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Financial Markets Report

Bank of Japan

March 2009

- This is a translation of the Japanese version published on January 30, 2009.
- This report covers the market developments during the second half of 2008, unless otherwise stated.

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Financial Markets Department, Bank of Japan

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Executive Summary

I. Financial Crisis and Heightening of Global Recessionary Pressures

The current financial turmoil, triggered by the U.S. subprime mortgage problem, developed into a global financial crisis from autumn 2008. This crisis was caused by the adjustment pressure from the so-called "financial imbalances" that had accumulated during the global credit boom from around 2002 to the first half of 2007. The considerable adjustment pressure was exerted because U.S. and European financial institutions expanded their businesses as intermediaries of international capital flow while taking on higher liquidity risk, and these international banking activity became excessive relative to the real economy.

Although central banks in major economies had increased their liquidity provisions to address the turmoil since summer 2007, financial markets suffered markedly heightened strain in September 2008, triggered by the failure of Lehman Brothers, a major U.S. investment bank. Financial institutions deepened concerns over counterparty risk in the interbank markets, and liquidity dried up particularly for term funding. Tensions in the interbank markets made banks' lending policies more stringent for the nonfinancial sector, which led to the deterioration in funding conditions for investors, households, and companies and made them risk averse. As a result, the market functioning declined not only in interbank markets but also in financial and capital markets overall. Under these circumstances, the adverse feedback loop between the financial sector the real economy intensified, as economic conditions significantly deteriorated, instigating a rapid increase in uncertainty about the economic outlook and financial asset valuations.

The effects of the adverse feedback loop between the financial and real sectors became evident in both the developed and developing economies, which had been relatively robust to that point. Because the expansion of international capital flow between developed and developing economies had amplified the global credit boom until 2007, once the trend in capital flow started to reverse, the subsequent negative effects spread instantly around the world.

II. Developments in Domestic Financial Markets in the Second Half of 2008: Deterioration in Market Functioning and Large Fluctuations in Asset Prices

Domestic financial markets in the first half of 2008 were relatively stable although they were

influenced by the turmoil in global financial markets. However, in the second half of 2008, domestic markets started to be strongly impacted by the turmoil, and their functioning declined.

In money markets, after the failure of Lehman Brothers, interest rates came under upward pressure, reflecting the rise in concerns over counterparty risk and the decrease in market liquidity. Market liquidity of Japanese government bonds (JGBs), which had already started to decline in the first half of 2008, decreased further after September. Arbitrage transactions became inactive and the price discovery function of the JGB market was impaired, as overseas investors such as hedge funds were forced to unwind their positions as they faced funding liquidity constraints. Against the background of sharp deterioration in the economic outlook and overseas investors' deleveraging, stock prices plunged, which led to a decline in the risk-taking capacity of domestic investors. This widened credit spreads in CP and corporate bond markets. The impaired functioning of long- and short-term credit markets caused companies to increase their reliance on bank borrowings. As a result, banks became increasingly active in funding through money markets while taking a cautious stance on investing funds, all of which exerted upward pressure on interbank rates.

In the foreign exchange (FX) markets, liquidity declined and FX rates fluctuated to a considerable degree as market participants became increasingly risk averse. Because of the rise in FX volatility, carry trade positions were unwound and the yen appreciated significantly, while also reflecting economic outlook and interest rate differentials between Japan and overseas. The sharp appreciation of the yen triggered not only substantial downward revisions of corporate profit forecasts in particular for manufacturing companies which had driven the Japanese economy's expansion until 2007, but also a further plunge in stock prices, leading to a decline in domestic investors' risk-taking capacity.

III. Policy Responses of Central Banks and Governments to the Financial Crisis

Against the backdrop of deterioration in economic conditions triggered by the financial crisis, central banks in major economies reduced policy interest rates significantly, and also expanded liquidity provisions to financial institutions by implementing various market operations in order to address the situation in which the impaired functioning of interbank markets lessened the effectiveness of monetary policy. In the early phase of the market turmoil, U.S. and European governments had conducted supportive measures against

problems at their financial institutions on a case-by-case basis. However, as concerns over financial system instability spread globally, authorities in major economies began to implement more comprehensive initiatives in the form of guarantees on bank debt and capital injections. Furthermore, as the deterioration in the functioning of financial markets led to tighter funding conditions for all economic agents, including companies and households, central banks and governments in some countries implemented several unconventional measures such as purchases of private-sector assets to restore liquidity to the markets whose functioning had deteriorated noticeably.

The series of measures taken by public authorities in major countries were effective in containing further instability of global financial markets for a period of time. Nevertheless, tensions in global financial markets remained at a heightened level, further downward revisions were made in the outlook for the global economy, and uncertainty about the depth and span of the global recession remained quite high. Although adjustments to reduce the "financial imbalances" that have accumulated in the past credit boom are essential to normalizing economic conditions, downward pressures tend to be exerted on economic activity in an adjustment phase. For example, the size of the balance sheets of financial institutions that have increased their leverage comes under inevitable pressure to decrease, leading to more stringent lending policies toward companies and households. However, it is important to underpin the funding environment for the nonfinancial sector, in order to facilitate progress of the adjustment process while averting protracted and substantial deterioration in the real economy. Therefore, public authorities need to implement appropriate policies to alleviate burdens on the nonfinancial sector, while stabilizing the financial system.

Many countries continued to face downward pressure stemming from the adverse feedback loop between the financial sector and the real economy. There remained a concern that the shock-absorbing mechanisms available in the current financial system and policy frameworks might not be sufficient to buffer the materialization of imminent risks, and this was one factor that hampered the lifting of uncertainty over the economic outlook. Meanwhile, market participants increasingly seemed to expect further fiscal support by governments, so as to reduce uncertainty over the macroeconomic outlook and strengthen financial and economic conditions. However, at the same time, it should be noted that new sources of uncertainty might have arisen in connection with the deterioration in governments' fiscal conditions associated with the transfer of risk to the public sector, as evidenced by the widening of

sovereign credit default swap (CDS) premiums.

IV. Issues Regarding the Functioning of Financial Markets and the Bank of Japan's Actions in 2008

With a view to supporting improvement in the functioning and efficiency of financial markets in Japan, the Bank addressed the following issues concerning the market infrastructure in 2008.

In 2008, the Bank enabled financial institutions to outsource transfers of Japanese government securities pledged to/returned from the Bank as eligible collateral. The Bank was also engaged in improving the statistics of interest rates on newly issued CP. In addition, the Bank carried out the Tokyo Money Market Survey, a comprehensive study of trends in money market transactions and changes in market participants' activities in August, in order to identify the challenges and developments related to the functioning of the money markets. The Bank published a report that includes data from the survey, as well as the findings regarding the impact of the failure of Lehman Brothers on the functioning of money markets, particularly on repo markets.

In response to the subprime mortgage problem, the Working Group on Distributions of Securitized Products under the Japan Securities Dealers Association held discussions on enhancing the transparency of transactions of securitized products by ensuring traceability to the underlying assets. Regarding over-the-counter derivatives markets, market participants discussed the needs for a central counterparty and other measures to improve the infrastructure, taking into account the developments in the United States and Europe.

With regard to the business continuity plan (BCP) in financial markets, ensuring that necessary transactions can be conducted even in emergency situations such as earthquakes or terrorist attacks is in the interest of each individual market participant, and contributes to maintaining the stability of the financial markets and the economy as a whole. In 2008, significant progress was made in the BCP, as market-wide exercises were conducted in money markets (call markets), FX markets, and securities markets.

The Bank will continue to support the initiatives by market participants related to improving market practices and infrastructure in financial markets.

I. Financial Crisis and Heightening of Global Recessionary Pressures

The current financial turmoil, triggered by the U.S. subprime mortgage problem, developed into a global financial crisis from autumn 2008. As mentioned in the September 2008 *Financial Markets Report*, the U.S. and European financial markets continued to be unstable in the first half of 2008 as an adverse feedback loop between the financial sector and economic activity became more evident. To address the situation, the Federal Reserve and other central banks in major economies implemented a series of liquidity provision measures from mid-March to early May 2008, while many major financial institutions in the United States and Europe strengthened their capital base. These measures temporarily staved off any further spread of the financial turmoil, but the economy continued to deteriorate, as evidenced by further adjustments in the housing market, and the outlook for the economy and asset valuation remained highly uncertain. Against this background, the deterioration of financial conditions at government-sponsored enterprises (GSEs), which had been an important part of the U.S. residential mortgage market infrastructure, and the failure of Lehman Brothers, a major investment bank in the United States, led to a significant rise in concerns over counterparty risk and virtually paralyzed the functioning of financial markets from autumn 2008. The adverse effects of these events spread to developed and developing economies in a short period of time, leading to global deterioration in economic and financial conditions, as evidenced by a sharp decrease in industrial production and a significant decline in stock prices, due to forced selling by investors that faced liquidity constraints.

In Chapter I, the process through which the financial markets moved from turmoil to crisis is described in terms of three points: (1) adjustment pressure from financial imbalances accumulated over a period of years; (2) a decline in the functioning of the global financial markets; and (3) the amplification of adverse feedback loop between the financial sector and the real economy.

1. Adjustment Pressure from Financial Imbalances

The current financial system instability stemmed from the reversal of the global credit boom, which continued from around 2002 to summer 2007. The large-scale global financial crisis occurred partly because the credit expansion was too large relative to growth in the real economy. This led to significant accumulation of the so-called "financial imbalances," thereby

exerting a considerable adjustment pressure later on markets. This section reviews the process through which imbalances in global financial markets were accumulated and examines how the functioning of financial markets and balance sheets of financial institutions were affected by the reversal of the favorable credit cycle.

Credit cycles and international banking activity

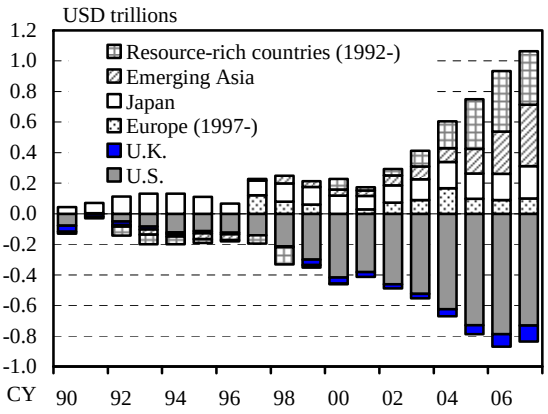
Global credit cycles from around 2002 were influenced by various factors, including financial innovation and deregulation, market participants' investment behavior, and changes in the macroeconomic environment. This section focuses on how international banking activities affected the credit cycles.[1]

Emerging and oil-exporting countries continued to increase their current account surpluses until around 2007. Some of their excess savings went into the government bond and stock markets in developed countries, and also flowed into countries with current account deficits such as the United States and the United Kingdom via intermediation of U.S. and European banks, in the form of investments in securitized products, corporate bonds, and leveraged loans, and lending to hedge funds (Chart I-1-1). In turn, these financial institutions as well as hedge funds and institutional investors, which had abundant risk appetite at the time, invested in emerging market assets such as stocks, contributing to the flow of funds back into developing economies.

The growth of developing economies, which later started to push up commodity prices, had contributed to developed economies' attainment of sustained growth and stable inflation by supporting export growth of developed economies and providing cheap goods to developed economies. This stable macroeconomic environment, the so-called "Great Moderation," had resulted in lower risk premiums, and this together with accommodative monetary policy stances in developed economies and excess savings in emerging economies allowed for long-term interest rates of developed economies to stay at historically low levels (Chart I-1-2).

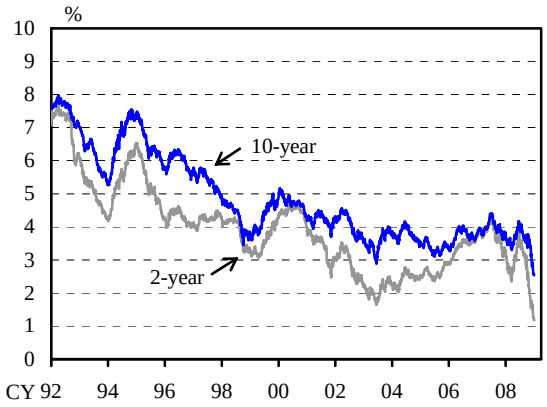
[1] For details on the mechanisms behind the accumulation of financial imbalances and emergence of financial market turmoil, see Box 1 in the September 2008 *Financial Markets Report*.

Chart I-1-1: Expansion of external imbalances



Note: Europe covers the euro area and Switzerland. Resource-rich countries cover the Middle East, Russia, and Latin America.
Source: International Monetary Fund, "WEO Database."

Chart I-1-2: Interest rates in developed economies



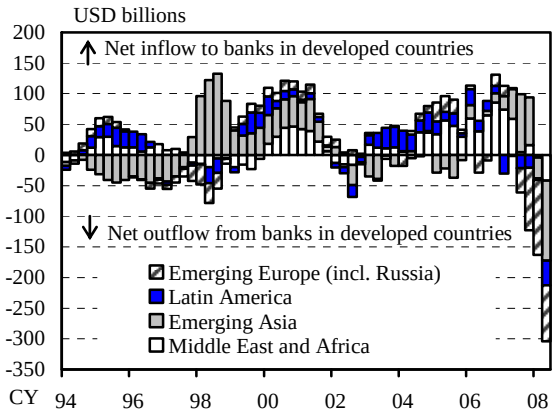
Note: Simple averages of government bond yields in the G5 countries.
Source: Bloomberg.

Against the background of such an accommodative monetary environment, particularly in the United States and Europe, housing investment increased and housing prices rose, creating a wealth effect that led to growth in private consumption. As households increased their debt in order to spend more, such debt was used as the underlying assets of securitized products, which were sold to investors around the world. As long-term interest rates remained low, investors increasingly took on more risk in an effort to obtain higher yields (the so-called "search for yield") and U.S. and European financial institutions encouraged investors' risk-taking activities. These financial institutions aggressively poured funds into securitized markets, not only directly by investing in securitized products, but also indirectly by extending loans to hedge funds and using their affiliated investment vehicles.

U.S. and European financial institutions came to depend increasingly on funding through interbank markets in order to expand their aforementioned investment activities. Countries with current account surpluses such as oil-producing and emerging Asian countries became prominent lenders in the interbank markets until around 2007, having increased the amount of U.S. dollar deposits at U.S. and European financial institutions (Chart I-1-3). In particular, the U.S. dollar deposits from developing countries played an important role for European banks in expanding their businesses in global financial markets, as they do not have retail deposits in U.S. dollars (Box 1). Looking at the foreign claims of internationally active banks by borrowers' location, there was a notable increase after 2002 in claims on the United Kingdom and the euro area -- in other words, an increase in capital inflow to these countries through banks (Chart I-1-4). This indicates that funds from developing countries as well as

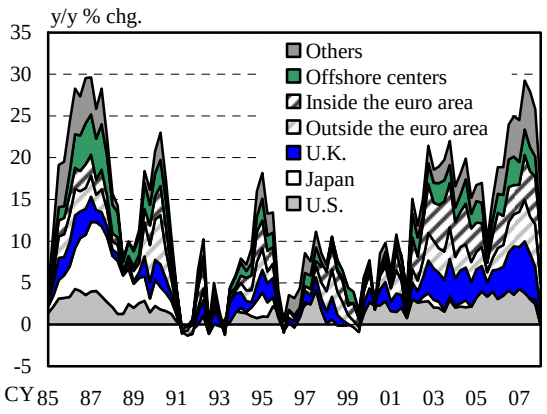
countries around the world first flowed into the United Kingdom and the euro area before being allocated globally, particularly to the United States.[2] The expansion of international banking activity, as explained above, supported development of the global credit boom, particularly in the U.S., the U.K., and European housing markets.

Chart I-1-3: U.S. dollar cash flow from developing countries to banks in developed countries



Note: Yearly changes in net foreign claims of banks on developing countries.
Source: Bank for International Settlements, "International Locational Banking Statistics."

Chart I-1-4: Banks' foreign claims by region



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

Three points should be mentioned as key factors in relation to aggravation of the current financial turmoil, from the perspective of international banking activity in the credit boom.

First, the pace of credit expansion was much more rapid than that of growth in the real economy, spurring significant expansion of "financial imbalances." These imbalances can be shown by various measures; for example, by the ratio of foreign claims of global banks to global GDP, which had risen significantly (Chart I-1-5). The rise in this ratio implies that international banking activity started to expand at a faster rate than economic growth from around 2002, leading to a global increase in market liquidity (Chart I-1-6).[3] The expansion of market liquidity was so significant in scale that the subsequent contraction in liquidity and turmoil in the markets became more severe.

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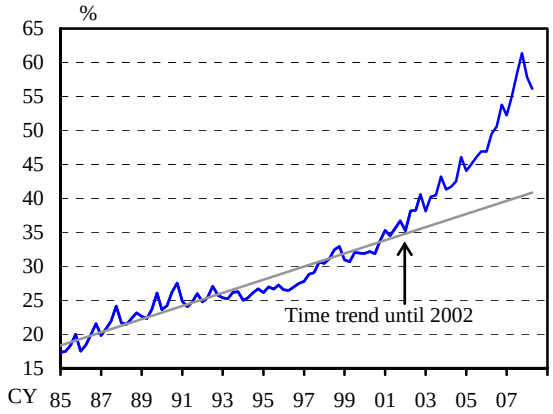
[2] Capital inflow to Japan, in terms of foreign claims of banks on Japan, increased markedly during the period of the economic bubble of the late 1980s, but very little during the period of the global credit boom from 2002.

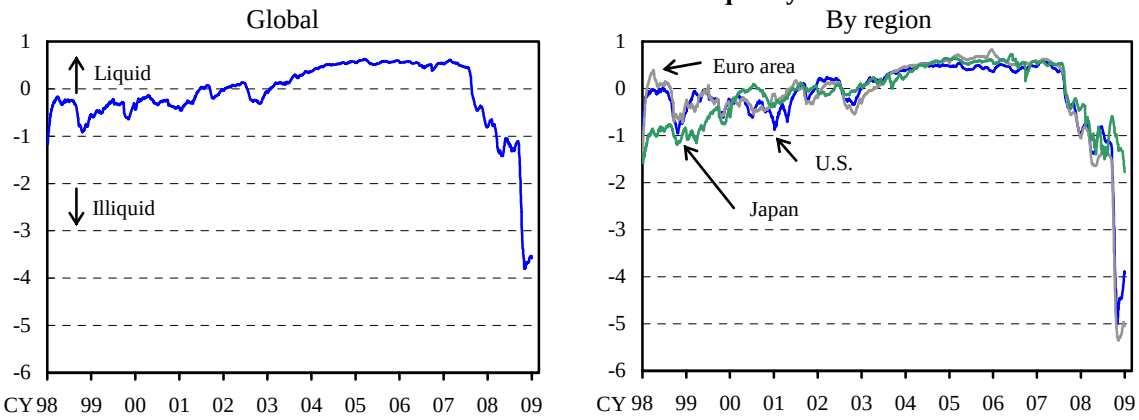
[3] For the concept and characteristics of market liquidity, see the March and September 2008 issues of the *Financial Markets Report*.

