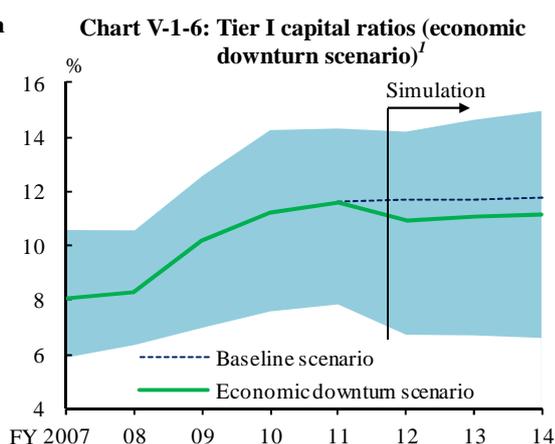
the end of fiscal 2014 by about 0.1 percentage point, and real estate prices would also decline by about 3.2 percent per annum.

Under the economic downturn scenario, the estimated credit cost ratio would increase considerably to 1.5 percent in fiscal 2012, but fall afterward to about 0.4 percent as the economy recovers (Chart V-1-5). Although the Tier I capital ratio of banks would decrease from 11.6 percent in fiscal 2011 to 10.9 percent in fiscal 2012 as the estimated credit costs would exceed operating profits from core business, the ratio would still exceed the regulatory level (Charts V-1-6 and V-1-7).<sup>68</sup> Meanwhile, stock prices would decline significantly, but the rate of decline in the Tier I capital ratio caused by unrealized losses on securities holdings would be limited.<sup>69</sup> This is because, while a large amount of unrealized gains on securities holdings existed at the end of fiscal 2011, unrealized gains on bondholdings reflecting a decline in interest rates offset to some extent the unrealized losses on stockholdings caused by a fall in stock prices.



Note: 1. Major banks and regional banks are counted. The shaded area indicates the 10th-90th percentile range under the economic downturn scenario. The horizontal dashed line indicates the break-even point in fiscal 2011.

Source: BOJ.



Note: 1. Major banks and regional banks are counted. The shaded area indicates the 10th-90th percentile range under the economic downturn scenario.

Source: BOJ.

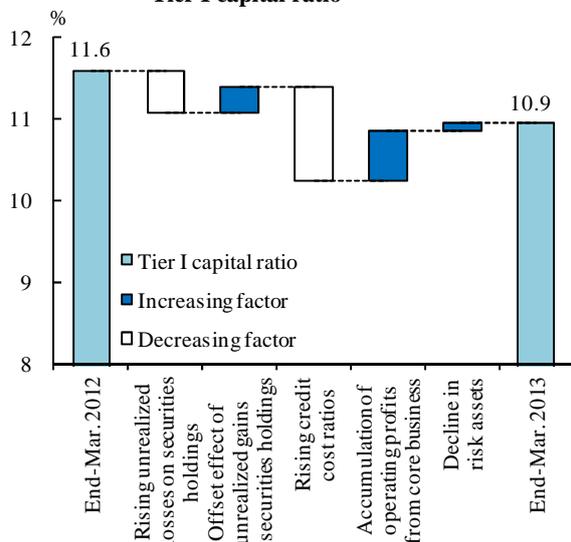
As described above, even if a significant economic downturn occurs temporarily, banks' capital bases as a whole would be able to avoid significant impairment. However, in the banks at the lower tail of the Tier I capital ratio distribution, the Tier I capital ratio

<sup>68</sup> The minimum required levels of capital adequacy ratios are stipulated as follows: 8 percent for internationally active banks (Basel II requirements) and 4 percent for domestic banks. Capital is calculated by deducting some items from the total of Tier I capital, Tier II capital, and Tier III capital.

<sup>69</sup> However, since internationally active banks are required to include 45 percent of their unrealized gains in Tier II capital, their capital adequacy ratios would decline due to a fall in stock prices under the economic downturn scenario.

would not rise and would remain at low levels. Attention should thus be paid to the possibility that the Tier I capital ratios will plunge further for banks whose quality of loans is relatively low (Chart V-1-8).

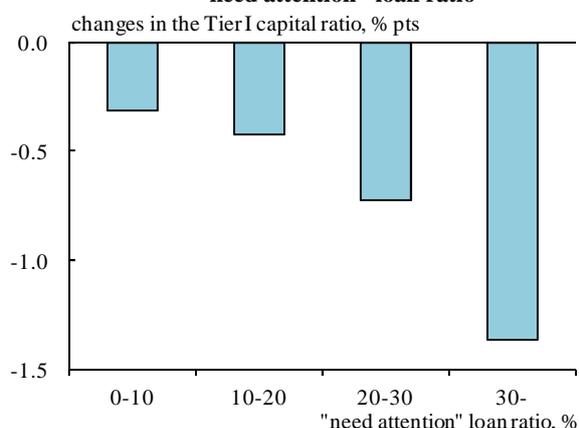
**Chart V-1-7: Factor decomposition of changes in the Tier I capital ratio<sup>1</sup>**



Note: 1. The average of major banks and regional banks. Rising unrealized losses on securities holdings include the tax effects.

Source: BOJ.

**Chart V-1-8: Reductions in the Tier I capital ratio and "need attention" loan ratio<sup>1,2</sup>**



Notes: 1. Regional banks are counted.

2. The horizontal axis shows the share of "need attention" loans in the amount outstanding of loans. The vertical axis shows the average of each bank's difference between the Tier I capital ratio under the economic downturn scenario and that under the baseline scenario as of end-March 2015.

Source: BOJ.

### 3. Upward shift scenarios of interest rates

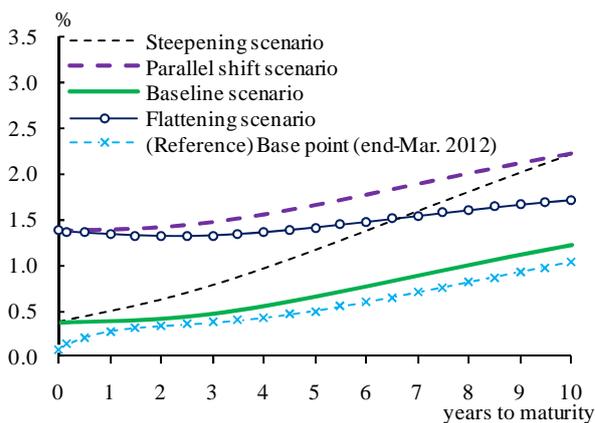
#### *Fluctuations in capital losses on bondholdings and net interest income amid a rise in interest rates*

This section estimates capital losses on bondholdings and net interest income in the case of a rise in interest rates. Three scenarios of an upward shift in the yield curve are set: (1) a parallel shift scenario in which interest rates for all maturities shift upward by 1 percentage point; (2) a steepening scenario in which the 10-year rate shifts upward by 1 percentage point; and (3) a flattening scenario in which the overnight rate shifts upward by 1 percentage point (Chart V-1-9).<sup>70</sup> Such upward shifts in interest rates are assumed to take place within 1 year, from the end of fiscal 2011 up to that of fiscal 2012.

