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**BOJ**  
*Reports & Research Papers*

*Financial*  
**F***markets*  
**M***report*  
**R**

*Bank of Japan*  
*August 2009*

- This is an English translation of the Japanese version published on July 31, 2009.
- This report covers the market developments during the first half of 2009, unless otherwise stated.

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Financial Markets Department, Bank of Japan

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## **Executive Summary**

### **I. Recovery in Risk Appetite in Global Financial Markets and Vulnerability of the Global Economy**

As the global economy was suffering through the financial crisis after autumn 2008, economic conditions significantly deteriorated, instigating a rapid increase in uncertainty about the economic outlook and financial asset valuations. Under these circumstances, governments and central banks utilized all their policy tools to break the vicious cycle between the financial system and the real economy. Around March 2009, however, uncertainties over the economic and financial environment started to decrease, and some economic agents which had been extremely pessimistic started to change their behavior. As excessive concern over financial system soundness began to abate and expectations began to grow that the real economy would bottom out, investors' risk appetite recovered somewhat and their purchases of risk assets such as equities and credit assets increased gradually.

Such risk-taking activities have yet to be seen in all economic agents. Economic agents have yet to shrink their balance sheets, which grew excessively during the global credit boom that continued until 2007. Accordingly, the global economy remains fragile. Judging from Japan's experience after the bursting of the bubble, balance-sheet adjustments are likely to continue and exert downward pressures on the economy until excess debt declines to a sustainable level. For example, real estate buyers such as households in the United States and the United Kingdom are likely to continue curtailing their spending until their degree of leverage returns to an appropriate level. Subsequently, the supply and demand conditions in real estate markets are likely to continue deteriorating. If the prices of real estate continued to fall as a result of the above, the balance sheets of real estate buyers would be devastated, and their spending would be further constrained.

Although the financial system is regaining market confidence, banks in the United States and Europe still have problems with their balance sheets. They have sought to improve their capital base, but the level of leverage is still high. If asset prices become volatile again due to an economic downturn, U.S. and European banks would have incentives to reduce leverage to avoid bankruptcy -- deleveraging pressures -- because higher leverage means higher bankruptcy risk. During the past few years, U.S. and

European banks became increasingly dependent on short-term funding in the interbank markets and increased their long-term loans funded by this short-term money. Following the financial turmoil, however, banks were exposed to higher liquidity risk due to maturity mismatches. While funding constraints were alleviated as central banks provided substantial liquidity, U.S. and European banks, in order to reduce the risk, would grow less dependent on short-term funding in the interbank markets, which would also exert deleveraging pressures.

Adjustment in the balance sheet of the private sector consists of downward pressure on the economy. Therefore, the public sector should instead underpin aggregate demand for the time being. However, global financial markets seem to be aware of the potential risk that expansion of the public-sector balance sheet due to the increasing fiscal deficit will destabilize long-term interest rates.

## **II. Developments in Domestic Financial Markets in the First Half of 2009: Improvements in the Financial Environment and Nervousness in Financial Markets**

After autumn 2008, domestic markets were strongly impacted by the turmoil in global financial markets and the market functioning deteriorated. Domestic markets remained very nervous for some time after the turn of the year, but upward pressure on interest rates moderated gradually in money markets, reflecting the active implementation of policy measures by the Bank of Japan. In the CP market where the issuing conditions had continued worsening toward the end of 2008, the issuance rate declined thanks to the policy measures taken by the government and the Bank, such as those to facilitate corporate financing. The CP market improved, and many firms with high ratings were able to issue CP without constraints in terms of lots and terms. As investors' risk appetite recovered, investors started to shift the weight in the investment portfolios from safe assets such as government bonds to risk assets such as stocks and corporate bonds. As a result, the increase in the government bond yields, the rise in stock prices, and the decline in credit spreads on corporate bonds were seen.

In the financial markets as a whole, although the intermediary functioning was on an improving trend, the market functioning had yet to fully recover. In money markets, the volume of transactions, particularly longer-term ones, remained low. In the credit market,

investors remained highly selective about the issues they purchased. While investment demand for issues with high ratings was firm, that for issues with low ratings was weak on the whole. In Japanese government bond markets, there was some nervousness, affected by concerns about the increasing fiscal deficit.

In 2009, foreign exchange (FX) rates continued to show unstable movements, greatly influenced by market participants' views on global economic conditions and the financial system. Buybacks of the U.S. dollar and the yen, which were observed toward the end of 2008, came to a halt. After March 2009, some investors shifted their investment from the U.S. dollar and the yen to currencies of resource-rich countries and high-yielding currencies as their risk appetite recovered. However, volatility in FX markets remained high, and investors' risk-taking activities were limited. Short positions in the U.S. dollar and the yen expanded only slightly.

### **III. Outlook for the Financial Markets**

Projections regarding the financial and capital markets need to take into account how the recovery of global final demand and the improvement in financial conditions, particularly of the U.S. and European financial institutions, proceed. When there exists a sector with excessive debt such as U.S. households, the spending of such a sector is curtailed and the demand stimulus effect of additional credit supply may decrease. In such a situation, the pace of economic recovery is likely to be moderate. If adjustments in balance sheets of nonbank sectors continue, there is a risk that nonperforming loans (NPLs) in the banking sector may increase. If the economy deteriorates and the performance of financial institutions worsens again, there is a possibility that concerns over the capital adequacy of financial institutions will reemerge. Markets are still cautious about such a risk. Given these circumstances, markets are likely to remain volatile and sensitive to shocks.

If concerns reemerge over the conditions of the financial sector in the United States and Europe, the downward pressure on the economy will strengthen through a negative feedback loop between financial markets and economic activity. This will lead to an increase in fiscal expenditure and to heightened uncertainty over its financing. If this results in a divergence of long-term government bond yields from fundamentals and an increase in the government's funding costs, there will be a chain reaction in which the funding costs of the private sector supported by the government increase as well. As a result,

there is a possibility that global financial markets' instability would negatively affect domestic financial markets. Considering these potential impacts, the key to financial stability is whether the U.S. and European financial institutions can maintain their disposal of NPLs with due speed.

Meanwhile, in the long run, it is necessary to bear in mind that in the past aggressive policy measures to restore stability in response to financial crisis triggered financial imbalances that developed subsequently, even though the measures' original objectives were achieved. If the financial markets unnecessarily seek the stability, the risk of a new financial imbalance would be heightened. Therefore, maintaining market functioning in a sustainable manner so that appropriate risk assessment is carried out is necessary for financial market stability in the long run. It is vital for each market participant to recognize this, and to work to restore the self-sustaining functioning inherent in the financial markets and strengthen the robustness of the financial and capital markets.



## **I. Recovery in Risk Appetite in Global Financial Markets and Vulnerability of the Global Economy**

Triggered by the failure of Lehman Brothers in September 2008 and subsequent financial system instability, the global economy entered a period of crisis. A negative feedback loop occurred in which financial markets lost their functions, financial institutions grew extremely cautious, and the real economy worsened. Under these circumstances, governments and central banks utilized all their policy tools to break the vicious cycle between the financial system and the real economy. Extreme pessimism was alleviated after March 2009, when the view began to prevail that the worst might be over for the U.S. financial system, and purchases of risk assets such as equities increased.

Nevertheless, economic agents have yet to shrink their balance sheets, which grew excessively during the global credit boom that continued until 2007. Accordingly, the global economy remains fragile. Households in the United States and the United Kingdom are likely to continue curtailing their spending until their degree of leverage returns to an appropriate level. In addition, even though the financial system is regaining market confidence, banks in the United States and Europe still have problems with their balance sheets. In order to minimize the impact of the decline in the quality of assets that exerts downward pressure on profits and capital ratios, banks will continue to deleverage for the time being.

Chapter I of this report discusses global financial market developments from three perspectives: (1) uncertainties surrounding the economic and financial environment; (2) the policy responses of central banks and governments; and (3) continued balance-sheet adjustments.

### **1. Uncertainties Surrounding the Economic and Financial Environment**

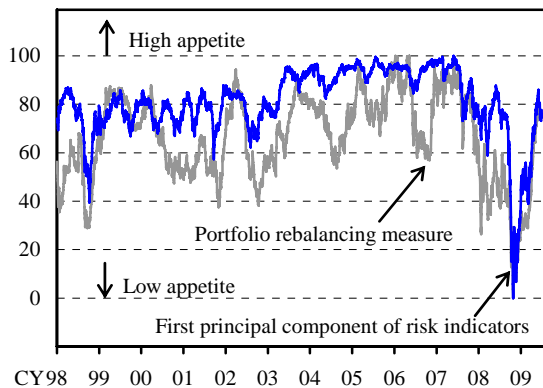
The negative impact from dysfunctional financial markets after the failure of Lehman Brothers was not limited to financial institutions, but extended to households, firms, and all other economic agents. As a result, uncertainties over the economic outlook, the valuation of financial assets, and fund-raising increased dramatically. In the first half of 2009, however, such uncertainties over the economic and financial environment started to decrease, and economic agents which had been extremely pessimistic started to change their behavior. Excessive concern over financial system soundness began to abate, and

expectations began to grow that the real economy would bottom out. Accordingly, the negative feedback loop between financial markets and economic activity was gradually alleviated.

### Signs of a recovery in risk appetite

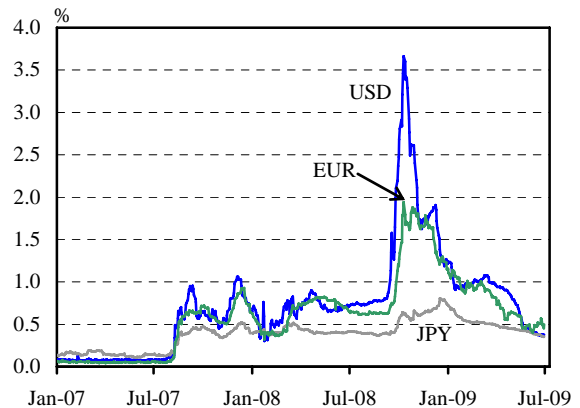
In the second half of 2008, reflecting the heightened uncertainties about the economic outlook and financing conditions, a number of economic agents increased precautionary demand for liquidity, and their risk appetite decreased rapidly to a level previously unseen (Chart I-1-1). Deteriorating expectations about future income and expenditure created a "flight to safety" of funds -- a shift from risk assets (for which the expected financial gain was uncertain) to safe assets (which were secure). This caused a drop in price for risk assets (i.e., an increase in the risk premium).

**Chart I-1-1: Risk appetite indicators**



- Notes: 1. Portfolio rebalancing measure is estimated from risk-return profile of government bonds and stocks for developed and emerging economies. First principal component is estimated from 17 risk indicators such as VIX.  
 2. Linearly transformed between zero and 100.  
 3. See the September 2008 *Financial Markets Report*.

**Chart I-1-2: LIBOR-OIS spreads**

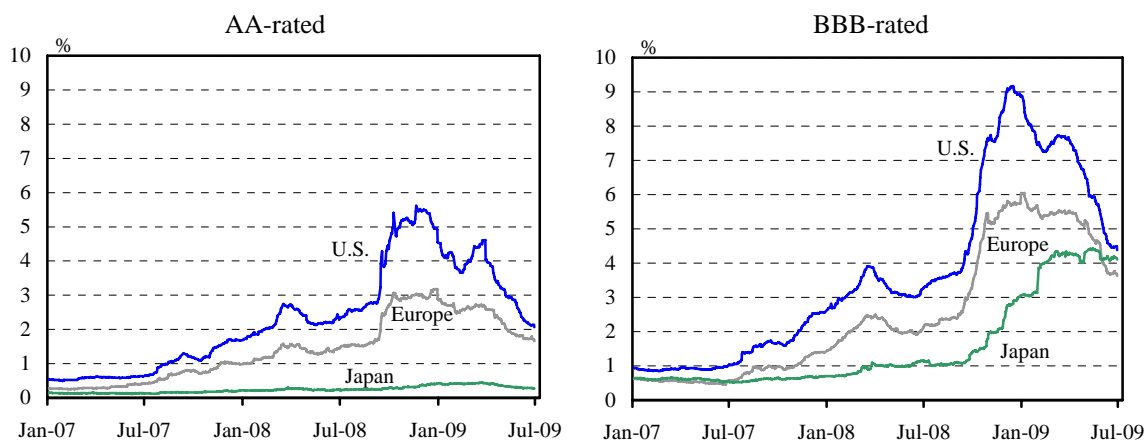


- Note: 3-month.  
 Source: Bloomberg.

This situation gradually improved, thanks to the various financial/industrial stabilization measures taken by governments and central banks. For example, the LIBOR-OIS spread, an indicator for liquidity risk and counterparty risk in interbank transactions, started to narrow significantly after active liquidity provisions by central banks that resolved funding problems toward the year-end (Chart I-1-2). In the U.S. corporate bond market, financial institutions, mutual funds, and other investors started to buy back

credit assets that they considered cheap in terms of the risk/return profile, after having shown great aversion to default risk during the heightened uncertainties. Under these circumstances, the spreads between corporate bonds and government bonds started to shrink at the end of 2008 (Chart I-1-3), and corporate bond issuance surged.<sup>1</sup>

**Chart I-1-3: Corporate bond spreads over government bond yields**

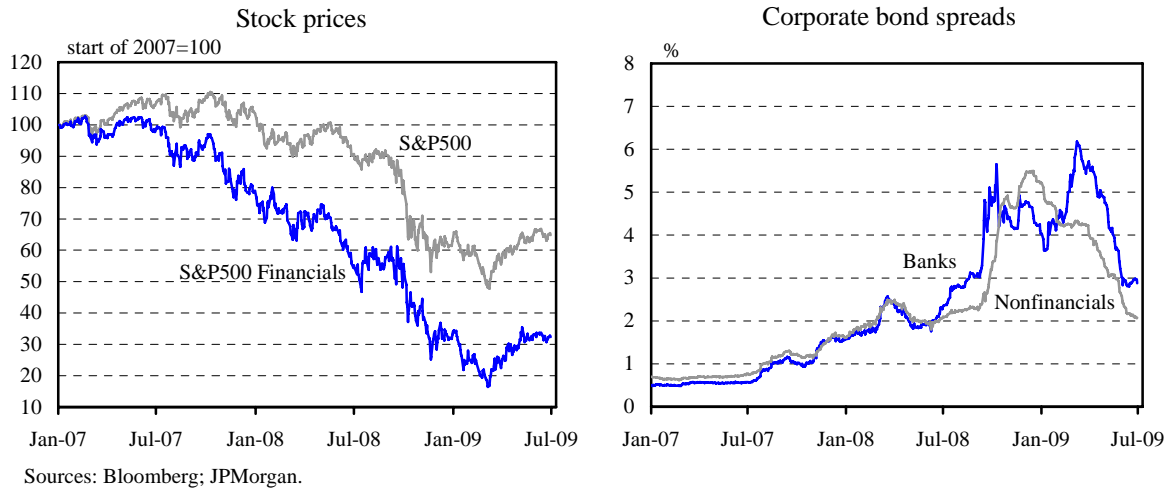


Sources: Bank of America Merrill Lynch; Japan Securities Dealers Association.

However, market sentiment did not show a straightforward improvement, as it was relying solely on the anticipation that public support measures for financial system would work and the negative feedback loop between financial markets and economic activity would be alleviated. Market participants remained rather nervous. After the turn of the year toward March 2009, amid a further deterioration in financial institutions' business results in the United States, the effectiveness of a series of policy measures was questioned because of the lack of effectiveness of measures announced in February 2009. As a result, the recovery in risk appetite came to a standstill, and financial markets once again became unstable. Equity prices fell, led by financials, and banks' corporate bond spreads widened (Chart I-1-4).

<sup>1</sup> U.S. corporate bond issuance almost doubled from 258.2 billion U.S. dollars in the second half of 2008 to 550.6 billion U.S. dollars in the first half of 2009. Concurrently, European corporate bond issuance increased from 261.0 billion U.S. dollars to 521.1 billion U.S. dollars.

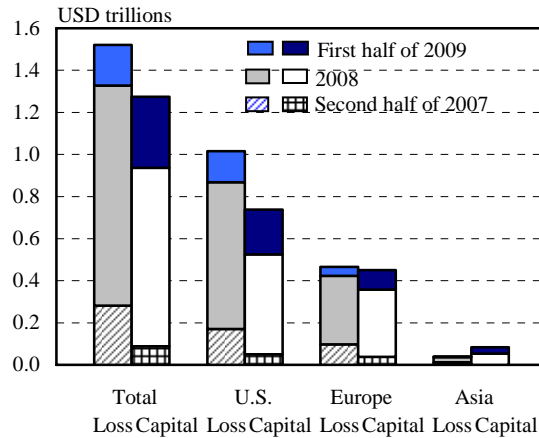
**Chart I-1-4: U.S. financial sector stock prices and corporate bond spreads**



**Alleviation of excessive concern about financial stability and the expected bottoming out of the real economy**

In an environment where destabilized financial markets affected the real economy and this in turn made it necessary for financial institutions to re-price downward the value of their financial assets, concerns were raised regarding the assets, required capital, and survival of the financial institutions. However, fear over the negative feedback loop between financial markets and economic activity receded gradually when public capital was injected into the U.S. and European banks (Chart I-1-5), and the expectation grew that the increase in nonperforming loans (NPLs) would slow down, reflecting the moderating pace of the economic downturn. In addition, the credibility of policy measures was slowly restored, as details of the U.S. financial stabilization measures were published. Initially, it was thought that the Supervisory Capital Assessment Program (SCAP) for the largest U.S. bank holding companies -- the "stress test" -- would reveal unexpected risk factors and undermine confidence in the financial markets. The results of the stress test, however, acted to strengthen confidence, as they did not uncover a greater-than-expected shortage of capital.

**Chart I-1-5: Financial institutions' losses and capital injections**



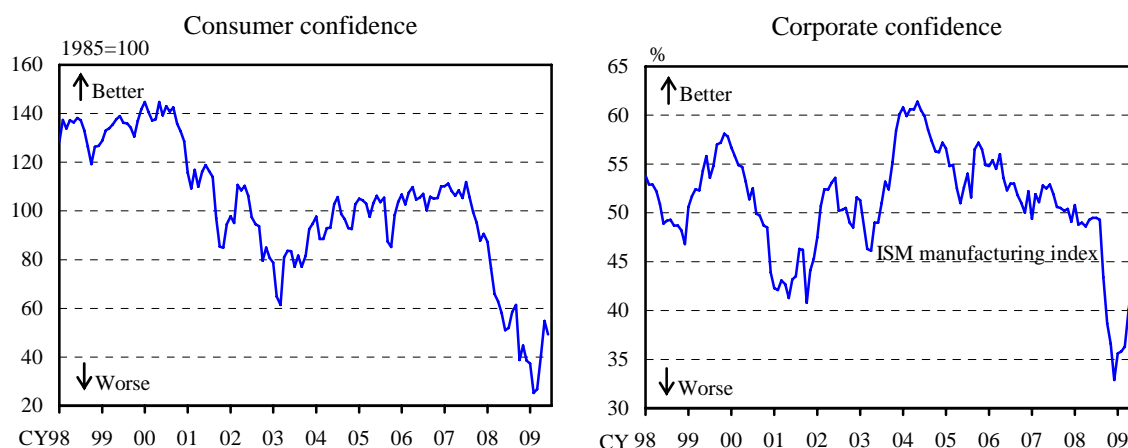
Note: As of July 24, 2009. U.S. data cover all countries in the Americas.

Source: Bloomberg.

At the beginning of 2009, the U.S. bank bond spreads over Treasury yields widened considerably, reflecting the declining market confidence in the policy responses of the public authorities. In early March 2009, however, the spreads narrowed sharply (Chart I-1-4). This confirmed that concern over the financial soundness of banks had eased to some extent and that the public authorities had gained credibility regarding their capacity to control the situation. Thus, the fear that the worst-case scenario would materialize -- and that the public authorities would be unable to take effective measures swiftly enough to respond to the deteriorating financial conditions of large financial institutions, thus significantly increasing financial system fragility -- receded considerably, and the financial markets began to return to stability.

At the same time, expectations for a bottoming out of the economy gradually emerged, given the series of fiscal and financial policy measures in many countries to stimulate demand and inventory adjustment in corporate sector. The level of uncertainty for the economic outlook decreased, and confidence indicators began to improve (Chart I-1-6). Under these circumstances, economic agents' precautionary demand for liquidity decreased, and hoarded liquidity began to return to the markets, partly sustaining spending and causing an inflow of funds to stock markets and credit markets.

**Chart I-1-6: U.S. confidence indicators**



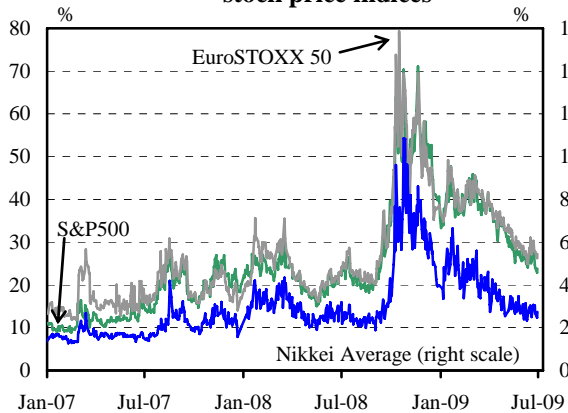
Sources: Conference Board, "Consumer Confidence Survey"; Institute for Supply Management.

### "Flight from safety"

Decreasing uncertainty about the economic outlook was also seen clearly in the reduction in volatility of financial asset prices (Chart I-1-7). This provided incentives for investors to increase the weight of risk assets in their portfolios. In fact, estimates of investors' risk appetite showed a recovery to a level close to the past average (Chart I-1-1). (Various factors such as policy responses by public authorities and economic developments seemed to have contributed to the recovery in risk appetite; for details, see Box 1.)

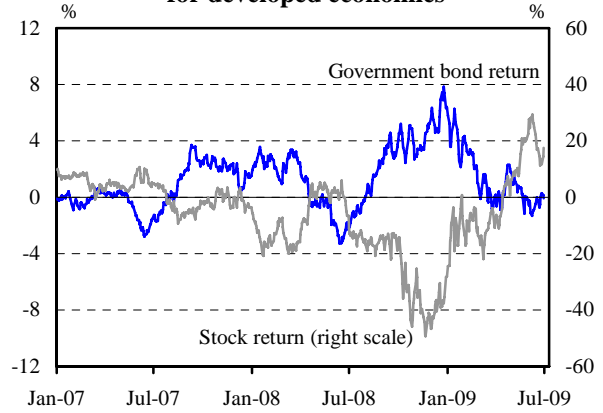
The recovery in investors' risk appetite was seen in the peaking out of government bond prices, which had risen significantly, and the rise in prices of stocks, private-sector bonds, and commodities. Looking at developments in investment return from government bonds and stocks for 20 developed economies, the "flight to safety" intensified the rise in government bond prices and the fall in stock prices until the beginning of 2009, but this trend gradually reversed thereafter (Chart I-1-8). The rise in prices of risk assets due to the decrease in risk premiums led to an improvement in funding conditions of economic agents in the private sector, thereby easing downward pressure on the real economy.

**Chart I-1-7: Implied volatility of stock price indices**



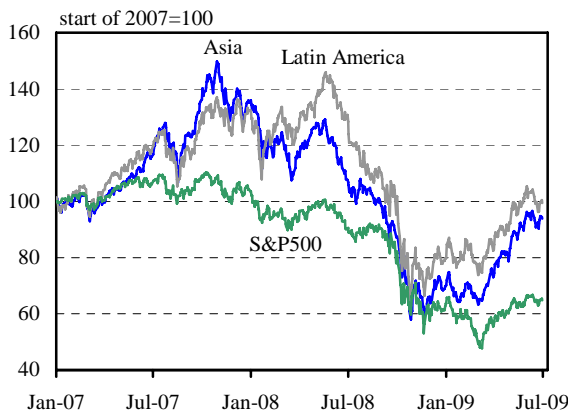
Source: Bloomberg.

**Chart I-1-8: Government bond and stock return for developed economies**



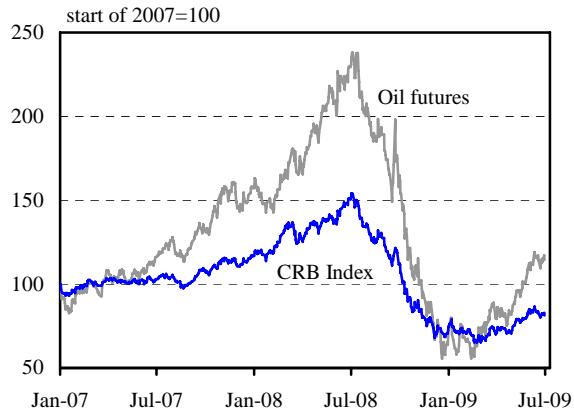
Note: Simple average of 3-month return on government bonds and stock indices for 20 advanced economies.  
Sources: Barclays Capital; Bloomberg.