Chart I-1-5: Ratio of banks' foreign claims to global GDP



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

Chart I-1-6: Financial market liquidity



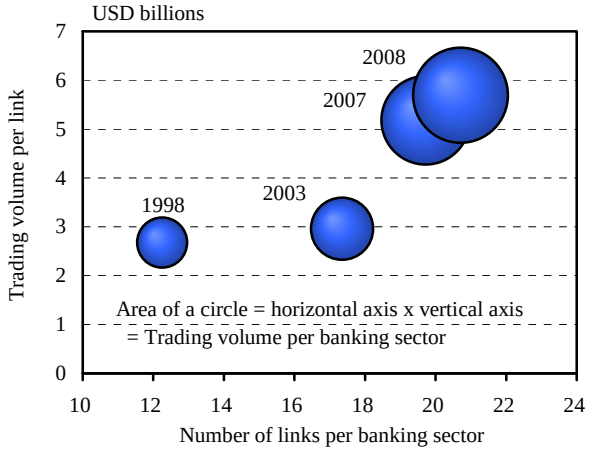
Notes: 1. Normalized measures using the sample average and standard deviation from 1999 through 2004. See the March 2008 *Financial Markets Report* for calculation methods.
2. The right-hand chart shows area-based indicators composing market liquidity measures in stock, government bond, foreign exchange, credit and money markets.

Sources: Bloomberg; Japan Securities Dealers Association; QUICK.

Second, financial institutions expanded their businesses as intermediaries of the international capital flow, and came to take higher liquidity risk. In particular, European banks that generally do not have retail deposits in U.S. dollars increased their dependence on short-term funding of U.S. dollars in the interbank markets in order to finance longer-term U.S. dollar-denominated claims (Box 1). As the financial market turmoil spread globally, the function of U.S. dollar interbank markets deteriorated partly due to developing countries' withdrawals of U.S. dollar deposits (Chart I-1-3), immediately leading to tighter funding conditions for banks, especially those in Europe. This in turn resulted in tighter lending standards, generating negative effects on the real economy.

Third, over the last decade, international banking activity expanded with the increase in network density. In times of heightened stress at a network node -- for example, when European banks face funding liquidity constraints -- the stronger the link between nodes, the more likely that the spread of the impact will be faster and wider across the international financial network. Over the last decade, the average number of international financial links of each country's banking sector to other countries nearly doubled (Chart I-1-7). At the same time, the average amount of international financial transactions per link also doubled. The stronger links in the financial network contributed to effectively allocating the wealth gained from the economic growth of a certain economy throughout the overall network until 2007; however, once the trend in capital flow started to reverse, the subsequent negative effects also spread instantly around the world. In particular, in the second half of 2008, uncertainty over macroeconomic conditions heightened rapidly throughout the world, and the risk premiums for various financial assets increased further, presenting market conditions opposite to those seen in the period of the "Great Moderation." In this situation, concerns increased not only among financial institutions but also other economic agents such as companies and households.

Chart I-1-7: Expansion of international financial network

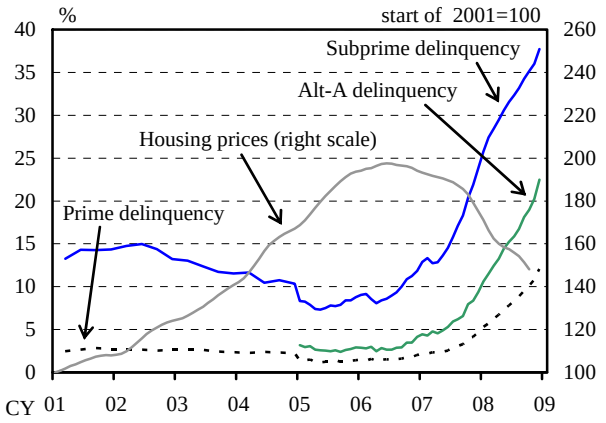


Note: Averages of number of links and foreign claims between each banking sector and its counterpart regions. End of June figures.
Source: Bank for International Settlements, "International Locational Banking Statistics."

Reversal of the credit cycle

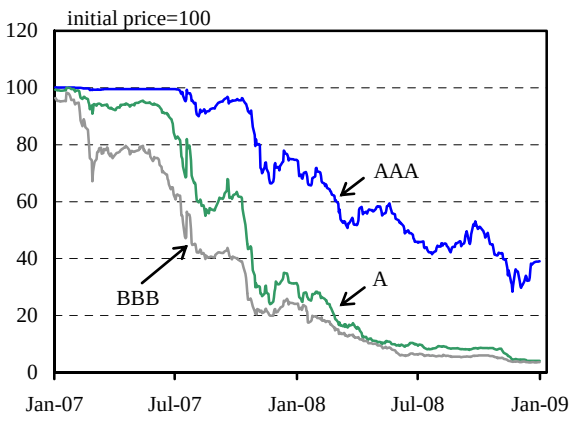
The subprime mortgage problem, which emerged in the United States in summer 2007, triggered a reversal of the credit cycle that had started from around 2002. Housing prices in the United States dropped by more than 20 percent from their recent peak and delinquency rates began to increase markedly even among prime loans, that is, loans for borrowers with higher creditworthiness (Chart I-1-8). Prices of subprime residential mortgage-backed securities (RMBSs) continued to fall, as the risk inherent in the underlying assets was increasingly reevaluated (Chart I-1-9). The decline in the prices of securitized products induced investors' deleveraging through mark-to-market revaluations, leading to further price declines. Various tranches were widely downgraded, with prices of BBB- and A-rated assets falling to one-tenth or less of their original value, and even AAA-rated assets declined to about one-third of their original value. The primary market for RMBSs, backed by not only subprime loans but also Alt-A and jumbo loans, was effectively closed from the second half of 2007 (Chart I-1-10). As in the United States, adjustments in the housing markets in the United Kingdom and the euro area began to intensify (Chart I-1-11).[4]

Chart I-1-8: U.S. mortgage delinquency rates and housing prices



Notes: 1. Adjustable/fixed-rate mortgages delinquent for more than 30 days.
2. S&P/Case-Shiller index (10-city composite).
Sources: Bloomberg; Standard and Poor's.

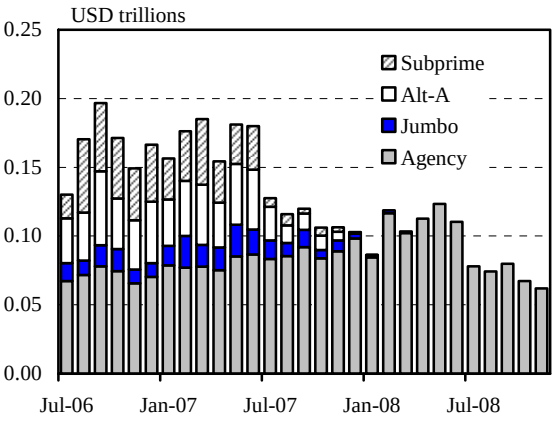
Chart I-1-9: Subprime RMBS indices (ABX. HE)



Source: JPMorgan.

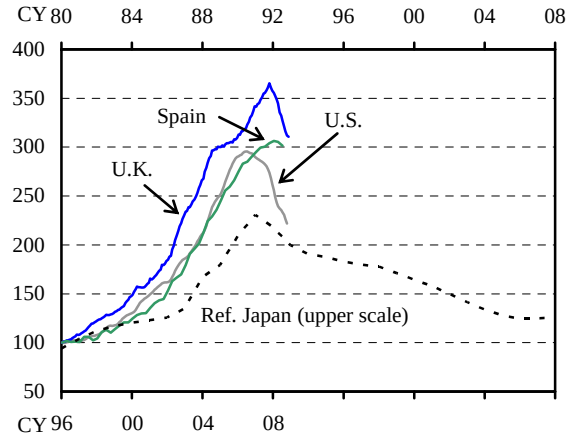
[4] The extent of the housing price increases in the U.S. and U.K. markets, as influenced by the global credit boom until 2007, was more considerable than that seen in the Japanese market during the period of the bubble economy in the late 1980s. The pace of subsequent declines in the U.S. and U.K. housing prices was also comparatively more rapid.

Chart I-1-10: U.S. RMBS issuance



Sources: Citigroup; JPMorgan.

Chart I-1-11: Housing prices



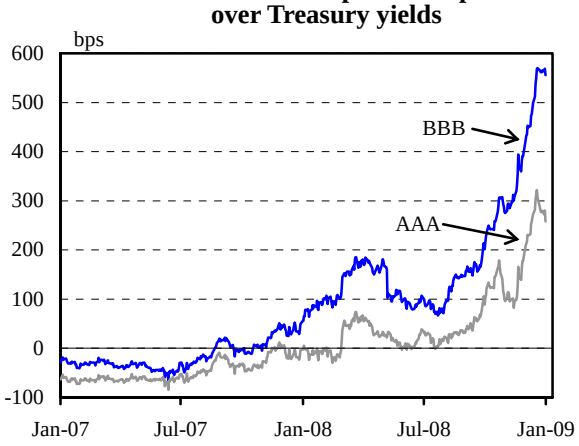
Note: S&P/Case-Shiller index (10-city composite) for the United States; Nationwide's house prices for the United Kingdom; housing prices for Spain; public notice of residential land prices for Japan.
Sources: Ministry of Housing, Spain; Ministry of Land, Infrastructure, Transport and Tourism, Japan; Nationwide; Standard and Poor's.

Concerns over the financial conditions of banks and investors heightened as downward adjustments in the housing markets and the associated decline in asset prices became more severe. The adjustments in the financial sector exerted downward pressure on the real economy via more stringent lending policies at banks and deterioration in the functioning of markets. As economic activity began to slow, the quality of underlying assets declined for various securitized products, including collateralized loan obligations (CLOs) backed by corporate loans, commercial mortgage-backed securities (CMBSs), and asset-backed securities (ABSs) backed by consumer loans. This resulted in rapid declines in the prices of securitized products overall, adding to the losses incurred by financial institutions and reducing their appetite for lending, and this in turn augmented the downward adjustment pressures on the real economy.

Uncertainty over the outlook on financial and economic conditions increased as the effects of the adverse feedback loop between financial and economic activity began to intensify. Market participants' concerns were fueled by difficulties in ascertaining how far and for how long the effects of the adverse feedback loop would extend; for example, the extent to which housing prices would decline and the financial conditions of banks and households would be affected. An increasing number of market participants began to reduce their risk asset holdings in light of the greater uncertainty over the financial and economic outlook. Downward pressure on financial markets even extended to the U.S. municipal bond markets,

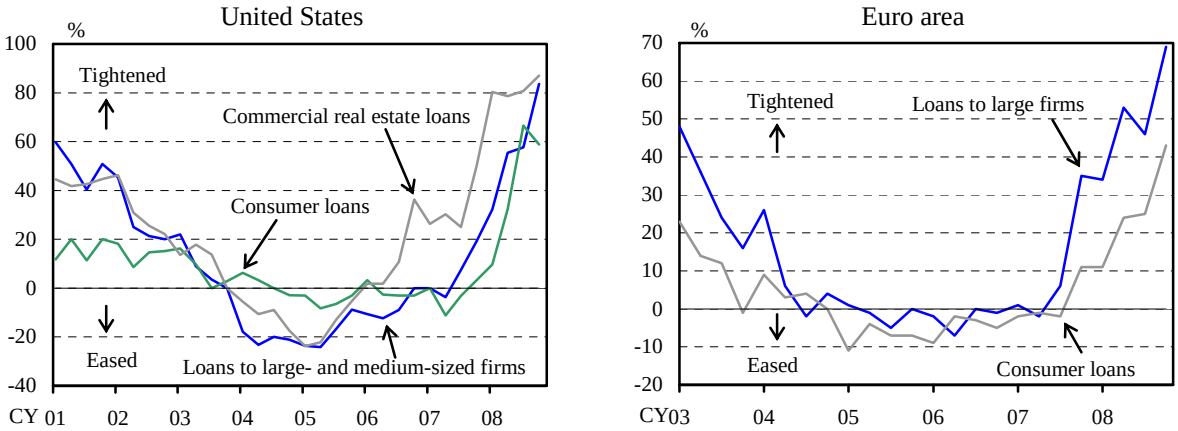
which had been considered relatively safe investments, and this prompted a considerable widening of spreads over Treasury yields (Chart I-1-12).[5]

Chart I-1-12: U.S. municipal bond spreads over Treasury yields



Note: 30-year maturity.
Source: Bloomberg.

Chart I-1-13: Banks' lending stance



Sources: Federal Reserve, "Senior Loan Officer Opinion Survey on Bank Lending Practices"; European Central Bank, "The Euro Area Bank Lending Survey."

As the functioning of security markets as a whole declined and market liquidity shrank further, financial institutions were forced into involuntary expansion of their balance sheets

[5] The widening of spreads in the U.S. municipal bond market was caused by several correlated factors, including (1) downgrading of municipal bonds guaranteed by monolines, (2) heightened concerns over the financial conditions of regional governments against the background of the recession, and (3) forced selling of municipal bonds by investment programs and hedge funds.

through a reintermediation of risk.[6] Such expansion of risk asset holdings, together with increases in mark-to-market losses and provisions for credit losses on risk assets, pushed down financial institutions' capital adequacy ratios. This both impaired the functioning of interbank markets by heightening counterparty risk concerns and weakened banks' intermediary functioning. The results of loan surveys conducted by the Federal Reserve and the European Central Bank (ECB) indicate that financial institutions further tightened their lending stance, particularly with respect to corporate loans, toward the end of 2008 (Chart I-1-13).

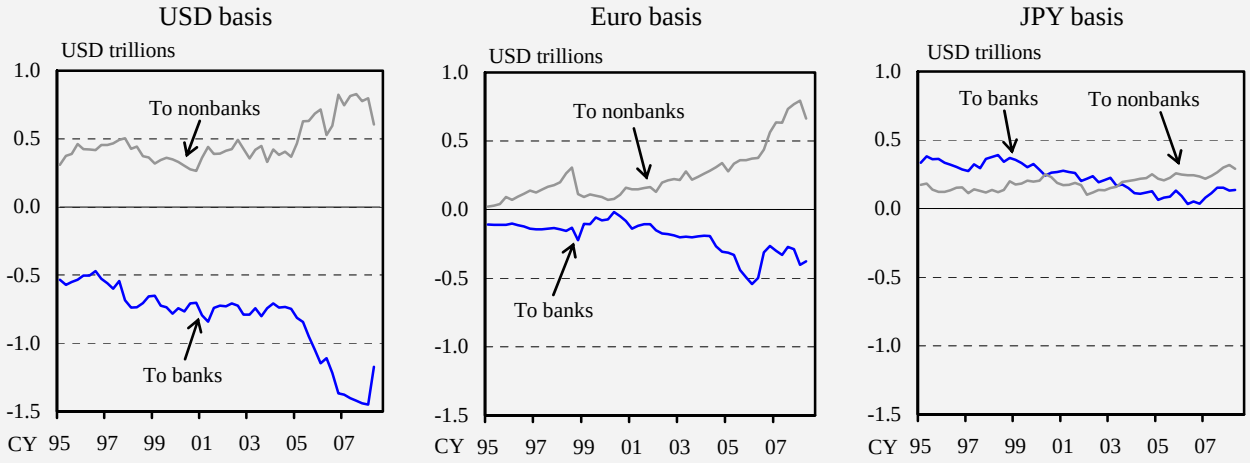
Box 1: U.S. Dollar Capital Flow via Banks

Box 1 Chart 1 shows net external claims of banks on other banks and nonbanks by each of the three currencies: the U.S. dollar, the euro, and the yen.[7] The charts show that yen-denominated positions are relatively small, whereas U.S. dollar-denominated positions are massive. In the banking sector overall, there was a trend to raise U.S. dollar funds from other banks in order to provide those funds to nonbanks. This tendency continued through summer 2007, until its reversal. Euro-denominated positions look relatively large in the chart, but taking into account that the considerable amount of euro flow within the euro area is included in the figures, the U.S. dollar is by far the dominant currency used in international capital flow.

[6] A reintermediation of risk consists, for instance, of (1) providing liquidity enhancements to investment programs that are experiencing funding difficulties due to a decline in the functioning of asset-backed CP (ABCP) and short-term municipal bond markets, (2) purchasing assets from such investment programs, and (3) having to keep mortgage loans and leveraged loans on balance sheets because of the decline in liquidity in the RMBS and CLO markets.

[7] Box 1 Chart 1 is based on data from the Bank for International Settlements (BIS) International Locational Banking Statistics on external claims and liabilities of BIS reporting banks *by residence*. For instance, figures for head offices of Japanese banks and Tokyo branches of foreign banks are included in external positions of banks in Japan, and those for overseas branches of Japanese banks are not. Box 1 Chart 2 is also based on data from the same statistics, but the focus is on positions *by nationality* of the reporting banks instead of by residence. For instance, figures for head offices and foreign branches of Japanese banks are included in external positions of Japanese banks, and those for Tokyo branches of foreign banks are not.

Box 1 Chart 1: Banks' net foreign claims by currency



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

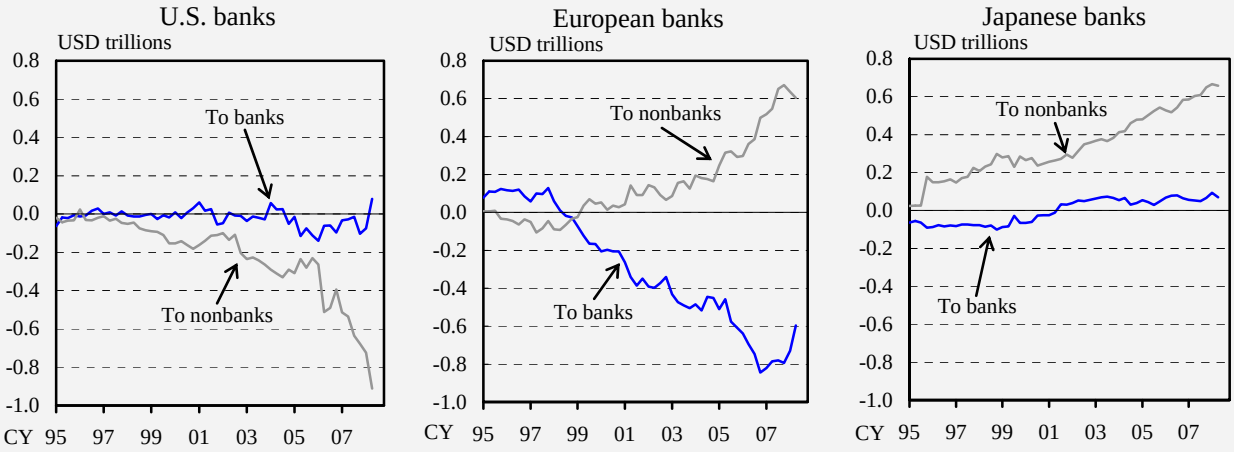
European banks, defined as banks with head offices located in the United Kingdom, the euro area, or Switzerland, did not have steady sources of U.S. dollar funding in the form of retail deposits, but nevertheless continued to expand their businesses as intermediaries of the U.S. dollar capital flow.[8] Developments in European banks' U.S. dollar claims and liabilities suggest that these banks raised U.S. dollar funds from other banks and provided those funds to nonbanks (Box 1 Chart 2). Given that funds raised from other banks were generally short-term liabilities, whereas claims on nonbanks such as leveraged loans, lending to hedge funds, and investments in securitized products most likely included a significant amount of long-term investments, European banks were exposed to high liquidity risk. European banks increased their reliance on U.S. dollar deposits employed by sovereign wealth funds and other developing market monetary authorities as part of their foreign reserve management (Chart I-1-3).[9] From summer 2007, however, the emergence of the subprime mortgage problem prompted monetary authorities in developing countries to review their foreign reserve management, and they began to invest more in safer assets such as U.S. Treasuries or euro-denominated assets while reducing U.S. dollar deposits on which interest rates had

[8] It should be noted that reporters to BIS International Locational Banking Statistics are commercial banks, and do not include securities companies and investment banks. Until 2007, investment banks in the United States also expanded cross-border businesses, but such developments are not reflected in these statistics.