<sup>70</sup> In each scenario, an upward shift in the yield curve is added to the level of the baseline scenario. The baseline scenario assumes that, at the end of fiscal 2012, future interest rates follow the path factored into the market yield curve as of the end of fiscal 2011. Banks' investment-funding balance essentially changes according to the shape of the yield curve, but it is assumed to remain constant from the end of fiscal 2011.

As banks invest mostly in short- to medium-term bonds, capital losses on banks' bondholdings would be large under the parallel shift and flattening scenarios, in which a rise in interest rates on these bonds is relatively strong (Chart V-1-10).<sup>71</sup> In contrast, under the steepening scenario, in which a rise in short- to medium-term interest rates would be relatively small, capital losses on bondholdings would be relatively small.

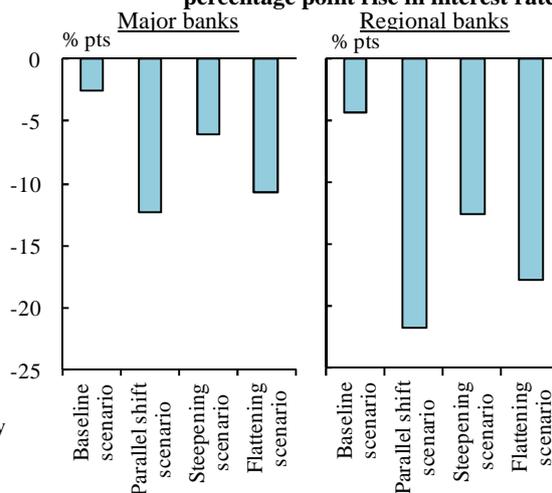
**Chart V-1-9: Upward shift scenarios of interest rates<sup>1</sup>**



Note: 1. 1-year-later predicted spot rate curves from the base point.

Sources: Bloomberg; BOJ.

**Chart V-1-10: Capital losses on bondholdings (1 percentage point rise in interest rates)<sup>1</sup>**



Note: 1. The ratio of capital losses on bondholdings following 1 year from the base point (end-March 2012) to Tier I capital.

Source: BOJ.

Banks' net interest income would also change with a rise in interest rates. The net interest income of major banks would increase in tandem with the rise in interest rates, because they hold a large amount of loans extended at floating interest rates and for a short term and such loan interest rates immediately reflect the rise in interest rates.<sup>72</sup> However, capital losses on bondholdings would exceed the net surplus of interest income within approximately a year after the upward shift of interest rates. On the other hand, regional banks hold a large amount of loans extended at fixed interest rates and for a longer term, and such loan interest rates do not increase immediately following the rise in interest rates. Therefore, net interest income of regional banks would decrease, as the rise in interest rates would push up funding costs more than investment returns.

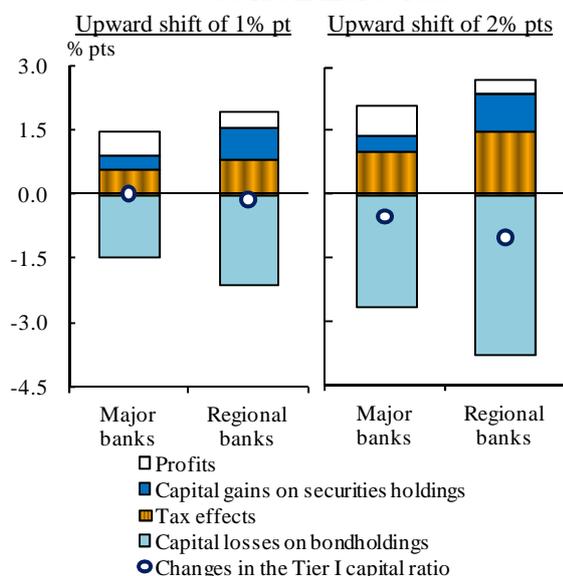
<sup>71</sup> Chart V-1-10 shows the sum of individual banks' capital gains/losses on bondholdings divided by the sum of individual banks' Tier I capital.

<sup>72</sup> For example, under the parallel shift scenario, in a year after the upward shift of interest rates, the change in net interest income relative to Tier I capital would be an increase of 0.8 percent for major banks and a decrease of 0.6 percent for regional banks.

### Effects on capital of capital losses on bondholdings amid a rise in interest rates

This section estimates effects on the Tier I capital ratio of fluctuations in capital losses on bondholdings and net interest income due to a rise in interest rates. Under the parallel shift scenario in which interest rates shift upward from the baseline scenario by 1 percentage point, banks would incur capital losses on bondholdings. However, the effects on capital of Japan's banks would be trivial, with the Tier I capital ratio of major banks in Japan remaining almost unchanged and that of regional banks falling by 0.1 percentage point (the left-hand side of Chart V-1-11; see Box 9 for accounting standards for bondholdings).<sup>73</sup> This is because the profits and unrealized gains on securities holdings would act as buffers and absorb most capital losses on bondholdings due to a rise in interest rates.

**Chart V-1-11: Changes in the Tier I capital ratio due to a rise in interest rates<sup>1</sup>**



Note: 1. Changes in the Tier I capital ratio following 1 year from the base point (end-March 2012).  
Source: BOJ.

**Chart V-1-12: Effects of a rise in interest rates on capital losses on bondholdings and the Tier I capital ratio<sup>1</sup>**

Major banks				
	Mar. 2012 (base point)	Upward shift		
		1 % pt	2 % pts	3 % pts
Capital losses on bondholdings (tril. yen)	—	3.7	7.0	10.3
Tier I capital ratio (%)	12.6	12.6	12.1	11.4
Changes (% pts)	—	0.0	-0.5	-1.2

Regional banks				
	Mar. 2012 (base point)	Upward shift		
		1 % pt	2 % pts	3 % pts
Capital losses on bondholdings (tril. yen)	—	3.0	5.6	8.1
Tier I capital ratio (%)	10.0	9.9	9.0	8.0
Changes (% pts)	—	-0.1	-1.0	-2.0

Note: 1. Changes indicate the Tier I capital ratio at end-March 2013 minus that at the base point (end-March 2012). For the estimate of the Tier I capital ratio, profits, capital gains on securities holdings, and tax effects are taken into account.

Source: BOJ.

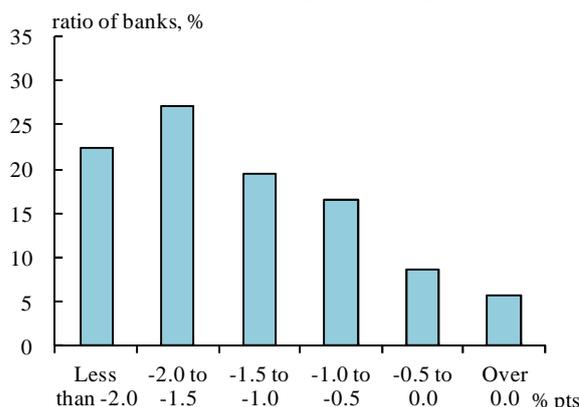
Nevertheless, a rise in interest rates by more than 1 percentage point would affect banks' capital accordingly. For example, if interest rates rise by 2 percentage points, capital losses on bondholdings would exceed the buffers such as the profits and unrealized gains on securities holdings. As a result, the Tier I capital ratios would decline by 0.5 percentage point for major banks and by 1.0 percentage point for regional banks (the

<sup>73</sup> For the estimate of the Tier I capital ratio, the profits, the capital gains/losses on all securities holdings, and the tax effects are taken into account. The profits are defined as operating profits from core business minus credit costs and corporate tax. Net interest income is estimated under the parallel shift scenario. Net non-interest income, general and administrative expenses, and credit costs are assumed to remain unchanged from the end of fiscal 2011.

right-hand side of Chart V-1-11, and Chart V-1-12).<sup>74</sup> Even in this case, the Tier I capital ratios of major and regional banks would generally exceed the regulatory level. However, about 20 percent of regional banks would experience a decline of more than 2 percentage points in their Tier I capital ratios (Chart V-1-13). Attention should be paid to the fact that regional banks are vulnerable to a rise in interest rates because of the large interest rate risk relative to their capital.