**Chart I-1-9: Emerging stock price indices**



Note: MSCI emerging market indices in local currencies.  
Source: Bloomberg.

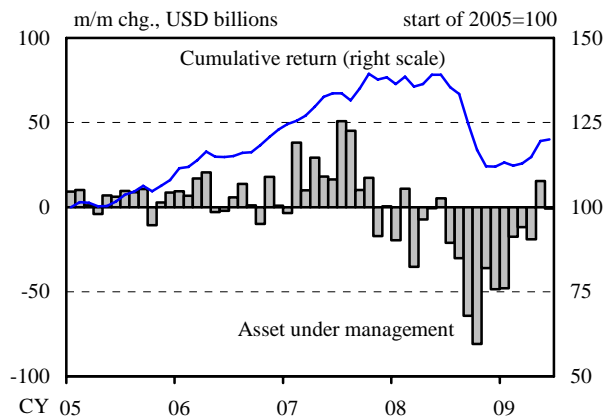
**Chart I-1-10: Commodity prices**



Note: Oil futures indicate the NYMEX price of the nearest contract months.  
Source: Bloomberg.

When investors' risk appetite decreased, the fall in stock prices was more pronounced in emerging economies than developed economies. Conversely, when investors' risk appetite recovered, investors gave priority to rebalancing their investment in emerging economies (Chart I-1-9). Reflecting this, investment in commodities also began to increase (Chart I-1-10). Investment gains of some investors including hedge funds appeared to be on a recovery trend (Chart I-1-11). However, the amount outstanding of assets under management by hedge funds remained significantly reduced, while hedge funds accelerated deleveraging. Some of the funds filed for bankruptcy, having faced a surge in redemption calls.

**Chart I-1-11: Hedge fund performance**



**Box 1: Background to the Recovery in Risk Appetite**

After declining significantly in autumn 2008, investors' risk appetite recovered somewhat, and the prices of risk assets such as stocks began to rise again, as the governments and central banks around the world implemented a series of measures (charts I-1-1 and I-1-8). One of the key factors in the projection of developments in global financial markets and economic activity is whether a recovery in risk appetite is sustainable. In this regard, Japan has experienced situations in which the recovery in risk appetite was either a temporary phenomenon (in 1999) or sustainable (in and after 2003).<sup>2</sup> This experience can serve as a reference for analysis of the current economic situations in the United States and Europe. Japan's experience suggests that an examination of the recovery's sustainability should take account of the factors that led the recovery in risk appetite and the strength of these factors' effects. The factors include the following.

**Factor 1: Introduction of Measures to Ensure Stability in Financial Markets**

In Japan, although public funds were injected twice in 1998 and 1999, banks were unable to fully dispose of their NPLs, and the Japanese economy entered a recovery phase due mainly to the emergence of the IT bubble in 1999. It was not until October 2002, when the Financial Reconstruction Act was enacted, that the resolution of the NPL problem finally began to gain force. This situation contrasts starkly with the present one in the United

<sup>2</sup> It was judged in the Reference Dates of Business Cycle that the economy entered a recovery phase in 2002, but stock prices continued to fall in 2002 and started to rise in 2003.



States, where measures aimed at achieving financial stability such as the Public-Private Investment Program (PPIP) and stress tests were introduced swiftly in succession. These actions may be considered to have contributed to the alleviation of market participants' uncertainty over the financial system and led to the recovery in their risk appetite.

Nevertheless, when a negative feedback loop between financial markets and economic activity is operating, it is difficult to evaluate accurately the true extent of financial institutions' NPL problems or their capital adequacy in real time. It is possible that the current actions taken in the United States, like the actions taken earlier in Japan, might be insufficient to ensure stability in the financial markets.

### **Factor 2: Financial Intermediation -- Direct and Indirect Financing**

In Japan, where indirect financing is dominant, the vast savings in the household sector are channeled through banks to their final investment destinations, so the risk-taking capacities of the banks define the overall risk-taking in the macroeconomy. In Japan, it was not until around 2003 that banks recovered their risk-taking capacities, and so the risk-taking activities in the overall economy also did not pick up. On the other hand, in the United States, direct financing and indirect financing exist side by side. Therefore, even if the direct financing channel in which banks act as intermediaries has not recovered fully, prices of risk assets could rise again as overseas investors and other net-savings entities that have regained risk appetite use the direct financing channels to invest in the United States.<sup>3</sup>

### **Factor 3: Conditions in the Real Economy**

In Japan, the economic recovery led by the IT sector from 1999 lasted only for a short time. In 2001, inventory adjustment pressures started to intensify, and production declined. The long-lasting economic recovery after 2003 was led by exports, with resolution of three excesses -- in capacity, employees, and debt. In contrast, in the current phase, domestic production and overseas production were both promptly adjusted downward, taking the significant decrease in demand into account, and this made the inventory adjustment period

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<sup>3</sup> In the United States and Europe, both short-term and long-term spreads are currently wide compared with those in Japan from 1998 to 2003. This may support profits of banks and contribute to the improvement of banks' intermediary functioning. The increase in profits caused by widening short-term and long-term spreads may not be sustainable, and thus banks' intermediary functioning will not improve structurally.

less prolonged. The large-scale fiscal expenditure also contributed to underpinning aggregate demand. Taken together, these factors enhanced expectations that economic activity would bottom out and thus might have led to a recovery in risk appetite.

The sustainability of the economic recovery, however, depends on the balance-sheet adjustment pressures of economic agents with excess debt (for details, see Chapter I.3).

#### **Factor 4: Market Participants' Optimistic Views on Excess Debt**

In Japan, after the bursting of the bubble, the three excesses -- in capacity, employees, and debt -- put downward pressure on the economy. In the current situation, the excess debt of private nonbanks in the United States, the United Kingdom, and emerging Europe has not been fully resolved, and U.S. and European banks must still address their balance-sheet problems. In this regard, the situation can be viewed as similar to that in Japan after the bursting of the bubble. Although risk appetite has recovered to around the levels seen at the end of 2007 (Chart I-1-1), the economic fundamentals have not recovered to the levels seen in 2007. This might suggest that the recovery in risk appetite thus far is based on market participants' optimistic views on excess debt, and market participants' risk appetite may be revised downward.

## **2. Policy Responses of Central Banks and Governments**

In response to the global financial crisis, central banks around the world implemented a series of policy measures, including unconventional ones, in an effort to bring the turmoil to an end (Chart I-2-1).<sup>4</sup> In addition, governments decided and implemented large-scale economic policy packages and measures to stabilize the financial systems, and the International Monetary Fund (IMF) expanded its lending facilities for emerging economies. These measures seemed to have contributed to preventing the global financial systems from becoming unstable and to maintaining and restoring market functioning by alleviating

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<sup>4</sup> For details on policy responses of central banks for two years from August 2007, see Bank of Japan, "Konji Kin'yu Keizai Kiki ni Okeru Shuyo Chuo Ginko no Taio ni Tsuite (Policy Responses of Central Banks to the Current Financial Crisis)," Bank of Japan Research Paper, 2009 (available only in Japanese).

market participants' concerns about financial system stability.

**Chart I-2-1: Policy measures taken by central banks after the failure of Lehman Brothers**

	Rate cuts	Active liquidity provision in interbank markets	Expansion of asset purchase in financial markets
Federal Reserve	2.00% to 0.00- 0.25%	- Expansion of TAF, PDCF, and TSLF - Interest on reserve balances - Increase in swap lines with foreign central banks	- Supportive measures against individual problem financial institutions - AMLF, CPFF, and MMIFF - Purchase of agency bonds and agency MBSs - Treasury security purchase - TALF
European Central Bank	4.25% to 1.00%	- Fixed-rate full-allotment liquidity provision - Expansion of long-term liquidity provision - Increase in counterparties - U.S. dollar repo and Swiss franc repo	- Expansion of eligible collateral - NCBs' supportive measures against individual problem financial institutions - Covered bond purchase
Bank of England	5.00% to 0.50%	- Expansion of long-term liquidity provision - Discount Window Facility - BOE Sterling bills to drain reserves - Operational Standing Facility - Interest on excess reserve balances - U.S. dollar repo	- Expansion of eligible collateral - Asset Purchase Facility for Gilts, CP and corporate bonds
Bank of Japan	0.50% to 0.10%	- Sufficient liquidity provision over calendar and fiscal year-ends - Increase in JGB purchase - Interest on excess reserve balances - U.S. dollar repo	- Increase in frequency and size of CP repo - Expansion of special funds-supplying - Expansion of eligible collateral - Purchase of CP and corporate bonds - Purchase of stocks held by financial institutions - Subordinated loans to banks

Note: Shadows indicate measures taken during the first half of 2009.

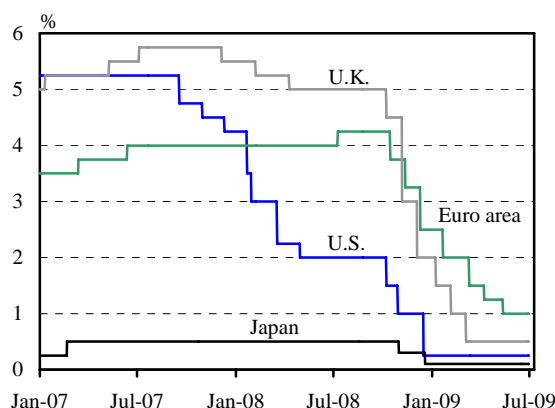
In what follows, policy responses taken in the first half of 2009 are outlined in four areas: (1) the low policy rate; (2) the continued provision of substantial liquidity to interbank markets; (3) the expansion of the range and size of assets purchased from financial markets; and (4) the actions taken by governments and international organizations. It should be noted that (2) and (3) include unconventional monetary policy measures. Conventional monetary policy measures assume that a central bank's control over short-term interest rates through financial markets influences rates (prices) of financial assets of various maturities and types as well as financial institutions, which affects the economic behavior of firms and households, thus transmitting policy effects to the real economy and prices. After the outbreak of the financial crisis, however, the effectiveness of the conventional channel of monetary policy was constrained because the intermediary functioning of markets and financial institutions was impaired and the room for a further cut

in short-term interest rates was limited. Under these circumstances, unconventional monetary policy measures aimed to improve the effectiveness of the conventional channel of monetary policy or to provide a supplementary channel.<sup>5</sup>

### Low policy rate

The central banks of the major developed economies took the coordinated policy action of reducing policy rates in October 2008 and subsequently lowered their policy rates (Chart I-2-2). The European Central Bank (ECB) and the Bank of England (BOE) continued to lower their policy rates after the turn of the year, by a cumulative 1.5 percentage points in the first half of 2009. The Federal Reserve and the Bank of Japan, which had already lowered their policy rates close to 0 percent by the end of 2008, decided to keep them unchanged in the same period.

**Chart I-2-2: Policy interest rates**



Note: U.S. policy rate from December 16, 2008 shows the upper range of the target.

Sources: Bank of England; European Central Bank; Federal Reserve; Bank of Japan.

The central banks of developed economies took a cautious stance in lowering their policy rates to 0 percent, despite lowering them to the historically low levels described above. In explanation, many central banks noted that they wanted to preserve market participants' incentives to trade so that the functioning of money markets would not be lost

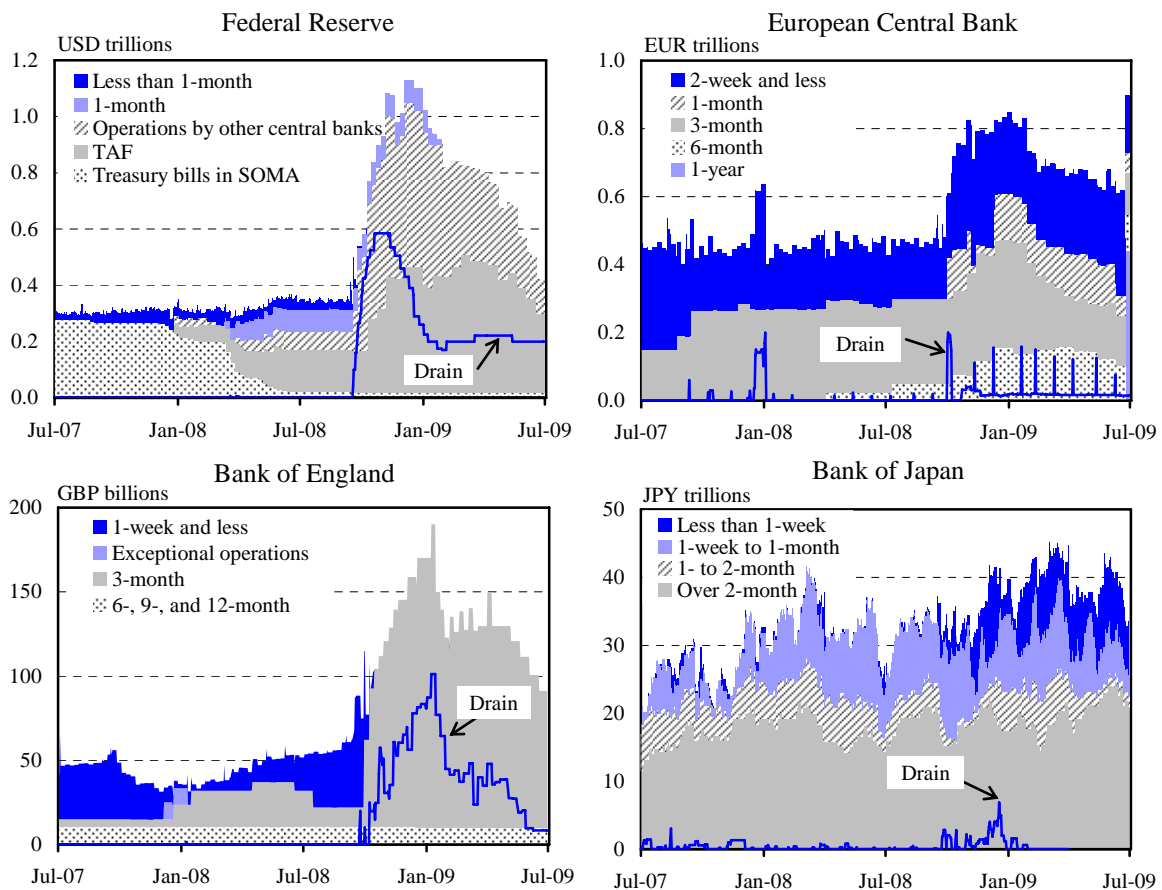
<sup>5</sup> The current unconventional monetary policy measures taken by the central banks can be categorized into two types: (1) credit easing in which a central bank changed the composition and the level of assets on its balance sheet while taking on higher credit risk and term risk than usual; and (2) quantitative easing in which a central bank expanded gross bank reserves well beyond the threshold necessary to achieve the effective lower bound for short-term interest rates.

under the extremely low interest rates.

### Continued provision of substantial liquidity to interbank markets

In order to prevent the effects of low policy rates from being offset by high counterparty risk and liquidity risk in interbank markets, central banks continued to provide substantial liquidity, particularly term funds, in the first half of 2009. As a result, the share of term money in the total amount of funds supplied through funds-supplying operations remained high (Chart I-2-3; for more information on the mechanism in which the provision of liquidity by central banks stabilized the financial markets, see Box 2).

**Chart I-2-3: Market operation outstanding by maturity**

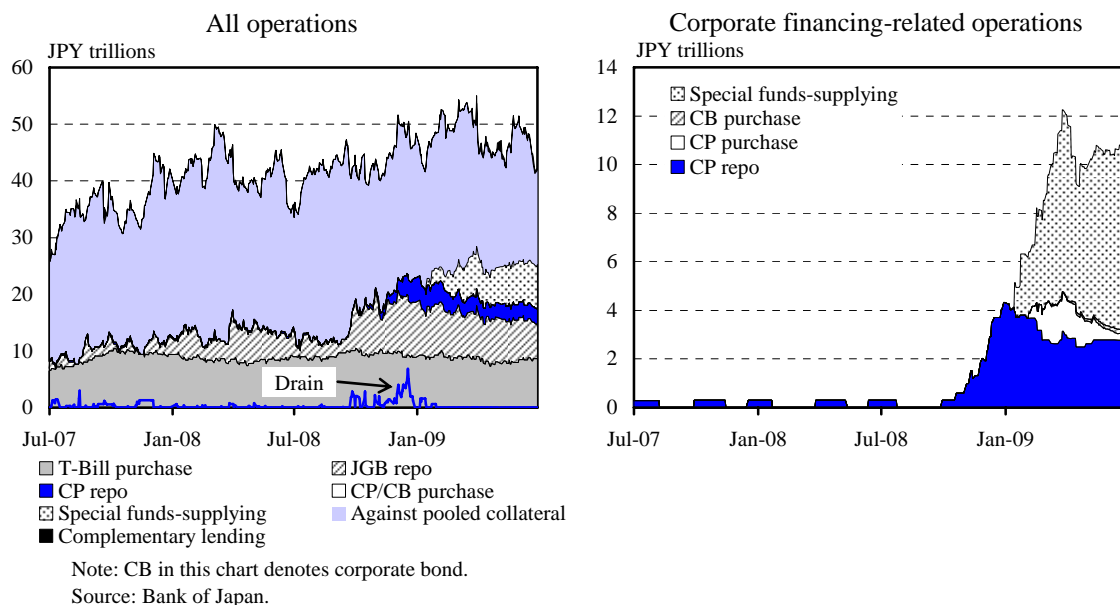


Note: Drain by the Federal Reserve includes the Treasury's Supplementary Financing Program.  
Sources: Federal Reserve; European Central Bank; Bank of England; Bank of Japan.

In May 2009, the ECB introduced longer-term refinancing operations (LTROs) with a one-year maturity through fixed-rate tender procedures with full allotment, after adding six-month refinancing operations to its regular LTROs with a three-month maturity

in March 2008. The rate in the first of these operations was the rate in the main refinancing operations (MROs) at that time, which provided the arbitrage opportunities against investments in government bonds. Therefore, the total value of bids reached the highest level, and short-term interest rates generally declined.

**Chart I-2-4: Bank of Japan's market operation outstanding by type of operation**



To ensure stability in financial markets, the Bank of Japan started to provide funds over the fiscal year-end at an early stage, and the total amount of funds maturing over the fiscal year-end that it provided significantly exceeded the level recorded at the previous fiscal year-end. Furthermore in February 2009, with a view to facilitating a decline in longer-term interest rates -- the rates actually applied when firms raised funds -- and to relieving firms' funding concerns, the Bank expanded special funds-supplying operations to facilitate corporate financing that had been introduced at the end of 2008 (Chart I-2-4).<sup>6</sup> Specifically, the Bank standardized the duration of all such loans to three months, starting from operations for funds maturing over the 2008 fiscal year-end, and increased the frequency of the operations from twice a month to once a week. The Bank also decided to

<sup>6</sup> Special funds-supplying operations to facilitate corporate financing are operations that provide funds to financial institutions at an interest rate equivalent to the target for the uncollateralized overnight call rate, the rate that is more favorable than the average market rate. The operations are conducted for an unlimited amount against the value of corporate debt pledged to the standing pool of eligible collateral.

extend its offering of such loans, which were previously scheduled to be offered through the end of March 2009, through the end of September 2009.<sup>7</sup> On top of that, with a view to further facilitating its money market operations, the Bank decided to accept, as eligible collateral for its provision of credit, debt instruments issued by real estate investment corporations, government-guaranteed dematerialized CP, and bonds issued by the governments of the United States, the United Kingdom, Germany, and France, and a wider range of loans on deeds extended by financial institutions to the public sector.

With regard to provision of liquidity in foreign currencies, in order to address continued pressures in global U.S. dollar funding markets, the Federal Reserve announced, in February 2009, the extension through October 30, 2009 of its existing swap arrangements with 14 central banks that were scheduled to expire on April 30, 2009, to make it possible for other central banks to continue providing U.S. dollar funds. In April 2009, the Federal Reserve, the BOE, the ECB, the Bank of Japan, and the Swiss National Bank announced new swap arrangements that would enable through October 30, 2009 the provision of foreign currency liquidity by the Federal Reserve to U.S. financial institutions. Should the need arise, currencies such as the euro and the yen would be provided to the Federal Reserve via the new swap arrangements with the relevant central banks. In June 2009, the Federal Reserve announced the extension of these swap arrangements through February 1, 2010.<sup>8</sup>

Thanks to the substantial provision of liquidity, tightness in money markets eased, as illustrated by the significant decline in LIBOR-OIS spreads (Chart I-1-2). As a result, the financial institutions' dependence on the above-mentioned provision of liquidity by central banks decreased compared with some time ago, as there was a growing sense that funds were abundant in the markets. The amount outstanding of U.S. dollar funds-supplying operations decreased as the supply and demand conditions in the U.S. dollar funding market eased and the rates applied to the operations rose above the market rates (Chart I-2-5). In

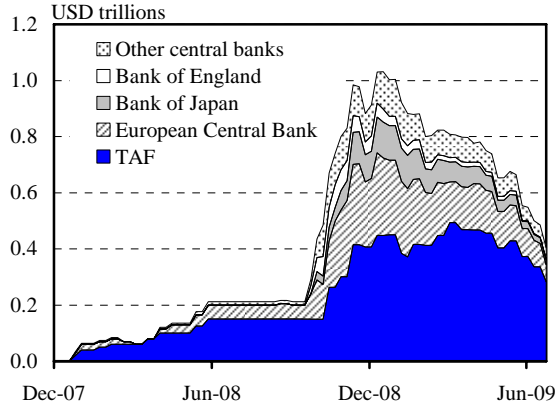
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<sup>7</sup> In July 2009, the Bank also decided to extend the effective periods of special funds-supplying operations to facilitate corporate financing further by three months through the end of December 2009.

<sup>8</sup> In July 2009, when the Bank of Japan decided to extend the period for which temporary measures, such as special funds-supplying operations to facilitate corporate financing, would remain in effect, it decided to extend the swap arrangements through February 1, 2010 together with central banks around the world.

January 2009, the Federal Reserve stopped conducting 28-day term repurchase transactions that had been introduced in March 2008 when repo markets became unstable. In June 2009, it decided to trim the size of upcoming Term Auction Facility (TAF) auctions and a part of the Term Securities Lending Facility (TSLF) auctions. These changes suggested the gradual improvement in market functioning.

**Chart I-2-5: U.S. dollar funds-supplying operation outstanding**

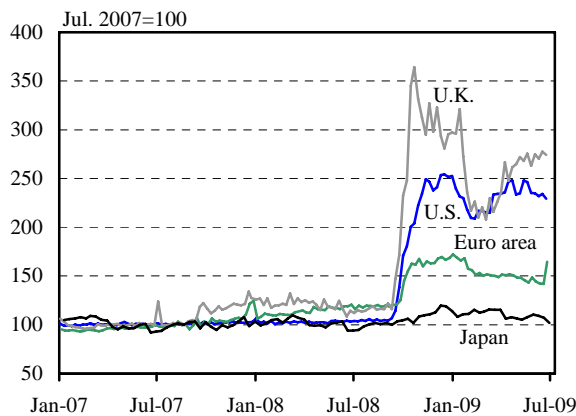


Sources: Bank of England; European Central Bank; Federal Reserve; Bank of Japan.

**Expansion of the range and size of assets purchased from financial markets**

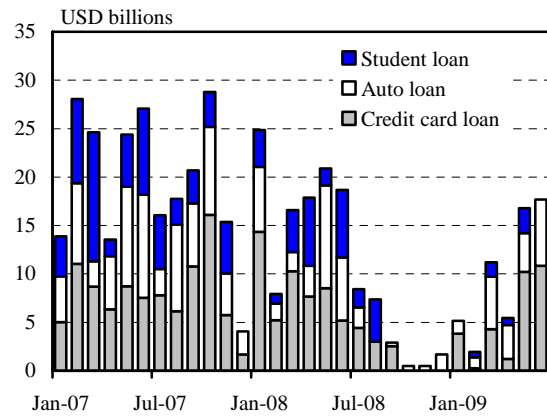
After the outbreak of the financial crisis, in order to enhance or complement the weakened intermediary functioning of financial markets and financial institutions, some central banks started to purchase risk assets. Purchases of risk assets as well as the above-mentioned provision of substantial liquidity led to an expansion of central banks' balance sheets. The size of their balance sheets remained at high levels after the turn of 2009 (Chart I-2-6).

**Chart I-2-6: Size of central bank balance sheets**



Sources: Bank of England; European Central Bank; Federal Reserve; Bank of Japan.

**Chart I-2-7: U.S. consumer loan ABS issuance**



Source: Banc of America Securities - Merrill Lynch.