[9] In the charts in this Box, 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 charts indicate that this creates a considerable drop in net foreign claims on banks.

declined. As a result, European banks began to face difficulties in securing U.S. dollar funds.

Box 1 Chart 2: Banks' net foreign U.S. dollar claims by nationality



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

U.S. banks' U.S. dollar trading activities were quite different from those for European banks, in that U.S. banks' net foreign claims on other banks were virtually zero while they heavily relied on U.S. dollar funds from nonbanks. Raising funds from nonbanks tends to take the form of equity financing and issuance of bank bonds and CP.

Japanese banks had actively increased their U.S. dollar claims on nonbanks via purchases of U.S. Treasuries and other assets, against the background of Japan's current account surplus. 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.

2. Decline in the Functioning of the Global Financial Markets

The liquidity provision measures taken by the Federal Reserve and other central banks in major countries temporarily calmed concerns over financial institutions' soundness in April

and May 2008, but markets remained unstable reflecting the effects of an adverse feedback loop between the financial sector and the real economy. Against this background, tensions in global financial markets led to a widespread financial crisis in September 2008, triggered by the deterioration of the financial condition of GSEs that were placed under conservatorship by the U.S. Department of the Treasury (U.S. Treasury), and by the failure of Lehman Brothers. The U.S. and European money markets suffered markedly increased strain, with market participants' deepening concerns over counterparty risk, liquidity drying up in financial markets, particularly for term funding, and LIBOR climbing sharply. Tensions spread rapidly across markets, leading to the decline in the functioning of the various markets; for example, in the U.S. CP market, the outstanding amount of CP issued decreased suddenly because money market funds (MMFs), the largest end-investors, faced a sharp rise in redemption requests and began to reduce their CP exposures considerably.

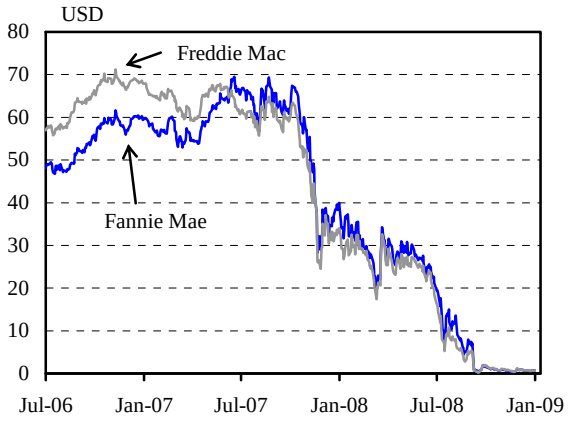
Adjustments in the residential mortgage market and GSE problems

The financial conditions of GSEs, which functioned as an important part of the U.S. residential mortgage market infrastructure, became a matter of concern through summer 2008 (Chart I-2-1). Market participants began to doubt the capital adequacy of GSEs given the mark-to-market values of assets held by GSEs, and the possibility of additional losses on their exposures. Under such circumstances, spreads over Treasury yields widened in summer 2008 for RMBSs originated by GSEs, that is, agency MBSs, and agency bonds issued by GSEs for the purpose of procuring funds (Chart I-2-2). In addition, the amount of issuance of these securities decreased significantly compared to the level seen in the first half of 2008 (Chart I-1-10). However, because new issuance of non-agency MBSs (private-sector MBSs) almost came to a stop in 2008, this pushed up the share of agency MBSs to extremely high levels in the U.S. housing market. At the same time, market participants began to cast doubt on whether GSEs had adequate capital strength to underpin the functioning of the housing market, thereby causing downward revisions to the outlook for the U.S. economy.

The U.S. government judged that the aforementioned deterioration in the functioning of the residential mortgage market could have grave consequences for the overall economy, and accordingly passed the Housing and Economic Recovery Act of 2008 in end-July 2008, providing the U.S. Treasury with powers to purchase GSE bonds and equities. In September,

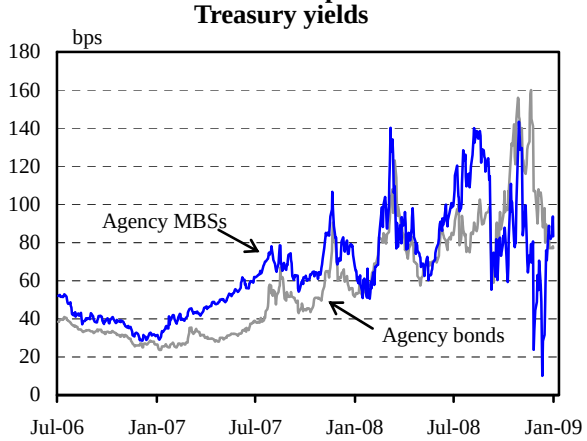
the Federal Housing Finance Agency (FHFA) announced its decision to place the two GSEs, Fannie Mae and Freddie Mac, into conservatorship. The U.S. Treasury also established Preferred Stock Purchase Agreements with GSEs, and as a temporary measure to expire in the end of 2009, introduced a program to purchase agency MBSs and a secured lending facility available to GSEs. These measures curbed the widening of yields on GSE bonds over Treasury yields for a period of time (Chart I-2-2), but the common stock prices of the two GSEs fell below one U.S. dollar, as common stockholders bear losses ahead of the government preferred stocks, which the U.S. Treasury agreed to purchase, and because dividends are eliminated while GSEs remained under conservatorship (Chart I-2-1).

Chart I-2-1: Stock prices of GSEs



Source: Bloomberg.

Chart I-2-2: GSE bond spreads over Treasury yields



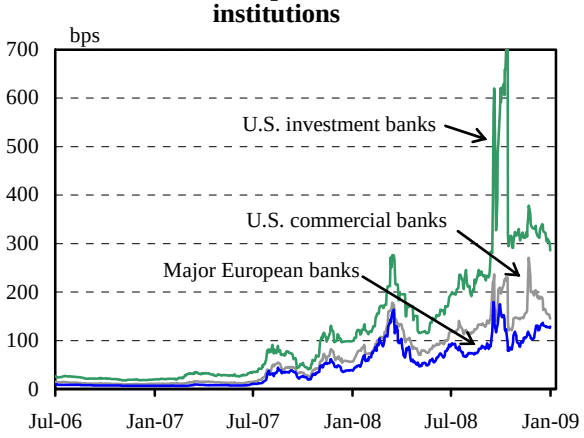
Note: Agency MBSs with 30-year maturity; agency bonds with 5-year maturity.
Source: JPMorgan.

Concerns over counterparty risk and financial system stability

The aforementioned problems related to GSEs led to heightened concerns over the financial conditions of U.S. and European financial institutions. In particular, market participants began to scrutinize the financial condition of U.S. investment banks, which had large exposures to securitized products and leveraged loans, and depended largely on short-term financing (Chart I-2-3). Under these circumstances, market participants realized the risk of sudden failure of counterparties and began to question the creditworthiness of other financial institutions when Lehman Brothers filed for bankruptcy on September 15, 2008, while maintaining an investment grade rating, after it failed to receive U.S. government support. Concerns over the scope of financial difficulties spread from the U.S. banking sector to other financial sectors

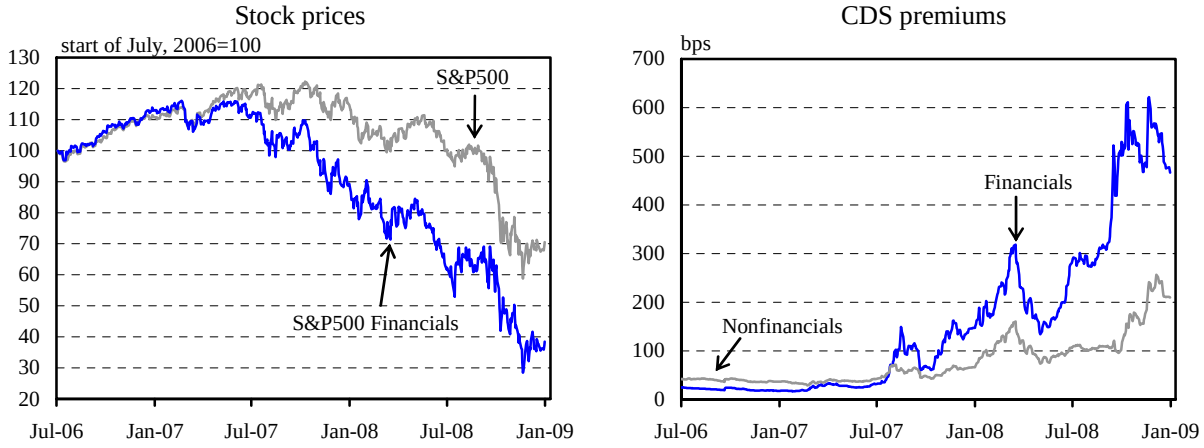
including insurance companies, and to other regions such as Europe, destabilizing the U.S. and European financial system. As evidenced by the plunge in financial institutions' stock prices across the board and the considerable widening of credit default swap (CDS) premiums for the financial sector relative to those for the nonfinancial sector, market participants had lost much of their faith in the soundness of the financial sector (Chart I-2-4).

Chart I-2-3: CDS premiums of financial institutions



Source: Bloomberg.

Chart I-2-4: U.S. financial sector stock prices and CDS premiums



Sources: Bloomberg; Markit.

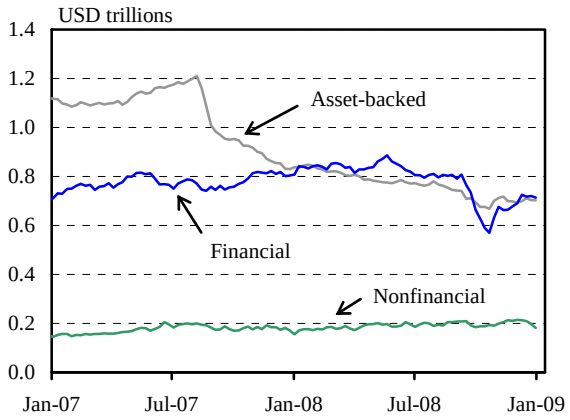
Meanwhile, tensions in the CDS markets rose significantly as the financial viability of American International Group (AIG), a large U.S. insurance company that had been an important risk-taking entity, came under question following several major credit events (default of CDS reference entities) including the failure of Lehman Brothers and the conservatorships of the two GSEs. In the end, AIG averted default both as a reference entity and as a CDS counterparty, owing to steps authorizing the Federal Reserve Bank of New York

to lend up to 85 billion U.S. dollars. However, the turmoil in the CDS markets continued, with further defaults occurring in the financial sector.

Breaking the buck at MMFs and implications for CP markets

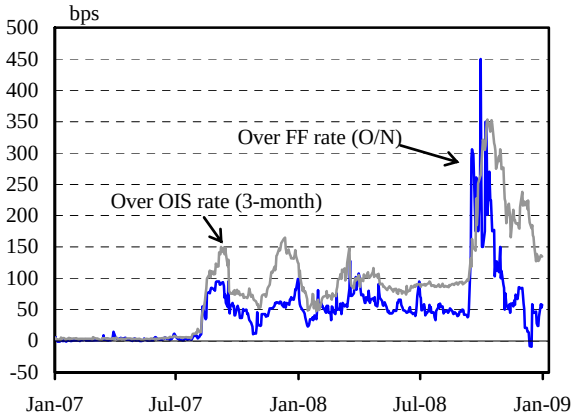
The failure of Lehman Brothers significantly affected the asset allocation decisions of MMFs, which play an important role in the U.S. money markets as lenders, in turn placing considerable stress on CP markets. Specifically, one of the largest "prime MMFs," which are funds investing primarily in financial sector debt, experienced the breaking the buck after incurring losses from exposure to CP issued by Lehman Brothers, and suspended redemptions. This led to a considerable cash outflow from prime MMFs in general into "U.S. government MMFs," which invest in public-sector debt. As a result, prime MMFs adopted an increasingly risk-averse stance in their asset allocation, thereby causing significant declines in the outstanding amount issued of financial-sector CP and ABCP in October 2008, as well as a sharp rise in issuance rates (Charts I-2-5 and I-2-6).

Chart I-2-5: U.S. CP amount outstanding



Source: Federal Reserve.

Chart I-2-6: U.S. ABCP spreads



Note: A1-rated. FF rate shows the target rate (the upper range of the target from December 16, 2008).
Source: Bloomberg.

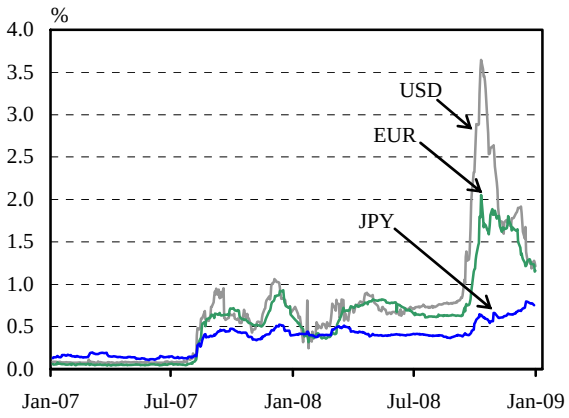
In recent years, the share of CP issued by financial institutions, particularly European banks, rose to a high level in the U.S. CP market (Box 2). This is attributable to European banks' increasing dependence on issuing CP as a way to raise short-term funds, as they increased investment in securitized products denominated in the U.S. dollar, that is, a non-domestic currency. Consequently, deterioration in the functioning of the CP markets

further tightened U.S. dollar funding conditions for banks, especially those in Europe.

Further turmoil in money markets: tightened U.S. dollar funding and a flight to quality

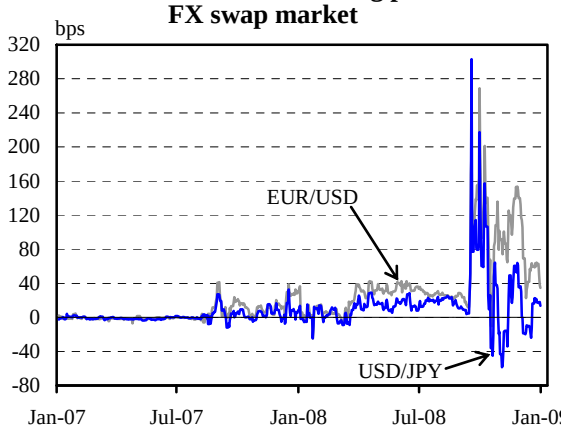
After the failure of Lehman Brothers, liquidity in money markets quickly evaporated on increased concerns over counterparty risk, prompting market participants to become extremely cautious in providing funds and to secure more funds on hand in case of unexpected events such as a sharp deterioration in their market reputation. Against this background, overnight U.S. dollar and euro LIBORs fluctuated significantly, and their term rates faced strong upward pressure as interbank transactions dwindled to a considerable degree (Chart I-2-7).

Chart I-2-7: LIBOR-OIS spreads



Note: 3-month.
Sources: Bloomberg; Meitan Tradition.

Chart I-2-8: U.S. dollar funding premiums in FX swap market



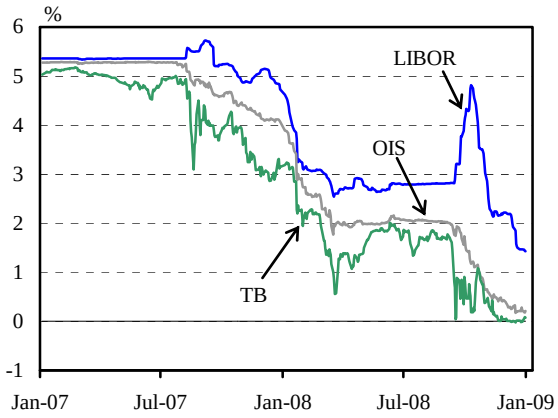
Note: 3-month spreads between FX swap implied U.S. dollar rates and U.S. dollar LIBOR.
Source: Bloomberg.

The supply-and-demand conditions in the U.S. dollar funding market tightened considerably due to the funding problem of European banks, which had expanded their businesses as intermediaries of the U.S. dollar capital flow, and this led to considerable stress in foreign exchange (FX) swap markets. The funding premiums for converting euros or yen into U.S. dollars in FX swap markets (the U.S. dollar funding premiums) soared following the failure of Lehman Brothers (Chart I-2-8). Liquidity in the FX swap markets dried up, particularly for term transactions, and market participants became very reluctant to take on counterparty risk and more inclined to secure funds on hand, thereby causing difficulty in

concluding even secured transactions.[10]

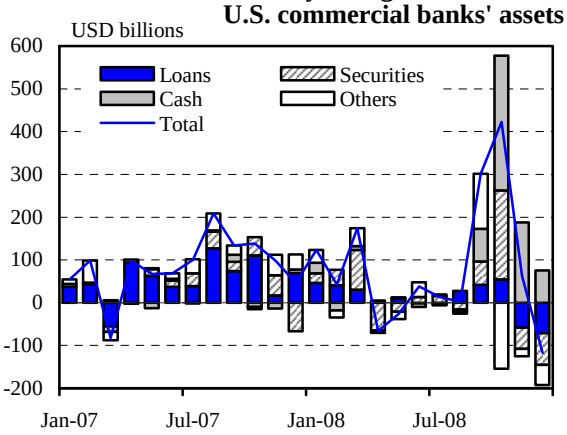
As market participants began to doubt counterparties' creditworthiness and became more risk averse, a "flight to quality" became more evident. Three-month interest rates on Treasury bills, which are considered safe assets, had generally stayed in the 1.6-1.8 percent range but dropped after the failure of Lehman Brothers to 0.04 percent on September 17, the lowest rate in the post-World War II period (Chart I-2-9).

Chart I-2-9: U.S. 3-month rates



Source: Bloomberg.

Chart I-2-10: Monthly changes in U.S. commercial banks' assets



Note: Seasonally adjusted. Data from October 2008 are adjusted for bank acquisitions.
Source: Federal Reserve.

In this situation, banks' balance sheets came under stronger pressure to expand (Chart I-2-10). This was mainly attributable to a reintermediation of risk stemming from a decline in liquidity in securitization markets, and to companies' higher demand for bank borrowing -- for example, through drawing down unused credit lines -- following the deterioration in the functioning of corporate bond and other credit markets.[11] In order to finance this involuntary expansion of their balance sheets, banks increasingly sought to raise funds in markets, and this led to greater tension in the money markets.

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[10] FX swap transactions can be considered as secured transactions where, for instance, euros are used as collateral against U.S. dollar funding.