Moreover, government bond yields have recently soared in Europe within a short period of time due to decreased confidence in fiscal conditions. The yield spreads of government bonds issued by Spain and Italy over German government bonds have risen by about 3 percentage points in the year or so since the summer of 2011 (Chart V-1-14). If this rise is applied to Japan's interest rates for all maturities -- that is, a parallel shift scenario of 3 percentage points -- the decline in the Tier I capital ratio would expand to

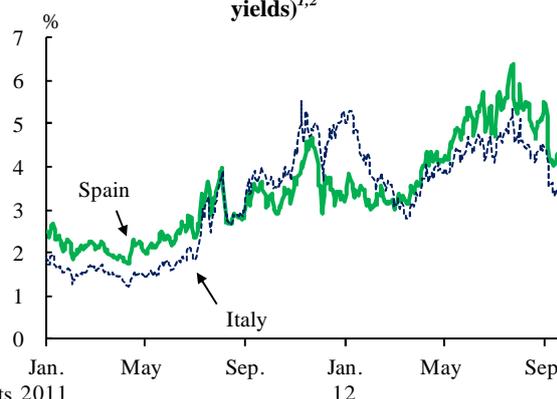
**Chart V-1-13: Distribution of changes in the Tier I capital ratio under the parallel shift scenario of 2 percentage points<sup>1,2</sup>**



Notes: 1. Regional banks are counted.  
 2. The horizontal axis indicates reductions in the Tier I capital ratio following 1 year from the base point (end-March 2012). The vertical axis indicates the share in the overall regional banks.

Source: BOJ.

**Chart V-1-14: Government bond yields in Spain and Italy (spreads over German government bond yields)<sup>1,2</sup>**



Notes: 1. 10-year spreads over German government bond yields.  
 2. The latest data are as of September 28, 2012.

Source: Bloomberg.

<sup>74</sup> The capital losses on bondholdings in Chart V-1-12 indicate the instantaneous capital losses due to a rise in interest rates. These losses correspond to the 100 basis point value in Chapter IV.C -- the capital losses on bondholdings under the parallel shift scenario in which interest rates shift upward by 1 percentage point. On the other hand, in the stress testing, the capital losses on bondholdings are smaller than the 100 basis point value at the end of fiscal 2012 when calculating the Tier I capital ratio. The reason for this is that 1 year will have passed since the base point and the remaining maturities of bonds shorten accordingly. This is termed the "roll-down effect." This effect describes a situation in which, with an upward yield curve, interest rates decline and the market value of bonds increases as the remaining maturities of bonds shorten with the passage of time. In addition, the market value of short-term bonds with the maturities of less than 1 year temporarily declines due to the rise in interest rates, but these unrealized losses on bondholdings eventually disappear owing to redemptions at face value.

1.2 percentage points for major banks and 2.0 percentage points for regional banks (Chart V-1-12). Even in this case, the Tier I capital ratios as a whole would exceed the regulatory level. Nonetheless, attention should be paid to the possibility that a rise in interest rates will affect banks' business conditions through not only capital losses on bondholdings but also a variety of channels such as the real economic channel.

### **Box 9: Accounting standards for bondholdings**

This chapter estimates the effects on banks' capital of a decline in bond prices due to a rise in interest rates of all domestic bonds held by banks. However, the accounting standards evaluate bonds somewhat differently, and not all bonds are assessed under mark-to-market accounting.

The accounting standards classify bondholdings into either of the following categories by purpose: (1) trading securities; (2) held-to-maturity securities; and (3) available-for-sale securities (Chart B9-1). Trading securities, which are held to gain profits from the variation in the market value, are evaluated by mark-to-market accounting. On the other hand, held-to-maturity securities are intended to be held until maturity and are basically not measured at market value.<sup>75</sup> Available-for-sale securities are not classified into either of the first two categories and are evaluated by mark-to-market accounting. However, the variations in unrealized gains/losses in these securities are not included in banks' statements of profits and losses and are directly recorded as net assets in their balance sheets.

In addition to the three categories, there is a category called policy-reserve-matching bonds for life insurance companies. This category covers bonds with the maturity corresponding to that of insurance policies in order to match the duration of assets to that of liabilities. The policy-reserve-matching bonds are basically not assessed at market value. While more than 90 percent of bonds held by banks are classified as available-for-sale securities, the proportions of held-to-maturity securities and policy-reserve-matching bonds are relatively large for life insurance companies (Chart

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<sup>75</sup> However, when the market value decreases significantly and is unlikely to recover, the losses must be included in the statement of profits and losses regardless of the classification of bonds by purpose. A loss of the market value of 50 percent or more is regarded as a "substantial decrease in the market value," while a loss of 30 to 50 percent is assessed properly after taking into account the circumstances. The rates of increase in interest rates that induce a 50 percent decline in the market value would be 7.7 percentage points for 10-year JGBs issued recently (with a coupon rate of 0.9 percent) and 15.0 percentage points for 5-year JGBs (with a coupon rate of 0.2 percent).

**Chart B9-1: Accounting standards for securities holdings by purpose<sup>1,2</sup>**

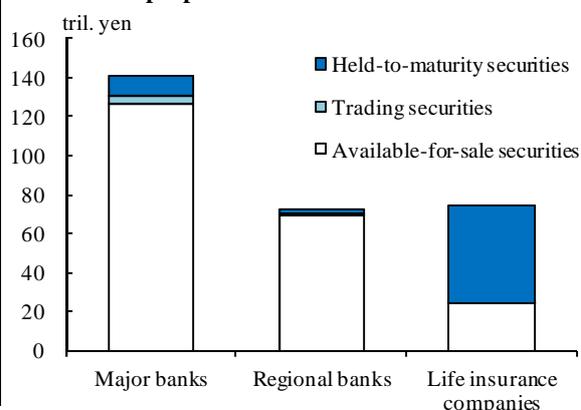
Purpose	Trading securities	Held-to-maturity securities	Available-for-sale securities	Policy-reserve-matching bonds (for insurance companies)
Balance sheet	Valued at market value	Valued at cost	Valued at market value	Valued at cost
Statement of profits and losses	Unrealized gains or losses recorded	Unrealized gains or losses not recorded	Unrealized gains or losses not recorded (recorded as a component of net assets)	Unrealized gains or losses not recorded
Capital adequacy ratio (solvency margin ratio)				
Without the flexible treatment	Unrealized losses recorded	Unrealized losses not recorded	Unrealized losses recorded	Unrealized gains or losses not recorded
With the flexible treatment	Unrealized losses recorded	Unrealized losses not recorded	Unrealized losses not recorded	—

Notes: 1. The flexible treatment of the capital adequacy requirement is an exceptional measure that allows the banks adopting domestic standards to avoid subtracting unrealized losses on securities holdings from Tier I capital through March 2014.  
2. Losses on devaluation are recorded in the statement of profits and losses regardless of the type of the above categories, in the case of a significant decline in the market value with no prospects for recovery.