In addition to the introduction of facilities to purchase CP and agency mortgage-backed securities (MBSs) and agency bonds in the second half of 2008, the Federal Reserve launched in March 2009 the operations of the Term Asset-Backed Securities Loan Facility (TALF), a three-year loan program to the holders of certain asset-backed securities (ABSs) on a non-recourse basis. In the U.S. ABS markets, which had historically funded a substantial share of consumer credit and small business loans, new issuance came to a halt after autumn 2008. After the launch of the TALF, however, new issuance of ABSs recovered to the summer 2008 level (Chart I-2-7), and ABS spreads narrowed to the level that had existed prior to the failure of Lehman Brothers. Although the amount of funds provided by the TALF was small compared with other facilities of the Federal Reserve, the TALF provides financing to private entities to support their purchases of ABSs. In May 2009, the Federal Reserve enhanced the TALF by adding commercial mortgage-backed securities (CMBSs) and other securities, the markets of which had also come to a standstill, to eligible collateral and offering five-year loans under the program.

As temporary measures to facilitate corporate financing, the Bank of Japan began outright purchases of CP and corporate bonds in January and March 2009, respectively. In January 2009, when outright purchases of CP started, the bid-to-cover ratio was higher than two times. As issuing conditions for CP, particularly that with high ratings, improved together with the positive effects of the Bank's special funds-supplying operations to facilitate corporate financing, the total value of bids decreased substantially in and after March 2009, and registered zero for some outright purchases of CP conducted in June (for information on the effects of the Bank's measures to facilitate corporate financing including outright purchases of CP on issuance rates on CP, see Box 4). The outright purchases of corporate bonds provided a safety net in case the corporate bond market deteriorated further, although the total value of bids continued to be below the amount tendered.

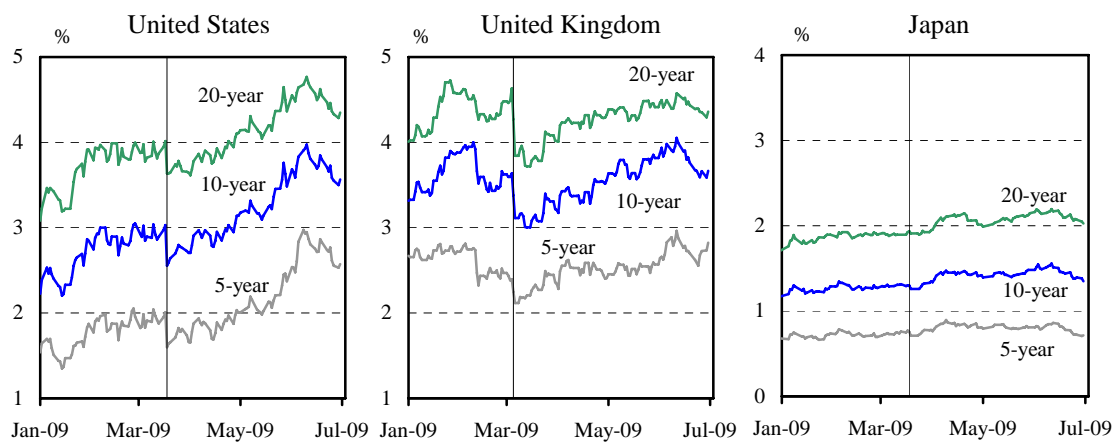
Under the Asset Purchase Facility (APF), the BOE decided to conduct outright purchases of CP and corporate bonds in January and March 2009, respectively, to facilitate corporate financing. In order to restore the functioning of the covered bond market, which had come to a standstill, in May 2009 the ECB decided to purchase euro-denominated covered bonds.<sup>9</sup> Issuance of covered bonds increased due to the announcement effect of

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<sup>9</sup> Covered bonds are bonds backed by mortgage loans and public-sector loans, and are used as funding instruments by financial institutions.

outright purchases of them, and government bond yields declined.

**Chart I-2-8: Government bond yields before and after the announcement of government bond purchase**



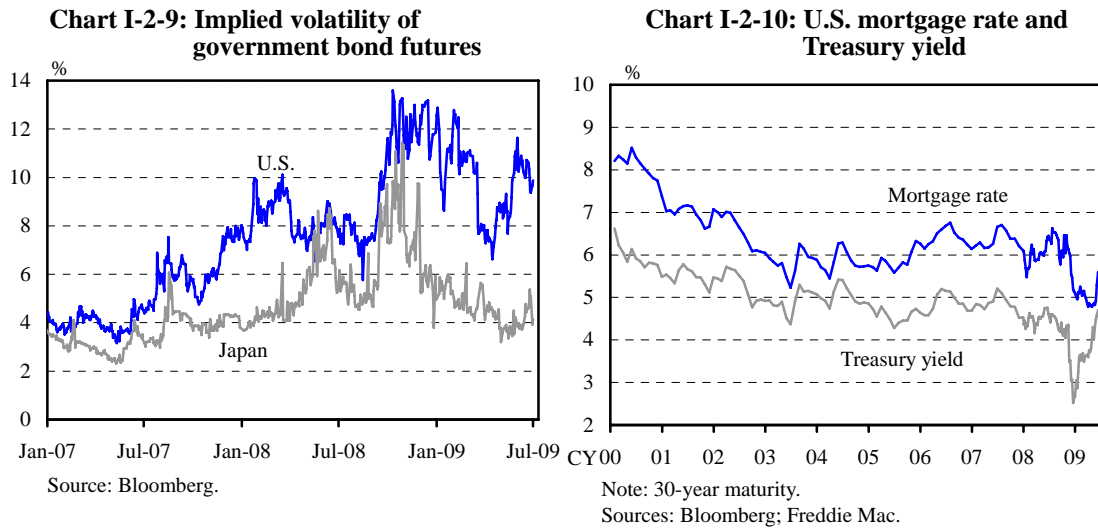
Note: Vertical line indicates the announcement date for government bond purchase.

Sources: Bloomberg; Japan Bond Trading.

In addition to outright purchases from credit markets whose functioning had declined, the Federal Reserve and the BOE decided to conduct outright purchases of government bonds. Their official explanation of the purchases differed; the purchases of long-term Treasury securities by the Federal Reserve aimed at improving conditions in private credit markets, while those of bills by the BOE aimed at directly providing funds to the economy. However, both were designed to improve the financial conditions for firms and households and stimulate the economy. Immediately after the announcements of outright purchases of government bonds, reflecting expectations that the supply and demand conditions of government bonds would improve, long-term interest rates -- particularly those for bonds eligible for the operation -- declined sharply in the United States and the United Kingdom,<sup>10</sup> and the implied volatility of government bond futures decreased (charts I-2-8 and I-2-9). However, long-term interest rates in the United States and the United Kingdom rose gradually, and by May 2009 reached the levels registered before the announcement of outright purchases, as cash outflow from government bonds increased due to the recovery in investors' risk appetite on one hand and concerns about the increasing fiscal deficit on the other. As a result, in the United States interest rates on mortgage loans rose after having declined sharply in response to the announcement of the Federal Reserve's

<sup>10</sup> The rate of decline in yields of ten-year U.S. Treasuries per day was the highest since Black Monday in 1987.

outright purchases of agency bonds and agency MBSs at the end of 2008 (Chart I-2-10).



The Bank of Japan increased the annual amount of its outright purchases of Japanese government bonds (JGBs) to 16.8 trillion yen in December 2008 and 21.6 trillion yen in March 2009. While outright purchases of government bonds in the United States and the United Kingdom were designed to expand the balance sheets of central banks, outright purchases of JGBs by the Bank were measures to ensure market stability by further facilitating money market operations. The Bank decided to resume its purchases of stocks held by financial institutions in February 2009 in order to reduce risks associated with stockholdings by financial institutions. The Bank also decided in April 2009 to provide subordinated loans to banks in order to contribute to bolstering the banks' capital bases. These two measures aimed at ensuring the smooth functioning of financial intermediation and the stability of the financial system, by enabling Japan's banks to maintain sufficient capital bases.<sup>11</sup>

**Actions taken by governments and international organizations**

The confidence in financial markets recovered, against the background that governments made large amounts of fiscal commitments through new measures to ensure stability in financial markets and large-scale economic stimulus packages.

<sup>11</sup> For details on the Bank's resumption of stock purchases held by financial institutions and provision of subordinated loans to banks, see the *Financial System Report* scheduled to be released in September 2009.

With a view to ensuring stability in financial markets, the U.S. government formulated a new Financial Stability Plan in February 2009, which focused on capital injections based on the SCAP and purchases of legacy assets through the PPIP.<sup>12</sup> The results of the SCAP suggested that 10 of the 19 largest U.S. bank holding companies needed to strengthen their capital buffers, and they are scheduled to build sufficient capital bases by early November 2009 under the oversight by the authorities. As for the PPIP, the preparation of programs to buy loans and securitized products got under way.<sup>13</sup> In the United Kingdom, the government announced the Asset Protection Scheme designed to protect financial institutions against exposure to exceptional future credit losses on legacy assets in January 2009. In May 2009, the German cabinet agreed to adopt the Act to Develop Financial Market Stability and approved a "bad bank" scheme that would allow financial institutions to transfer their legacy assets to "bad banks."<sup>14</sup>

With a view to ensuring stability in global financial markets, at the London Summit held in April 2009 to address the global financial crisis, the leaders of the Group of Twenty agreed to make available, through the global financial institutions, 850 U.S. billion dollars of resources, 500 U.S. billion dollars of which would be allocated to the IMF to strengthen its capital base. In March 2009, the IMF introduced the new Flexible Credit Line (FCL) together with its reformed lending and conditionality framework, which would enable the IMF to ensure that its facilities addressed the financing needs more flexibly and effectively. With the increase in resources and the new framework, the IMF sharply expanded the lending framework to emerging economies that were suffering from the current downturn in economic conditions (Chart I-2-11).

The communiqué of the London Summit also stated the fiscal expenditures would amount to 5 trillion U.S. dollars by the end of 2010. The unprecedented and concerted fiscal expansion would be undertaken from 2009 to 2010 in countries around the world, including the United States, whose fiscal expenditures would total more than 5 percent of GDP.

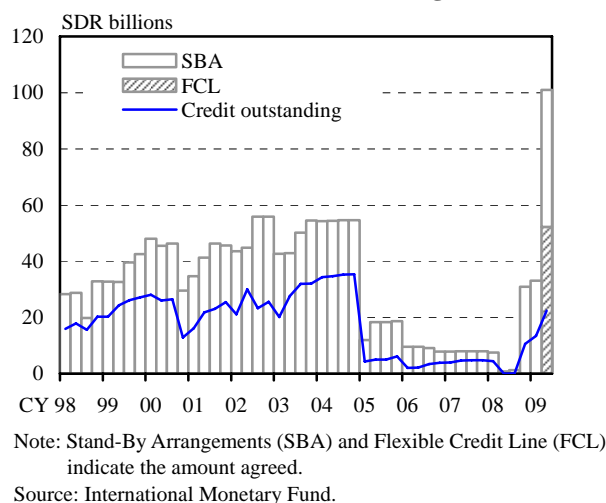
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<sup>12</sup> For details on measures to ensure stability in financial markets taken by governments in developed economies in the second half of 2008 and the first half of 2009, see the *Financial System Report* released in March 2009 and that scheduled to be released in September 2009.

<sup>13</sup> Implementation of programs to buy legacy assets had been postponed so that financial institutions and supervisors could take more time to examine the size and timing of sales of legacy assets to strengthen the banking sector.

<sup>14</sup> The act was approved by the upper house and enacted in July 2009.

**Chart I-2-11: IMF lending**



### **Box 2: Liquidity Crises and Liquidity Provision by Central Banks -- Failure and Promotion of Coordination**

Provision of substantial liquidity by central banks contributed to restoring stability in the markets that were facing liquidity crises. This box outlines the mechanisms behind this.<sup>15</sup>

Liquidity crises, whether they are triggered by a bank run or market run, are associated with "coordination failure" among relevant parties such as depositors and market participants. Coordination failure occurs when the welfare of one economic agent is determined by not only the actions of that agent but also the decisions of other economic agents. Let us look at the case where a liquidity crisis occurs in the interbank market. When liquidity concern increases owing to events such as the failure of Lehman Brothers, banks become concerned about whether they will be able to borrow from other banks when the need for liquidity arises, so they tend to hoard liquidity to fulfill their precautionary demand

<sup>15</sup> Before the outbreak of the current financial crisis, some economists expressed the view that, in the current interbank markets, banks had a high capacity for information gathering and clearly distinguished their counterparties' solvency and liquidity constraints; thus, solvent banks would not face liquidity constraints and a "market run" would not occur. However, in the current situation where uncertainty rose significantly, even banks with a high capacity for information gathering fell into a state of mutual distrust, and market liquidity declined due to coordination failure. As a result, banks faced liquidity constraints regardless of their solvency. For theoretical background on the severe liquidity constraints in the interbank market and roles of central banks in such crises, see Jean-Charles Rochet and Xavier Vives, "Coordination Failures and the Lender of Last Resort: Was Bagehot Right After All?" *Journal of the European Economic Association*, 2 (6), 2004, pp. 1116-1147.

and become less eager to lend to the market. In other words, banks will have greater incentives to hold as much liquidity as possible in anticipation of stress situations such as contraction of market trades. In addition, in a situation where uncertainty grows over information on counterparty risk, when one bank begins to withdraw liquidity, other banks become worried that the action is based on a change in fundamentals not yet apparent to them, and they may follow suit. If such developments extend market-wide, market trades contract, and market liquidity dries up.

In this way, when all economic agents move in the same direction as a result of individual economic agents acting based on their rational expectations of other agents' actions, it is possible that a liquidity crisis will occur even if economic fundamentals are sound, leading eventually to deterioration in fundamentals. In the latest financial crisis, interbank rates rose to levels that deviated significantly from market fundamentals, that is, the actual level of credit risk involved. As a result, deterioration in fundamentals was eventually observed, as the rise in interbank rates themselves contributed to higher funding constraints for banks, leading to a rise in banks' credit risk.

Thus, there is a possibility that market liquidity will dry up when uncertainty in the interbank market grows owing to banks' doubts about the creditworthiness of their potential counterparties. To maintain the level of liquidity in the interbank market, banks need to coordinate actions so that they can lend and borrow funds in the market. When there is a coordination failure, liquidity may suddenly evaporate. In addition, because money markets around the world are interconnected through the trades of internationally active banks, a liquidity crisis that occurs in one market is likely to spill over globally to other markets when coordination failure occurs among internationally active banks.<sup>16</sup>

In the current situation, faced with a liquidity crisis stemming from coordination failure, central banks took coordinated policy action such as policy rate cuts and large-scale liquidity provision measures. The U.S. and European governments also extended government guarantees to the interbank market. The series of measures was effective in providing a coordinating device for banks and investors. In other words, the provision of substantial liquidity by central banks contributed to easing the liquidity constraints of banks

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<sup>16</sup> For more details, see Kei Imakubo, "Kokusai Kin'yu Network kara Mita Sekaiteki na Kin'yu Kiki (Examination of Global Financial Crisis from the View Point of Global Financial Network)," Bank of Japan Review Paper No. 2009-J-9, 2009 (available only in Japanese).

and alleviating uncertainty over banks' funding, and helped change views on fundamentals, including banks' counterparty risk. This further promoted coordination among market participants in regard to liquidity.

The bold policies taken by central banks such as entering into reciprocal currency agreements (swap lines) with other central banks sent a strong signal to market participants that central banks were committed to restoring stability in the global financial network. This signal helped assure market participants that central banks would support market functioning by providing ample liquidity, so there was no need to be overly cautious in market transactions, thus contributing to the recovery in market transactions. In addition, central banks prevented a further deepening of the liquidity crisis through coordinated actions in liquidity provision, while encouraging improvements in other market fundamentals such as fortifying banks' capital base. These efforts culminated in improvements in market participants' outlook on markets and enhancements in the coordination among market participants.

In addition to central banks' liquidity provision measures, financial support programs by international organizations such as the IMF played an important role in preventing the influences of the current financial crisis from spreading to emerging economies. Because European banks held a large share of lending to emerging European markets, if European banks had tried to withdraw their lending to these markets, the economies in the emerging European countries would have been significantly affected. If the concerns had increased over sovereign credit risk, individual banks might have been compelled to withdraw their lending early to avert a potential increase in NPLs. However, if European banks had rushed to retrieve their lending to emerging markets in Europe at the same time, signifying a coordination failure, not only would there have been negative impacts on the emerging European economies, but also much of the remaining debt might

have become NPLs.<sup>17</sup> The support programs initiated by the IMF and other international organizations, such as loans to emerging economies, promoted coordination in order to deter European banks from steeply reducing their exposure to the emerging European economies by avoiding the worsening of economic conditions.<sup>18</sup>

### 3. Continued Balance-Sheet Adjustments

As mentioned earlier, reflecting the positive effects of various measures to ensure stability in financial markets that were taken by governments and central banks around the world, market participants' risk appetite recovered from around March 2009, and prices of risk assets rebounded. Developments in prices of risk assets influence the funding conditions for not only financial institutions but also firms and households, and they also affect the pace of recovery in future economic activity. Therefore, in projecting economic and financial developments, the sustainability of the recovery in risk appetite is a key factor to be taken into account (Box 1). In this regard, careful examination should be made as to whether the recovery in risk appetite since March 2009 has spread to a broad number of economic agents or is limited to a small number.

Sovereign investors in emerging economies and resource-rich countries with excess savings did not suffer from excess debt, although their mark-to-market losses expanded due to the decline in asset prices during the financial turmoil. These investors were again shifting their investment portfolio from safe assets to risk assets as the macroeconomic environment regained stability. Similarly in developed economies, there

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<sup>17</sup> For example, when several banks have undertaken large-scale lending to a certain economic agent (a government or firm), whether a bank allows the agent to renew the loan at maturity will depend on the bank's view as to whether other banks are likely to maintain their lending. When the financial condition of the borrower deteriorates, banks have two options: renew the loan to the borrower at maturity, or collect their loans early. If a bank is confident that other banks will roll over their loans and collects loans early, it may gain the advantage of averting the issue of NPLs. On the other hand, if all banks collect their loans at once, there is a higher probability that remaining debt will become nonperforming, which places all relevant banks at a disadvantage. This is called a collective action problem.

<sup>18</sup> For more details, see the IMF, "European Banking Group Coordination Meeting for Hungary," held in Brussels, Belgium, on May 20, 2009, and "Financial Sector Key to European Recovery," *IMF Survey Magazine: Countries & Regions*, April 24, 2009.



was a recovery in the risk appetite of pension funds and wealthy individuals with excess savings, as well as hedge funds that provided them with services. However, the recovery in risk appetite of entities with excess savings lacks sufficiently strong enough momentum to lead an economic expansion, as their propensity to spend is generally lower than that of entities with excess investments.

The next issue is the risk appetite of economic agents that had excessively increased borrowings and subsequently boosted spending during the credit boom before the financial crisis, such as households in the United States and the United Kingdom and private nonbanks in emerging Europe. If these agents completed their balance-sheet adjustments and their risk appetite recovered, their spending would increase and the economic recovery would become more sustainable. In addition, reducing excess debt of these economic agents and resolving impaired assets at financial institutions, which were two sides of the same coin, would lead to a gradual increase in financial institutions' risk-taking activities and a more sustainable economic recovery. However, the above-mentioned development has not yet been observed.

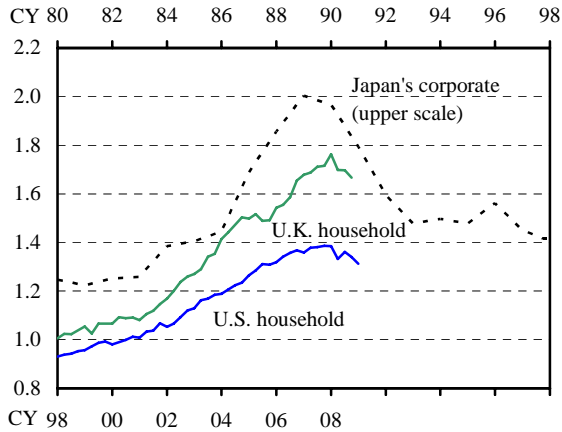
### **Deleveraging of private nonbanks**

In the United States and the United Kingdom, households had increasingly applied for mortgage loans and expanded their balance sheets toward 2007. Households' leverage ratio, the ratio of debt to disposable income, rose to around 1.5 in both countries (Chart I-3-1). Although the leverage ratio fell somewhat in 2008, home prices continued to decline (Chart I-3-2).<sup>19</sup> Households with decreasing collateral margins would have to continue reducing their debt. The continued increase in mortgage delinquency rates (Chart I-3-3) caused by the deterioration in the employment and income situation would force households' deleveraging through the tightening of banks' lending attitudes. Despite the recovery in investors' risk appetite, prices of subprime residential mortgage-backed securities (RMBSs) did not rebound in 2009 but continued to fall (Chart I-3-4) as a result of the deterioration in the quality of mortgage loans as underlying assets.

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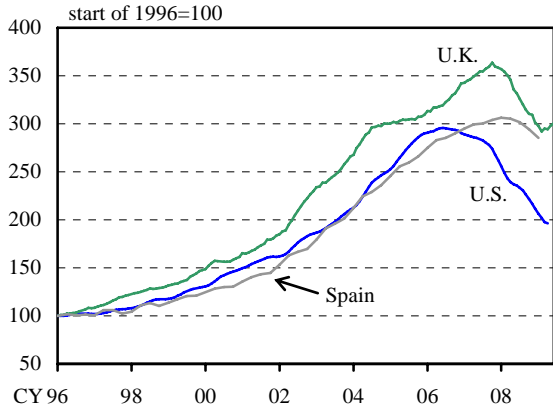
<sup>19</sup> According to the latest data for home prices in the euro area, a decline in home prices was observed in at least six countries of the euro area. For details, see Box 5 of the *Monthly Bulletin* released by the ECB in June 2009.

**Chart I-3-1: Leverage ratios**



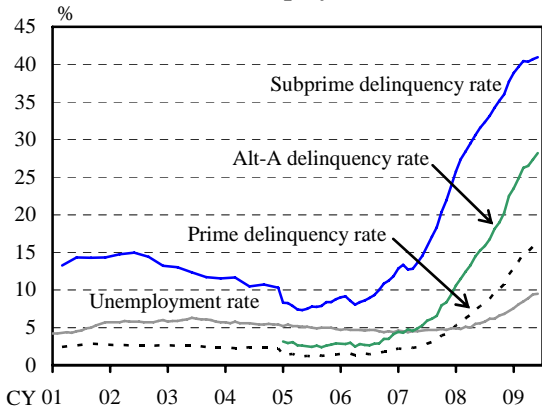
Sources: Bureau of Economic Analysis, U.S.; Cabinet Office, Japan; Office for National Statistics, U.K.; Bank of England; Federal Reserve; Bank of Japan.

**Chart I-3-2: Housing prices**



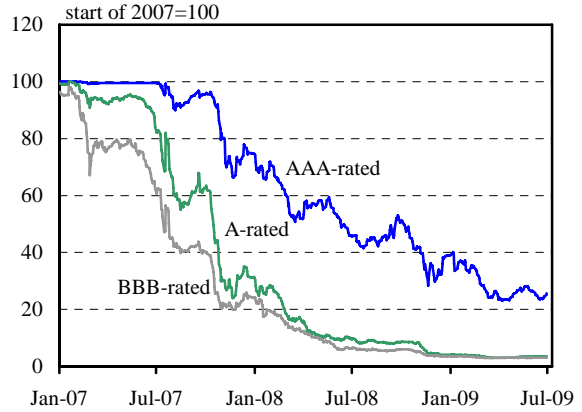
Sources: Ministry of Housing, Spain; Nationwide; Standard and Poor's.

**Chart I-3-3: U.S. mortgage delinquency rates and unemployment rate**



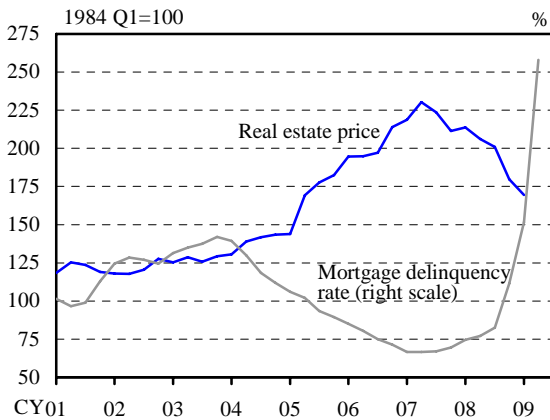
Note: Adjustable/fixed-rate mortgages delinquent for 30 days or more.  
Sources: Bloomberg; Bureau of Labor Statistics, U.S.

**Chart I-3-4: Subprime RMBS indices (ABX.HE)**



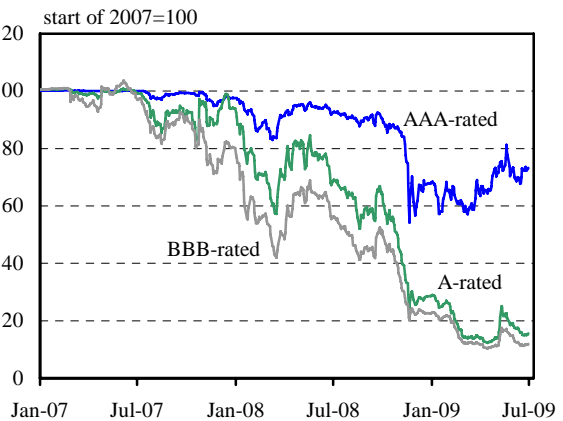
Source: JPMorgan.