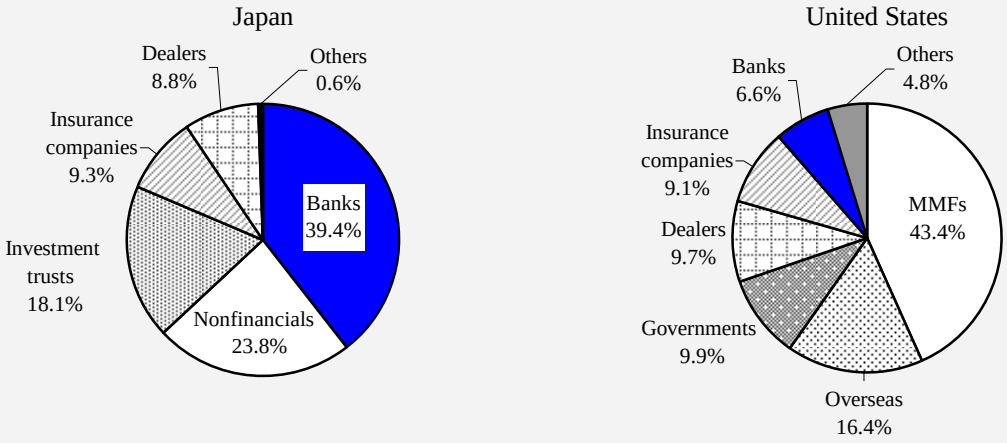
[11] In terms of factors affecting changes in the outstanding amount of banks' assets in Chart I-2-10, "loans" includes the drawing down of unused commitment lines and liquidity enhancements to investment vehicles such as ABCP conduits, and "securities" includes asset purchases from investment programs. The increase in "cash" since September 2008 reflects banks' active use of the Federal Reserve's funds-supplying operations, increasing provisional liquidity in the form of excess reserves.

Box 2: Differences in the CP Market Structure in Japan and the United States

In both Japan and the United States, CP markets play a vital role as markets where large-lot funds can be swiftly raised. However, there are some differences in the structure of these markets.

A breakdown of CP investors in Japan shows that banks are the largest holders of CP, accounting for about 40 percent of the market, followed by corporates and investment trusts with 20 percent each, and insurance companies at 10 percent (Box 2 Chart 1). On the other hand, in the United States, MMFs are the largest holders, accounting for about 40 percent of the market. Therefore, in the United States, MMFs' asset allocation decisions play a large role in supporting the CP issuance; accordingly, the U.S. CP market was more vulnerable to the direct influences from changes in the market environment after the failure of Lehman Brothers.

Box 2 Chart 1: Breakdown of CP investors

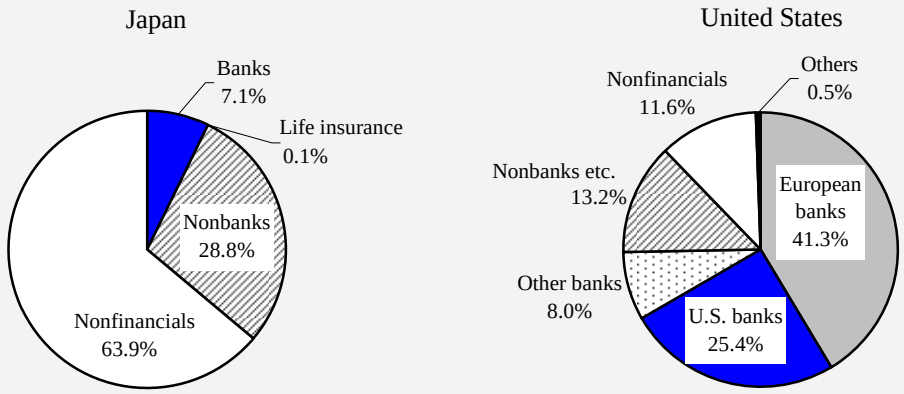


Sources: Bank of Japan, "Flow of Funds"; Federal Reserve, "Flow of Funds Accounts."

A breakdown of CP issuers indicates that nonfinancial companies have a dominant share of around 60 percent in Japan, whereas they account for only about 10 percent of the market in the United States (Box 2 Chart 2). In Japan, banks account for roughly 7 percent of the market, and even the financial sector (including nonbanks) only accounts for about 35 percent of the share. In the United States, in contrast, banks alone account for about 75 percent of the share, and the share reaches approximately 90 percent when including securities companies and nonbanks. A closer look at the breakdown of CP issuers reveals that the most prominent issuers of CP in the U.S. market are not U.S. banks but European banks. This is because European banks increased their funding activities in the U.S. CP market as

they expanded their holdings of U.S. dollar-denominated securitized products.

Box 2 Chart 2: Breakdown of CP issuers



Note: U.S. breakdown is estimated by the Bank using Moody's data.
Sources: Bank of Japan, "Flow of Funds"; Moody's, "Ratings Interactive."

In summary, the CP market in Japan had primarily been used by nonfinancial companies to obtain funds, and therefore deterioration in the functioning of the CP market led to tightness in corporate funding (Box 4). In the United States, in contrast, the CP market had been used mainly as a funding market for banks, and deterioration in market functioning led to tighter conditions in U.S. dollar funding for banks.

3. Adverse Feedback Loop between the Financial Sector and the Real Economy Stemming from the Sharp Increase in Uncertainty

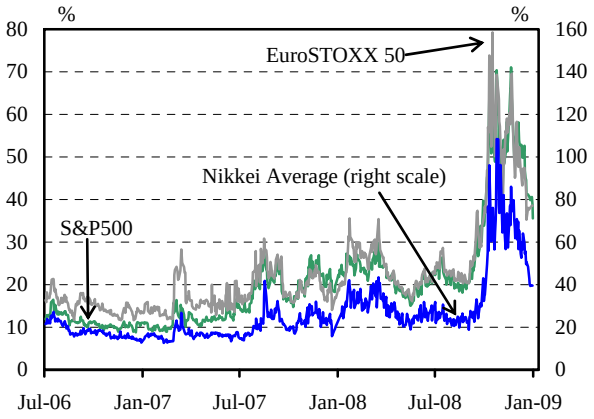
Deterioration in the functioning of financial markets triggered by the failure of Lehman Brothers significantly affected not only financial institutions but also all economic agents, including households and companies, instigating a rapid increase in uncertainty surrounding the economic outlook, financial asset valuations, and the funding environment. As a result, the adverse feedback loop between the financial sector and the real economy intensified.

Increased uncertainty and a heightening of recessionary pressures on the economy

As investors sold assets considerably, the implied volatility of stock and bond prices rose

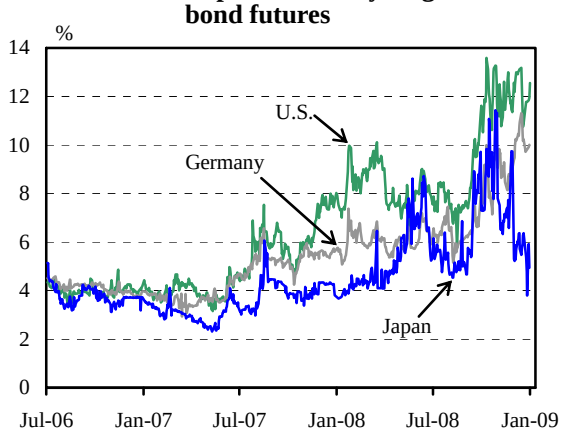
sharply around the world in mid-September 2008, and remained elevated against the backdrop of a heightening of recessionary pressures on the economy (Charts I-3-1 and I-3-2). In particular, the volatility in the U.S. stock market rose to its highest level since the Great Depression (Chart I-3-3). The sharp increase in uncertainty, as evidenced by such high volatilities in the markets, affected financial and economic developments via three channels, as follows.

Chart I-3-1: Implied volatility of stock price indices



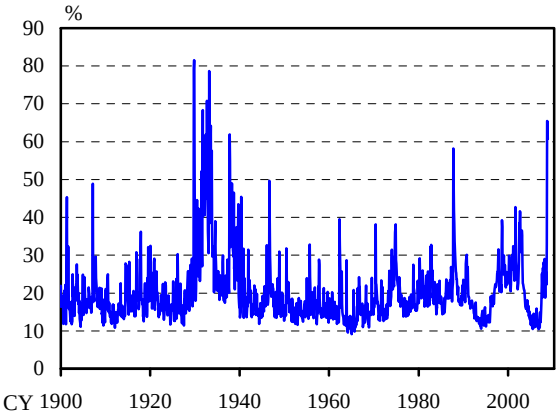
Source: Bloomberg.

Chart I-3-2: Implied volatility of government bond futures



Source: Bloomberg.

Chart I-3-3: Volatility of U.S. stock price indices

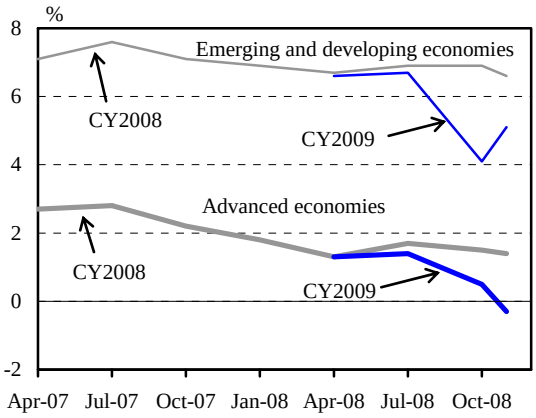


Note: Data from 1986 are implied volatility, and data prior to that are historical volatility.
Source: Bloom, N. "The Impact of Uncertainty Shocks," *Econometrica*, forthcoming.

First, heightened uncertainty directly influenced the real economy via decreases in business fixed investment and household consumption. Given that there are irreversible or sunk costs associated with business fixed investment, a rise in uncertainty increases the option value of waiting for new information to arrive, making it larger than the expected discounted

pay-off from the investment. Therefore, investment plans are highly likely to be put off, as uncertainty increases. Indeed, looking at actual data, orders for investment goods decreased significantly in developed economies from October 2008. In addition, households tend to cut back on spending, especially for durables, which are usually more costly, in the face of mounting uncertainty over the outlook for employment and income. A case in point is auto sales, which declined sharply on a global scale from October 2008. Against the background of such spending cuts by companies and households, the outlook for the world economy was revised considerably downward from autumn 2008 (Chart I-3-4). Such revisions to the economic outlook caused an overall increase in credit risks (concerns over the rise in default rates) for companies and households, which led to the tightening of lending standards at financial institutions and exerted further downward pressures on the real economy.

Chart I-3-4: World economic outlook

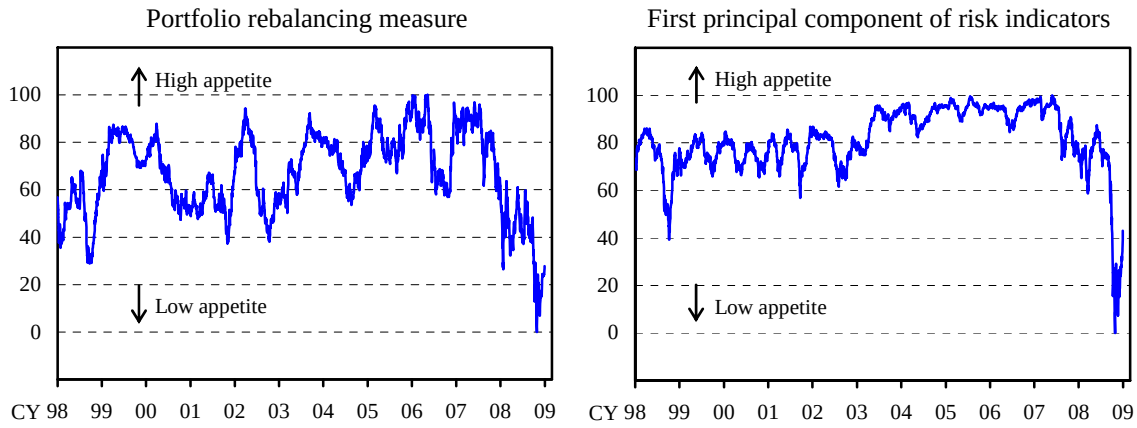


Source: International Monetary Fund, "World Economic Outlook."

Second, heightened uncertainty reduced investors' risk appetite, resulting in a widespread reduction in the holding of risk assets. That is, when uncertainty about the economic outlook increases, holding risk assets generates greater uncertainty over consumption prospects because of the increase in uncertainty about property income. For this reason, investors tend to avoid holding risk assets and try to increase the weight of safe assets in their portfolios, in order to limit the rise in uncertainty about income (including property income) and consumption prospects as much as possible. Estimates show that global investors' risk appetite decreased sharply after the failure of Lehman Brothers (Chart I-3-5), and this likely stimulated the subsequent rise in risk premiums for various financial assets. Higher risk premiums led not only to declines in the prices of various financial assets including stocks and securitized products, but also to deterioration in the funding environment

for financial institutions, companies, and households, resulting in further downward pressure on the real economy.

Chart I-3-5: Risk appetite of global investors



Notes: 1. Linearly transformed between 0 and 100.
2. Portfolio rebalancing measure is estimated from 63 series composed of MSCI stock index, Barclays Capital index, and EMBI+. First principal component of risk indicators is estimated from 17 representative market data series including VIX.
3. For details of the calculation, see the September 2008 *Financial Markets Report*.
Sources: Barclays Capital; Bloomberg; JPMorgan; Japan Securities Dealers Association.

Third, higher uncertainty over the macroeconomic outlook, in other words, increased downside risks to the economy, generated uncertainty over the financial institutions' asset valuation, prompting market participants to question these institutions' capital adequacy and ability to honor their debt obligations. In an environment where the default probabilities of financial institutions are low, the value of assets held by such institutions is determined as the discounted present value of cash flow of assets held to maturity, that is, their economic value. However, when financial institutions' default probabilities rise because of greater downside risks to the economy, this leads to an increase in the probability that assets would have to be sold at market prices before maturity. As a corollary, when default probabilities of financial institutions began to rise from September 2008, as reflected in the high CDS premiums of such institutions (Chart I-2-4), market participants began to focus more on mark-to-market values rather than economic values in evaluating the assets in financial institutions' portfolios. However, as market prices fell at a faster pace than the deterioration in credit fundamentals, with risk premiums rising against the background of the decline in market liquidity, market participants began to cast a severe eye on asset values with respect to financial institutions' portfolios. Furthermore, there was increased pressure to sell assets before maturity as financial institutions began to face tighter funding liquidity constraints, and this added to the

uncertainty over the valuation of assets on financial institutions' balance sheets. Consequently, market participants increasingly began to doubt the financial institutions' capital adequacy and funding ability against their risk exposures on their balance sheets. Such doubts led to increased wariness of counterparty risk and resulted in weaker functioning of financial markets.

In sum, higher uncertainty caused deterioration in the real economy (the first channel), declines in asset prices and deterioration in the funding environment (the second channel), and increased doubts over the capital adequacy of financial institutions (the third channel), intensifying the adverse feedback loop between the financial sector and the real economy.

Tighter credit conditions for the household sector

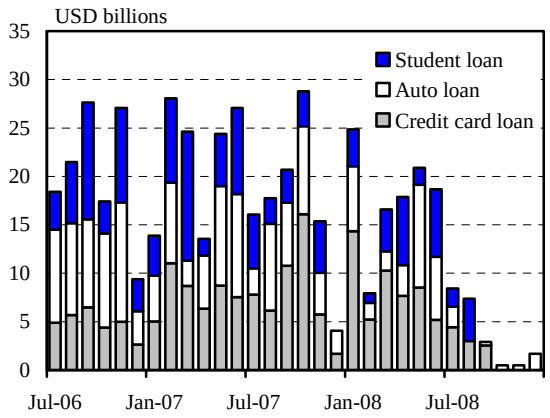
To examine the impacts of the adverse feedback loop between the financial sector and the real economy, we first review developments in the funding environment for the U.S. household sector.

Concerns intensified over households' ability to repay debt, as income prospects were revised downward and labor market conditions became less stable, while housing prices continued to face downward pressures. Accordingly, banks began to take an even more stringent lending stance toward households (Chart I-1-13). The availability of mortgage loans, which account for about 80 percent of total loans to the U.S. household sector, became increasingly severe as banks applied more stringent lending policies, and issuance of non-agency MBSs came to a halt while that of agency MBSs dwindled rapidly (Chart I-1-10). The environment surrounding home equity loans also deteriorated, with many households holding negative equity -- a situation where the market value of the home is less than the outstanding balance of the loan -- and therefore losing potential access to new loans.

Regarding the environment surrounding consumer loans, which account for 20 percent of total loans to the U.S. household sector, issuance of ABSs backed by these loans came to a virtual standstill after September 2008, and risk premiums on such ABSs expanded sharply following the failure of Lehman Brothers (Charts I-3-6 and I-3-7). Therefore, despite the considerable rate cuts by the Federal Reserve, interest rates on various retail loans did not decline significantly and funding conditions for the household sector remained grave.

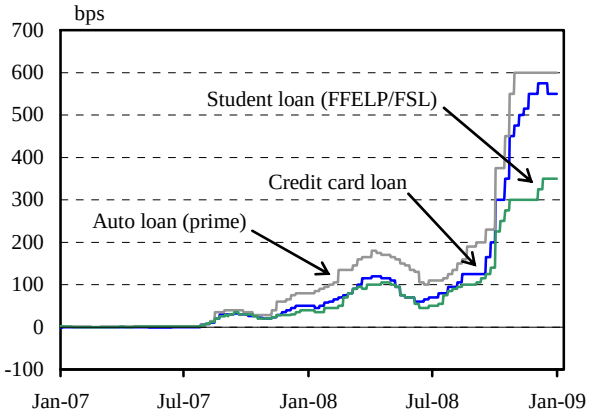
Consequently, U.S. households increasingly cut back on their spending.

Chart I-3-6: U.S. consumer loan ABS issuance



Source: Merrill Lynch.

Chart I-3-7: U.S. consumer loan ABS spreads over LIBOR

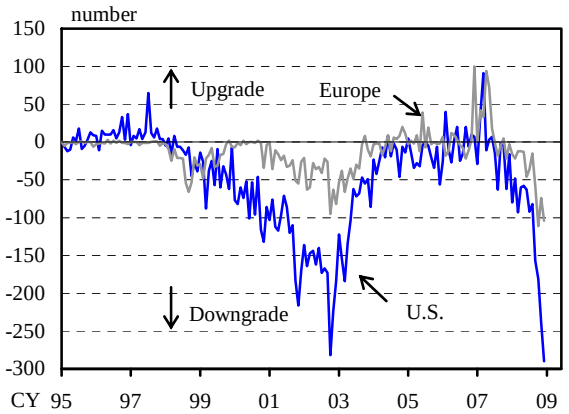


Note: AAA-rated and 3-year maturity.
Source: JPMorgan.

Tighter credit conditions for the corporate sector

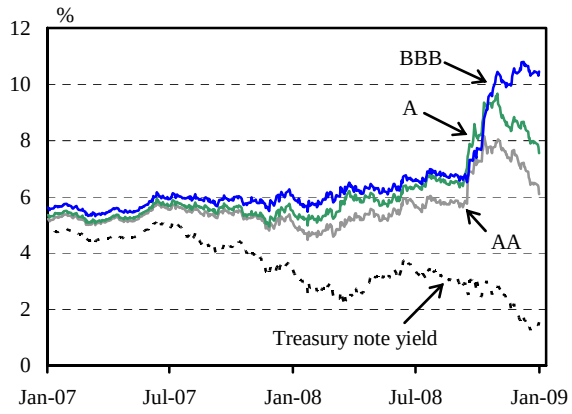
Next, we review developments in the funding environment for the corporate sector. Corporate credit ratings were widely downgraded from October 2008, against the background of considerable downward revisions to corporate profit forecasts at U.S. and European companies (Chart I-3-8). Concerns mounted rapidly over companies' ability to honor their debt obligations, and predictions of a rise in corporate defaults increased.