B9-2).

In evaluating banks' capital adequacy ratios, the unrealized gains/losses are counted in trading securities and available-for-sale securities, while variations in the market value are not reflected in held-to-maturity securities.<sup>76</sup> However, banks do not need to include unrealized losses on holding available-for-sale securities in their capital adequacy ratios since 2008, due to an exceptional measure, namely, the flexible treatment of the capital adequacy requirement. Although this measure has already been terminated for internationally active banks at the end of March 2012, it has been extended for domestic banks until March 30, 2014.<sup>77</sup>

**Chart B9-2: Outstanding amount of bondholdings of banks and life insurance companies by purpose<sup>1</sup>**



Note: 1. Held-to-maturity securities of life insurance companies include policy-reserve-matching bonds. The data are as of end-March 2012.

Source: BOJ.

### *Feedback loop between a rise in interest rates and the real economy*

A rise in interest rates could impair banks' capital through losses on bondholdings and restrain their financial intermediation. This restraint could adversely affect the real economy and exert stronger downward pressure on banks' business conditions. This

<sup>76</sup> While 45 percent of unrealized gains from available-for-sale securities (with the tax effects not considered) are included in Tier II capital for internationally active banks, they are not included for domestic banks. Nevertheless, under the Basel III requirements, all unrealized gains/losses (with the tax effects considered) are reflected in the common equity Tier I capital ratio.

<sup>77</sup> The estimates in this chapter regarding the effects of the rise in interest rates on capital do not take this measure into account.

section estimates how the banks' behavior and the real economy affect each other reflecting an upward shock to interest rates.

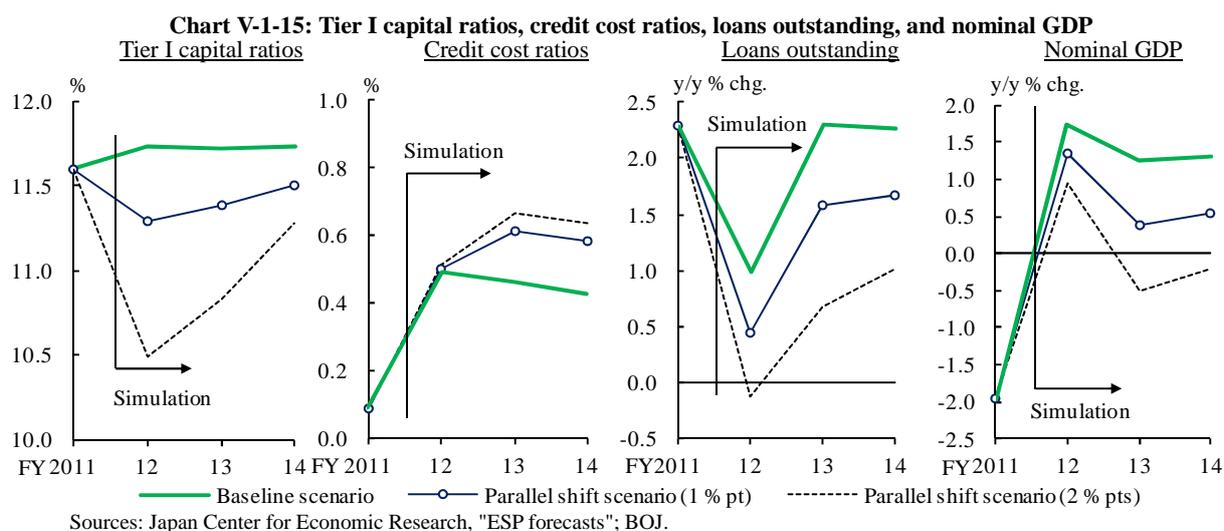
As mentioned above, under the parallel shift scenario in which interest rates for all maturities shift upward by 1 percentage point in fiscal 2012, tightening of banks' lending attitudes would be limited because losses on bondholdings have only insignificant effects on capital. However, following the rise in lending interest rates, the real economy would gradually be under downward pressure and the nominal GDP growth rate would deviate downward from the baseline scenario by about 0.4 to 0.9 percentage point (Chart V-1-15). As a result, credit costs would increase moderately, but such effects on capital are small. Banks' Tier I capital ratios would decline only by about 0.2 percentage point in fiscal 2014 from the baseline scenario.

On the other hand, under the parallel shift scenario in which interest rates for all maturities shift upward by 2 percentage points, the decline in the banks' Tier I capital ratios caused by capital losses on bondholdings in fiscal 2012 would be considerable, inducing banks to tighten their lending attitudes to restore their capital adequacy ratios. Therefore, the bank loans outstanding in fiscal 2014 would deviate downward from the baseline scenario by 1.3 percentage points (Chart V-1-15). Banks' Tier I capital ratios would gradually recover through fiscal 2014, partly due to the restraint on their lending (risk assets) and a reduction in capital losses on bondholdings reflecting the roll-down effect. However, these ratios would decline by 0.5 percentage point at the end of fiscal 2014 from the baseline scenario.<sup>78</sup> The nominal GDP growth rate would turn negative in fiscal 2013 due to a reduction in lending and deviate downward from the baseline scenario by 1.8 percentage points at the maximum.

The results imply that severe shocks in the government bond market, such as concern about fiscal sustainability, could affect the resilience of the financial system and the real economy to an extent of the shocks through the adverse feedback loop between the financial system and the real economy. Such a risk warrants due attention, since Japan's banks hold a massive amount of government bonds.

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<sup>78</sup> See Footnote 74 for an explanation of the roll-down effect.