**Chart I-3-5: U.S. commercial real estate market**



Note: Delinquency rate for 30 days or more.  
Sources: Citi Strategy and Analysis; MIT Center for Real Estate.

**Chart I-3-6: U.S. CMBS indices (CMBX)**



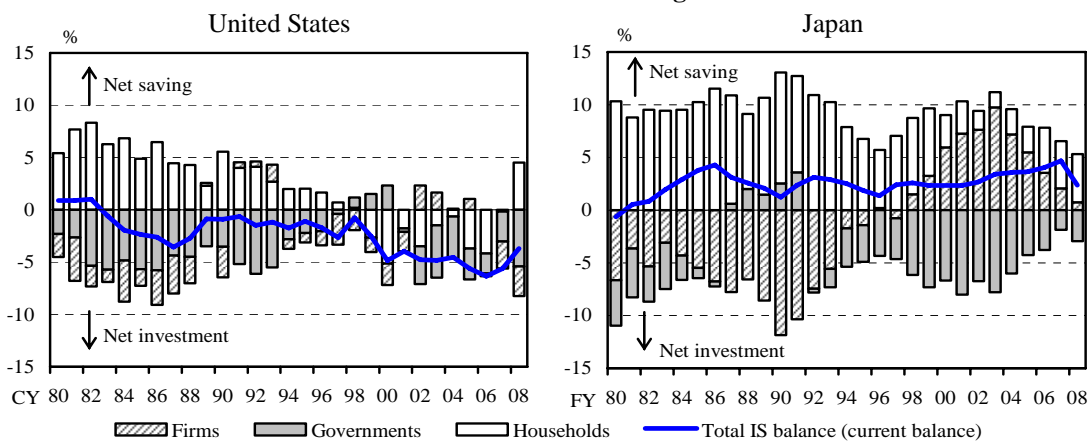
Source: JPMorgan.

In the United States, in the course of the economic decline as seen in weak private consumption, commercial real estate prices fell following the drop in home prices, and delinquency rates of commercial mortgage loans rose sharply (Chart I-3-5). The prices of CMBSs rebounded only temporarily due to the effects of the TALF but remained largely on a downward trend as the quality of underlying assets declined (Chart I-3-6).

Judging from Japan's experience, balance-sheet adjustments are likely to continue and exert downward pressures on the economy until excess debt declines to a sustainable level. During the period of the bubble economy in the late 1980s, it was the debt of firms instead of households that expanded significantly, and the subsequent reduction in firms' leverage ratio, the ratio of debt to GDP, took a long time (Chart I-3-1). Given the difference in sectors with excess debt, or in economic structure and policy measures, it would not be appropriate to directly apply Japan's experience regarding the pace and period of decline in the leverage ratio to the current situation in the United States and the United Kingdom. However, it is highly likely that adjustment pressures on excess debt of households would persist for some time.

The supply and demand conditions in real estate markets are likely to continue deteriorating until the completion of balance-sheet adjustments of the buyers of residential and commercial real estate. If the prices of real estate continued to fall, the balance sheets of real estate buyers holding debt would be devastated. Consequently, their risk appetite would not recover, and their spending would be constrained. This can be seen in the fact that the saving rate of U.S. households, which had remained low, rose sharply (Chart I-3-7). In Japan, after the bursting of the bubble, firms with excessive capital stock and excessive debt took a long time to curtail spending and repay debt to move to net saving positions, and this pushed down the growth rate.

**Chart I-3-7: Investment-saving balances**

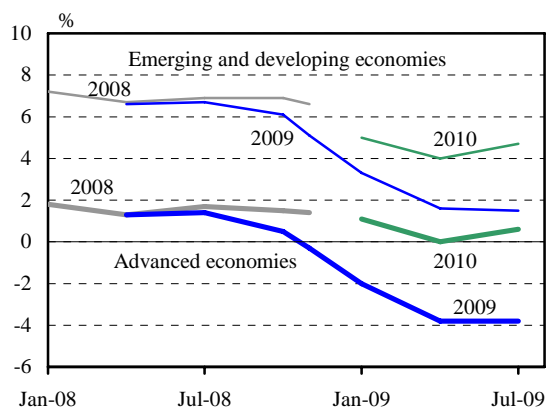


Note: IS balance to GDP ratios.

Sources: Federal Reserve, "Flow of Funds Accounts"; Bank of Japan, "Flow of Funds."

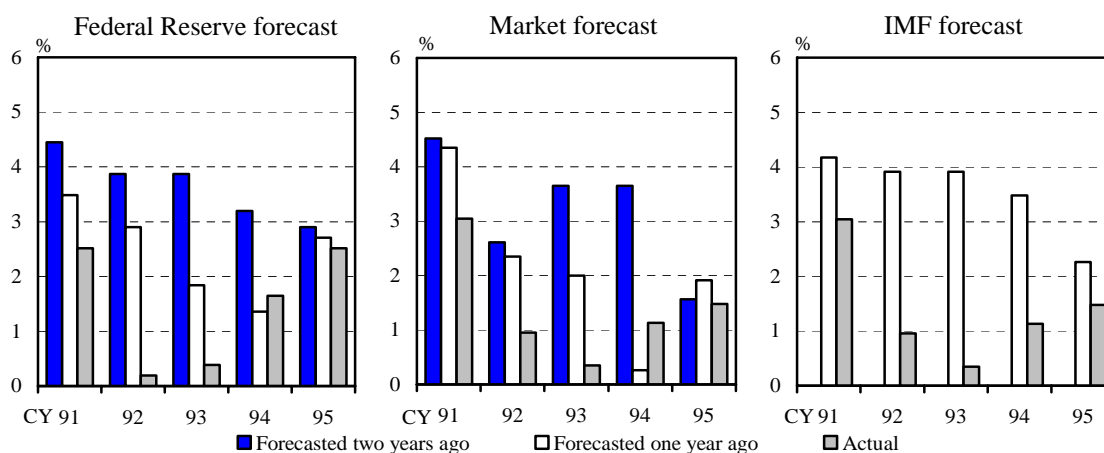
Looking at the IMF's *World Economic Outlook*, world growth is projected to recover in 2010, reflecting growing expectations for economic activity to bottom out (Chart I-3-8). It should be noted that, when balance-sheet adjustment pressures are exerted on the economy, the economic growth rate tends to be revised downward from the projections. When the balance-sheet adjustments of individual economic agents progress and economic agents decrease their spending, macroeconomic data on income and profits tend to deviate downward. As income and profits are the source of repayment of debts, their downward deviation would lead to an upward revision of leverage of households and firms, which in turn would necessitate a further decrease in spending. Such downward pressures on the economy could be mitigated by policy measures. However, after the bursting of the bubble, the growth rate of the Japanese economy was successively revised downward despite a series of policy rate cuts and fiscal expenditures (Chart I-3-9).

**Chart I-3-8: World economic outlook**



Source: International Monetary Fund, "World Economic Outlook."

**Chart I-3-9: Outlook for Japan's real growth after the bursting of the bubble**



Note: Federal Reserve forecast is a year-on-year rate of change in the fourth quarter, and market and IMF forecasts are an average annual rate of change from the previous year.

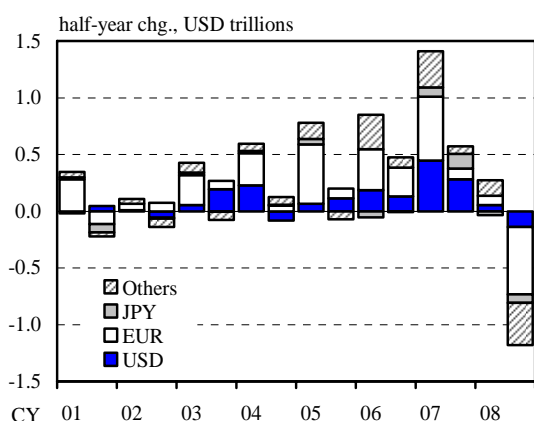
Source: Ahearne et al., "Preventing Deflation: Lessons from Japan's Experience in the 1990s," FRB International Finance Discussion Papers, No.729, 2002.

### Banks' balance-sheet adjustment pressures

Reducing excess debt of private nonbanks and resolving impaired assets held by banks are two sides of the same coin. As long as private nonbanks, such as households in the United States and United Kingdom, continue to deleverage, U.S. and European banks will continue to adjust their balance sheets. Although U.S. and European banks have sought to improve their capital base (Chart I-1-5), the pace of decrease in leverage is slow. If asset prices become volatile again due to an economic downturn, U.S. and European banks would have incentives to reduce leverage to avoid bankruptcy, because higher leverage means higher bankruptcy risk. The quality of assets is still declining, as seen in the rise in delinquency rates, and this could lead to an increase in mark-to-market losses of banks and the heightening of pressures to reduce their asset holdings.

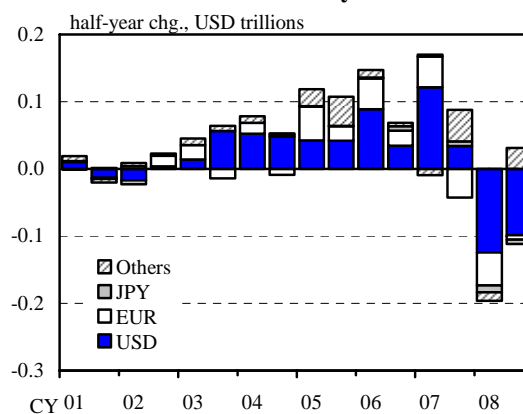
During the global credit boom that continued until 2007, U.S. and European banks became increasingly dependent on cross-border transactions to obtain short-term funds in the markets and increased their long-term loans funded by this short-term money. Following the financial turmoil, however, banks were exposed to higher liquidity risk due to maturity mismatches. In fact, international banking activity in the interbank markets expanded significantly until 2007 and then fell sharply around mid-2008, and liquidity in the international interbank market declined (Chart I-3-10). In particular, European banks noticeably decreased their interbank transactions in euros. U.S. dollar deposits (foreign reserves) from monetary authorities in developing countries had played an important role in European banks' expansion of their businesses in global financial markets, as the banks do not have retail deposits in U.S. dollars. In 2008, increasingly concerned over counterparty credit risk, the monetary authorities in developing countries withdrew U.S. dollar deposits (Chart I-3-11). This also led to tighter funding conditions for European banks.

**Chart I-3-10: Banks' foreign claims on banks**



Source: Bank for International Settlements, "Locational International Banking Statistics."

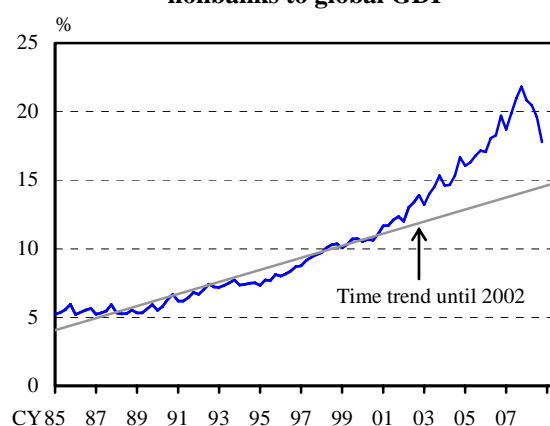
**Chart I-3-11: Banks' foreign debt to monetary authorities**



Source: Bank for International Settlements, "Locational International Banking Statistics."

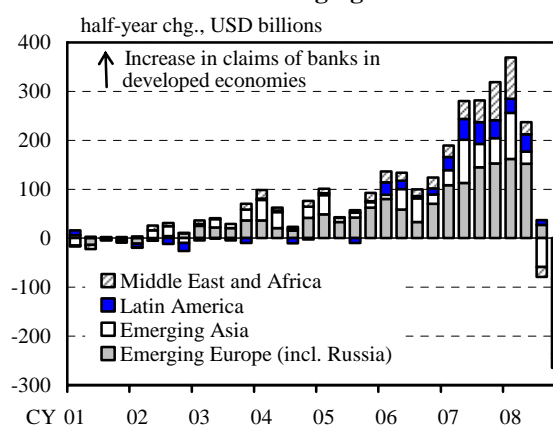
While funding constraints were alleviated as central banks provided substantial liquidity, U.S. and European banks, in order to reduce the risk, would grow less dependent on short-term funding in the interbank markets, which would also exert deleveraging pressures. For example, the foreign claims of banks on nonbanks had expanded at a faster pace than global GDP growth since around 2002, but then decreased from 2008 onward (Chart I-3-12; see Box 3 for details on characteristics of the credit cycles from the viewpoint of international banking activity). Heightened sovereign risk of emerging economies as a result of the global economic destabilization seemed to have further triggered a return of funds from overseas. The foreign claims of banks on emerging economies, particularly emerging Europe, increased at a faster pace based on the decoupling theory, even after the downturn in developed economies was projected reflecting the emergence of the U.S. subprime mortgage problem in summer 2007 (Chart I-3-13). Therefore, there is a possibility that banks could come under renewed pressures to reduce their foreign claims as accumulated loans reach maturity. European banks, however, might reduce their positions in markets in emerging Asia or developed economies instead of emerging Europe, because the latter are strategically crucial markets for many European banks. As the economic activity of emerging Europe is the most vulnerable among emerging economies, European banks might aim to secure medium- to long-term profitability while holding considerable risks on their balance sheets in the short run.

**Chart I-3-12: Ratio of banks' foreign claims on nonbanks to global GDP**



Sources: Bank for International Settlements, "Locational International Banking Statistics"; International Monetary Fund, "WEO Database."

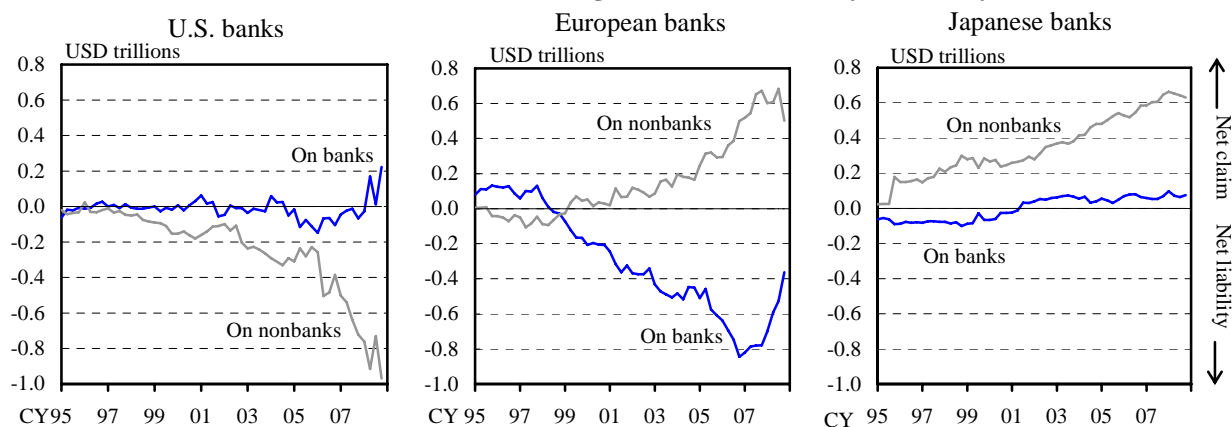
**Chart I-3-13: Banks' foreign claims on emerging economies**



Source: Bank for International Settlements, "Locational International Banking Statistics."

Looking at banks' foreign claims by nationality, Japanese banks did not have to reduce their foreign claims on nonbanks to a great extent, as the short-term foreign claims on banks were small.<sup>20</sup> On the other hand, European banks faced pressures to reduce their foreign claims on nonbanks, as they had accumulated a significant amount of short-term foreign claims (Chart I-3-14).<sup>21</sup>

**Chart I-3-14: Banks' net foreign U.S. dollar claims by nationality**



Source: Bank for International Settlements, "Locational International Banking Statistics."

### Expansion of governments' balance sheets

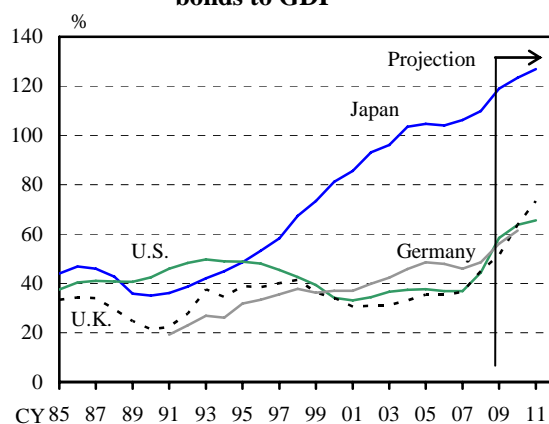
Decreasing the leverage of economic agents that had expanded their balance sheets excessively during the global credit boom that continued until 2007 became essential to normalize economic conditions. The adjustment process, however, exerted downward pressure on economic activity in the adjustment phase. In order to facilitate the progress of the adjustment process while averting a protracted and substantial deterioration in the real economy, the governments and central banks around the world took a series of measures. In

<sup>20</sup> In terms of foreign claims on other banks, Japanese banks had been net borrowers of U.S. dollars until the late 1990s, but began to cut back on their foreign positions after experiencing a rise in the Japan premium in the aftermath of the 1998 financial crisis. Japanese banks became net lenders of U.S. dollars from around 2002, and being net long on U.S. dollar positions seems to have been less damaging to them compared to their European counterparts when the conditions of the U.S. dollar interbank markets tightened after summer 2007.

<sup>21</sup> In Chart I-3-14, changes in foreign reserves of monetary authorities are reflected in banks' net foreign claims on banks. When banks receive more U.S. dollar deposits as overseas monetary authorities allocate more of their foreign reserves in these assets -- in other words, when banks increase their external liabilities -- the chart indicates that this creates a considerable drop in net foreign claims on banks.

other words, public entities expanded their balance sheets for private entities in order to avoid a situation in which private entities' deleveraging led to a significant deterioration in macroeconomic conditions (charts I-2-6 and I-3-15). The ratios of the amount outstanding of government bonds to GDP are projected to rise due to large-scale fiscal expenditures. Looking at this from the perspective of the investment-saving balance, in the United States, for example, households increased their net saving through deleveraging, while the government increased its net investment by expanding the fiscal deficit to support aggregate demand (Chart I-3-7). Similar developments had been seen in Japan after the bubble burst. In Japan, firms that had expanded their net investment during the bubble period deleveraged after the bubble burst and became a sector of net saving as the government increased its fiscal deficit.

**Chart I-3-15: Ratios of outstanding government bonds to GDP**



Sources: Bureau of Economic Analysis, U.S.; Eurostat; Office for National Statistics, U.K.; Cabinet Office, Japan; Bundesbank; Federal Reserve; Bank of Japan.

Active implementation of fiscal policies around the world contributed to the recovery in investors' risk appetite by halting the economic deterioration. As described in Chapter I.1, shifting the weight in the investment portfolios from safe assets such as government bonds to risk assets could have led to a decline in demand for government bonds, thereby lifting government bond yields. An increasing number of market participants considered that additional changes in the supply-demand balance of government bonds caused by an increase in government bond issuance (an increase in supply) through



expansionary fiscal policy also exerted upward pressures on interest rates.<sup>22</sup>

This point could be confirmed by examining developments in swap spreads -- the difference between swap rates and government bond yields.<sup>23</sup> There are two channels through which the increasing fiscal deficit affected government bond yields: (1) changes in the projection of short-term interest rates affected by changes in the outlook for inflation and economic activity; and (2) changes in the supply and demand conditions in the government bond market.<sup>24</sup> As for the first channel, both swap rates and government bond yields are affected, and, as a result there is no change in swap spreads.<sup>25</sup> As for the second channel, only government bond yields are affected, and swap spreads change. Given the deterioration in market participants' views on the increasing government deficit at home and abroad against the background of governments' crisis responses, swap spreads declined sharply in Japan, the United States, the United Kingdom, and Europe (Chart I-3-16). This suggested that the rise in long-term interest rates at home and abroad in the first half of 2009 was not only affected by the first channel reflecting expectations for economic activity to bottom out but also by the second channel, that is, the deterioration in the supply and demand conditions for government bonds reflecting the sharp increase in the fiscal deficit.<sup>26</sup>

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<sup>22</sup> For example, after the rating outlook for the United Kingdom was downgraded in May 2009 due to the expansion of the government deficit, upward pressure on long-term interest rates heightened due to growing concerns about a possible downgrade of the credit rating of the United States.

<sup>23</sup> For details on the recent changes in swap spreads, see Takashi Suzuki, Naoto Takemoto, Haruko Kato, and Takeshi Kimura, "Kin'yu Konranka no Swap Shijo to Kokusai Shijo no Kakaku Hakken Kino -- Swap Spread no Ugoki kara Nani wo Yomitoru ka? -- (Price Discovery Function of Swap Markets and Government Bond Markets during the Financial Turmoil: What Can Be Observed from the Developments in Swap Spreads?)," Bank of Japan Review Paper No. 2009-J-7, 2009 (available only in Japanese).

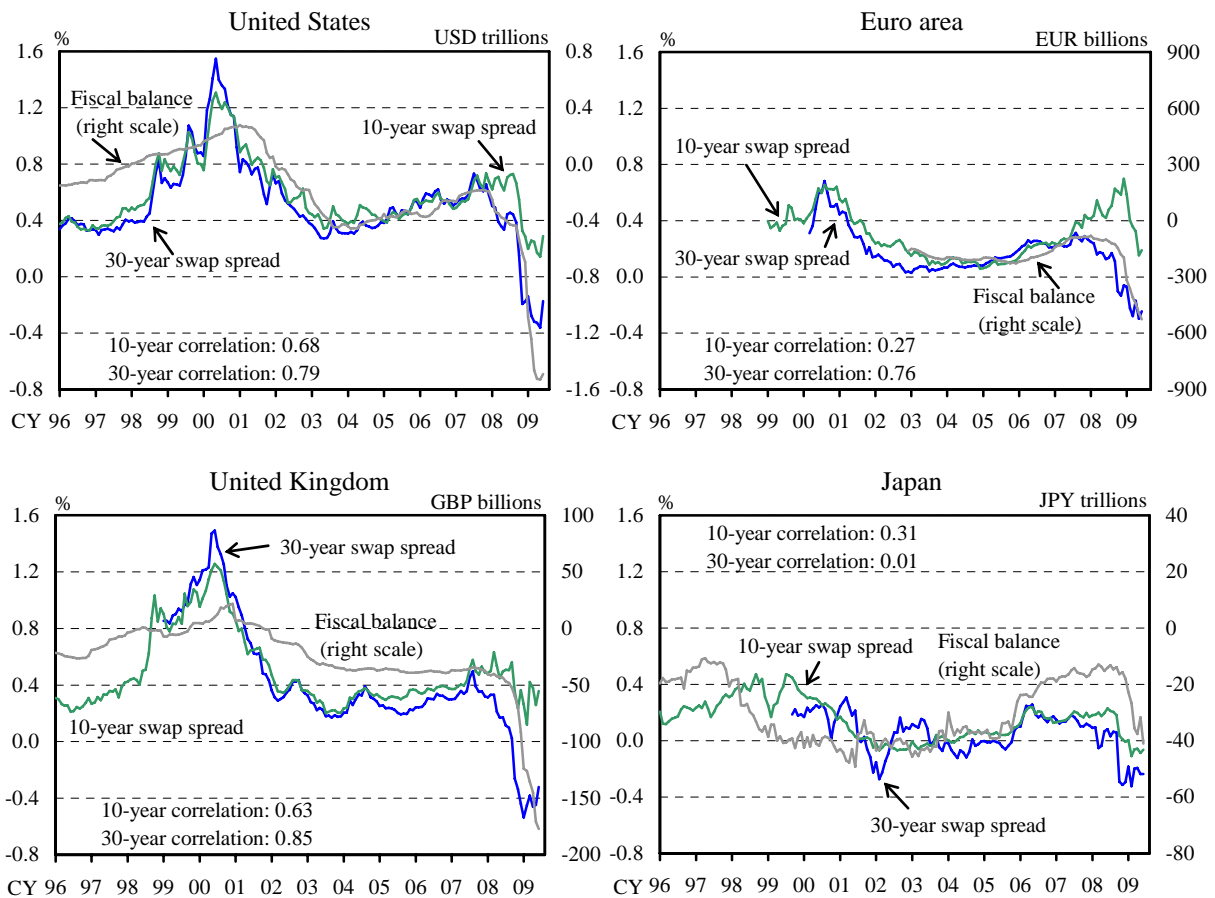
<sup>24</sup> The first channel was based on a theory of the term structure of interest rates, and the second channel was based on the term segmentation hypothesis, the preferred habitat hypothesis.