Chart I-3-8: Credit rating revisions



Note: The difference between the number of upgrades and that of downgrades.
Source: Bloomberg.

Chart I-3-9: U.S. corporate bond yields

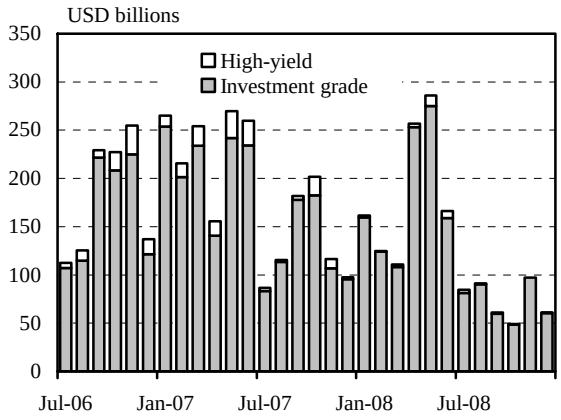


Note: 3- to 5-year maturity for corporate bonds; 5-year maturity for Treasury notes.
Sources: Bloomberg; Merrill Lynch.

Under these circumstances, despite the significant policy rate cuts by the Federal Reserve, yields on corporate bonds remained at higher levels than in summer 2007, as

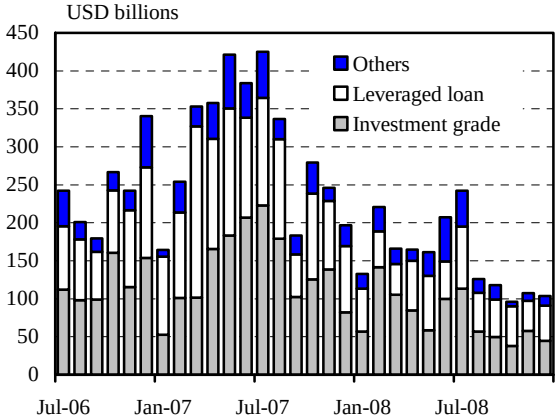
corporate bond spreads over Treasury yields widened to a considerable degree (Chart I-3-9). In addition, issuance of high-yield bonds was at a virtual standstill and that of investment-grade corporate bonds was lackluster (Chart I-3-10).[12] Banks' capacity to extend new loans declined considerably, reflecting increased downward pressure on banks' capital adequacy and the continued expansion of their balance sheets via a reintermediation of risk. Therefore, the amount of syndicated loans issued decreased significantly (Chart I-3-11) and the amount of newly extended credit lines hovered at historical lows. Such deterioration in the corporate funding environment was not unique to the United States, but also was noted in the European markets.

Chart I-3-10: U.S. and European corporate bond issuance



Note: Horizontal axis indicates bond issue dates.
Source: Thomson Reuters.

Chart I-3-11: U.S. and European syndicated loan issuance



Note: Horizontal axis indicates loan issue dates.
Source: Thomson Reuters.

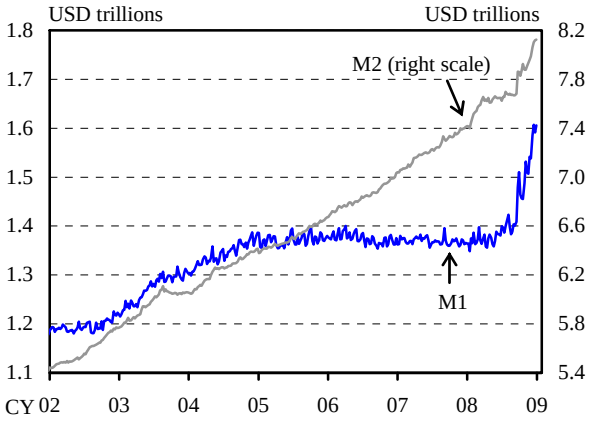
Higher demand of the private sector for liquidity

Against the background of deterioration in the funding environment and the rapid heightening of uncertainty over the economic outlook, companies and households began to show higher precautionary demand for liquidity. The surge in money stock in the United States following the failure of Lehman Brothers is a case in point (Chart I-3-12). Factors contributing to the increase in money stock included an increased tendency for companies to secure deposits by drawing down unused lines of credit and a greater tendency for households to shift into bank

[12] In the United States, the decision for the Federal Deposit Insurance Corporation (FDIC) to guarantee newly issued senior unsecured debt of banks was followed by 83 issuances guaranteed by the FDIC, totaling about 100 billion U.S. dollars, in November and December 2008. In Chart I-3-10, the effect of these guarantees is excluded from the bond issuance in November and December 2008.

deposits the funds redeemed from MMFs that fell below par value.

Chart I-3-12: U.S. money stock



Source: Federal Reserve, "Money Stock Measures."

Generally, stronger demand for liquidity against the background of increased uncertainty and lower risk appetite are two sides of the same coin, which together reduce demand for risk assets and exert upward pressure on interest rates on these assets. This acts as a hindrance to the funding activities of companies and households, thereby restraining corporate and household spending and exerting downward pressure on the economy. The current phenomenon in the United States, where money stock is rising while the economy is deteriorating, was also observed in Japan and Korea a decade ago, when these economies experienced their financial crises (Box 3). In most cases, when an increase in money stock is driven by an increase in banks' lending (a supply-side factor), interest rates would decline and monetary conditions would be eased; however, when it is driven by an increase in precautionary demand of the non-bank sector for liquidity (a demand-side factor), this leads to tightening of monetary conditions entailing a rise in interest rates.

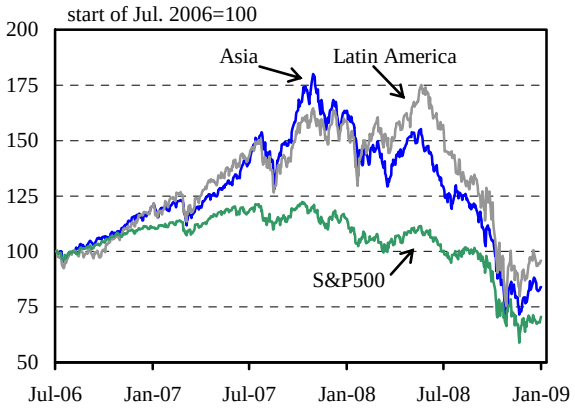
Impacts of the financial crisis on developing countries

From October 2008, the effects of the adverse feedback loop between the financial sector and the real economy became evident not only in developed economies, but also in developing economies, which had been relatively robust to that point.

Banks in developed economies had financially supported the economic growth of emerging and other developing countries through extensive lending to the nonfinancial sector in those regions. However, banks started to cut back on these exposures as they began to face

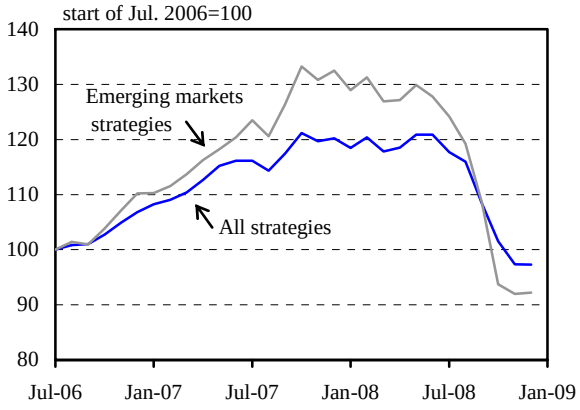
funding constraints. In addition, hedge funds that had been leveraging by borrowing from European and U.S. banks and increasing their exposures in emerging stock markets were also forced to unwind their positions in these markets as financial institutions tightened their lending stance and withdrew credit lines on repo transactions, thereby accelerating the fall in stock prices in emerging markets (Chart I-3-13). The marked deterioration in hedge fund performances in the second half of 2008 induced a wave of redemptions and accelerated deleveraging in emerging markets (Chart I-3-14).[13] Thus, developing countries deteriorated sharply on the negative impact from a decrease in exports to developed economies, as such economies suffered a slowdown, and on influences from the financial side as global investors curtailed investments in them.

Chart I-3-13: Emerging stock price indices



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

Chart I-3-14: Cumulative return of hedge funds



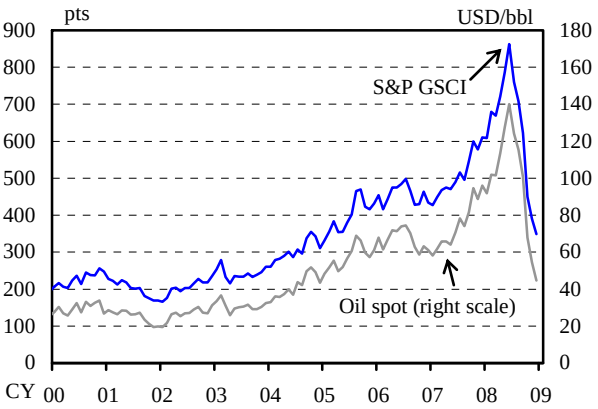
Source: Bloomberg.

Given that the developed and developing countries entered into a recessionary phase at the same time, global demand for commodities declined significantly, leading to a sharp drop in commodity prices, especially crude oil prices (Chart I-3-15). The fall in commodity prices was also due in part to a decline in global investors' risk appetite for commodities whose price

[13] Redemptions tend to increase when returns of hedge funds and other investment funds deteriorate below a certain threshold. More specifically, the probability of liquidation rises when asset prices become volatile and variance of returns become larger; therefore, fund managers need to brace themselves for the potential rise in funding liquidity risk caused by an increase in redemption requests. To deal with this, fund managers tend to avoid investments in illiquid assets, given that these positions are usually costly to unwind, and prefer to invest in liquid assets such as government bonds. Consequently, the pressure to sell illiquid assets such as emerging market stocks tends to increase, thereby causing a sharp rise in risk premiums and a significant drop in the prices of emerging market stocks.

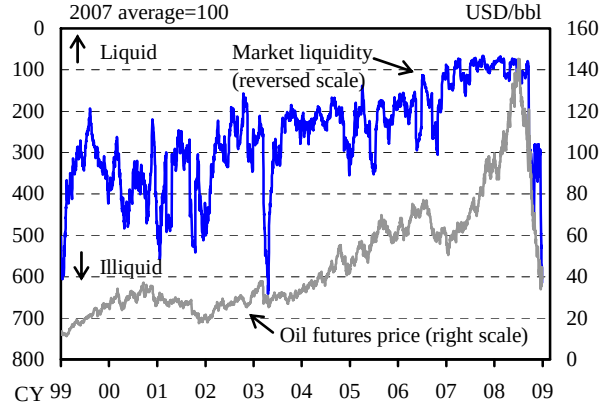
volatility risk was high. In the first half of 2008, investors reduced their positions in securitized products and other risk assets on the one hand, and shifted the excess cash to invest in commodities on the other, which led to the surge in commodity prices. However, this changed in the second half of 2008 as investment positions began to be unwound in commodity markets, leading to significant contractions of liquidity in the commodity futures market (Chart I-3-16). The September 2008 *Financial Markets Report* noted that investors in the commodity futures market tend to be relatively homogenous and highly likely to exhibit similar trading patterns; in other words, there is a risk that the markets may move in one direction and liquidity may evaporate suddenly when a shock occurs. Indeed, this situation became a reality in the second half of 2008.

Chart I-3-15: Commodity prices



Note: Oil spot indicates the WTI price.
Source: Bloomberg.

Chart I-3-16: Oil futures market liquidity



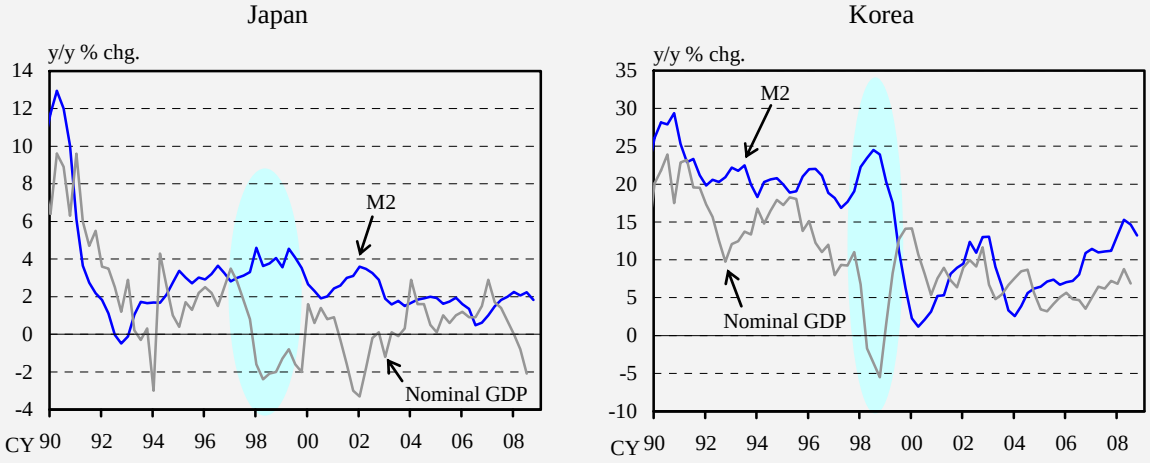
Note: Market liquidity indicates the ratio of daily return to trading volume for oil futures (30-day moving average).
Source: Bloomberg.

A fall in commodity prices translates into improvements in terms of trade for importers but signifies a decrease in export income for resource-rich countries. When commodity prices were on the rise, the savings of resource-rich countries had flowed into global financial markets via European and U.S. banks. However, the decline in commodity prices reduced such inflow of funds from resource-rich countries, and this tightened the funding liquidity constraints that European and U.S. banks experienced in the second half of 2008 (Chart I-1-3).

Box 3: Higher Liquidity Demand and Deterioration in the Real Economy in Japan and Korea in the Late 1990s

The phenomenon whereby money stock increases while the real economy deteriorates was also observed in Japan and Korea during the financial crisis of the late 1990s (Box 3 Chart 1). At that time, while households and companies had higher precautionary demand for liquidity, spending on durable goods and business fixed investment decreased rapidly and simultaneously, and both countries consequently suffered declines in GDP.

Box 3 Chart 1: Money stock



Sources: Cabinet Office, "National Accounts"; Bank of Japan, "Money Stock"; Bank of Korea, "National Income Statistics" and "Money Statistics."

The following text describes through use of the IS-LM model how an increase in financial anxieties affects the macroeconomy (Box 3 Chart 2).

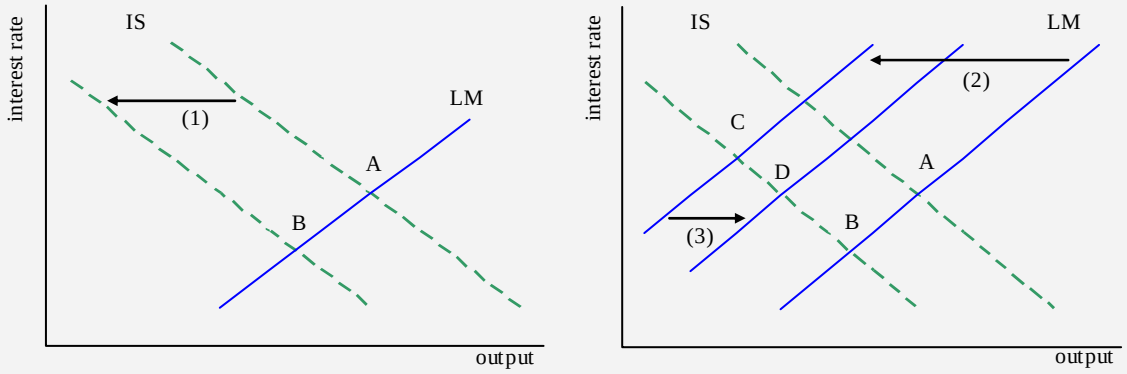
(1) An increase in uncertainty due to financial anxieties exerts negative influences on business fixed investment and private consumption, which leads to a decline in output under a given interest rate. Therefore, the IS curve shifts to the left, and the equilibrium consequently moves from A to B, indicating a decline in interest rates and a decrease in output.

(2) Financial anxieties induce a precautionary demand for money by households and companies. Then, under a given interest rate (therefore, a given level of speculative demand for money), a balance in supply and demand for money requires a decrease in transaction demand for money by lowering output. Therefore, an increase in precautionary

demand for money causes the LM curve to shift to the left, and the equilibrium moves from B to C, signifying a further decrease in output and a rise in interest rates.

(3) Responding to financial anxieties, companies draw down unused credit lines in an effort to secure more liquidity on hand, which results in an increase in bank deposits, that is, money supply bank deposits. This makes the LM curve shift back to the right. If the central bank provides ample liquidity to markets in an effort to avoid a situation where higher precautionary demand for money induces a rise in interest rates, this also has the effect of shifting the LM curve back to the right. In the end, the equilibrium moves from C to D, where output decreases from the original level at A, while money stock increases.

Box 3 Chart 2: IS-LM analysis for financial instability



II. Developments in Domestic Financial Markets in the Second Half of 2008: Deterioration in Market Functioning and Large Fluctuations in Asset Prices

Chapter II reviews developments in various financial markets in the second half of 2008, focusing primarily on domestic ones. The September 2008 *Financial Markets Report* pointed out that domestic markets in the first half of 2008 were relatively stable although they were influenced by the turmoil in global financial markets. However, domestic markets started to be strongly impacted by the turmoil and the situation changed in the second half of 2008, with the market function deteriorating and stock prices and FX rates fluctuating significantly.

1. Money Markets

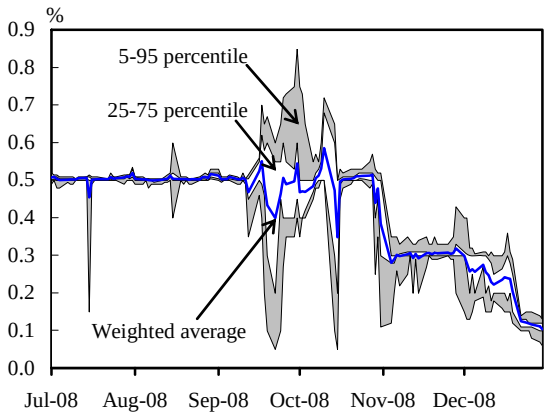
Japan's money markets remained nervous amid the turmoil in U.S. and European money markets, and experienced further strains after the failure of Lehman Brothers in September 2008. Interest rates came under upward pressure reflecting the rise in concerns over counterparty risk, especially against foreign financial institutions, and the decrease in market transactions. In addition, the supply of funds from Japanese banks in the money markets diminished because companies' reliance on bank borrowings increased as a result of the decline in the functioning of long- and short-term credit markets. Consequently, repo rates and interbank term rates came under upward pressure. In response to the heightened market tension, the Bank of Japan introduced a series of measures regarding its money market operations with a view to ensuring stability in financial markets.