## B. Resilience against funding liquidity risk

### *Resilience against liquidity risk in yen funding*

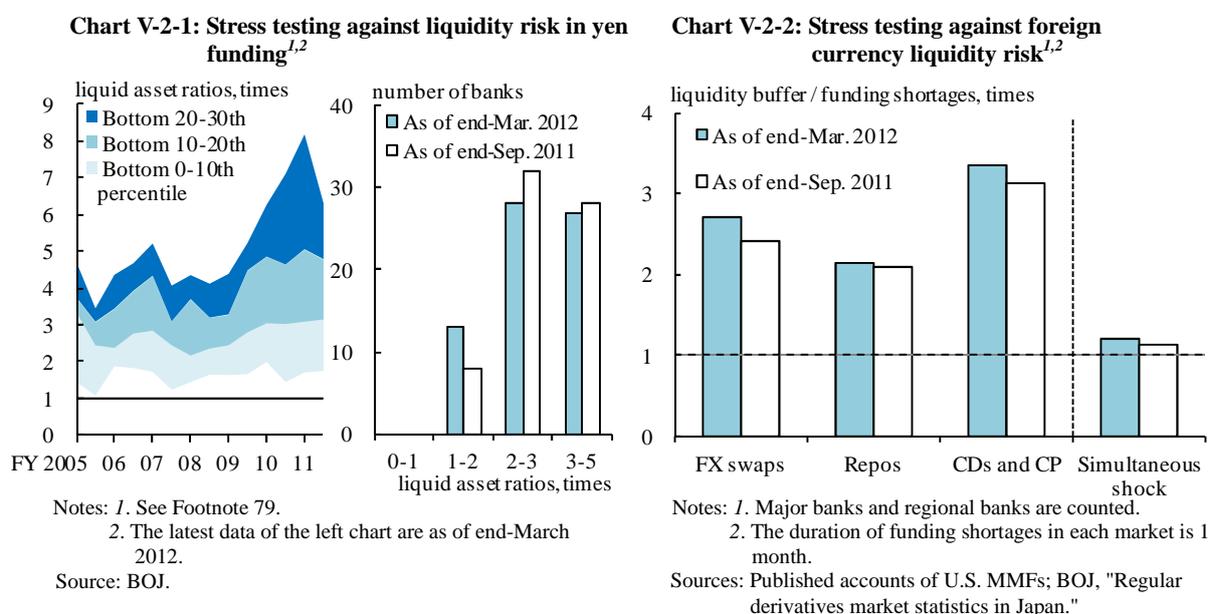
While concern remains over the European debt problem, vigilance persists against counterparty risk of European banks. If concern over the creditworthiness of European banks triggers turmoil in global financial markets, the functioning of the domestic and foreign currency funding markets could deteriorate. With these cases in mind, the resilience of Japan's banks against funding liquidity risk is examined as follows. The estimate is based on the amount of assets and liabilities both in the domestic and foreign currencies as of the end of March 2012.

This section evaluates the adequacy of liquidity buffers for funding in yen at Japan's banks under a stress scenario in which the yen funding market becomes dysfunctional for a certain period.

Even under an assumption of a shock in which market funding in yen comes to a complete stop for 3 months, all banks would have sufficient liquid assets to satisfy short-term funding demand, as was the case in the results of the previous *Report* (as of the end of September 2011; the left-hand side of Chart V-2-1).<sup>79</sup> This is primarily because banks have significantly increased their holdings of liquid assets, particularly

<sup>79</sup> In Chart V-2-1, major banks (excluding trust banks) and regional banks are counted. However, banks whose market borrowing is less than market lending are excluded. The "bottom 0 to 10th percentile" in the left chart indicates the distribution of liquid asset ratios of banks with the lowest liquidity asset ratio and those with the ratios in the bottom 10th percentile. The right chart indicates distributions of liquidity asset ratios under the assumption that the deposit runoff occurred at end-March 2012, and does not show banks with liquid asset ratios over 5 times. See Annex 2 for the definition of liquid asset ratios.

JGBs. Furthermore, even if a more severe shock is assumed in which 10 percent of deposits are drained out of those whose term until the renewal of the deposit rate is 3 months or less, all banks would have sufficient liquid assets necessary for funding, as was the case in the results of the previous *Report* (the right-hand side of Chart V-2-1).



### *Resilience against foreign currency liquidity risk*

This section evaluates the adequacy of foreign currency liquidity buffers at Japan's banks against funding shortages under a stress scenario in which the foreign currency funding markets become dysfunctional for a certain period.

The stress scenario assumes that one of the major sources of foreign currency funding for Japan's banks -- the foreign exchange swap market, the repo market, and the CD and CP markets -- becomes dysfunctional for 1 month. Even under this assumption, Japan's banks would still have an adequate amount of foreign currency liquidity buffers to cover funding shortages that may occur in any of the markets, and their resilience has strengthened to some degree compared with the results in the previous *Report* (as of the end of September 2011; Chart V-2-2).<sup>80</sup> This indicates that even if banks' funding of

<sup>80</sup> Funding shortages due to the disruption of each market comprise the amount of debt due within a month. Foreign currency liquidity buffers include foreign currency-denominated securities (excluding held-to-maturity securities and securities used as collateral in repo transactions) and foreign currency deposits. The estimate is based on the amount of foreign currency-denominated assets and liabilities as of the end of March 2012. Funding shortages are calculated based on the maturity structure estimated as follows: the amount of foreign exchange swaps as well as CDs and CP to be redeemed within a month is estimated based on the data on the transaction balance, while all repo transactions are presumed to be redeemed within a month. If the foreign exchange swap

foreign currencies from any of these markets suddenly grows difficult, banks could retain foreign currency liquidity by selling their foreign currency-denominated securities and using their foreign currency deposits.

However, under an extremely severe stress scenario in which all of the aforementioned markets become dysfunctional for 1 month, funding shortages would amount to almost the same level as the current foreign currency liquidity buffers. Japan's banks have been promoting overseas lending and foreign bond investment, while they depend heavily on short-term markets for foreign currency funding. If overseas short-term markets remain dysfunctional for a long time, Japan's banks may need to find alternative funding sources.

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market and the CD and CP markets are put under stress, banks are assumed to retain foreign currencies by using their foreign currency deposits and selling foreign currency-denominated securities or financing against the collateral of the securities. On the other hand, if the repo market is put under stress, banks are assumed to retain foreign currencies by using their foreign currency deposits and selling the securities. In each scenario, the outstanding amount of funds investment or securities borrowing in repo transactions is excluded from liquidity buffers.

## VI. Assessment and challenges regarding the financial system

This chapter presents a comprehensive assessment of the stability of Japan's financial system based on the earlier discussions. It then summarizes the challenges for Japan's financial institutions in terms of further ensuring stability in the system.

### A. Assessment of the financial system stability

Japan's financial system as a whole has been maintaining stability.

In the examination of the financial system to ascertain financial imbalances, there is no indicator that warns of financial imbalances stemming from bullish expectations. Due attention should be paid, however, to a further increase in the amount outstanding of JGBs held by financial institutions.

The amount of risks banks and *shinkin* banks bear as a whole has been decreasing relative to capital. In these circumstances, the resilience of financial institutions is generally strong. Banks' capital bases as a whole would be able to avoid significant impairment, even if a significant economic downturn similar to that observed after the Lehman shock or an upward shift of domestic interest rates for all maturities by 1 percentage point occurs. Moreover, even if banks become unable to raise funds from some markets, they would generally hold a sufficient amount of funding liquidity both in the domestic and foreign currencies.

Nevertheless, the future external environment for Japan's financial system is highly uncertain. In order to ensure the long-lasting stability of Japan's financial system and to maintain smooth financial intermediation, the following three points warrant particular attention.

First, close attention should be paid to the possibility that shocks such as a further worsening of the European debt problem will lead to a significant downturn in the global economy. If shocks in overseas economies spill over to Japan's economy, credit costs arising from loans particularly to small and medium-sized firms with severe financial conditions could increase. Close attention should therefore be paid to the possibility that capital adequacy ratios will plunge for financial institutions whose quality of loans is relatively low. Moreover, due attention also needs to be paid to the possibility that shocks in overseas stock markets will spread to Japan, and capital of financial institutions with large stockholdings will become impaired. Furthermore, banks could require additional funding sources under a particularly severe situation in

which a number of measures for foreign currency funding become inoperative simultaneously due, for example, to turmoil in global financial markets.