<sup>25</sup> According to theory on the term structure of interest rates, term premiums incurred by uncertainties about the future changes in short-term interest rates would also affect the developments in interest rates. However, the term premiums affect both swap rates and government bond yields, and thus swap spreads would not be affected.

<sup>26</sup> The term segmentation hypothesis assumes that investors have different preferences with respect to the maturity composition. Therefore, government bond markets are segmented by maturity, and bond yields depend on the demand for bonds by residual maturities. The duration of such effects depends on the availability of substitute bonds by residual maturities. If substitute bonds with long maturities are readily available, the effects of the change in the supply-demand balance would last only temporarily.

In June 2009, there was little information to support the expected economic growth, and government bond yields in Japan, the United States, and Europe declined. However, no change in the level of swap spreads was observed, as swap rates fell simultaneously. Accordingly, it seems that even when interest rates decreased, upward pressure on government bond yields caused by the deterioration in the supply-demand balance of government bonds remained.

**Chart I-3-16: Swap spreads and fiscal balances**

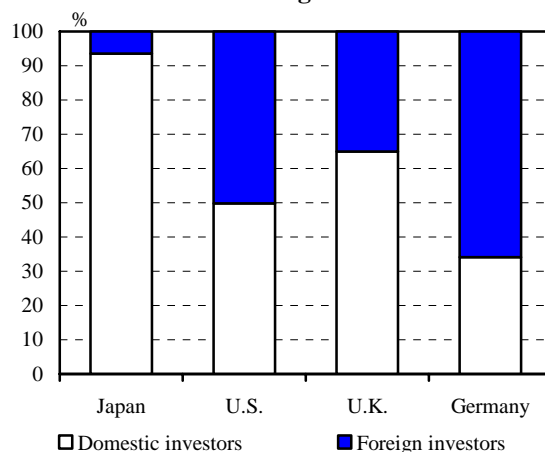


Notes: 1. Fiscal balance indicates the average of current- and next-year forecasts based on the Consensus Forecasts.  
 2. "10-year (30-year) correlation" indicates the correlation coefficient between 10-year (30-year) swap spread and fiscal balance.  
 Sources: Bloomberg; Consensus Economics.

As shown in the function of correlation between swap spreads and the fiscal balance, JGB yields are apparently not strongly influenced by changes in the fiscal balance compared with the United States and Europe. This can be explained by the fact that Japan maintains a current account surplus and, supported in part by the home bias of domestic investors, it can finance most of its fiscal deficits without depending on foreign capital. In

fact, compared with the United States and Europe, the ratio of holdings of government bonds by domestic investors is considerably higher in Japan (Chart I-3-17), although the ratio of the amount outstanding of government bonds to GDP in Japan is significantly higher (Chart I-3-15). In the United States and the United Kingdom, which register current account deficits, the ratio of holdings of government bonds by foreign investors is relatively higher than that by domestic investors. As a significant change in fiscal policy might affect both interest rates and exchange rates, foreign investors seem to be sensitive to changes in the fiscal balance that affect both the price risk of bonds and the foreign exchange (FX) risk. This seems to be a factor behind the high correlation between the fiscal balance and government bond yields in the United States and the United Kingdom.

**Chart I-3-17: Breakdown of government bond investors**



Note: End of 2008.

Sources: Office for National Statistics, U.K.; Bundesbank; Federal Reserve; Bank of Japan.

### **Box 3: International Capital Flows and Credit Cycles**

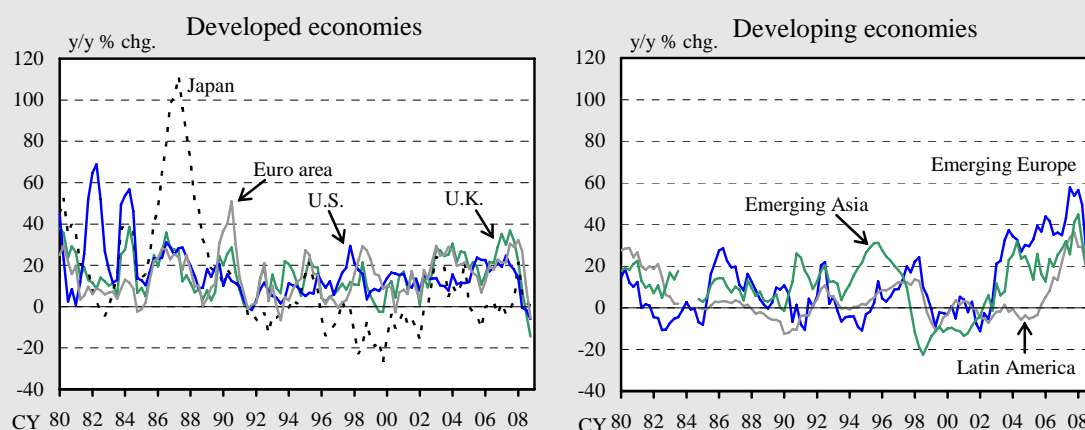
Looking at long-term time-series data on international capital flows, countries and regions that experienced large increases in external debt and strong economic growth sustained by ample liquidity generally experienced subsequently a decrease in external debt and significant declines in economic growth.

In the late 1980s, Japan was the largest creditor country in the world, with a large current account surplus, but at the same time its gross external debt increased considerably (Chart 1 for Box 3). This was because Japanese banks had obtained a large amount of funds in the Euromarkets. These funds combined with the large current account surplus not only prompted a considerable increase in direct foreign investment and foreign securities

investment but also led to an increase in liquidity in Japan in the form of bank lending. For example, impact loans, which were not subject to the Bank's window guidance at the time, increased considerably in tandem with the increase in funding in the Euromarkets. After the bursting of the bubble, however, the growth in gross external debt slowed sharply, and Japan's economy entered a period of slow growth.

Turning to developing economies, prior to the large external debt problems, particularly in Latin America, in the 1980s<sup>27</sup> and the Asian Crisis in the late 1990s, a large net inflow of capital via bank lending and securities investments was recorded in the private sector before each crisis, accompanied by a significant expansion of external debt (charts 1 and 2 for Box 3). Following this, these developing economies experienced capital outflows and sluggish economic growth.

**Chart 1 for Box 3: Locational foreign debt through banks**



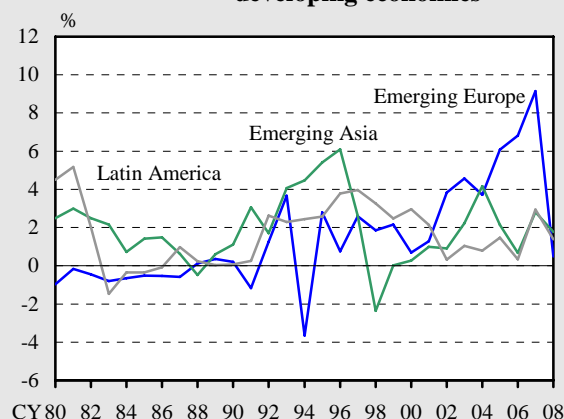
Source: Bank for International Settlements, "Locational International Banking Statistics."

As for the recent case, during the global credit boom that continued from around 2003 to 2007 preceding the current global financial crisis, an increase in external debt was noted in United States and Europe, and was also pronounced in emerging economies. External debt in emerging European countries continued to expand at a particularly fast pace. However, the growth in external debt in all of these regions slowed considerably in

<sup>27</sup> The abundant funds that oil-producing countries gained from oil revenues after the two oil shocks were channeled through private-sector banks in developed economies to flow into Latin America and other developing economies in the form of bank lending. Subsequently, in the late 1970s, following interest rate hikes in the United States to curb inflation, funding conditions of developing economies deteriorated. In 1982, Mexico defaulted on its payments of interest rate and principal. The debt crisis soon spread to other Latin American countries.

the latter half of 2008.

**Chart 2 for Box 3: Private capital balance in developing economies**



Note: Private capital balance to GDP ratios.

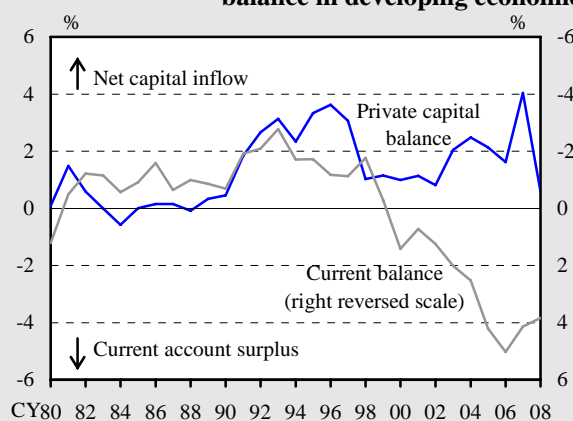
Source: International Monetary Fund, "WEO Database."

Regarding the issue of global imbalances, the focus tends to be on the net capital flows between the current account surpluses of developing economies and the current account deficits of developed economies such as the United States and the United Kingdom. It should be noted, however, that gross external debt was on an increasing trend not only in economies with current account deficits such as these two countries but also in many other countries and regions such as the euro area and developing economies. During the global credit boom that continued until 2007, the current account imbalances were small in the euro area with savings and investments generally in balance, but gross external credit and debt expanded considerably. Because European banks were dominant intermediaries of these cross-border fund transactions, they faced large balance-sheet adjustment pressures when the financial crisis subsequently emerged.

While recording a current account surplus, developing economies continued to enjoy a large net capital inflow in the private sector (Chart 3 for Box 3). The divergence in private capital balance and current account balance was more or less nonexistent up to the late 1990s, but expanded in the 2000s. This divergence stemmed mainly from an increase in overseas investment of foreign reserves by monetary authorities of developing economies. Some of the funds were deposited at European banks, contributing to the expansion of these banks' balance sheets (Chart I-3-11). The foreign reserve investments were not fully sterilized, and this led to easy monetary conditions in domestic markets, supporting higher economic growth and stimulating capital inflows from abroad, in other words, an increase

in external debt. At the same time, a virtuous cycle started to operate, in which foreign exchange intervention was conducted to suppress the upward pressure on the domestic currency stemming from an increase in capital inflow from abroad, leading to a further increase in foreign reserves. In this process, both the foreign reserves and external debt of developing economies expanded, but in the ensuing financial crisis developing economies also faced balance-sheet adjustment pressures related to their external debt.

**Chart 3 for Box 3: Private capital balance and current balance in developing economies**



Note: Balance to GDP ratios.

Source: International Monetary Fund, "WEO Database."

## **II. Developments in Domestic Financial Markets in the First Half of 2009: Improvements in the Financial Environment and Nervousness in Financial Markets**

Chapter II reviews developments in various financial markets in the first half of 2009, focusing primarily on domestic ones. The March 2009 *Financial Markets Report* pointed out that domestic markets in the second half of 2008 were strongly impacted by the turmoil in global financial markets and the market functioning deteriorated. Domestic markets remained very nervous for some time after the turn of the year, but upward pressure on interest rates moderated gradually in money markets, reflecting the active implementation of policy measures by the Bank. Similarly in credit markets, credit spreads on corporate bonds, particularly those with high ratings, narrowed. Improvements in the money markets, however, were limited, and the linkage between the call market and the repo market was lost. In the interbank market, liquidity, particularly longer-term liquidity, remained low. In the credit market, investors remained highly selective about the issues they purchased, and investment demand for issues with low ratings was weak on the whole. Meanwhile, there was some nervousness in the JGB markets, affected by concerns about the increasing fiscal deficit.

### **1. Money Markets**

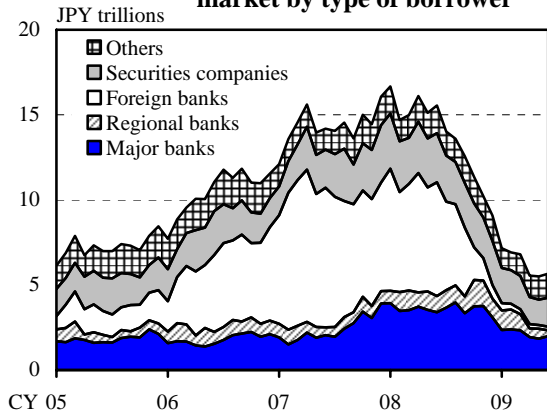
Japan's money markets remained nervous, although demand for funds maturing over the year-end subsided. Toward the end of fiscal 2008, upward pressure on repo rates and interbank term rates increased, as Japanese banks continued to limit their provision of funds to money markets in response to firms' heightened demand for borrowings. Reflecting the fact that the Bank continued to provide substantial liquidity by implementing various money market operation measures, upward pressure on interest rates moderated gradually after funding over the fiscal year-end had mostly been completed.

#### **Nervousness in money markets toward the fiscal year-end**

In the first half of 2009, foreign financial institutions and major banks, which had been making arbitrage transactions, substantially reduced their funding positions in the call market, while regional banks grew more cautious about investing funds in the market under the complementary deposit facility. As a result, the amount outstanding of transactions in

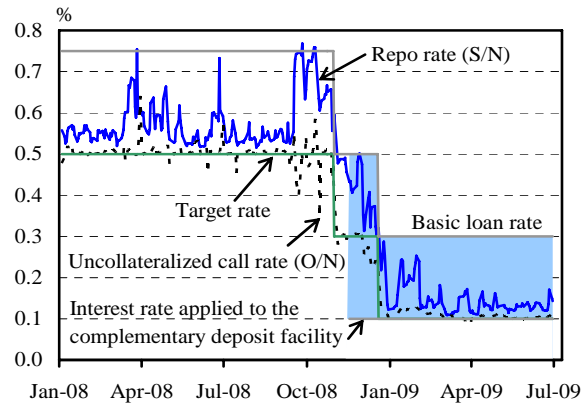
the call market decreased to the level reached during the quantitative easing policy period from 2003 to 2006 (Chart II-1-1). The repo market became less correlated with the uncollateralized market, as the lenders remained cautious about investing funds and market liquidity continued to decline. Therefore, the repo market remained unstable, with the repo rates fluctuating in tandem with the developments in demand for liquidity (Chart II-1-2).

**Chart II-1-1: Amount outstanding in the call market by type of borrower**



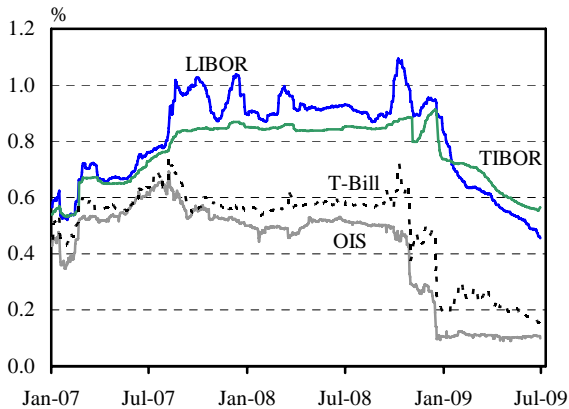
Note: Monthly average of the amount outstanding of uncollateralized transactions.  
Source: Bank of Japan, "Amounts Outstanding in the Call Money Market."

**Chart II-1-2: Overnight rates**



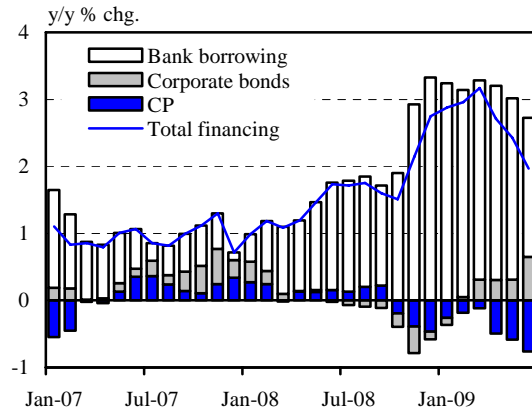
Note: Horizontal axis indicates the settlement dates.  
Source: Bank of Japan.

**Chart II-1-3: 3-month rates**



Note: Rate prior to the integration of FBs and TBs in February 2009 is the FB rate.  
Sources: Bloomberg; Japan Bond Trading.

**Chart II-1-4: Corporate financing**



Sources: I-N Information Systems; Japan Securities Dealers Association; Japan Securities Depository Center; Bank of Japan.

As for interbank term rates such as Euroyen rates, it continued to be difficult to carry out transactions, particularly longer-term ones. Interest rates on term instruments remained high compared to OIS rates against the background of liquidity risk and risks to foreign financial institutions (Chart II-1-3). In addition to these particular risks involved in interbank transactions, deterioration in funding conditions for firms adversely affected the



interbank rates. Toward the end of fiscal 2008, as firms' reliance on bank borrowings increased (Chart II-1-4) reflecting the continued worsening of the issuing conditions for CP and corporate bonds, the Tokyo Interbank Offered Rate (TIBOR), which is an interbank rate for Euroyen transactions, exceeded the London Interbank Offered Rate (LIBOR) (Chart II-1-3). LIBOR, a prevailing market rate provided by reference banks consisting mostly of foreign financial institutions, had been higher than TIBOR since summer 2007, reflecting the heightening concerns over credit risk among financial institutions in the United States and Europe.<sup>28</sup> However, TIBOR, which provides a basis for the rates applied to interbank transactions, stopped declining as uncertainties about firms' funding conditions grew and concerns over firms' credit risks increased, and rose above LIBOR.<sup>29</sup> TIBOR exceeded LIBOR clearly for the first time since the financial crisis in Japan from 1998 to 1999, when the credit risk premium for Japanese financial institutions increased. The current condition was caused by the increase in the credit risk premium of firms examined by Japanese financial institutions.

### **Provision of substantial liquidity by the Bank**

The Bank undertook various policy responses after the turn of the year into 2009 including an increase in outright purchases of JGBs and provided substantial liquidity through various money market operations.<sup>30</sup> With a view to ensuring stability in financial markets, the Bank started to provide funds over the fiscal year-end at an early stage, the outstanding amount of which exceeded that for the previous fiscal year. In addition, in order to address the deterioration in the functioning of repo markets, the Bank successively conducted large-scale JGB repo operations. In an effort to facilitate corporate financing, the Bank continued to actively carry out its CP repo operations, expanded special funds-supplying operations to facilitate corporate financing, and introduced outright purchases of CP and

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<sup>28</sup> As of the end of June 2009, of the 17 reference banks for Euroyen TIBOR, three were foreign financial institutions, while of the 16 reference banks for Euroyen LIBOR, twelve were foreign financial institutions.

<sup>29</sup> TIBOR usually does not deviate from the actual interbank rates for a continued period. At least in this case, the heightening of firms' credit risk delayed the return of TIBOR to the level of actual interbank rates.

<sup>30</sup> For details, see Bank of Japan, "Money Market Operations in Fiscal 2008," BOJ Reports & Research Papers, 2009.

corporate bonds (Chapter I.2).<sup>31</sup> As a result, the amount of funds supplied through such active market operations (excluding outright purchases of JGBs) exceeded 50 trillion yen at the end of fiscal 2008 again following the end of year 2008, and remained at a high level thereafter. Looking at the breakdown, the amount of funds provided through special funds-supplying operations to facilitate corporate financing was almost the same as that provided through outright purchases of JGBs (Chart I-2-4).

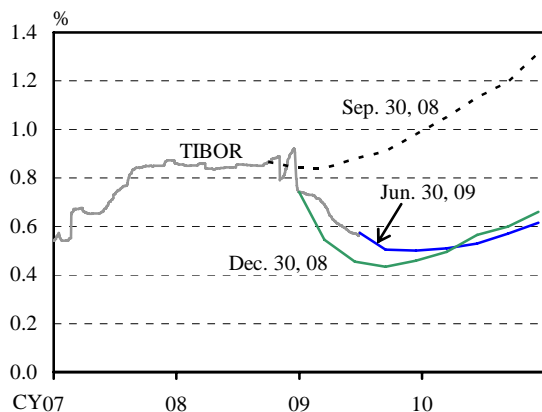
### **Moderation of upward pressure on interest rates**

As the Bank continued to provide substantial liquidity, the tightness in funding conditions in money markets eased gradually. Financial institutions' demand for funds to lend to firms decreased as firms stopped securing funds for precautionary reasons over the fiscal year-end, and upward pressure on interbank rates decreased (Chart II-1-3). Interbank rates on term instruments such as TIBOR declined steadily albeit moderately, and are likely to remain at a low level (Chart II-1-5). In the CP market, firms' credit demand for working capital decreased mainly due to progress in inventory adjustments. Thanks to the policy measures such as those to facilitate corporate financing, interest rates on CP with high ratings declined, to hover stably below TIBOR (Chart II-1-6). An increasing number of firms were able to issue CP without constraints in terms of lots and terms. As some financial institutions secured CP with high ratings in order to secure collateral for special funds-supplying operations to facilitate corporate financing, some issuance rates fell below the rates on government bills (for details on the effects of funds-supplying operations to facilitate corporate financing on the issuance rates on CP, see Box 4).

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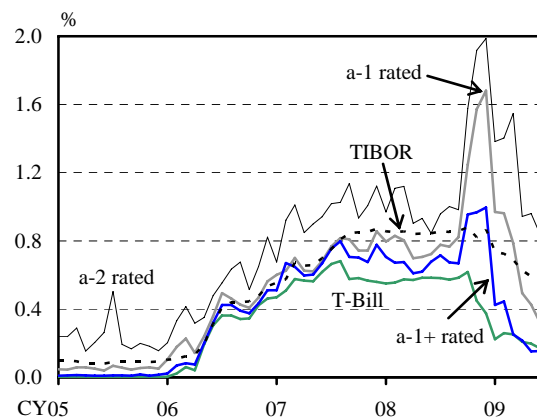
<sup>31</sup> Other than mentioned above, the Bank extended the period of temporary measures such as the complementary deposit facility and acceptance of broader range of eligible collateral, accepted government-guaranteed dematerialized CP and debt instruments issued by real estate investment corporations as eligible collateral, and added 30-year government bonds, floating-rate JGBs, and inflation-indexed JGBs to the list of eligible JGBs for its repo operations.

**Chart II-1-5: Forward curves for Euroyen futures**



Sources: Bloomberg; Tokyo Financial Exchange.

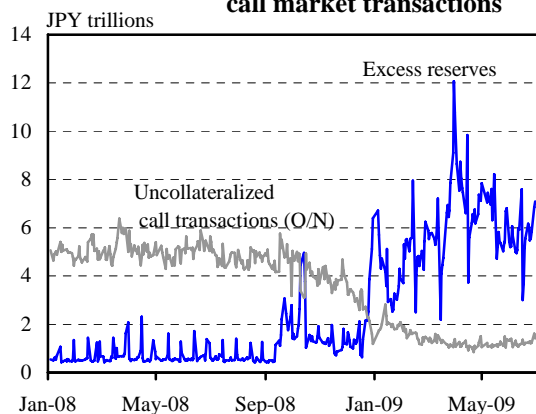
**Chart II-1-6: CP issuance rates**



Note: 3-month maturity. Monthly average.

Sources: Bloomberg; Japan Bond Trading; Bank of Japan.

**Chart II-1-7: Excess reserves and call market transactions**



Note: Excess reserves are the sum of excess reserves of institutions subject to the reserve requirement and current account balance of institutions not subject to the reserve requirement.

Source: Bank of Japan.

As major banks used their excess short-term funds to buy government bills and for repo operations, upward pressure on rates on government bills, the demand for which was anticipated to decline due to the increase in their issuance, and on general collateral (GC) repo rates also moderated gradually (Chart II-1-2). Regional banks and foreign financial institutions with limited investment opportunities tended to hold excess funds at the Bank (Chart II-1-7). This was because they reduced their exposures in markets reflecting the reduction in investment margin under the policy interest rate of 0.1 percent since December 2008 and opportunity costs for holding excess reserve funds decreased under the complementary deposit facility, which applied the interest rate of 0.1 percent on excess reserves.

**Box 4: Effects of Measures to Facilitate Corporate Financing -- Influences on CP Issuance Rates**

The Bank's measures to facilitate corporate financing consist of (1) an increase in the size of CP repo operations, (2) special funds-supplying operations to facilitate corporate financing, (3) outright purchases of financial instruments such as CP and corporate bonds, and (4) an expansion in the range of corporate debt as eligible collateral. Quantitative assessments of the influences of the first three measures on CP issuance rates will be provided below.

In more detail, the spreads between issuance rates on CP with various credit ratings (a-1+, a-1, a-2) and three-month OIS rates are evaluated. The spreads show the risk premiums on corporate credit risk and CP market liquidity risk that are included in CP rates which deviated upward from expectations on policy rates. These dependent variables were regressed against three independent variables, as explained below.<sup>32</sup>

**Variable 1: Implied Volatility of Stock Prices**

Implied volatility of stock prices was used as a proxy variable for changes in uncertainty over the corporate financing and investors' risk appetite. In other words, when implied volatility rises and uncertainty heightens over corporate financing, firms increase their precautionary demand for liquidity. As a result, their demand grows for CP issuance, exerting upward pressure on CP issuance rates. When implied volatility increases and investors' risk appetite declines, intermediaries become less willing to underwrite CP, exerting upward pressure on CP issuance rates.