Increased concerns over counterparty risk

As concerns over counterparty risk increased following the failure of Lehman Brothers, the uncollateralized overnight call rate polarized by type of borrowers: the rate applied to foreign financial institutions ranged from 0.6 to 0.7 percent, while that applied to Japanese financial institutions ranged from 0.1 to 0.4 percent (Chart II-1-1). This polarization eased after mid-October as foreign financial institutions reduced their funding positions in the call market, but Japanese financial institutions continued to avoid making transactions with foreign ones. As a result, the amount outstanding of the uncollateralized call transactions including term transactions decreased to around two-thirds of the level reached at the beginning of 2008

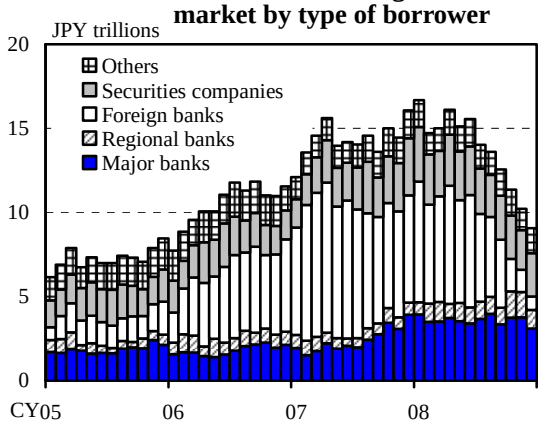
(Chart II-1-2).

Chart II-1-1: Uncollateralized overnight call rate



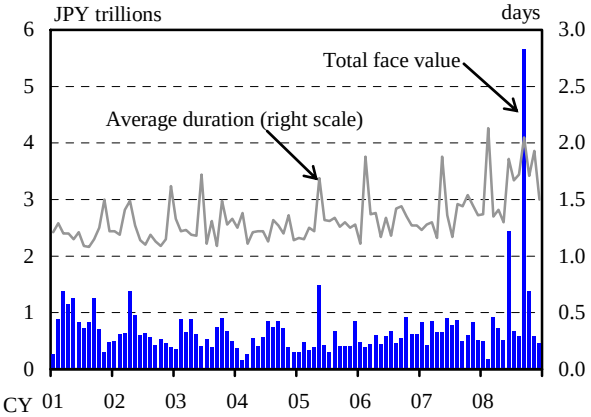
Source: Bank of Japan.

Chart II-1-2: Amount outstanding in the call market by type of borrower



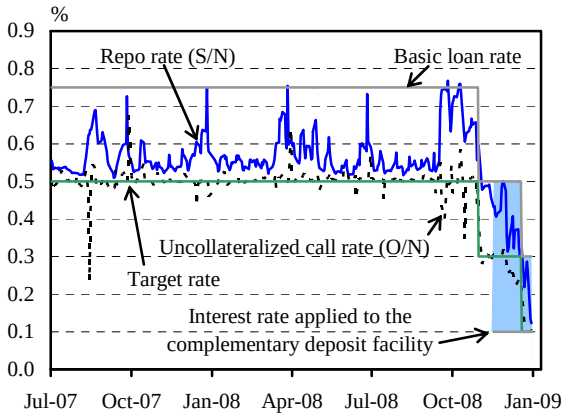
Note: Monthly average of the amount outstanding of uncollateralized transactions.
Source: Bank of Japan, "Amounts Outstanding in the Call Money Market."

Chart II-1-3: Settlement fails of JGBs



Source: Bank of Japan, "Figures on Settlement of Japanese Government Bonds."

Chart II-1-4: Overnight rates



Notes: 1. Horizontal axis indicates the settlement dates.
2. Repo rate from October 29, 2007 is the Tokyo Repo Rate, and the rate prior to that is the Repo Rate (indication, aggregated).
Source: Bank of Japan.

In addition to the uncollateralized market, the collateralized markets, such as repo and FX swap markets, experienced a decrease in trading after the failure of Lehman Brothers. In the repo market, Japanese financial institutions tended to avoid making transactions with their foreign counterparts after the defaults on trade contracts with Lehman Brothers. Furthermore, the settlement fails related to the defaults increased sharply and some market participants that were cautious about incurring costs associated with the fails avoided repo transactions (Chart II-1-3). Major banks, the main fund suppliers in the repo market, became reluctant to make

arbitrage transactions by taking long positions in the repo market and short positions in the uncollateralized call market. This also led to the decline in functioning of the repo market. As market trades decreased, GC repo rates remained under upward pressure and the spread between GC repo and uncollateralized call rates widened (Chart II-1-4).[14]

Tightening of interbank markets due to deterioration in credit market functioning

Uncertainties about the financial and economic environment increased significantly from mid-September 2008 and the issuing environment of CP and corporate bonds deteriorated sharply, reflecting a decrease in investors' risk appetite and a rise in default risk. Consequently, companies increased their reliance on bank borrowings, including the drawdown of their commitment lines (Box 4). In response to companies' heightened demand for borrowings, banks became increasingly active in funding through money markets while taking a cautious stance on investing funds in interbank markets.

Interbank term transactions in the uncollateralized money market continued to decrease, apart from some short-term trades, and interbank rates such as TIBOR and LIBOR remained high toward the calendar year-end (Chart II-1-5). Looking at the spread between LIBOR and overnight indexed swap (OIS) rates, which represents the premium for both credit and liquidity risk, those denominated in Japanese yen were relatively lower than those denominated in U.S. dollars and euros, but gradually widened toward the calendar year-end (Chart I-2-7). This was mainly attributable to rising uncertainty about financial institutions' funding conditions as companies' demand for financing increased. GC repo rates remained under further upward pressure as a result of Japanese banks' diminished capacity to supply funds and their reluctance to make repo transactions due to the costs associated with settlement fails, as described above (Chart II-1-4). Furthermore, FB/TB rates remained high compared to OIS rates, reflecting a rise in funding costs caused by deterioration in the functioning of the repo market, as well as increased selling of TBs and FBs to secure funds maturing beyond the calendar year-end (Chart II-1-5).

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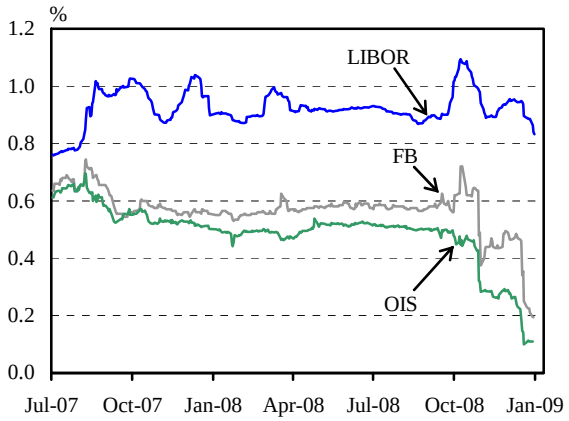
[14] The Japanese situation contrasts with the U.S. situation, where GC repo rates were generally lower than the federal funds (FF) rate. The U.S. repo rates remained lower, partly due to the "flight to quality" after the failure of Lehman Brothers, and the level of market functioning was maintained because the market practice to address settlement fails was well established.

Chart II-1-5: 3-month rates

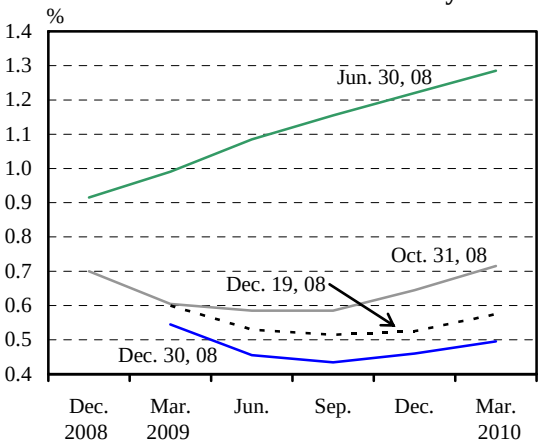


Sources: Bloomberg; Japan Bond Trading; Meitan Tradition.

Policy interest rate cuts and forward curve

The Bank reduced its policy interest rate in response to the worsening financial and economic environment, and introduced a series of measures regarding its money market operations with a view to maintaining accommodative financial conditions as strains in the money markets intensified (as described in detail in Chapter III). The Bank lowered its target for the policy interest rate, the uncollateralized overnight call rate, to around 0.3 percent from around 0.5 percent at end-October 2008, and even further to around 0.1 percent in December (Chart II-1-4). Forward curves for the Euroyen futures shifted downward compared to the level of summer 2008, reflecting the policy rate cuts and market expectations that low interest rates would continue given the increased downward pressure on the economy (Chart II-1-6).

Chart II-1-6: Forward curves for Euroyen futures

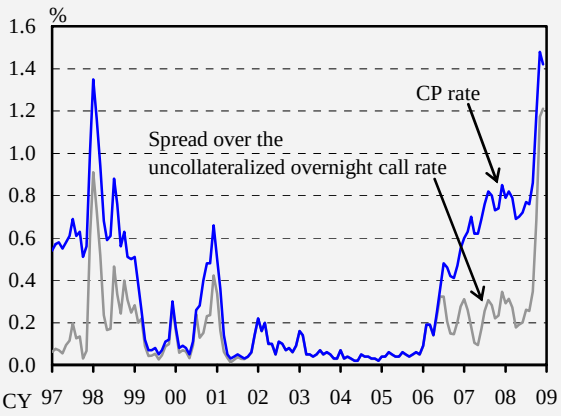


Note: The Bank decided to reduce policy interest rates on October 31, 2008 and December 19, 2008.
Source: Tokyo Financial Exchange.

Box 4: Deterioration in Capital Market Functioning and Expansion of Banks' Balance Sheets

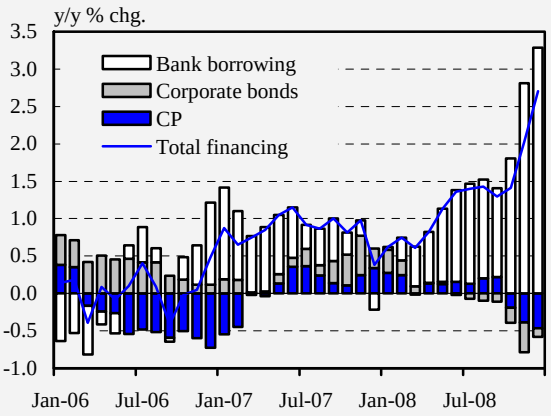
In Japan, the functioning of CP and corporate bond markets has deteriorated since mid-September 2008 and the corporate funding environment has worsened dramatically. In the CP market, the issuance rate rose above the level observed during the financial crisis in 1998, against the background of the increased risk-averse stance of investors (Box 4 Chart 1). Regarding the issuance volume, some companies could not roll over their longer-term paper with a maturity of over two months, and others were forced to reduce the amount to be issued even with a maturity of less than a month. Consequently, the amount outstanding of CP as a whole decreased (Box 4 Chart 2). In the corporate bond market, the issuing environment in terms of both yields and volume worsened sharply (as described in detail in Chapter IV).

Box 4 Chart 1: CP issuance rate (3-month)



Note: Monthly average.
Sources: Bloomberg; Bank of Japan.

Box 4 Chart 2: Corporate financing



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

The amount outstanding of bank lending increased significantly after October as companies drew funds from their commitment lines and increased their bank borrowings against the background of the impaired long- and short-term credit markets (Box 4 Chart 2).[15]

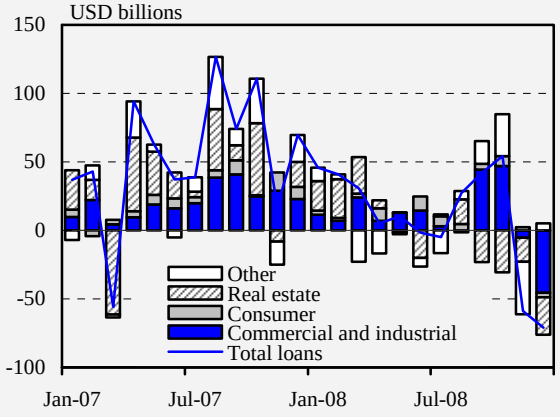
As described in Chapter I, an increase in bank lending amid the turmoil in financial markets was also observed in the United States (Box 4 Chart 3). The rise in U.S. bank lending

[15] There is a significant difference between the financial crisis in 1998 and the current market turmoil. In 1998, funding from capital markets such as CP and corporate bond markets increased due to deterioration in the banks' financial intermediary function; in the current situation, funding from indirect finance such as bank lending rose as the banks' intermediary function was kept relatively intact, while the functioning of direct finance deteriorated.

was attributable to the following factors: (1) companies' increased demand for borrowings due to the deterioration in credit markets such as the corporate bond market; (2) an increase in companies' precautionary demand for liquidity (i.e., securing liquidity by drawing down their commitment lines); and (3) banks' re-intermediation of risks against the backdrop of a decline in securitization market liquidity.

Although an increase in bank lending was commonly observed in the United States and Japan, the increase in bank lending in Japan was relatively moderate compared to the United States as the size of Japan's securitization and corporate bond markets was smaller than that of the United States.[16] In terms of the capacity to provide additional lending, U.S. banks' capacity was smaller than that of Japanese banks and accordingly, U.S. banks' lending stance was more severe. According to the December 2008 *Tankan* (Short-Term Economic Survey of Enterprises in Japan), the diffusion index of all companies on the lending attitudes of banks turned from "accommodative" to "severe" for the first time since the emergence of the current financial market turmoil, whereas the U.S. banks' lending stance was considerably tighter in December (Chart I-1-13). Indeed, pressure to reduce U.S. banks' lending strengthened gradually after November 2008 (Box 4 Chart 3).

Box 4 Chart 3: Monthly changes in U.S. banks' loans



Note: Seasonally adjusted. Data from October 2008 are adjusted for bank acquisitions.
Source: Federal Reserve.

[16] The flow of funds accounts at end-September 2008 show that the proportions of bank lending and capital market funding to total corporate financing were 80 percent and 20 percent, respectively, in Japan and 44 percent and 56 percent, respectively, in the United States.

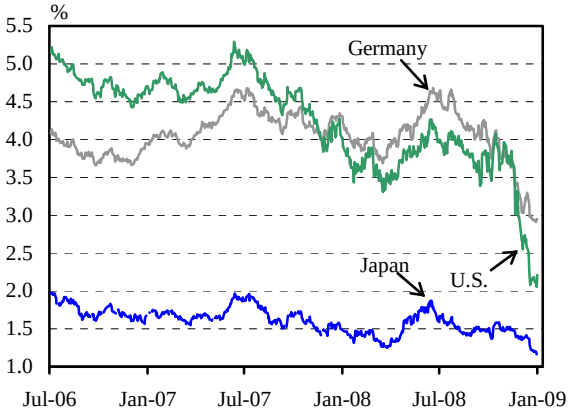
2. Japanese Government Bond Markets

Long-term government bond yields were on a declining trend in both domestic and overseas markets. In the U.S. and European markets, long-term yields declined sharply due to a "flight to quality" against the backdrop of heightened concerns about financial system stability, as well as the sharp deterioration in economic conditions and downward adjustment in the outlook for prices. Japanese government bond (JGB) yields, which had already been at a considerably low level, declined only slightly compared with U.S. and European long-term yields.

Deterioration in the global economy and a decline in U.S. and European long-term yields

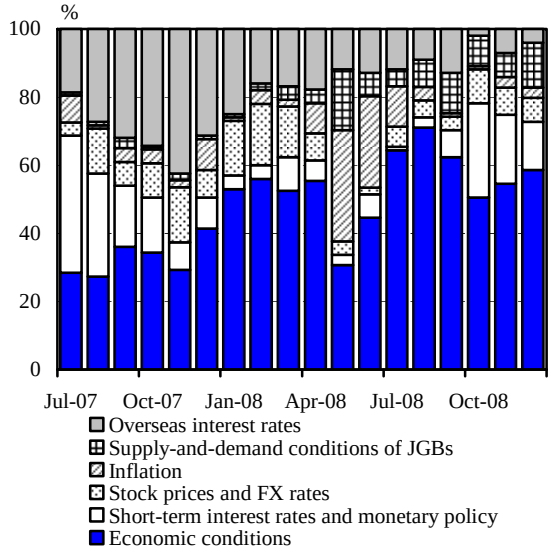
Long-term yields in U.S. and European markets were on a declining trend during the second half of 2008 as global economic conditions deteriorated sharply (Chart II-2-1). In addition, the outlook for inflation, which had been working as a factor that put upward pressure on yields until summer 2008, changed into an exerting downward pressure as prices of international commodities such as crude oil and grain started to decline. Furthermore, the deterioration in GSEs' financial conditions and the failure of Lehman Brothers heightened concerns about financial system stability and led to the flight to quality, resulting in further downward pressure on yields. Under these circumstances, yields on the U.S. ten-year Treasury notes fell to the historical low level of 2.0 percent.

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



Sources: Bloomberg; Japan Bond Trading.

Chart II-2-2: Factors affecting JGB yields



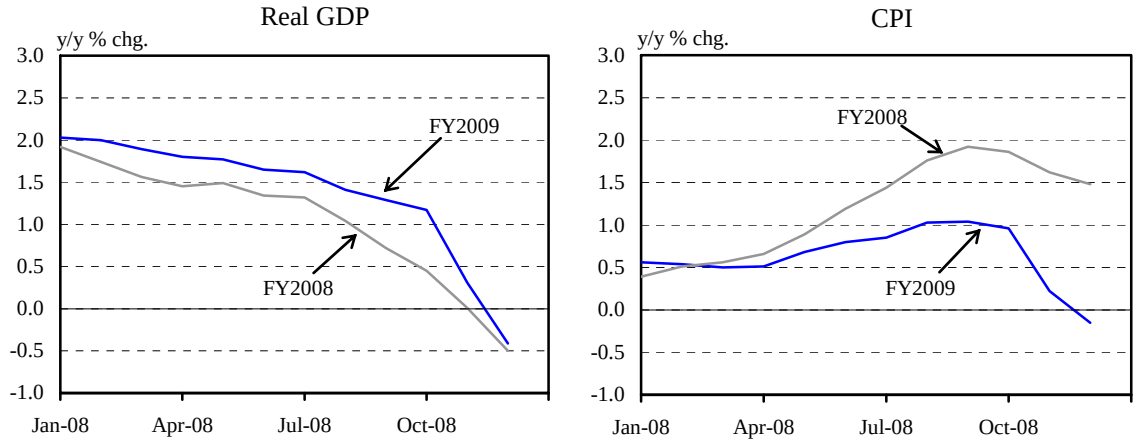
Source: QUICK, "QUICK Survey System Report."

U.S. and European implied volatility derived from options on long-term government bond futures also rose substantially against the backdrop of increased uncertainties about the economic outlook (Chart I-3-2).

Limited decline in JGB yields compared with that in U.S. and European yields

JGB yields also fell, but the size of the decline was limited relative to the drops in U.S. and European long-term yields. In the second half of 2008, JGB yields declined by about 0.5 percent, while U.S. and European long-term yields fell by about 2 percent and 1.5 percent, respectively (Chart II-2-1). This was mainly because yields on newly issued ten-year JGBs declined to around 1.2 percent in December 2008, below the average level of 1.3 percent during the quantitative easing policy period from March 2001 to March 2006, and hence the room for a further decline in JGB yields compared with U.S. and European long-term yields was limited. Furthermore, a rise in funding costs caused by the deterioration in the repo market functioning also seemed attributable to the smaller decline in JGB yields.