Second, close attention should be paid to the possibility that shocks such as a rise in overseas interest rates and a decline in market confidence regarding fiscal sustainability will cause a significant rise in JGB yields. If JGB yields rise significantly by exceeding the aforementioned assumption, banks' capital could decline to a noticeable extent and such effects could be amplified through an adverse feedback loop between the financial system and the real economy.

Third, close attention should be paid to the steady decrease in financial institutions' core profitability, especially net interest income, amid the decreasing population and the aging of society particularly in nonmetropolitan areas. This is mainly attributable to a decline in the growth potential of Japan's economy and intensified competition among financial institutions. Therefore, the domestic environment for earning profits from financial intermediation could remain severe. If the downtrend in financial institutions' core profitability continues for a prolonged period, an increasing number of financial institutions would face impairment of their capital due to materialization of credit risk and market risk.

## **B. Challenges for Japan's financial institutions**

In order for financial institutions to maintain smooth financial intermediation while ensuring their capability to respond to stresses on the economy and financial markets, they need to address the three major challenges discussed below. In view of these challenges, the Bank of Japan will continue to conduct on-site examinations and off-site monitoring, hold seminars at the Bank's Center for Advanced Financial Technology, and participate in international discussions.

### *Enhancing the effectiveness of risk management*

Financial institutions need to continue to enhance the effectiveness of risk management. It is vital for them to examine risks from a company-wide perspective, including involvement of managers, and enhance their capability to respond to sudden changes occurring in the business environment, such as a major change in financial and economic conditions or a massive disaster, and improve their *ex post* responses.<sup>81</sup>

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<sup>81</sup> For details on issues of operational risk management, such as business continuity arrangements

As for credit risk, various extraordinary measures responding to the crises have gradually been terminated. In this situation, financial institutions need to strengthen measures to help ailing borrowing firms improve their business conditions. At the same time, financial institutions need to appropriately manage credit risk based on the borrowing firms' capacity for self-reconstruction. On the other hand, the weight of overseas lending business has increased further, especially at major banks, and these banks need to enhance their risk management capability further by, for example, examining issues regarding credit concentration risk and acquisition of foreign currencies.

Financial institutions need to examine market risk from multidimensional perspectives with the use of stress testing and other methods, in order to achieve balanced investment portfolios and manage risk in accordance with financial institutions' capital. It is especially important for financial institutions to examine various risks associated with JGB holdings and consider in advance countermeasures for materialization of the risks. They need to reexamine the merits arising from business ties of strategic stockholdings and then reduce these risks at a measured pace.

Japan's financial institutions are required to continue to conduct strict risk management for funding liquidity both in the domestic and foreign currencies. They need to further proceed with their measures to secure stable funding particularly of foreign currencies, given the prominent increase in foreign-currency denominated assets, especially at major banks.<sup>82</sup>

### *Strengthening capital bases*

Financial institutions need to further strengthen their capital bases to maintain smooth financial intermediation well into the future.<sup>83</sup> It is indispensable for them to enhance

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and risk management with regard to computer systems, see the Bank's "On-Site Examination Policy for Fiscal 2012," April 2012.

<sup>82</sup> The Bank continues to monitor the foreign currency funding of Japan's financial institutions that are internationally active and the yen funding of foreign banks resident in Japan. The Bank has also continually conducted the U.S. dollar funds-supplying operation against pooled collateral in cooperation with major overseas central banks and lowered the loan interest rates by 0.5 percentage point in November 2011. The objective of the operation is to avoid market instability through financial institutions' utilization of the operation when the market functioning of foreign currency funding deteriorates.

<sup>83</sup> The conditions for injection of public funds were eased for financial institutions in need of additional capital to smoothly extend credit following the Great East Japan Earthquake. So far, in the disaster areas, public funds have been injected into four regional banks, four *shinkin* banks, and three

their capital not only to be prepared for various stresses but also to continue financial intermediation in areas with high risk and return through investments and loans to growing business areas at home and abroad. In addition, the new requirements for capital adequacy ratios will be applied in an orderly manner to internationally active banks from 2013. Financial institutions will be required to strengthen their capital bases steadily by, for example, accumulating retained earnings and using instruments includable in the capital, with a view to enhancing the quantity and quality of their capital.

### *Constructing stable profit bases*

It is important for Japan's financial institutions to construct stable profit bases to accumulate retained earnings and issue equities smoothly to strengthen their capital bases. However, their core profitability has steadily decreased.

Financial institutions' customer networks are large compared with other industries. Thus, there is room for the institutions to more effectively support local firms' exploration of new markets and business succession by utilizing their own customer networks. They could strengthen their own profitability by increasing business opportunities and receiving adequate commissions through such valuable information services. In supporting firms with growth potential such as start-ups, financial institutions are expected to tap potential demand by increasing the usage of financial instruments such as ABL and utilizing the functioning of funds. Moreover, strategic business partnerships and integration among financial institutions could not only improve business efficiency but also expand their customer networks and in turn strengthen their profit bases.

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credit unions.

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## V. Resilience of the financial system

## Annex 2: Glossary

### *Financial statements of financial institutions*

Comprehensive income = net income + other comprehensive income (such as changes in unrealized gains/losses on stockholdings and bondholdings)

Net income = operating profits from core business + realized gains/losses on stockholdings + realized gains/losses on bondholdings – credit costs ± others (such as extraordinary gains/losses)

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

Net interest income = interest income – interest expenses

Net non-interest income = net fees and commissions + profits on specified transactions  
+ other operating profits – realized gains/losses on bondholdings

Overall gains/losses on stockholdings = realized gains/losses on stockholdings  
+ changes in unrealized gains/losses on stockholdings

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

Overall gains/losses on bondholdings = realized gains/losses on bondholdings  
+ changes in unrealized gains/losses on bondholdings

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

Credit costs = loan-loss provisions + write-offs + losses on credit sales – recoveries of write-offs

Credit cost ratio = credit costs / total loans outstanding

Tier I capital ratio = Tier I capital / risk assets

Tier I capital is the core capital including common equities and retained earnings.