**Variable 2: Spreads between TIBOR and the OIS Rate**

When firms want to obtain short-term funds, they can choose either to issue CP or borrow from banks. If TIBOR -- which provides a basis for the rates applied to bank lending -- rises in relation to the OIS rates, firms' demand to issue CP tends to increase, exerting upward pressure on CP issuance rates. As TIBOR is also the funding rate for banks, when the cost of financing CP increases, upward pressure will also be exerted on CP issuance rates.

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<sup>32</sup> Estimations were based on daily data from September 2008. The exponential general autoregressive conditional heteroskedastic (EGARCH) model was used for error terms.

**Variable 3: Share of the Amount Outstanding of Funds Provided through the Bank's Measures to Facilitate Corporate Financing in the Amount Outstanding of CP**

By using the funds obtained through the Bank's operations to facilitate corporate financing, banks can finance CP at rates lower than TIBOR. For instance, CP repo operations, as the name suggests, are operations where the Bank provides funds against CP as eligible collateral. Special funds-supplying operations to facilitate corporate financing are operations providing an unlimited amount of term-funds against the value of corporate debt pledged as the standing pool of eligible collateral at fixed loan rates of 0.1 percent. The increase in the size of these operations was intended to lower CP issuance rates, by lowering CP financing costs for banks and increasing banks' incentives to underwrite CP. The Bank's outright purchases of CP also lower the CP issuance rates by directly influencing the supply-demand conditions in the CP market, in other words, by means of the Bank directly taking on the firms' credit risk.

The details of the estimation results will be omitted here, but all the independent variables have the expected sign, and all the results are statistically significant. After autumn 2008, as uncertainty about firms' funding conditions heightened and investors' risk appetite decreased in the CP market -- implied volatility of stock prices rose significantly (Chart I-1-7) -- strong upward pressure was exerted on CP issuance rates. It could be said that the Bank's measures to facilitate corporate financing contributed to minimize the adverse effects of the above on the CP market.<sup>33</sup>

In the current financial crisis where the financial conditions have changed significantly, it is necessary to further examine the variables and robustness of results; however, the effects of the third measures to facilitate corporate financing -- the extent to which CP issuance rates declined with the introduction of the measures by the Bank -- will be shown in the chart below at various significance levels of estimated parameters (Chart 1 for Box 4).

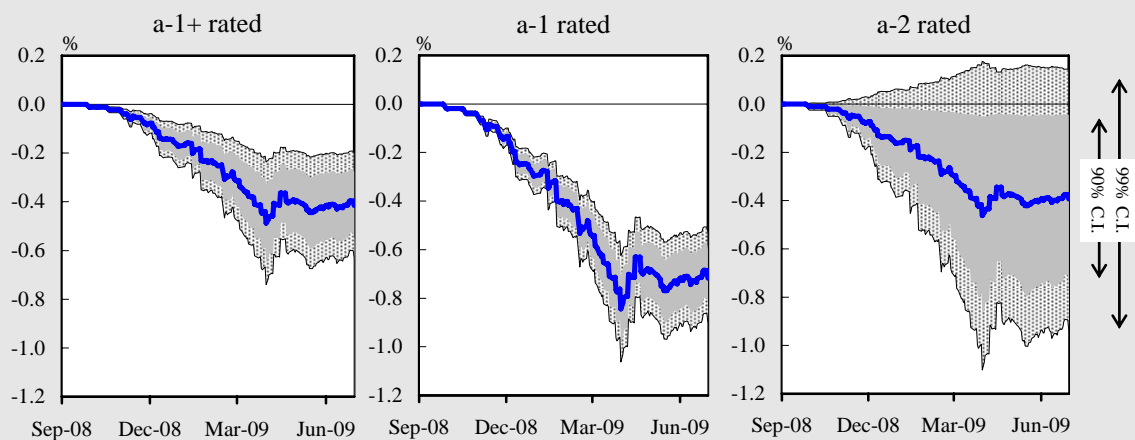
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<sup>33</sup> After October 2008, although the Bank increased the size of operations to facilitate corporate financing (Chart I-2-4), CP issuance rates continued to rise (Chart II-1-6). This did not mean that these operations had no positive effects but rather implied that, if the Bank had not increased the size of operations, CP issuance rates would have soared.

The key points are as follows.

- (1) As the amount of funds supplied through the measures to facilitate corporate financing increased, downward pressures were exerted on CP issuance rates. This implies that the measures to facilitate corporate financing were effective in lowering CP issuance rates, without going through the conventional policy transmission channels of policy interest rate cuts.
- (2) The effectiveness of the measures in lowering CP issuance rates varied by credit rating, with the effects on a-1 ratings being the most powerful. In the midst of the financial turmoil that emerged since autumn 2008, demand remained firm for CP rated a-1+ from investors such as trust funds, and thus the functioning in the market for CP rated a-1+ did not deteriorate as much as that for CP rated a-1. In other words, there was less room for policy effects to permeate the a-1+ market versus the a-1 market. In addition, as only CP rated a-1 or higher was subject to the outright purchases, the effectiveness of these policies was limited on CP rated a-2, which was outside the scope of these measures.
- (3) It should be mentioned that, albeit with a large degree of uncertainty (confidence interval) as to the effects, there were admittedly some downward pressures on issuance rates on CP rated a-2, which was not subject to outright purchases, due to the spill-over effect. This indicated that, because the Bank's measures were effective in improving the markets for CP with higher ratings such as a-1+ and a-1 CP, the underwriting capacities of banks and other investors of CP with lower ratings had picked up somewhat.

**Chart 1 for Box 4: Downward effects on CP issuance rates of corporate financing measures**



Note: Shadow indicates the confidence interval (C.I.) for policy effects based on the C.I. for estimated parameters.

## 2. Japanese Government Bond Markets

Long-term government bond yields declined in both Japan and overseas toward the end of 2008 against the backdrop of the sharp deterioration in economic conditions, but were on an uptrend in the first half of 2009. Expectations for economic activity to bottom out worldwide and the active implementation of fiscal measures, which gave rise to concern about a deterioration in the balance in government bond markets, posed upward pressure on long-term yields.

### Limited rise in JGB yields compared with that in yields on overseas long-term government bonds

From January to mid-June 2009, JGB yields were on an uptrend following U.S. and European long-term yields (Chart II-2-1). The results of a market survey indicated that market participants focused increasingly on the supply and demand conditions of JGBs as a factor causing upward pressure on JGB yields, reflecting the increasing fiscal deficit, which gave rise to concern about a deterioration in the balance in JGB markets (Chart II-2-2). With expectations for economic activity to bottom out, market participants gradually grew less concerned about economic conditions, which had been considered a factor causing downward pressure on JGB yields when the Japanese economy was deteriorating.

Chart II-2-1: Government bond yields (10-year)

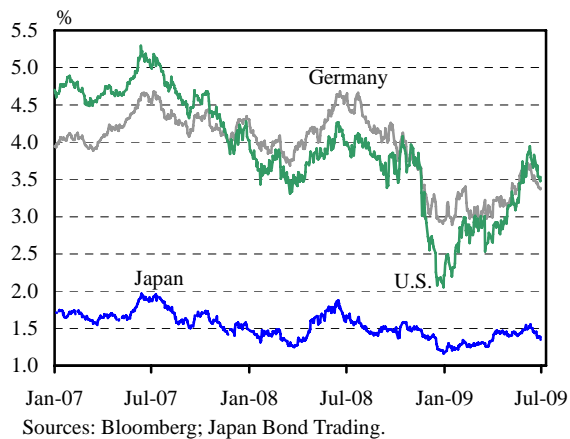
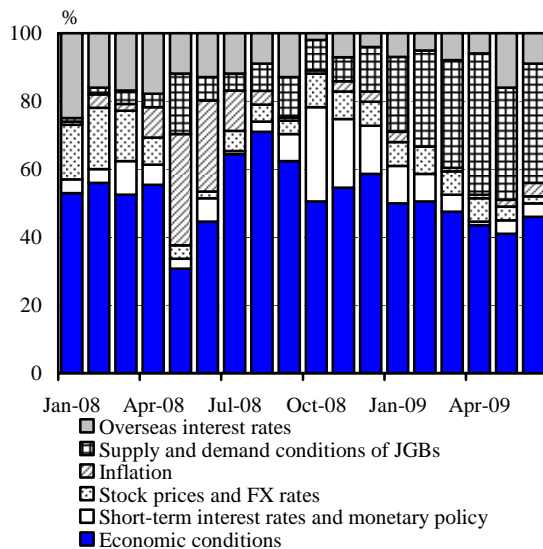


Chart II-2-2: Factors affecting JGB yields



Source: QUICK, "QUICK Survey System Report."

In the first half of 2009, JGB yields rose by 0.4 percent, while U.S. and European long-term yields increased by 1.7 percent and 0.8 percent, respectively. In addition, Japanese implied volatility derived from options on long-term government bond futures was lower than that in the United States and Europe. Japanese implied volatility has been on a declining trend since around the end of 2008, reaching the level registered around summer 2007 (Chart I-2-9). JGB yields declined to around 1.2 percent at the end of 2008, below the average level of 1.3 percent during the quantitative easing policy period from March 2001 to March 2006, thus the room for a further decline in JGB yields due to the "flight to safety" was limited. Conversely, the adverse effects of the "flight from safety" were also limited.

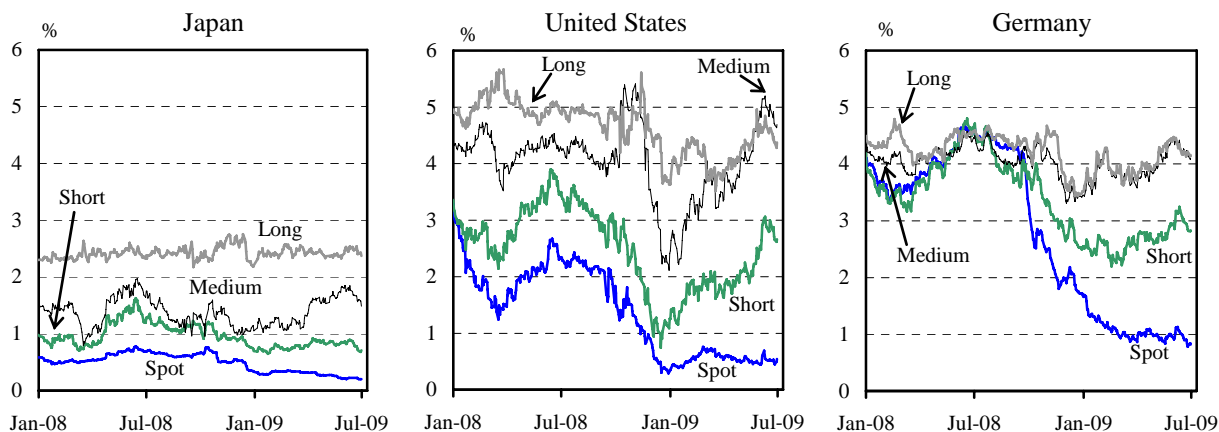
Long-term government bond yields declined again in mid-June 2009. Although investors had expected a rise in interest rates due to a possible increase in the issuance of government bonds after July 2009 and reduced their positions, they increased their purchases of government bonds as U.S. long-term yields turned out to be lower than expected. The increase in purchases of JGBs was further due to excess funds arising from Japanese financial institutions' improved net balance of deposits against loans reflecting the decline in firms' demand for funds and from large-scale redemptions of JGBs in June 2009.

### **Developments in interest rates by maturity**

Looking at developments in forward interest rates of JGBs ( $n$ -year-ahead one-year forward rates), in Japan, the United States, and Germany, spot rates declined toward the end of 2008 and remained stable at low levels, but medium-term forward rates (one- to three-year-ahead forward rates and four- to six-year-ahead forward rates) had been relatively volatile in response to the economic outlook and the expectation of an increase in the issuance of government bonds (Chart II-2-3). Long-term forward rates (seven- to nine-year-ahead forward rates) remained stable at around 2.5 percent in Japan. It can be interpreted from this that Japanese long-term forward rates were firmly supported by a nominal anchor, that is, price stability, even in a situation in which there were concerns about the increasing fiscal deficit. On the other hand, U.S. and German long-term forward rates fluctuated somewhat. Large fluctuations were observed particularly in the United States.



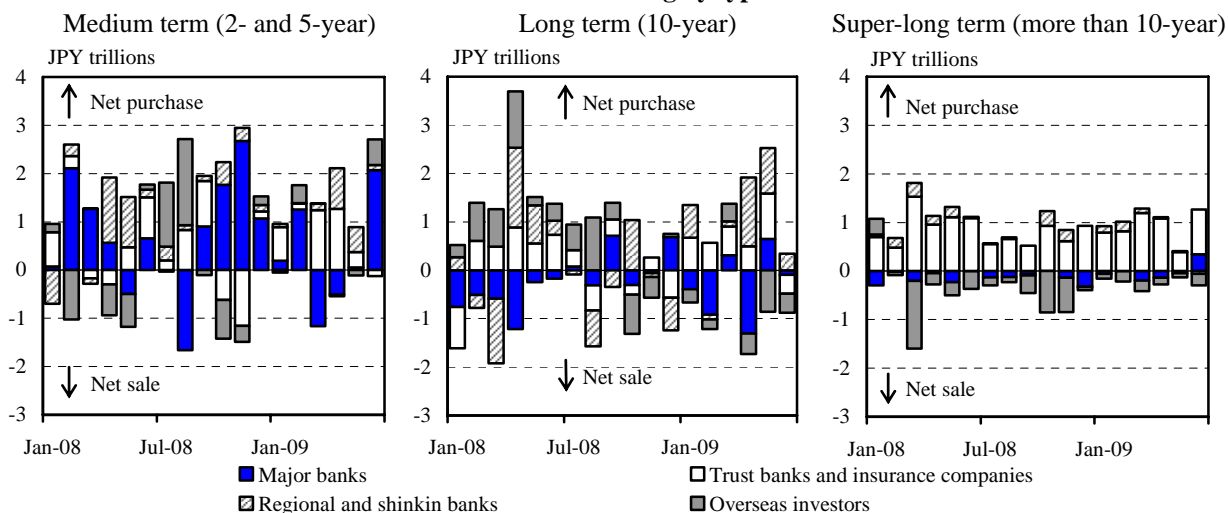
**Chart II-2-3: 1-year forward rates of government bonds**



Note: "Short" stands for 1- to 3-year-ahead; "medium" for 4- to 6-year-ahead; "long" for 7- to 9-year-ahead.

Sources: Bloomberg; Japan Securities Dealers Association.

**Chart II-2-4: JGB trading by type of investor**



Source: Japan Securities Dealers Association, "Trends in Bond Transaction (by investor type)."

**JGB trading activity by type of investor**

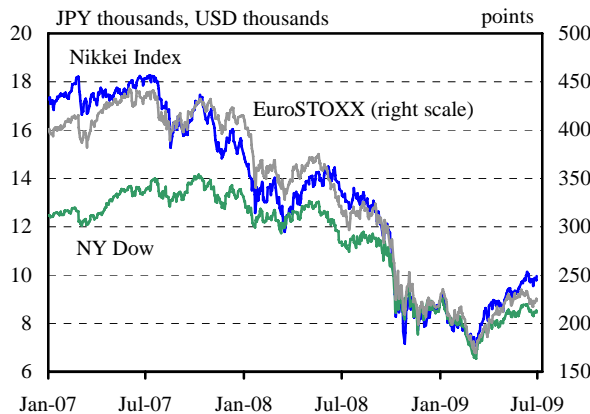
Overseas investors continued to reduce their positions on the whole even after their investment turned to net sales toward the end of 2008 (Chart II-2-4). Investment of major banks, which had registered net purchases of medium- to long-term JGBs, turned to net sales from around March 2009, as the banks expected a rise in interest rates due to a possible increase in the issuance of government bonds and an economic recovery. In June 2009, U.S. long-term yields declined, and investors simultaneously started to purchase government bonds. Long-term investors such as pension funds and life insurance companies maintained stable purchases of cash bonds, mainly those with super-long yields and increased their purchase of bonds with a relatively short maturity when the medium- to

long-term interest rates rose, and thus their investment behavior subdued fluctuations in yields on the whole. Some regional banks actively purchased medium- to long-term bonds with the aim of profiting from carry trades.

### 3. Stock Markets

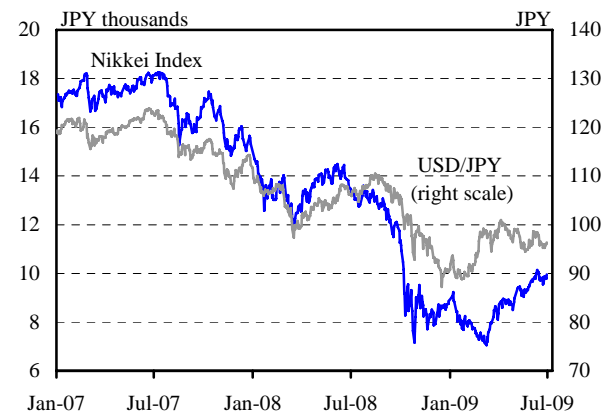
Overseas and domestic stock prices had been on a declining trend toward early March 2009 against the background of heightened concerns about financial system stability, particularly in the United States and Europe, and a sharp deterioration in economic conditions. They then started to rise, as excessively heightened concerns about financial system stability eased and an increasing number of market participants gradually began to expect economic activity to bottom out, given the positive effects of policy actions taken by governments and central banks in various countries. Even after rising, however, stock prices generally remained at the lowest level recorded after the plunge in autumn 2008.

**Chart II-3-1: Stock indices**



Source: Bloomberg.

**Chart II-3-2: Stock index and FX rate**



Source: Bloomberg.

#### Decline and rebound in stock prices

Japanese stock prices were on a declining trend toward early March 2009 following U.S. and European stock prices (Chart II-3-1). On March 10, 2009, the Nikkei 225 Stock Average registered 7,054 yen, for the first time in 27 years since October 1982. This seemed to be due to the further deterioration in firms' overall funding conditions and their successive downward revisions of earnings forecasts. Stock prices started to rise in mid-March, and the Nikkei 225 Stock Average recovered to around 10,000 yen. The recovery was led by the fact that concerns about the funding availability for firms eased due

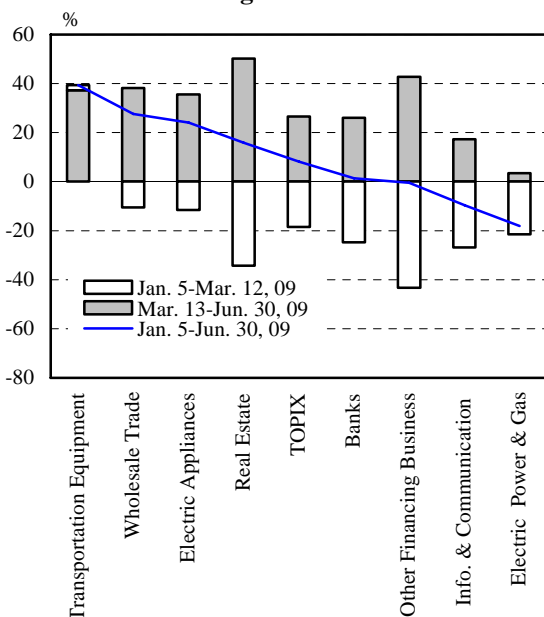
to the positive effects of policy actions taken by the government and the Bank, and an increasing number of market participants started to expect economic activity to bottom out against the background of the progress in inventory adjustments. In addition, the fact that the appreciation of the yen had come to a halt and the worsening of exporting companies' performance had subsequently stopped seemed to contribute to the rebound in stock prices (Chart II-3-2).

### **Developments by sector**

Looking at the developments in stock prices by sector, stock prices of manufacturers of transportation equipment and electric appliances had plunged toward the end of 2008 due to the appreciation of the yen. These prices rebounded significantly after the turn of the year, as the appreciation of the yen came to a halt and inventory adjustments progressed (Chart II-3-3). Stock prices of wholesale trade sector (including trading companies) had declined significantly in the second half of 2008 due to the decrease in commodity prices, but they rose relatively strongly after the turn of the year in tandem with the rebound in commodity prices. Reflecting the deterioration in banks' profits due to the increase in unrealized losses on their stockholdings, stock prices of the banking sector declined relatively significantly with the approach of the fiscal year-end in March 2009 but then rebounded. Since the beginning of 2009, Japanese real estate and financial sectors other than banks saw a considerable decline in their stock prices due to the deterioration in their funding conditions and corporate profits.

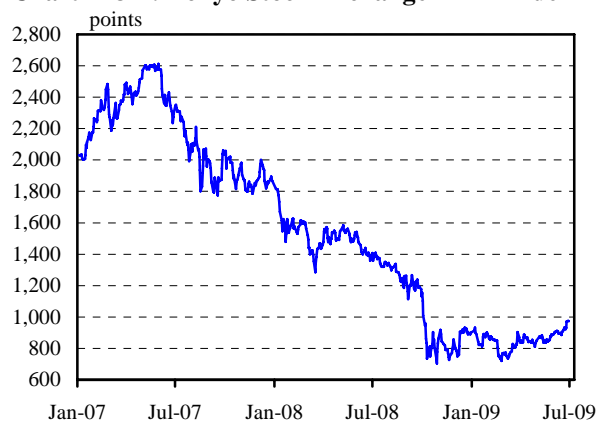
The Tokyo Stock Exchange real estate investment trust (REIT) Index did not gather momentum, as considerable anxiety remained over the funding availability for real estate companies and concerns over the worsening of corporate profits due to the deterioration in the real estate rental market, and also because REITs had successively revised their earnings and dividend forecasts downward (Chart II-3-4). Concerns about the bankruptcy of REITs, however, declined significantly compared with some time ago, as the positive effects of public policy measures were expected and new sponsors for some REITs were decided.

**Chart II-3-3: Changes in TOPIX Sector Indices**



Source: Bloomberg.

**Chart II-3-4: Tokyo Stock Exchange REIT Index**

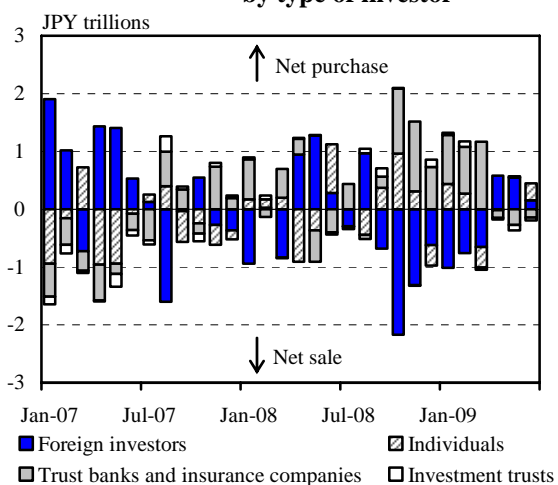


Source: Bloomberg.

### Stock trading activity by type of investor

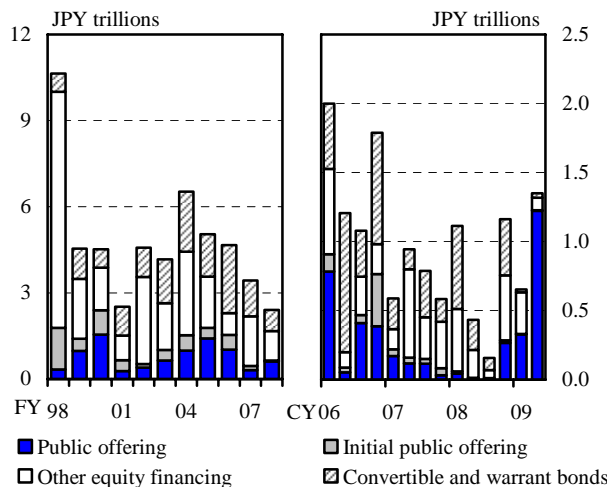
While stock prices were declining until March 2009, investment by overseas investors continued to record net sales (Chart II-3-5). This was because hedge funds that faced funding liquidity constraints and increased risk exposures were forced to sell their stocks, and also because investors increased stock selling to secure funds as Japanese stock prices had risen relative to overseas stock prices due to the appreciation of the yen toward the beginning of 2009 (for details on the mechanism by which the expansion of risk exposures induces investors' deleveraging, see Box 5). Individuals and pension funds that made investments through trust banks to rebalance their portfolio by purchasing were net buyers when stock prices declined. From April 2009, overseas investors who had been net sellers became net buyers, and this led to a rebound in stock prices. Individual investors also became net buyers in June 2009.

**Chart II-3-5: Japanese stock trading by type of investor**



Note: Data include both spot and futures transactions.  
Sources: Tokyo Stock Exchange; Osaka Securities Exchange.

**Chart II-3-6: Equity financing**



Note: "Other equity financing" includes allotments to existing shareholders and third parties.  
Source: QUICK.