Chart II-2-3: Outlook for Japan's economy



Source: Economic Planning Association, "ESP Forecast Survey."

The results of a market survey indicated that market participants shifted their focus from "inflation," which had been a factor causing upward pressure on JGB yields in the first half of 2008, to "economic conditions" and "short-term interest rates and monetary policy" as factors causing downward pressure on JGB yields (Charts II-2-2 and II-2-3). Meanwhile, after the failure of Lehman Brothers, market participants considered "supply-and-demand conditions of JGBs" as the only factor causing upward pressure on JGB yields, reflecting the

rise in risk premium associated with the decline in market liquidity. An elevated risk of price volatility due to low market liquidity was evident from the rise in implied volatility, which exceeded 10 percent in October 2008 for the first time since the so-called "VaR shock" in 2003 (Chart I-3-2).

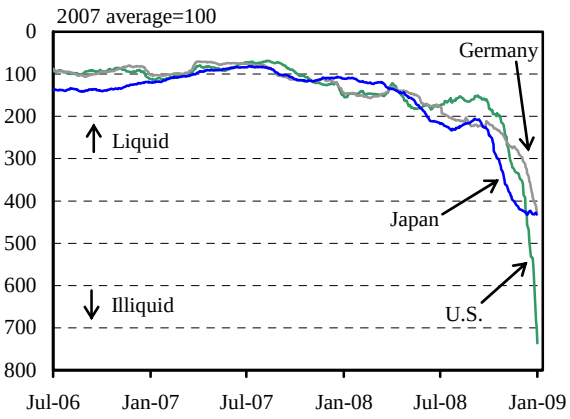
Dislocation and low liquidity in fixed income markets

When many market participants with various kinds of information trade actively, market prices are normally expected to function as a "mirror" that reflects financial and economic conditions. This is called a price discovery function. However, when trades decrease and market liquidity drops due to market participants' funding liquidity constraints, or because of a severe decline in their risk appetite, the mirror fogs up and the price discovery function is impaired. Such a situation occurred following the failure of Lehman Brothers.

Liquidity in JGB markets, which had already started to decline in the first half of 2008, decreased further in both domestic and overseas markets. Distortions of arbitrages expanded in various markets (Chart II-2-4), triggered by unwinding of positions held by overseas investors as financial institutions tightened their credit stance against them. For instance, investors such as relative-value hedge funds had previously taken the position in anticipation of a rise in break-even inflation (BEI, which is the spread between yields on nominal bonds and inflation-linked bonds), because they had perceived that BEI stayed at a lower level than the fundamental value. However, as those hedge funds were forced to unwind their positions as they faced funding liquidity constraints, BEI dropped further below 0 percent (Chart II-2-5). Likewise, hedge funds' positions that had been taken in anticipation of a convergence of the undervalued market price of 15-year floating-rate bonds to the theoretical price were also unwound. Consequently, the divergence from the theoretical price expanded further (Chart II-2-6).[17]

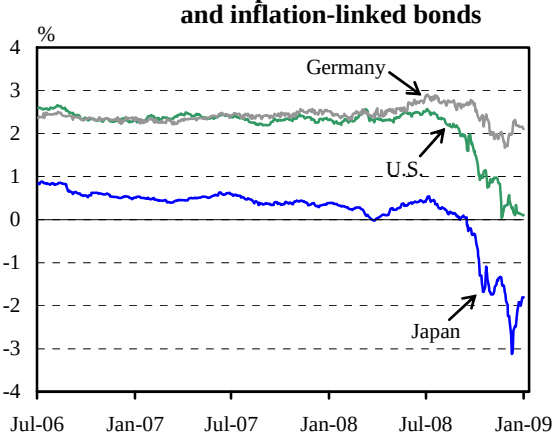
[17] As a result of the measures taken against the sharp decline in the prices of the 15-year floating-rate and other bonds, the downward trend in the prices of the 15-year floating-rate and inflation-linked bonds came to a halt toward the end of 2008. One such measure was revealed in late October 2008, when the Accounting Standards Board of Japan released its practical solution, which stipulates that a fair value of financial assets does not have to be based on a market price if the number of transactions is extremely small or there is a significantly large bid-ask spread; instead, in such cases, it is to be based on the rationally

Chart II-2-4: Government bond market liquidity



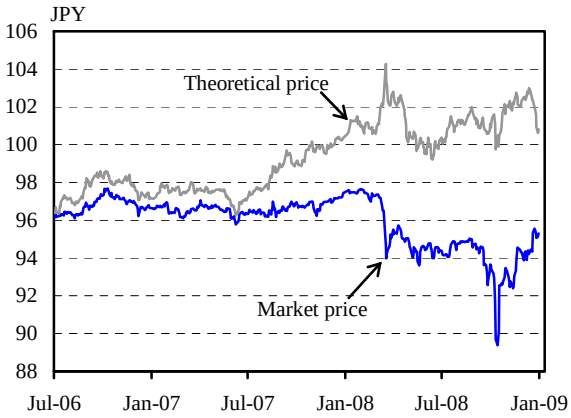
Note: The ratio of intraday high-low spread to trading volume for government bond futures (60-day moving average).
Sources: Bloomberg; QUICK.

Chart II-2-5: Yield spreads between nominal and inflation-linked bonds



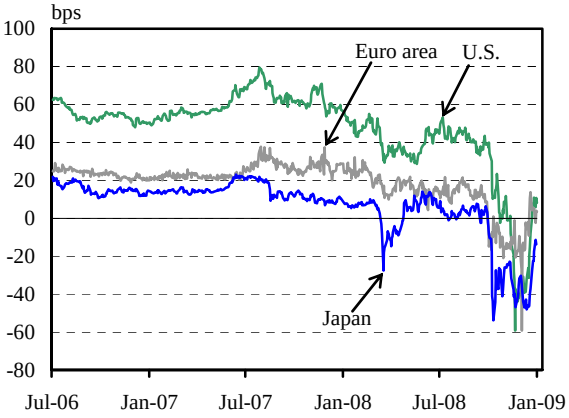
Note: 10-year maturity.
Sources: Bloomberg; Federal Reserve; QUICK.

Chart II-2-6: 15-year floating-rate bonds



Note: Both market and theoretical prices are averages of prices of #15-48 bonds.
Sources: Japan Bond Trading; QUICK.

Chart II-2-7: Swap spreads



Note: 30-year maturity.
Sources: Bloomberg; QUICK.

The unwinding of investors' positions also caused negative swap spreads (Chart II-2-7). Swap spreads, defined as the difference between swap rates based on LIBOR and yields on government bonds, normally reflect financial institutions' counterparty risks. Given the low level of swap spreads, overseas investors had taken positions in anticipation of a positive widening of swap spreads. However, as those investors were forced to unwind the positions, swap spreads declined to far below 0 percent. This implies that the market perceived financial

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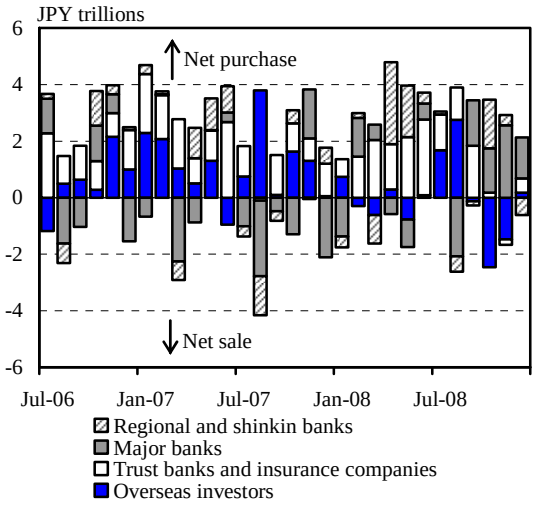
calculated value taking into account the management's rational estimation. In addition, as a measure to address the supply-and-demand condition, the Ministry of Finance in Japan decided to increase the buy-back amount of inflation-linked and 15-year floating-rate bonds in fiscal 2008, and to cancel the remaining issuance plans of these bonds in the fiscal year.

institutions to be healthier than the government despite the heightened concerns about financial system stability. This is one example of the price discovery function failing to work properly, due to the low market liquidity, and of market prices diverging from fundamentals.

In addition to the dislocations described above, the price differential between the cash bonds and futures, that is, the net basis, expanded (Box 5). Under normal circumstances in which various types of investors participate in financial markets, such an upward pressure on the net basis will be restrained because some investors take long positions in futures and short positions in cash bonds, in awareness of the situation where futures are undervalued against the cash bond. Nevertheless, this type of arbitrage behavior weakened against a backdrop of overseas investors' reduced risk appetite. Thus, the net basis continued to be wide and it remained difficult to hedge cash bond positions using futures. This also led to the decrease in market participants' incentives to purchase and hold cash bonds, thereby leading to the lower liquidity in JGB markets.

Chart II-2-8: JGB trading by type of investor



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

JGB trading activity by type of investor

As described above, overseas investors, particularly hedge funds that faced funding liquidity constraints, increasingly reduced their positions (Chart II-2-8). As for domestic investors, major and regional banks became sensitive to funding costs and relatively cautious about purchasing cash bonds, because their risk-taking ability was limited due to sharply increased

mark-to-market losses on 15-year floating-rate bonds. However, they took additional long positions as JGB yields declined toward the calendar year-end. Long-term investors such as pension funds and life insurance companies kept up a stance of purchasing cash bonds smoothly, and thus their investment behavior subdued fluctuations in super-long yields.

Box 5: Price Differential between Futures and Cash Bonds

The government bond futures market plays an important role in forming a price view in the cash bond market. In particular, the cheapest-to-deliver bonds, which move in close relation to futures, link the two markets together.[18] The price differential between the cheapest-to-deliver bonds and futures, that is, the net basis, is an important indicator when measuring the efficiency of hedging transactions and the arbitrage opportunities in the repo market (Box 5 Chart 1).

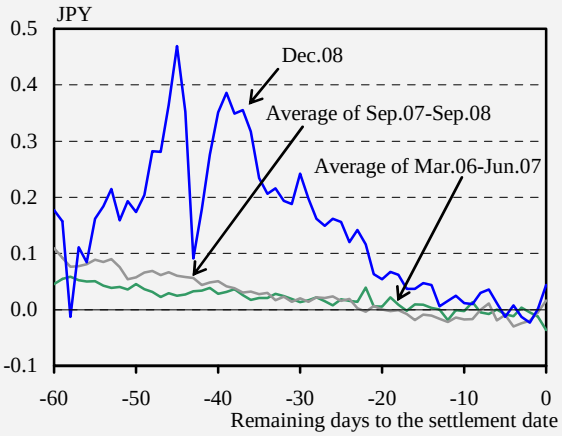
Normally, a net basis of the cheapest-to-deliver bonds converges to zero as the settlement day of futures contracts approaches. After the failure of Lehman Brothers, however, the net basis widened compared with that under normal circumstances and fluctuated largely toward the settlement day of futures. This was because the linkage between cash bonds and futures weakened as liquidity in cash bond and special collateral (SC) repo markets declined further.

As the relationship between the cheapest-to-deliver bonds and futures became unstable, so did the one between futures and other cash bonds that were linked to the cheapest-to-deliver bonds through the yield curve. Consequently, uncertainties about hedging with future contract increased amid the rising price volatility of cash bonds, and the arbitrage

[18] Deliverable issues for long-term government bond futures are determined to be interest-bearing ten-year JGBs with at least seven but less than eleven years to maturity, and the seller of futures (the deliverer of cash bonds) has a right to choose the issue to deliver on the settlement day of futures contracts. In a circumstance where the level of the interest rate is lower than the 6 percent of the coupon of underlying bonds for futures contracts, the seller of futures is more likely to deliver the issue with seven years to maturity. For this reason, the linkage between prices of futures and cash bonds with about seven years to maturity is expected to be strong.

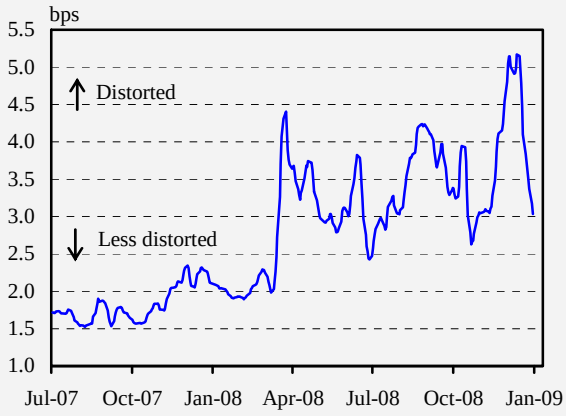
behavior of investors exposed to greater price risk weakened. This appears to be one of the factors that distorted the shape of the yield curve (Box 5 Chart 2), and therefore decreased the efficiency of the monetary policy transmission.

Box 5 Chart 1: Net basis for JGB futures



Note: Difference between the forward price of the cheapest-to-deliver bonds and the settlement price of JGB futures.
Source: Bloomberg.

Box 5 Chart 2: Distortion of JGB yield curve



Note: Distortion of JGB yield curve is the average difference between market and theoretical rates estimated using the spline curve (5-day moving average).
Source: Japan Bond Trading.

3. Stock Markets

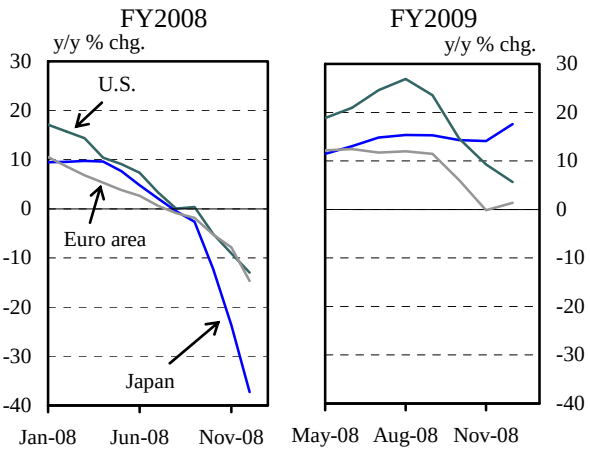
Overseas and domestic stock prices plunged during the second half of 2008 against the background of heightened concerns about financial system stability and sharp deterioration in the economic outlook. Amid the declining trend in stock prices, there were periods when investors' deleveraging amplified the downward pressure on stock prices, and the Dow Jones Industrial Average declined to the level recorded in 2003 while the Nikkei 225 Stock Average fell to the 1982 level. The appreciation of the yen also contributed to the accelerated speed at which Japanese stock prices declined.

Worldwide decline in stock prices

U.S. and European stock prices plummeted on growing concerns about financial system stability triggered by the failure of Lehman Brothers in mid-September and the substantial downward revision of corporate profit forecasts (Charts II-3-1 and II-3-2). In particular, bank

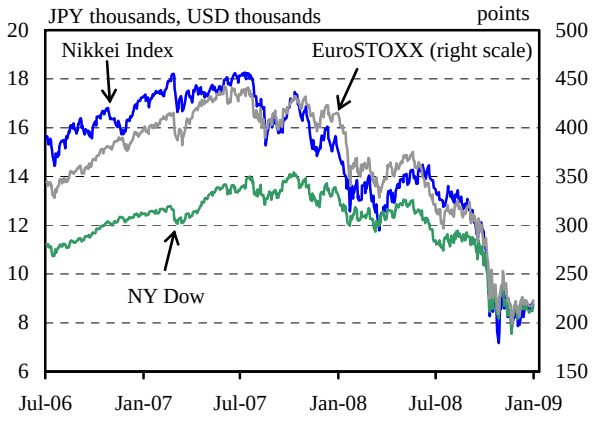
stocks that had declined due to the subprime loan problem in summer 2007 marked a further significant decline, reflecting the heightened systemic risk and deteriorating profits caused by the rise in credit costs along with the economic downturn (Chart I-2-4). As the governments and central banks in developed economies took a series of measures to stabilize financial systems and provide liquidity, concerns about the chain reaction of major bank bankruptcies diminished and stock markets regained stability temporarily (see Chapter III). However, stock price volatility stayed at a high level after soaring sharply from mid-September, and prospects for stock markets remained unclear (Chart I-3-1). Such uncertainty may have been caused by the adverse feedback loop between the financial sector and the real economy, as macroeconomic data deteriorated after October.

Chart II-3-1: Corporate profits forecasts



Note: Fiscal year starts in April in Japan, and January in the United States and Europe.
Source: Thomson Reuters.

Chart II-3-2: Stock indices



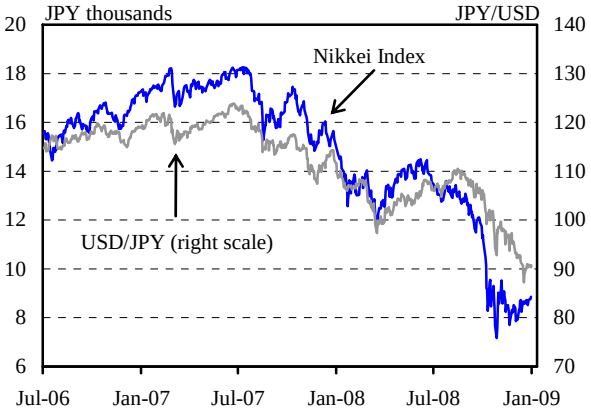
Source: Bloomberg.

Stock prices also fell in emerging economies (Chart I-3-13). In the first half of 2008, stock prices remained relatively firm in resource-rich countries such as Brazil and Russia, whereas those in Asian economies declined as a result of accelerating inflation and external imbalances. In the second half of 2008, however, stock prices dropped in all developing economies including resource-rich countries. As described above, this was partly because (1) global investors, such as hedge funds, faced with funding liquidity constraints were forced to liquidate their investments in emerging economies; and (2) economic fundamentals deteriorated, evidenced by the fall in commodity prices and sluggish growth in exports to developed economies.

Sharp decline in Japanese stock prices caused by deterioration in corporate profits

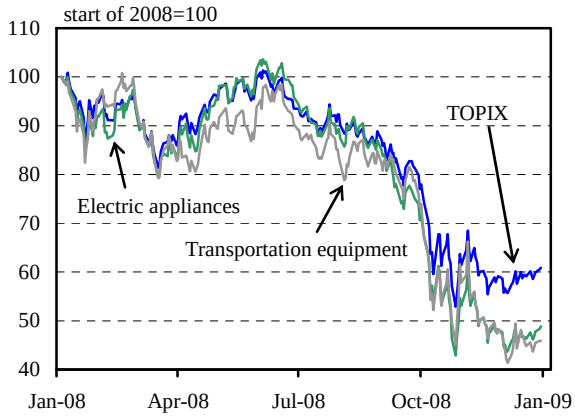
As in other economies, against the backdrop of investors' heightened risk aversion, Japanese stock prices plummeted through the beginning of October (Chart II-3-2). While the Japanese economy and corporate profits deteriorated rapidly after October (Chart II-3-1), the Nikkei 225 Stock Average registered a record low since 1982 and remained unstable. In particular, stock prices of exporting companies including manufacturers of transportation equipment and electric appliances, which had driven the Japanese economy's expansion until 2007, fell by a greater extent than those in other sectors as the yen continued to appreciate during the second half of 2008 (Charts II-3-3 and II-3-4). Exporting companies had previously been evaluated highly in terms of their efforts to diversify sources of profits by expanding a range of export destinations, but their profit forecasts and stock prices came to reflect the simultaneous and rapid downward adjustments of global economies in the second half of 2008.