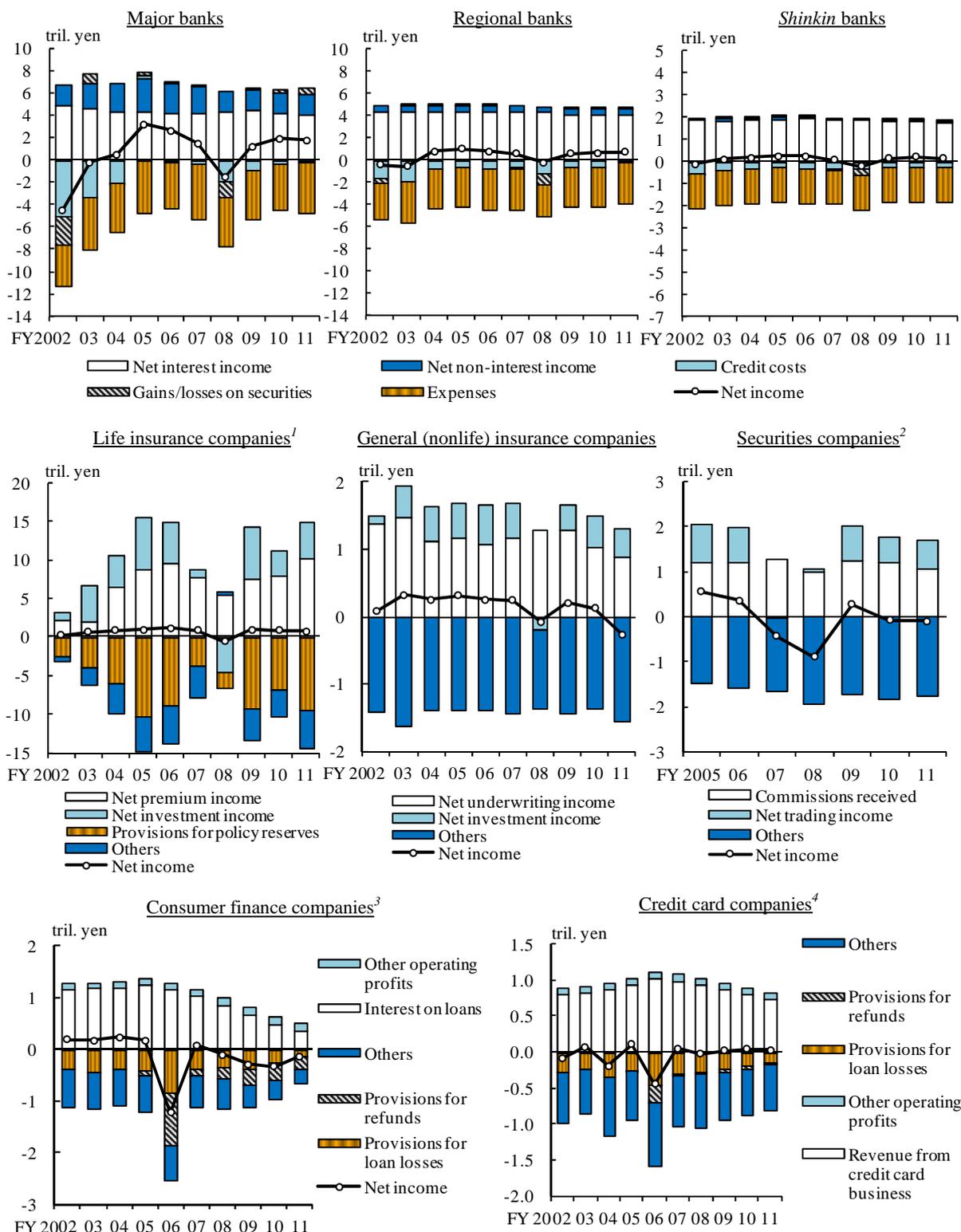
Risk assets are financial institutions' risk-weighted assets.

Liquid asset ratio = (current accounts at the Bank of Japan + cash + government bonds) / (net market funding maturing within 3 months + runoff of deposits with a renewal time within 3 months)

### *Country specification (three-letter code)*

ARG: Argentina, BRA: Brazil, CHL: Chile, CHN: China, CZE: Czech Republic, DEU: Germany, ESP: Spain, FIN: Finland, FRA: France, GRC: Greece, HUN: Hungary, IDN: Indonesia, IND: India, IRL: Ireland, ITA: Italy, KOR: South Korea, MEX: Mexico, MYS: Malaysia, NOR: Norway, POL: Poland, PRT: Portugal, ROU: Romania, RUS: Russia, SWE: Sweden, THA: Thailand, TUR: Turkey, TWN: Taiwan, UAE: United Arab Emirates, USA: United States of America, ZAF: South Africa.

### Annex 3: Financial results of Japan's financial institutions



Notes: 1. Net premium income = premium income and others - insurance benefits paid. Net investment income = investment income - investment expenses.

2. The four major companies are counted for securities companies. For details, see Footnote 63 in Chapter IV.

3. The three major companies are counted for consumer finance companies.

4. The six major companies are counted for credit card companies.

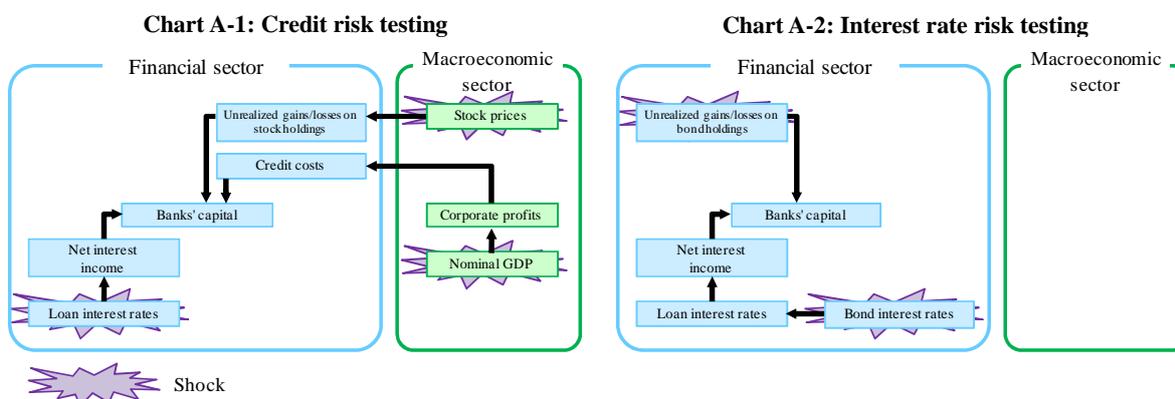
Sources: Published accounts of securities companies, consumer finance companies, and credit card companies; The Life Insurance Association of Japan, "Summary of life insurance business"; General Insurance Association of Japan, "Business result"; Japan Securities Dealers Association, "Financial overview of regular members."

## Annex 4: Framework of macro stress testing

The core macro stress testing in this *Report* includes the feedback loop between the financial system and the real economy. In this section, this new framework of macro stress testing is explained in comparison with the macro stress testing in previous issues of the *Report*.

### Previous macro stress testing

Credit risk testing and interest rate risk testing were the core of macro stress testing in previous issues of the *Report*. Credit risk testing estimates how banks' business conditions would deteriorate under scenarios of fluctuations in the real economy and stock prices. Interest rate risk testing estimates how banks' business conditions would deteriorate under scenarios of an upward shift in the yield curve (Charts A-1 and A-2). These estimations enable the Bank to grasp dispersion among banks' resilience against stresses, because these estimations are based on individual banks.



Nevertheless, such macro stress testing failed to take into account the adverse feedback loop between the financial system and the real economy, in which deterioration in banks' business conditions leads to banks' cautious lending attitudes and consequently depresses the real economy. Therefore, such testing might have underestimated the deterioration in banks' business conditions under stress.

To address this, from the October 2011 issue of the *Report*, the Bank started to partly conduct testing that reflected the adverse feedback loop between the financial system and the real economy using the Financial Macro-econometric Model (FMM), in

addition to the previous macro testing.<sup>i</sup> The Bank, however, could not grasp individual banks' business conditions using the previous FMM, since it assumed an aggregated bank.