### Equity financing

Although equity financing by firms remained sluggish due to the decline in stock prices, financial institutions launched measures to boost capital because their capital adequacy ratios had fallen. When the stock prices rebounded, some firms also launched such measures, and equity financing through public offerings increased. However, equity financing through initial public offerings (IPOs) continued to be sluggish, and that through convertible bonds (CBs) remained weak (Chart II-3-6).

### Box 5: Stock Price Volatility and Leverage Effects

It is widely acknowledged among market participants that volatility, or dispersion, of stock prices tends to be asymmetric in stock price increases and decreases. The volatility of stock market investment returns tends to rise when there is new information for market participants, whether it is a positive surprise (good news) or a negative surprise (bad news). However, the asymmetry in volatility stems from differences in leverage effects. When stock prices rise and firms' financial leverage (debt divided by the market value of stocks) declines, the volatility of the stock market investment lessens for the investor, and thus the risk involved in the stock investment lessens. On the other hand, when stock prices fall and firms' financial leverage increases, the risk involved in the stock investment increases.

After the failure of Lehman Brothers in autumn 2008, the volatility of stock price movements rose steeply (Chart I-1-7). This is possibly because not only did the frequency

and size of a negative surprise increase, but also the negative surprise was accompanied by a rise in firms' financial leverage, amplifying the expansion in volatility.

To examine this assertion in more detail, a model considering asymmetry was used to evaluate the fluctuations in volatility of daily changes in the Nikkei 225 Stock Average. The results imply that even when the extent of change in stock prices is the same in absolute terms, the influences of a positive surprise and a negative surprise differ widely in terms of the impacts on volatility (Chart 1 for Box 5).<sup>34</sup> By estimating the actual movements in volatility, breaking it down into the contribution of a negative surprise and a positive surprise, the results show that the contribution of a negative surprise expanded considerably just after the failure of Lehman Brothers.

As a result of a steep rise in volatility, the risk exposure associated with stockholdings grew larger than the risk limits of overseas investors and other investors, which induced them to sell their stocks (Chart II-3-5).<sup>35</sup> After March 2009, funds began to return to the stock markets due to the effects of policy measures introduced by the governments and central banks, and the frequency and size of a negative surprise started to

<sup>34</sup> The threshold autoregressive conditionally heteroskedastic (TARCH) model that considers asymmetry in volatility fluctuations was used. The data sample covered daily data from 2003.

$$\Delta S_t = c + \varepsilon_t, \quad \varepsilon_t \sim N(0, \sigma_t^2)$$

$$\sigma_t^2 = \alpha + \beta^+ \varepsilon_{t-1}^2 + \beta^- \varepsilon_{t-1}^2 d_{t-1} + \gamma \sigma_{t-1}^2$$

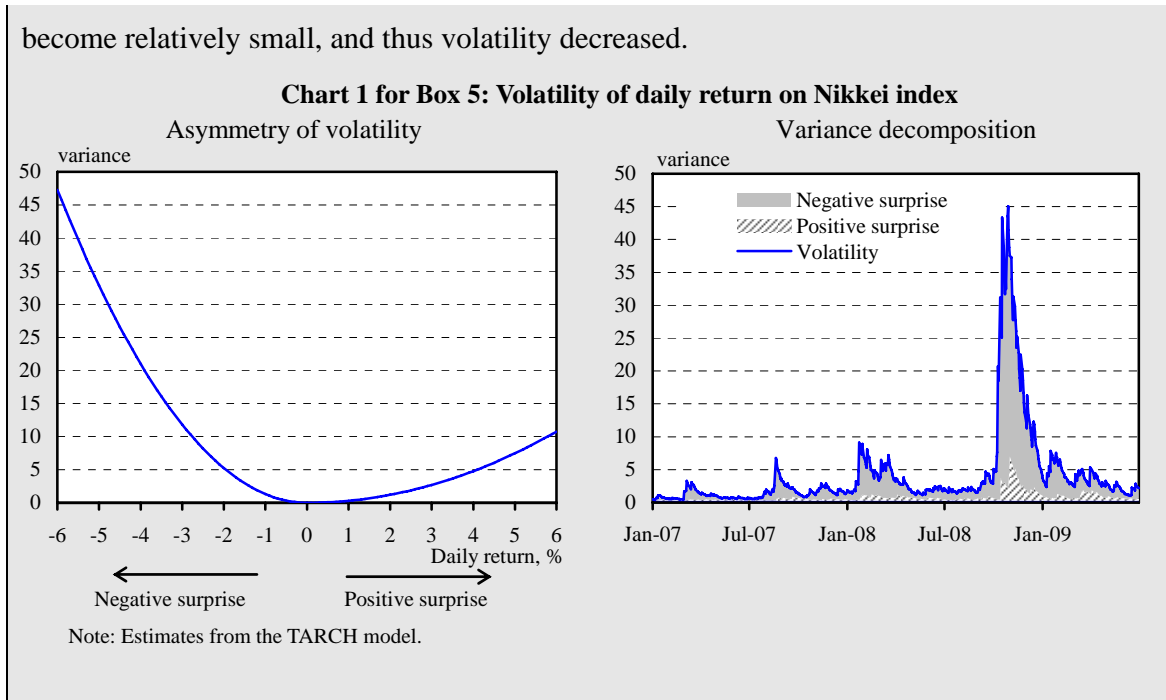
where  $\Delta S_t$  is the rate of change in the Nikkei 225 Stock Average,  $\varepsilon_t$  is the news ( $\varepsilon_t < 0$  is a negative surprise, and  $\varepsilon_t \geq 0$  is a positive surprise.), and  $d_t$  is a dummy variable with sign  $\varepsilon_t$  (when  $\varepsilon_t < 0$ ,  $d_t = 1$ , and when  $\varepsilon_t \geq 0$ ,  $d_t = 0$ ).

As for the volatility in Chart 1 for Box 5, the following equation was used for all results.

$$\sigma_t^2 = \sum_{i=0}^{\infty} \gamma^i \{ \alpha + \beta^+ \varepsilon_{t-i}^2 + \beta^- \varepsilon_{t-i}^2 d_{t-i} \}$$

<sup>35</sup> The decline in stock prices exerts upward pressure not only on the financial leverage of firms issuing stocks, but also on investors' leverage. The reason that leverage increases when downward pressure is exerted on asset prices is as follows. If investors feel that the added increase in leverage is not appropriate for risk management purposes, they may adjust their balance sheets to keep the amount of leverage stable within a certain level, in other words, sell stocks to decrease their asset holdings. Investors' deleveraging may lead to a further decline in asset prices, which in turn would lead to further selling of assets. Such activities by investors may have, to an extent, influenced the amplification of volatility amid stock price declines.

become relatively small, and thus volatility decreased.



#### 4. Credit Markets

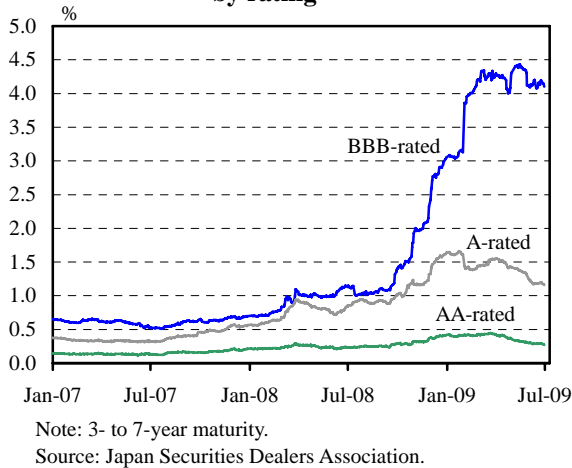
The sharp widening of credit spreads, such as corporate bond spreads over government bond yields and credit default swap (CDS) premiums in the U.S. and European credit markets from autumn 2008 came to a halt, and credit spreads as a whole were on a decreasing trend. Likewise, in the Japanese market, credit spreads grew increasingly unstable toward the end of fiscal 2008, but subsequently started to decrease, particularly those for corporate bonds with high ratings. The environment for corporate bond issuance in Japan improved considerably compared with some time ago. However, investors remained highly selective about the issues they purchased, and demand for corporate bonds with low ratings and those issued by firms in some industries remained sluggish on the whole.

#### **Improvements in the secondary market for corporate bonds, particularly those with high ratings**

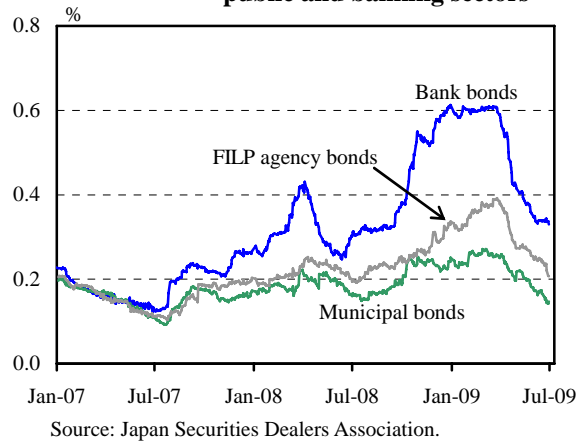
Japan's corporate bond markets became unstable toward March 2009 (Chart II-4-1), as seen in the further rise in corporate bond spreads due to heightened concerns over the deterioration in firms' financial conditions and funding availability, as well as to the decline in investors' risk-taking capacity caused by the fall in stock prices. In fiscal 2009, improvements in corporate bond markets were seen (Chart II-4-2) in the fact that credit

spreads on corporate bonds, particularly those with high ratings issued by, for example, the public sector, financial institutions, and electric power companies, started to decrease and some bonds were becoming scarce. This occurred mainly because (1) concerns about the funding availability for firms eased due to the positive effects of measures to facilitate corporate financing taken by the government and the Bank and (2) risk appetite of domestic investors recovered reflecting the rebound in stock prices. The recovery in demand for corporate bonds was also attributable to the rise in absolute yields on corporate bonds, reflecting the widening of credit spreads and the rise in long-term yields thus far. In fact, the amount outstanding of transactions of corporate bonds and the turnover rate increased, and market liquidity recovered somewhat (Box 6).

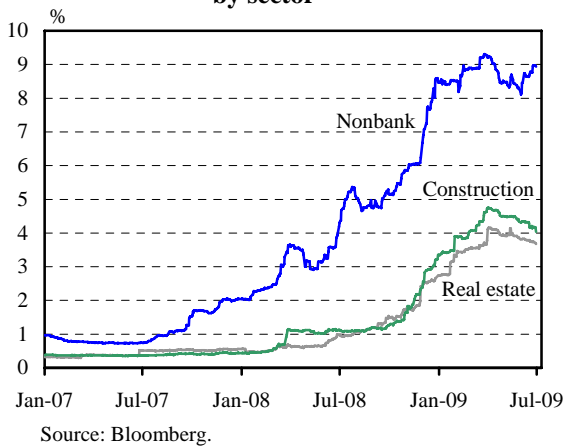
**Chart II-4-1: Corporate bond spreads by rating**



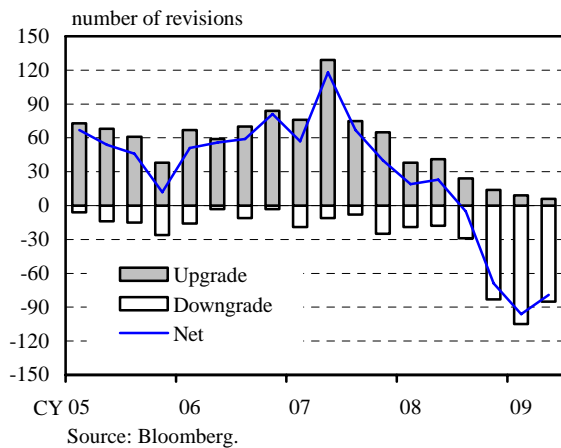
**Chart II-4-2: Credit spreads of public and banking sectors**



**Chart II-4-3: Corporate bond spreads by sector**



**Chart II-4-4: Revisions of firms' credit ratings**



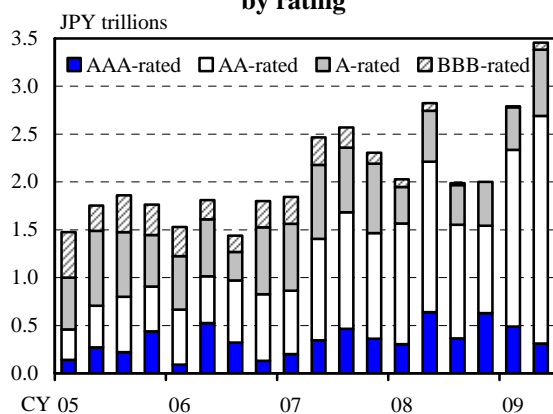


However, the difference between the corporate bond spreads with high ratings and those with lower ratings had rarely narrowed, and credit spreads on corporate bonds issued by construction, real estate companies, and consumer finance companies generally remained at high levels (Chart II-4-3). This suggested that investors remained highly selective about the issues they purchased, as the number of downgradings of firms remained high (Chart II-4-4), and defaults on publicly offered corporate bonds issued by emerging real estate companies continued.

### Improvement in the environment for corporate bond issuance in Japan

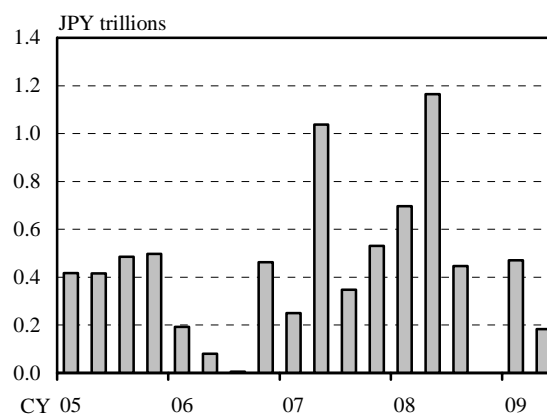
In the first half of 2009, the total amount of primary corporate bond issuance registered the second-highest level on record after the record high set in the first half of 1998 (Chart II-4-5). Looking at corporate bonds by issuer rating, issuance basically continued to be limited to those rated AA or higher, but from April 2009 issuance of bonds rated single-A and some BBB-rated corporate bonds was resumed. The environment for corporate bond issuance in Japan improved as a whole, as evidenced by the decrease in the issuance spread, the rise in the number of firms that expanded the amount outstanding of corporate bonds issued, and the increase in issuance in terms of type and sectors such as real estate companies, nonbanks (lease), and trading companies. Although firms' demand for funds declined against the background of the deterioration in economic conditions, the amount outstanding of corporate bonds issued increased as firms started to take an active stance on raising funds due to the firms' shift back from bank lending (Chart II-1-4) and increasing need for issuance to refinance with longer-term funds. This increase may also be attributable to the strong demand for corporate bonds with high ratings from investors.

**Chart II-4-5: Corporate bond issuance by rating**



Sources: I-N Information Systems; Capital Eye.

**Chart II-4-6: Samurai bond issuance**

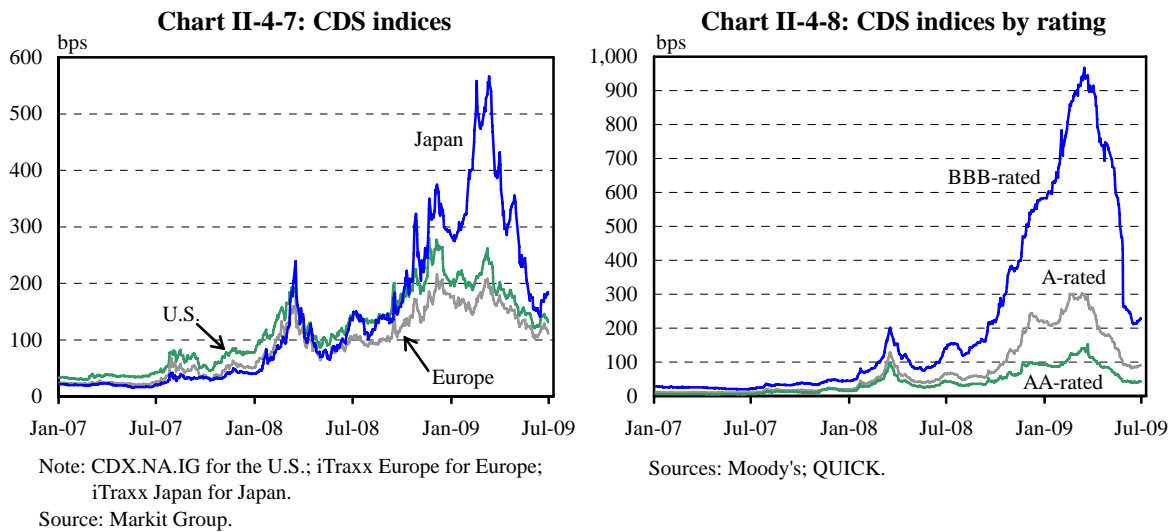


Source: I-N Information Systems.

In the *samurai* bond market, foreign financial institutions resumed their issuance of *samurai* bonds guaranteed by the government, but the issuance of *samurai* bonds without government guarantee was at a standstill. As such, the *samurai* bond market as a whole remained sluggish (Chart II-4-6). This seemed to be because overseas issuers' incentives to raise funds in the yen market decreased, reflecting mainly the recovery in the corporate bond markets of their countries, and domestic investors continued to take a cautious stance on investing in *samurai* bonds without government guarantee.

### Sharp tightening of CDS premiums for Japanese companies

CDS premiums for Japanese companies, particularly those with low ratings, widened sharply toward March 2009 and registered a record high. They then started to tighten to adjust the excessive widening of premiums and returned to the level recorded before the failure of Lehman Brothers (charts II-4-7 and II-4-8).



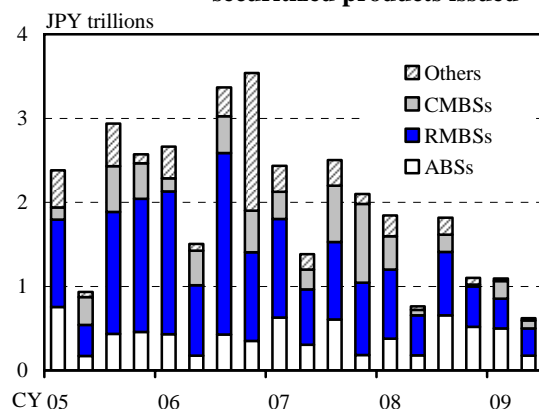
Toward March 2009, when CDS premiums widened against the background of the worldwide economic downturn and deterioration in corporate earnings, increased concerns over firms' funding conditions accelerated the efforts by domestic and overseas investors to reduce the credit risk of various sectors. The tightening of CDS premiums thereafter seemed attributable to the decline in risk reduction activities due to the improvement in the cash bond market, selling of protection to create structured bonds such as credit-linked notes, and selling of protection by investors and dealers to stop losses. The CDS index in Japan was quite volatile compared with that in the United States and Europe. This appears to be the

result of substantial evaporation of market liquidity as a consequence of investors' contraction in CDS transactions (Box 7).

### Continued sluggish issuance of securitized products

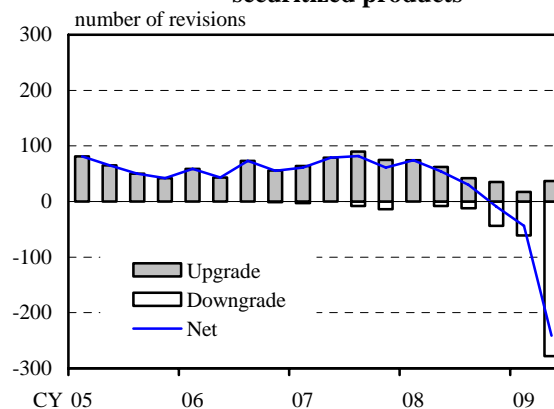
The notional amount of securitized products issued remained sluggish (Chart II-4-9). The underlying assets for some securitized products, such as CMBSs and collateralized debt obligations (CDOs) backed by credited loans to small firms, shrank further as a result of the deterioration in real estate markets and corporate earnings, and an increasing number of these products saw downgrades to their credit ratings (Chart II-4-10). Against this background, domestic investors and securities companies grew more cautious about investing in and increasing the holdings of such products. The notional amount of securitized products issued, excluding RMBSs issued by the Japan Housing Finance Agency, decreased significantly after the turn of the new fiscal year.

**Chart II-4-9: Notional amount of securitized products issued**



Source: Deutsche Securities.

**Chart II-4-10: Credit rating revisions of securitized products**



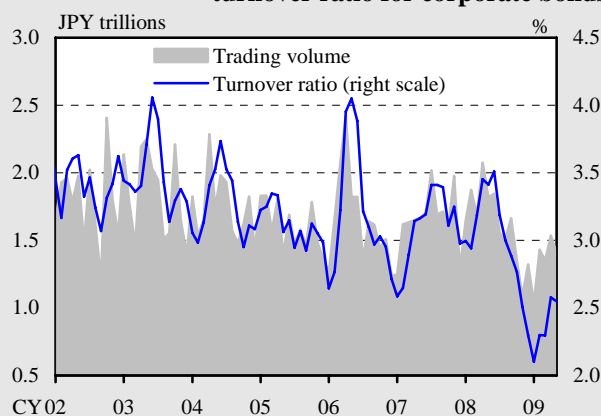
Sources: Deutsche Securities; Mizuho Securities.

### Box 6: Assessing Liquidity in the Corporate Bond Market

Trading volume and the turnover ratio of corporate bonds in the cash market, which declined steeply after the failure of Lehman Brothers in September 2008, have recovered somewhat recently, with signs of recovery in liquidity in the corporate bond market (Chart 1 for Box 6). As for the yield on corporate bonds in the secondary market, the dispersion in the rates quoted by market makers (securities firms), which had been widening since

autumn 2007, started to narrow from around April 2009 (Chart 2 for Box 6).<sup>36</sup> When views are widely split on the price of a particular issue among market participants, the possibility that trades will be executed in the market decreases. On the other hand, when views on the price of a particular issue narrow and dispersion declines, the possibility that trades will be executed in the market grows. Therefore, the larger the dispersion in market maker quotes becomes in terms of secondary market rates, the more likely the liquidity in the corporate bond market will decrease. Conversely, the smaller the dispersion becomes, the more likely liquidity will increase.<sup>37</sup>

**Chart 1 for Box 6: OTC trading volume and turnover ratio for corporate bonds**



Note: Turnover ratio (3-month moving average) indicates the ratio of monthly trading volume to end-of-month amount outstanding.

Source: Japan Securities Dealers Association.

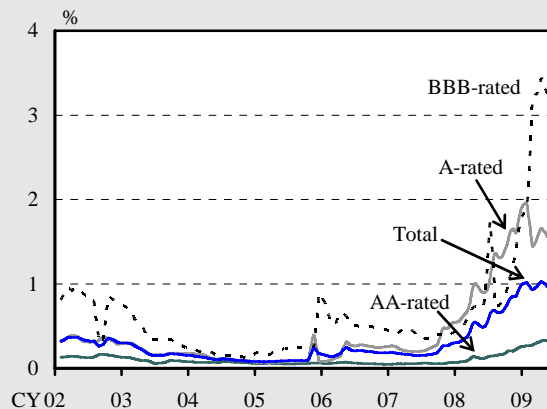
Looking at the dispersion of corporate bond yield in the secondary market by credit rating, the dispersion for bonds rated AA or higher is low, indicating that market liquidity has been relatively high even following the financial market turmoil. That for

<sup>36</sup> Dispersion (standard deviation) of the yield on corporate bonds in the secondary market by credit rating and residual maturity is calculated from issues where there are quoted rates from more than five market makers (securities firms). For example, corporate bonds in the secondary market are categorized by rating and residual maturity, such as AA-rated bonds with residual maturity of three years or more and less than four years, and the standard deviation of a corporate bond yields quoted by securities firms is calculated for corporate bonds within the same category. Chart 2 for Box 6 plots the averages of the standard deviation of rates in each category, weighted by the number of issues in each category.

<sup>37</sup> Dispersion of corporate bond yield in this sense includes dispersion not only on the price evaluation for a certain issue but also among issues in the same category, in other words, the same credit rating and residual maturity.

A-rated bonds, after having widened somewhat since autumn 2008, started to narrow after the turn of the year, accompanied by a recovery in liquidity. Meanwhile, the dispersion for bonds rated BBB or lower remains large, with market liquidity remaining low even after April 2009. As this shows, there are differences in the environment for market liquidity in the corporate bond market according to the credit rating of the issues.

**Chart 2 for Box 6: Standard deviation of corporate bond yields by rating**



Note: 20-day moving average.  
Source: Japan Securities Dealers Association.

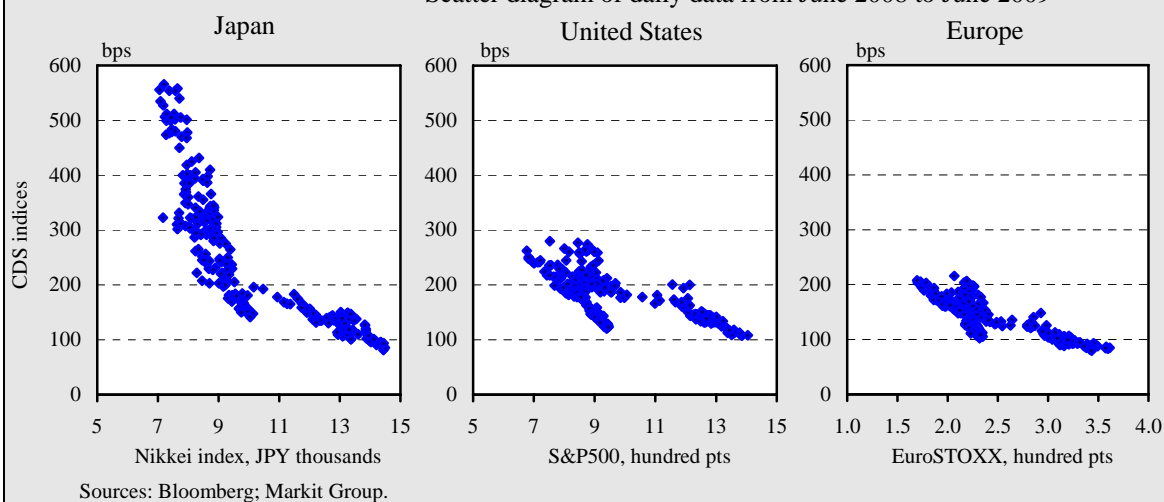
**Box 7: Pro-Cyclicality of Market Liquidity in the CDS Market -- Correlation between Stock Prices and CDS Premiums**

In some instances, correlation is observed in movements in stock prices and CDS premiums, because both reflect market views on corporate creditworthiness and growth potential. In general, when market participants become aware of good news about firms in the market, their stock prices tend to rise and CDS premiums decline, and in the case of bad news, stock prices tend to decline and CDS premiums rise.<sup>38</sup> Looking at actual market data in Japan, the United States, and Europe in the financial turmoil since autumn 2008, while stock price declines were observed, CDS premiums widened significantly (Chart 1 for Box

<sup>38</sup> However, when the capital and debt structures of a firm change drastically amid a substantial deterioration in the creditworthiness of that firm, it is possible for both the stock price and CDS premium to decline. For example, in autumn 2008, when many large European financial institutions were partly or wholly placed under government support, expectations increased that payment on senior debt would be honored, while the outlook that stock prices would fall virtually to zero strengthened. Under these circumstances, CDS premiums contracted significantly and stock prices declined drastically.

7). As market participants became increasingly risk averse, they began to sell stocks, which were risk assets in their portfolio, and reduced their credit risk exposures, that is, bought CDS protection. These activities of market participants may have induced a simultaneous decline in stock prices and widening in CDS premiums. In addition, this may have been attributable to the fact that market participants sold stock futures in anticipation of a further decline in stock prices and bought CDS index protection in anticipation of a further rise in the credit risk of firms (rise in CDS premiums) as the influence of the financial turmoil spread.

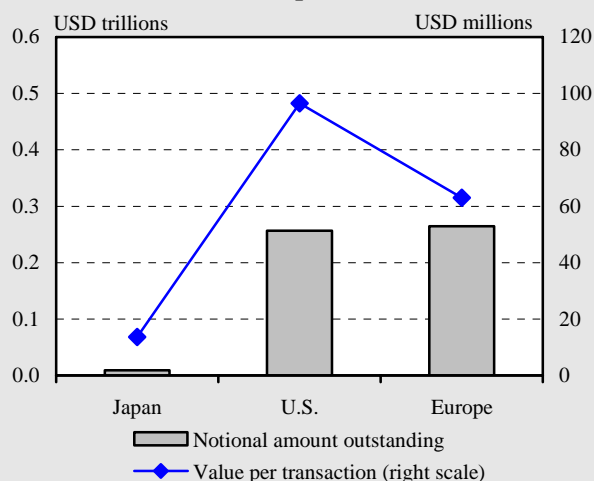
**Chart 1 for Box 7: Correlation between stock prices and CDS premiums**  
Scatter diagram of daily data from June 2008 to June 2009



In Japan, the rise in CDS premiums tends to be asymmetrically large in relation to the decline in stock prices, when stock prices fall below a certain threshold. One of the factors that contributed to amplifying the movements in CDS premiums may have been the low liquidity in the CDS market. In addition, there is a notable difference in the variation of market participants and transaction volume between the Japanese market and the U.S. and European markets. The amount outstanding of Japan's CDS index transactions is 2 to 3 percent of that of U.S. and European indices, based on the notional amount, and the amount per transaction is only about one-fifth (Chart 2 for Box 7). For this reason, CDS premiums

in Japan tend to be more susceptible to large fluctuations in times of stress.<sup>39</sup> Under such circumstances, because the decline in stock prices below a certain threshold induced a steep contraction in the risk appetite of market participants through capital constraints, market participants became reluctant to enter into new risk-taking activities (selling CDS protection), leading to a steep rise in CDS premiums.

**Chart 2 for Box 7: Notional amount outstanding and value per transaction of CDS indices**



Note: As of June 26, 2009.

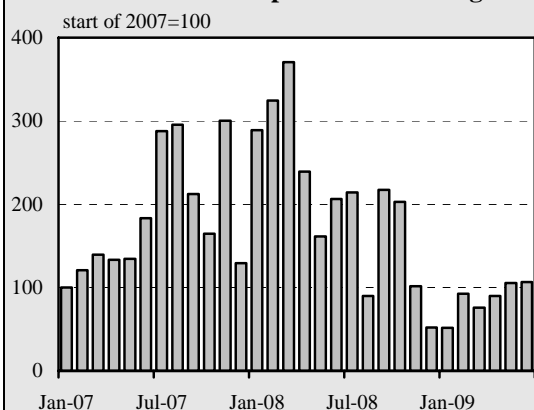
Source: Depository Trust and Clearing Corporation.

When CDS premiums rise to levels significantly higher than the level warranted by fundamentals (the true credit risk of firms), in normal conditions, selling of CDS protection would increase because it becomes relatively cheap (the premium to be gained would be high compared to the risk involved). In circumstances where investors' risk appetite declined, these transactions did not increase, however. In addition, overshooting of CDS premiums made the cost of hedging risk high, leading to a decrease in demand by Japanese banks and other market participants for CDS protection. Furthermore, the increase in volatility of CDS premiums intensified the impact of fluctuations in CDS price changes

<sup>39</sup> Looking at CDS index components in Japan by constituent issues, the index is characterized by relatively high proportions of industrials and financials and a low proportion of utilities, which are relatively immune to the economic cycle. For this reason, in Japan the premium of Japan's CDS index has a stronger tendency to rise when market participants take an increasingly cautious stance regarding the risk of economic deterioration and financial system instability. This is another factor enforcing the pro-cyclicality of market liquidity in Japan's CDS market. For more details, see Box 7 in the March 2009 *Financial Markets Report*.

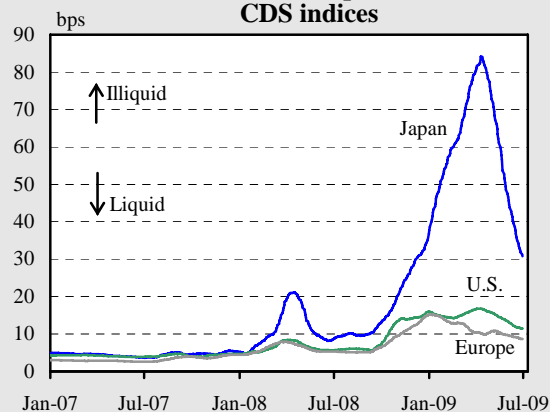
on the profit and loss account, and this may have induced market participants that wanted to avert large fluctuations in profits and losses to refrain from CDS transactions. Against this background, CDS transactions in the market decreased (Chart 3 for Box 7), and in terms of prices the bid-ask spread widened steeply toward the end of March 2009 (Chart 4 for Box 7).

**Chart 3 for Box 7: Japan's CDS trading volume**



Note: Trading principal basis.

**Chart 4 for Box 7: Bid-ask spreads of CDS indices**



Note: Simple average of reference entities (30-day moving average).

Source: Bloomberg.

In this way, with further deterioration in economic conditions as reflected in the fall of stock prices, the steep decline in liquidity in the CDS market -- in other words, the stronger pro-cyclicality of market liquidity -- may have lowered the usefulness of CDSs in terms of their function as financial products that allow transfer of credit risk. Pro-cyclicality of market liquidity is widely seen not only in CDS markets but also in financial markets in general. But in the current situation, it seems that many market participants pointed out that CDS market functioning in the transfer of credit risk deteriorated to insufficient levels during the financial crisis.

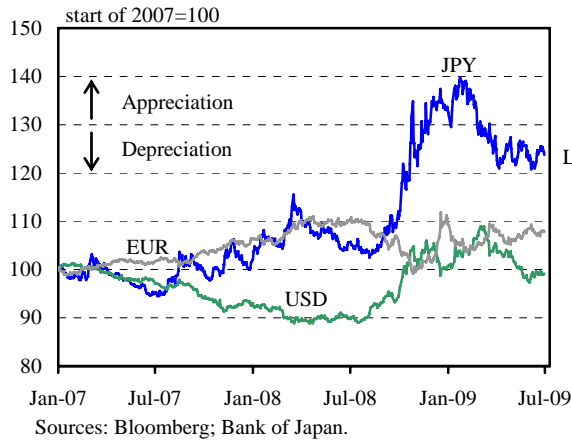
## 5. Foreign Exchange Markets

FX rates continued to show unstable movements, greatly influenced by market participants' views on global economic conditions and the financial system. Buybacks of the U.S. dollar and the yen, which were observed toward the end of 2008, came to a halt after the turn of the year. After March 2009, some investors shifted their investment from the U.S. dollar and the yen to currencies of resource-rich countries and high-yielding currencies as their risk

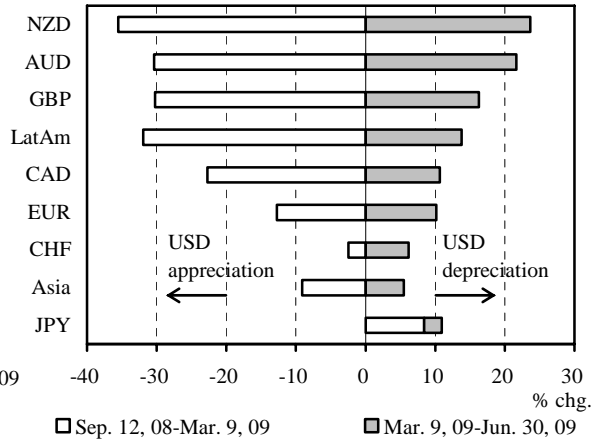


appetite recovered.

**Chart II-5-1: Nominal effective exchange rates**



**Chart II-5-2: Changes in FX rates against the U.S. dollar**



Note: Changes from just before the failure of Lehman Brothers to the date on which the nominal effective exchange rate of the U.S. dollar marked the highest during the first half of 2009, and to the nearest date.

Source: Bloomberg.

### Depreciation of the U.S. dollar and the yen

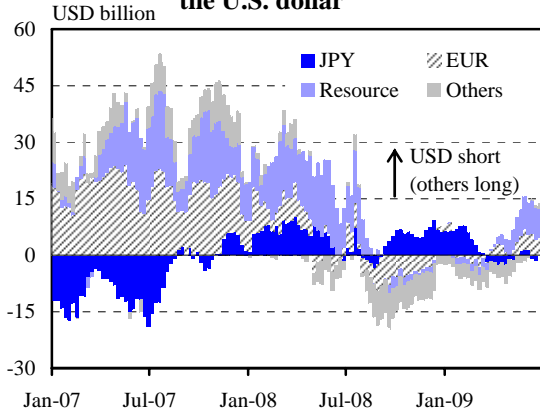
The U.S. dollar appreciated considerably in autumn 2008 as U.S. investors with diminished risk-taking capacity increased their repatriation of U.S. dollar funds from the global financial markets. It continued to appreciate for some time, albeit with some fluctuations (charts II-5-1 and II-5-2). Around March 2009, however, when stock prices rebounded and started to rise worldwide, investors resumed their short positions in the U.S. dollar against the euro and the currencies of resource-rich countries (Chart II-5-3). In addition, the nominal effective exchange rate of the U.S. dollar started to depreciate, as there was also growing concern over the risk of downgradings of U.S. Treasuries reflecting the view that the fiscal deficit would increase.

The yen had been on an upward trend since autumn 2008, due in part to unwinding of the yen-carry trade positions.<sup>40</sup> However, its nominal effective exchange rate depreciated in February 2009 reflecting the fact that GDP growth rate marked a double-digit decline on an annualized basis in the October-December quarter of 2008 (Chart II-5-1). The yen had

<sup>40</sup> For details, refer to Hiroyuki Shiozawa, Maiko Koga, and Takeshi Kimura, "Carry Trade to Kawase Rate Hendo -- Kinri Hendo ga Shijo Sankasha no Risk Ninshiki ni Ataeru Eikyo (Carry Trades and Movements in Foreign Exchange Rates: Effects of Movements in Interest Rates on Market Participants' Assessments of Risks)," Bank of Japan Review Paper No. 2009-J-5, 2009 (available only in Japanese).

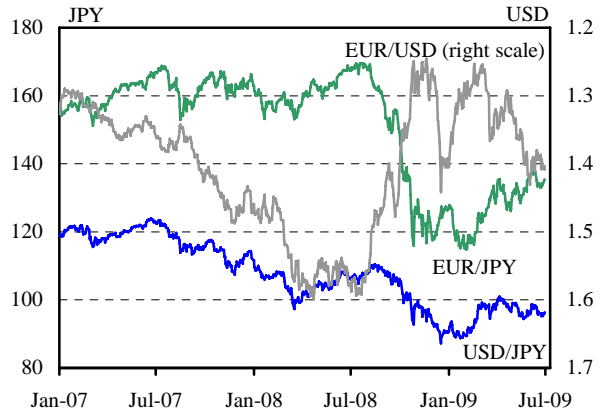
been moving around the rate of 90 yen to the U.S. dollar until January 2009, and after February it moved in the range of 95-100 yen to the U.S. dollar (Chart II-5-4).

**Chart II-5-3: IMM futures net position against the U.S. dollar**



Note: "Resource" consists of AUD, NZD, CAD, and MXN.  
 "Others" consists of GBP and CHF.  
 Source: Bloomberg.

**Chart II-5-4: Bilateral exchange rates**



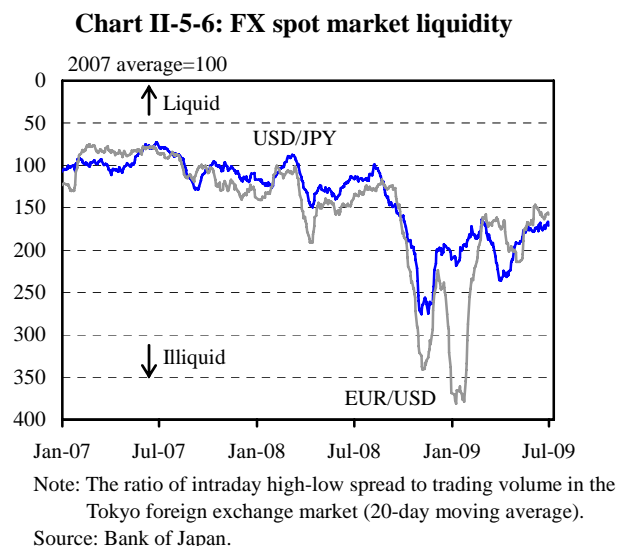
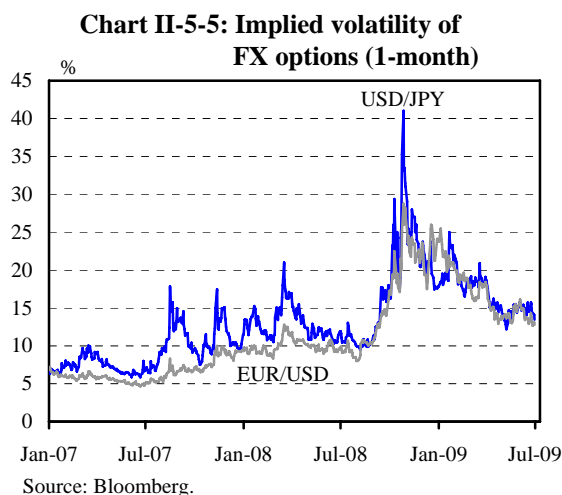
Source: Bloomberg.

The euro depreciated due to the expectations of additional monetary easing by the ECB and also to concerns about financial system stability and the deterioration in governments' fiscal conditions in the euro area and surrounding economies. Around March 2009, however, appreciation pressure was seen on the euro mainly from the recovery in market participants' risk appetite and diversification in the currency composition of official foreign reserves by monetary authorities, particularly those in emerging economies. Therefore, the euro remained more or less unchanged as a whole (Chart II-5-1).

**Risk appetite and risk reversal**

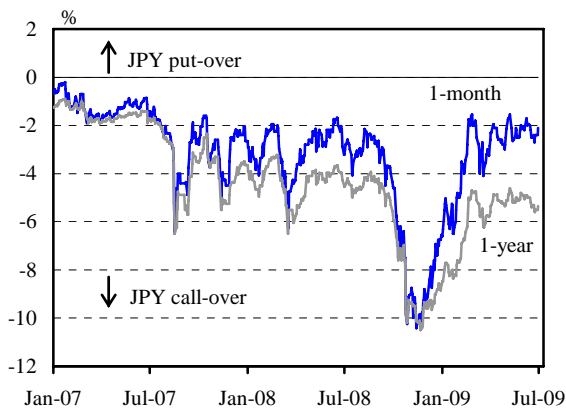
Since autumn 2008, implied volatility of currencies rose while liquidity in FX markets declined. After the turn of the year, this feedback effect between volatility and market liquidity diminished gradually as market participants' risk appetite recovered (charts II-5-5 and II-5-6). The recovery in risk appetite can be seen in the developments in risk reversal -- the difference in implied volatility between yen puts and yen calls (Chart II-5-7). The risk reversal can be viewed as insurance to hedge losses incurred by a significant change in FX

markets, or costs to purchase protection against the positions exposed to FX risks.<sup>41</sup> If the supply of insurance against the risk of a sharp appreciation of the yen decreases or demand for it increases, due to the decline in market participants' risk appetite, the premium for yen calls options (insurance) will increase and the yen call-over position will increase. On the other hand, if the supply of insurance against the risk of a sharp appreciation of the yen increases or demand for it decreases, due to the recovery in market participants' risk appetite, the premiums (insurance) will decrease and the yen call-over position will diminish. The yen call-over position increased sharply in autumn 2008 but then fell after the turn of the year. In other words, it can be confirmed that market participants' risk appetite recovered after declining sharply.



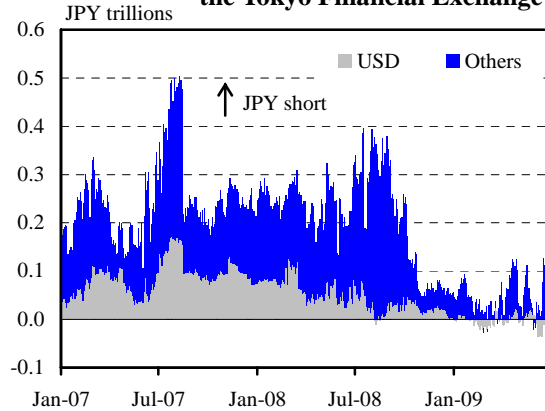
<sup>41</sup> The risk reversal was negative on average, that is, it registered call-over. This suggests that the demand for insurance against the risk of a sharp depreciation of the U.S. dollar or a sharp appreciation of the yen remains strong. This seems to be because Japan has a current account surplus, exporting companies tend to hedge risks associated with foreign currency-denominated payments, and domestic institutional investors tend to hedge risks associated with foreign currency-denominated bonds.

**Chart II-5-7: Risk reversal of U.S. dollar/yen**



Source: Bloomberg.

**Chart II-5-8: FX margin trading on the Tokyo Financial Exchange**



Source: Tokyo Financial Exchange.

### **Speculators' positions and Japanese retail investors' FX trading**

The International Monetary Market (IMM) futures net positions of noncommercial investors on the Chicago Mercantile Exchange showed that speculators gradually increased their short positions in the U.S. dollar since March 2009, reflecting the recovery in risk appetite (Chart II-5-3). This suggested that the funds of U.S. investors that had returned to the United States after the failure of Lehman Brothers were now flowing to resource-rich countries and others. However, in June 2009, the short positions in the U.S. dollar were still around two-thirds of the level reached in the first half of 2008, before the failure of Lehman Brothers.

Looking at Japanese retail investors' trading behavior, FX margin traders, who sought profits over a relatively short-term horizon, had significantly decreased their positions in some currencies such as the Australian dollar against short-term market directions -- the "yen carry trade" -- after autumn 2008, but increased them again around March 2009 (Chart II-5-8). Although volatility in FX markets had declined, it still remained high (Chart II-5-5). Given the tightening of interest rate differentials between Japan and overseas, the increase in investors' short positions in the yen did not gather momentum, as it did not pay from a risk/return standpoint, and so positions remained at a low level.

### **III. Outlook for the Financial Markets**

Investors' risk appetite has recovered somewhat, and financial and capital markets have started recovering recently, in response to policy measures implemented by authorities in countries to stabilize financial markets and signs of a bottoming out of economic activity along with the rapid progress in production and inventory adjustments. Nonetheless, the improvement in the financial markets so far is mostly due to the unwinding of the overly pessimistic views about the global economy and financial markets. It is also strongly supported by measures implemented by the public authorities to support and stabilize the financial markets. Consequently, it is too early to say that the financial and capital markets have normalized. In point of fact, the rise in long-term interest rates and stock prices, and narrowing of credit spreads started to reverse or came to a standstill from mid-June 2009, as little global economic data was reinforcing the economic recovery.

Projections regarding the financial and capital markets need to take into account whether both the recovery of global final demand and the improvement in financial conditions, particularly of the U.S. and European financial institutions, proceed simultaneously. When there exists a sector with excessive debt such as U.S. households, the spending of such a sector is curtailed and the demand stimulus effect of additional credit supply may decrease. In such a situation, the pace of economic recovery is likely to be moderate. Moreover, if the level of aggregate demand of the economy is projected to remain low, the pressure to adjust capital stock may strengthen. Under these circumstances, if firms' equipment becomes obsolete, the impairment loss on fixed assets may exert downward pressure on their capital adequacy.

If adjustments in balance sheets of nonbank sectors including the corporate sector continue, there is a risk that NPLs in the banking sector may increase. In the United States, as stated in Chapter I.3, loans continue to deteriorate, reflecting the worsening in the employment and income situation. If the economy deteriorates and the performance of financial institutions worsens again, there is a possibility that concerns over the capital adequacy of financial institutions will reemerge. Markets are still cautious about such a risk. Given these circumstances, markets are likely to remain volatile and sensitive to shocks.

Adjustment in the balance sheet of the private sector consists of downward pressure on the economy. Therefore, the public sector should instead underpin aggregate demand for the time being. However, markets seem to be aware of the potential risk that

expansion of the public-sector balance sheet due to the increasing fiscal deficit will destabilize interest rates. Long-term government bond yields at home and abroad have not largely diverged from the level considered to be anchored by price stability. However, some nervousness was seen in response to the increasing fiscal deficit. If concerns reemerge over the conditions of the financial sector in the United States and Europe, with their remaining nonperforming assets, the downward pressure on the economy will strengthen through a negative feedback loop between financial markets and economic activity. This will lead to an increase in fiscal expenditure and to heightened uncertainty over its financing. If this results in a divergence of long-term government bond yields from fundamentals and an increase in the government's funding costs, there will be a chain reaction in which the funding costs of the private sector supported by the government increase as well. As a result, there is a possibility that global financial markets' instability would negatively affect domestic financial markets. Considering these potential impacts, the key to financial stability is whether the U.S. and European financial institutions can maintain their disposal of NPLs with due speed.

Meanwhile, in the long run, it is necessary to bear in mind that in the past aggressive policy measures to restore stability in response to financial crisis triggered financial imbalances that developed subsequently, even though the measures' original objectives were achieved. Market participants increasingly take on more risk in stable circumstances when liquidity risk and price fluctuation risk are low. Should such behavior spread through the economy, adjustment pressure from financial imbalances may accumulate. Consequently, if the financial markets become so stable that market participants lose their sensitivity to risks, the risk of a new financial imbalance would be heightened. Therefore, maintaining market functioning in a sustainable manner so that appropriate risk assessment is carried out is necessary for financial market stability in the long run. It is vital for each market participant to recognize this, and to work to restore the self-sustaining functioning inherent in the financial markets and strengthen the robustness of the financial and capital markets.