#### *New framework of macro stress testing*

In the October 2012 issue of the *Report*, the FMM has been expanded, enabling the Bank to grasp indicators of individual banks' business conditions. This made it possible for the Bank to conduct macro stress testing under the same framework by using the FMM, instead of conducting three types of testing -- credit risk testing, interest rate risk testing, and testing under an adverse feedback loop between the financial system and the real economy -- using separate frameworks as in previous issues of the *Report*. In other words, both credit risk testing and interest rate risk testing have come to reflect the feedback loop between the financial system and the real economy. The details are as follows.

The credit risk testing in this issue of the *Report* assumes that severe stresses equivalent to the Lehman shock occur in overseas economies and global financial markets (an economic downturn scenario; Chart A-3). In this case, a slowdown in overseas economies would affect Japan's economy through a decline in exports, and in turn increase banks' credit costs. Meanwhile, a shock that occurred in global financial markets would decrease domestic stock prices, thereby deteriorating banks' unrealized gains/losses on stockholdings.<sup>ii</sup> This stress testing includes an adverse feedback loop, in which such losses depress the real economy through banks' cautious lending attitudes, deteriorating banks' business conditions. After the inclusion of the adverse feedback loop, the rate of change in nominal GDP (the average figure of the period between fiscal 2012 and fiscal 2014) under the economic downturn scenario is minus 0.7 percent, deviating downward from the previous macro stress testing by 1.4 percentage points.

Furthermore, similar characteristics can be observed in the interest rate risk testing (an

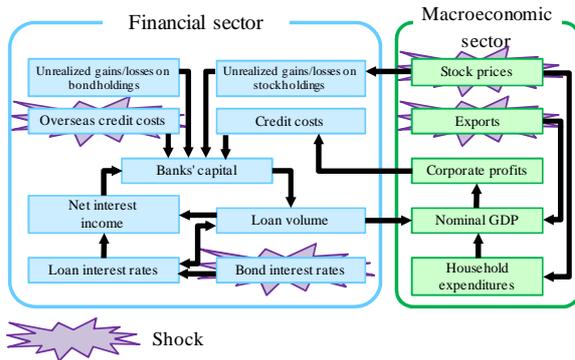
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<sup>i</sup> In previous issues of the *Report*, the feedback loop between the financial system and the real economy was additionally evaluated for the results of credit risk testing and interest rate risk testing, which were the core of macro stress testing. See the October 2011 and April 2012 issues of the *Report* for details.

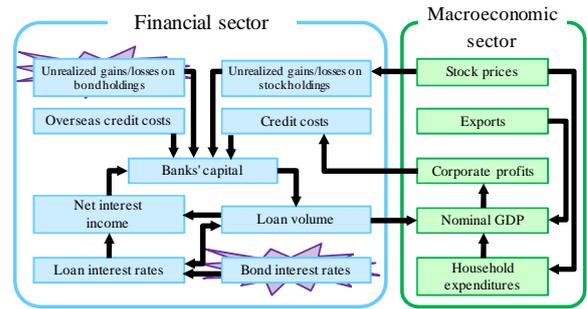
<sup>ii</sup> When global financial markets are under stress, interest rates in Japan tend to decline because of investors' increased demand for safe-haven assets. The credit risk testing in this issue of the *Report* also includes the effects in which the unrealized gains in bondholdings due to the decline in interest rates underpin banks' earnings.

upward shift scenario of interest rates; Chart A-4). The effects of a rise in interest rates leading to changes in banks' unrealized gains/losses on bondholdings and net interest income are the same as in the previous stress testing. The interest rate risk testing in this issue of the *Report* includes a channel in which the effect of these changes on banks' lending attitudes induces fluctuations in economic activity and stock prices, and this outcome in turn affects banks' business conditions.

**Chart A-3: Economic downturn scenario**  
(assessment of resilience against macroeconomic shocks)



**Chart A-4: Upward shift scenarios of interest rates**  
(assessment of resilience against financial market fluctuations)



## Annex 5: Major events in the financial system (since April 2012)

Apr. 12, 2012	The Basel Committee on Banking Supervision (BCBS) announced the results of the Basel III monitoring exercise (quantitative impact study [QIS]).
Apr. 19	U.S.: The FRB, Commodity Futures Trading Commission, Office of the Comptroller of the Currency, Securities and Exchange Commission, and FDIC published a statement that clarified the "Volcker Rule" conformance period.
Apr. 20	The G20 issued a communiqué regarding enhancement of IMF resources for crisis prevention and resolution. Japan: The Financial Services Agency set out a policy package for management support for SMEs based on the final extension of the SME Financing Facilitation Act.
Apr. 27	Japan: The Bank of Japan decided to enhance monetary easing.
May 31	Europe: The European Systemic Risk Board (ESRB) released its first annual report.
June 6	Europe: The ECB decided to continue conducting its main refinancing operations (MROs) as fixed-rate tender procedures with full allotment for as long as necessary. Europe: The European Commission established a framework for the recovery and resolution of credit institutions and investment firms.
June 14	U.K.: The BOE decided to commence operations under the Extended Collateral Term Repo.
June 19	The G20 issued a communiqué.
June 20	Europe: Following elections in Greece, three parties including the pro-bailout ruling parties agreed to form a coalition government.
June 25	Europe: The Spanish government formally requested financial assistance from the Eurogroup.
June 29	Europe: The Eurogroup agreed on establishment of a single supervisory mechanism and direct recapitalization of banks in the euro area through the European Stability Mechanism (ESM).
June 30	Japan: The Financial Services Agency extended the flexible treatment of the capital adequacy requirement for banks that focus on domestic operations through March 30, 2014.
July 11	Europe: The Spanish government announced the launch of a new 65-billion-euro fiscal austerity package.
July 20	Europe: The Eurogroup agreed to grant financial assistance to Spain. U.S.: The Office of Financial Research released its first annual report.
July 25	Europe: The European Commission adopted amendments to the proposals for a Regulation and a Directive on insider dealing and market manipulation of base interest rates including Libor.
July 30	U.S.: The FRB published a final rule establishing risk-management standards for certain financial market utilities (FMUs) designated as systemically important.
Aug. 1	Japan: The IMF released its report of the Financial Sector Assessment Program (FSAP) Update for Japan.
Aug. 7	Japan: The Financial Services Agency announced the draft for partial revisions of the ministerial ordinances, etc., on prompt corrective actions and the relevant supervisory guidelines, following the amendment to administrative notice on capital adequacy rules for internationally active banks based on Basel III.
Aug. 10	U.K.: HM Treasury published "The Wheatley Review of LIBOR: Initial Discussion Paper." Japan: The bill relating to raising the consumption tax rate was passed.
Sep. 6	Europe: The ECB decided to introduce Outright Monetary Transactions (OMTs) in secondary markets for sovereign bonds in the euro area.
Sep. 12	Europe: The German constitutional court ratified the ESM on the condition that Germany's contribution should not be increased without legislative approval. Europe: The European Commission proposed a single supervisory mechanism under which ultimate responsibility for supervising banks in the euro area lay with the ECB.
Sep. 13	U.S.: The FRB decided to purchase additional agency mortgage-backed securities.
Sep. 19	Japan: The Bank of Japan decided to enhance monetary easing.
Sep. 28	U.K.: HM Treasury published "The Wheatley Review of LIBOR: Final Report." Europe: The Spanish government and the Bank of Spain published the results of stress tests on 14 major Spanish banking groups.