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



Source: Bloomberg.

Chart II-3-4: TOPIX Sector Indices



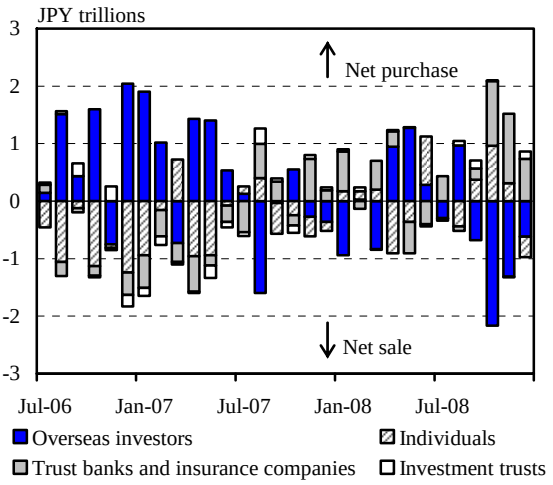
Source: Bloomberg.

Meanwhile, the stock prices of the Japanese real estate sector also continued to decline. Amid the economic downturn and resultant deterioration in corporate profit forecasts in this sector, foreign financial institutions withdrew their funds. Consequently, funding conditions for real estate companies deteriorated further and this had a significant damage on their stock prices. The real estate investment trust (REIT) market experienced the same situation: the Tokyo Stock Exchange REIT Index plunged on rising anxiety over the funding availability for real estate companies, following the bankruptcy of a listed REIT that had maintained an investment grade rating in October.

Stock trading activity by type of investor

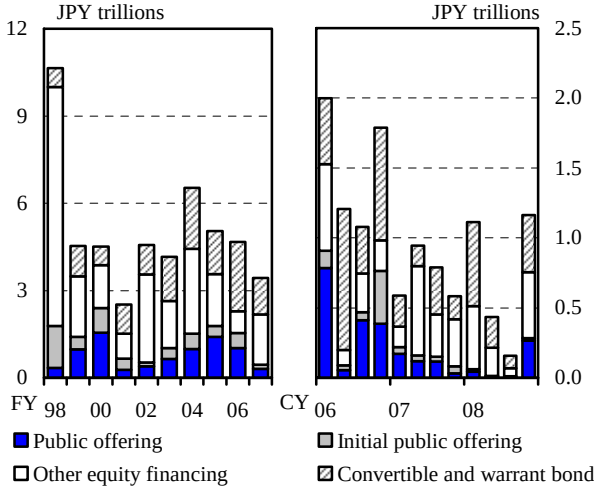
As stated earlier, investors such as hedge funds that faced funding liquidity constraints were forced to sell their stocks, as uncertainty over financial and economic conditions increased on a global basis. In the Japanese stock market, overseas investors held about a 60 percent share of trading volume in the second half of 2008, and their net sales position led to deterioration in supply-and-demand conditions for the Japanese stock market (Chart II-3-5). Individuals and pension funds that make investments through trust banks were net buyers from September 2008, but the impact was not strong enough to push up the overall stock prices.

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.

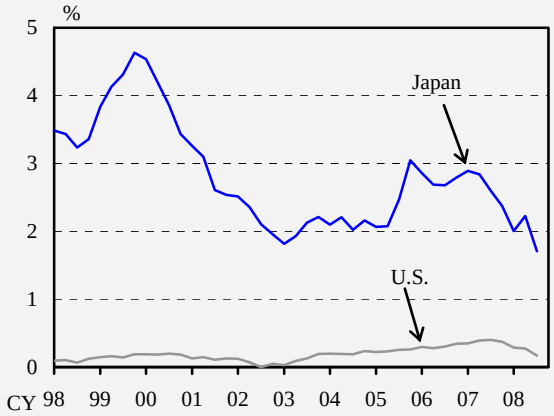
Equity financing

Equity financing by companies remained sluggish (Chart II-3-6). On the other hand, financial institutions launched capital increase measures from October 2008 because their capital adequacy ratios were pushed down by the stock price decline (Box 6).

Box 6: Effects of the Decline in Stock Prices on the Capital Adequacy of Japanese Financial Institutions

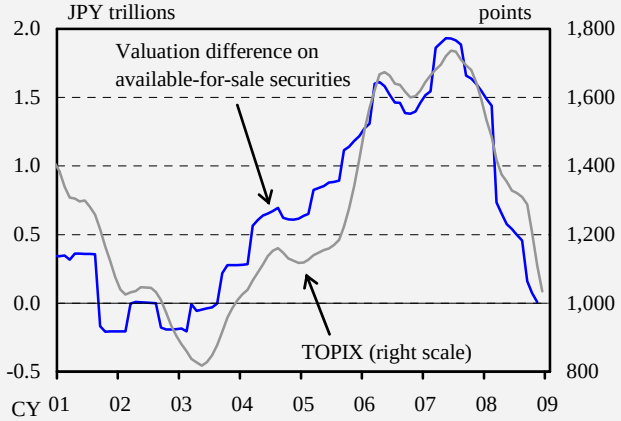
Unlike their U.S. and European counterparts, Japanese financial institutions generally had little exposure to securitized products, and therefore their profits were not greatly damaged by the market turmoil after summer 2007. However, the sharp fall in stock prices from September 2008 had a considerable negative impact on their unrealized profits and losses.[19]

Box 6 Chart 1: Financial institutions' stock holdings as a proportion of financial assets



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

Box 6 Chart 2: Valuation difference on available-for-sale securities and stock index



Note: 6-month moving average.
Sources: Bloomberg; Bank of Japan, "Financial Institutions Accounts."

The ratio of stockholdings as a proportion of Japanese banks' total asset portfolios is still high compared with that of U.S. banks (Box 6 Chart 1), although Japanese banks had cut the ratio in order to reduce risks associated with stock price volatilities after having faced the financial crisis in 1998. Therefore, the continued decline in stock prices from 2007 pushed down Japanese banks' capital adequacy. For example, the valuation difference on available-for-sale securities (including equities), which is counted as a part of capital, decreased as stock prices fell (Box 6 Chart 2).[20] The decline in stock prices had a significant

[19] For a detailed explanation of the effects of stock price declines on Japanese banks' capital adequacy, see *Financial System Report*, March 2009.

[20] In December 2008, the Financial Services Agency of Japan introduced a special treatment, which specifies that valuation loss on securities is not to be included in capital defined under the capital adequacy regulation, for banks that are not internationally active. This treatment is applied only to regulatory capital, but not to accounting capital. Therefore, the valuation difference on available-for-sales securities (including equities) continues to be reflected in the accounting capital for these banks.

impact on unrealized profits and losses of not only banks but also institutional investors such as life insurance companies, which reduced their risk appetite. As a result, investors became more reluctant to invest in risk assets, and this widened spreads in credit markets for products such as CP and corporate bonds.

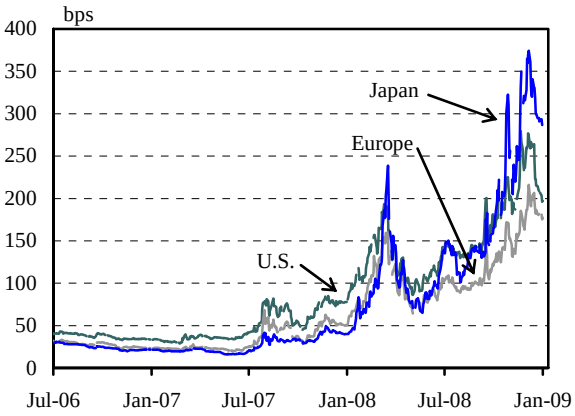
4. Credit Markets

Credit spreads, such as corporate bond spreads over government bond yields and CDS premiums, widened sharply in the U.S. and European credit markets from mid-September, when Lehman Brothers filed for bankruptcy. Likewise, in the Japanese market, credit spreads tended to rise as investors' risk-taking capacity declined substantially and concerns intensified over deterioration in economic activity and corporate earnings. While the environment surrounding corporate finance worsened rapidly, it became difficult for some companies to issue corporate bonds.

Heightening of tensions in overseas credit markets

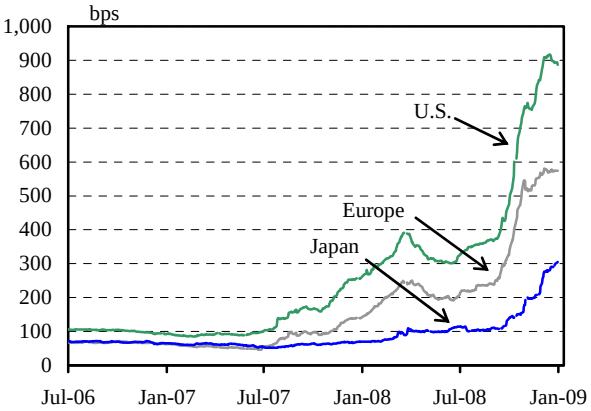
Credit spreads in the U.S. and European markets became increasingly unstable after the failure of Lehman Brothers, as they widened sharply on growing concerns over the chain reaction of financial institutions' failures and deterioration in economic activity (Charts II-4-1 and II-4-2). Corporate bond spreads by sector widened considerably for both the financial and nonfinancial sectors, reflecting the growing adverse feedback loop between the financial sector and the real economy (Chart II-4-3). This widening trend of credit spreads also reflected the behavior of investors such as financial institutions and hedge funds, which were forced to sell assets as their risk-taking capacity diminished on heightened concerns over the decline in asset prices.

Chart II-4-1: CDS indices



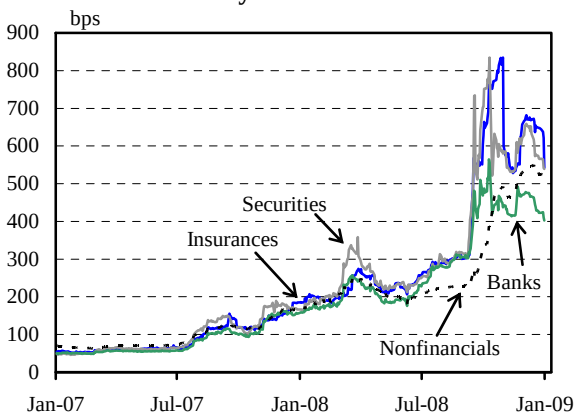
Note: CDX.NA.IG for the U.S.; iTraxx Europe for Europe; iTraxx Japan for Japan.
Source: Markit Group.

Chart II-4-2: BBB-rated corporate bond spreads over government bond yields



Note: Corporate bonds with 3- to 5-year maturity for the U.S. and Europe, and those with 3- to 7-year maturity for Japan.
Sources: Japan Securities Dealers Association; Merrill Lynch.

Chart II-4-3: U.S. corporate bond spreads by sector

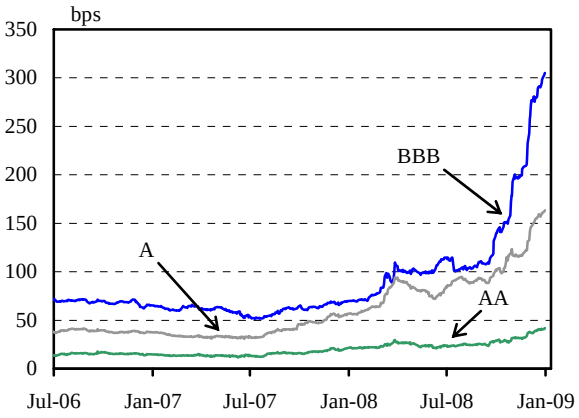


Note: 3- to 5-year maturity.
Source: JPMorgan.

Volatile movements in Japan's corporate bond markets

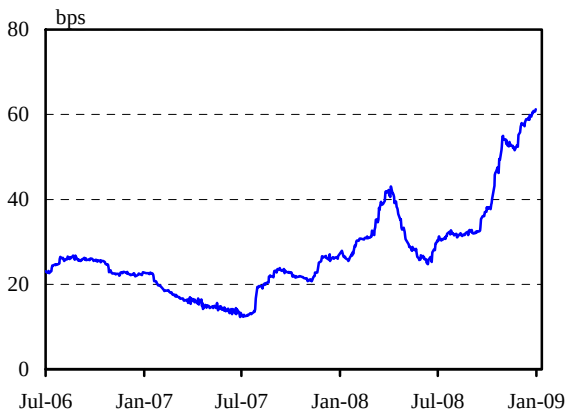
Investors in Japan's corporate bond markets are mostly on the domestic side, and therefore, as noted in our previous report (September 2008), corporate bond markets in Japan had been generally stable because the impact of overseas investors' risk reduction behavior had been limited and domestic investors' demand for corporate bonds had remained firm. Following the failure of Lehman Brothers, however, the Japanese market also became unstable. The difference between the corporate bond spreads with high ratings and those with lower ratings expanded further (Chart II-4-4). In addition, as for the corporate bond spreads with high ratings that had been stable so far, those of single A-rated corporate bonds and bank bonds also widened out (Chart II-4-5).

Chart II-4-4: Corporate bond spreads over JGB yields



Note: 3- to 7-year maturity.
Source: Japan Securities Dealers Association.

Chart II-4-5: Japanese bank bond spreads

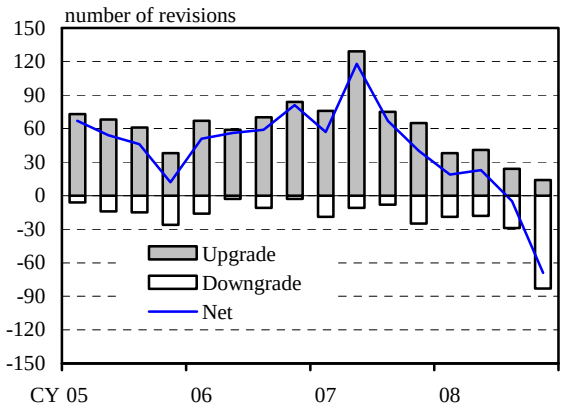


Source: Japan Securities Dealers Association.

Major factors behind the expansion of the Japanese corporate bond spreads include the widening of risk premiums due to (1) issuers' worsening financial conditions, caused by the declines in corporate earnings and credit ratings against the background of the deterioration in the economic activity (Chart II-4-6), and (2) a decline in the risk-taking capacity of domestic investors such as banks and life insurance companies as a result of a steep fall in stock prices (Box 6). A series of defaults in publicly offered corporate bonds issued by emerging real estate companies, *samurai* bonds (yen-denominated bonds issued by nonresidents in the Japanese market), and bonds issued by a real estate investment trust, also made investors more risk conscious. Moreover, a decline in securities companies' warehousing capacity led to an overall decrease in liquidity in the corporate bond markets, which also contributed to the widening in corporate bond spreads.

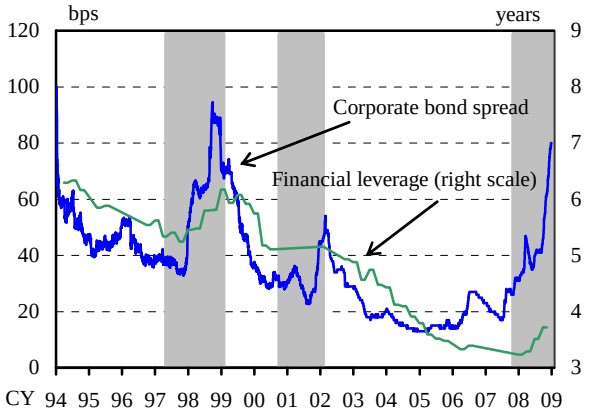
The relationship between companies' financial leverage, which is an indicator of how long it takes to discharge interest-bearing debt through cash flow, and corporate bond spreads shows that corporate bond spreads rose sharply relative to the deterioration in financial leverage, although the two indicators had not deviated significantly from each other in the past (Chart II-4-7). This could suggest that corporate bond spreads reflected not only the risk of rapid erosion of financial leverage in the near future, but also an excessive increase in risk premium caused by a decline in investors' risk-taking capacity, which made credit spreads too high relative to credit fundamentals.

Chart II-4-6: Credit rating revisions



Source: Bloomberg.

Chart II-4-7: Corporate bond spread and financial leverage



Notes: 1. Corporate bond spread for bonds with A or higher ratings. Financial leverage is the ratio of interest-bearing debts to cash flow (for companies with capital larger than 1 billion yen).
2. Shadow indicates the recession phase.
Sources: Nomura Securities; Ministry of Finance, "Financial Statements Statistics of Corporations by Industry."

Rapid worsening of the environment for corporate bond issuance in Japan

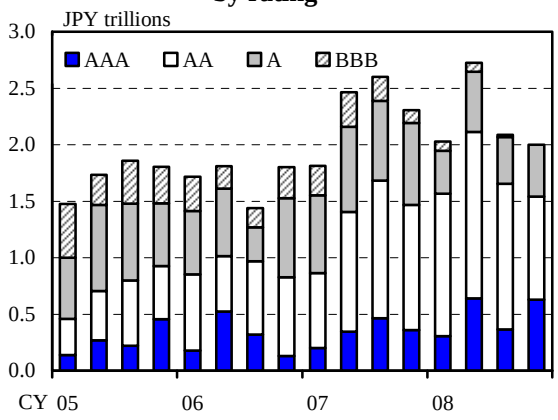
The total amount of primary corporate bond issuance decreased (Chart II-4-8). Issuance of BBB-rated corporate bonds came to a halt, and in October, some planned issuances were postponed for both private-sector bonds and public-sector bonds, such as government-guaranteed bonds, municipal bonds, and Fiscal Investment and Loan Program (FILP) agency bonds. From November, the environment for issuing bonds for the public sector, electric power companies, and financial institutions recovered gradually, but primary issuance for private-sector bonds was basically limited to those rated AA or higher, and the amount of issuance of bonds rated single A or lower was very small.[21] As a result of this rapid deterioration in the issuing environment for corporate bonds, companies shifted their funding source to bank loans (Box 4).

The total amount of primary issuance of *samurai* bonds, which had been firm, decreased sharply (Chart II-4-9). Overseas issuers seemed to have strong incentives to raise funds in the yen market, but domestic investors' appetite for *samurai* bonds diminished. This was mainly because of (1) defaults in *samurai* bonds issued by Lehman Brothers and other U.S. and European financial institutions, (2) heightened sovereign risk of emerging countries

[21] In Chart II-4-8, issuance of corporate bonds with A ratings increased somewhat in the fourth quarter of 2008 because several major banks and securities companies issued corporate bonds for retail investors.

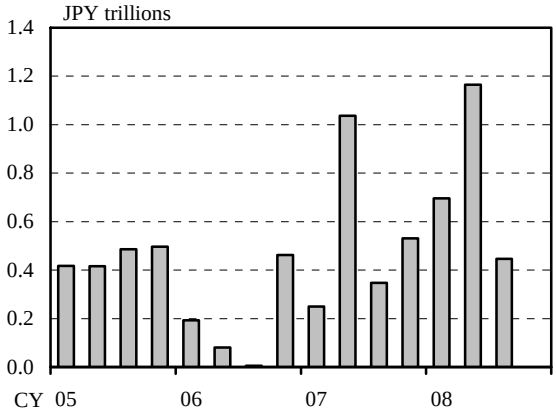
as a result of the global economic slowdown, and (3) increased concerns over the financial conditions of overseas companies such as those in the U.S. auto industry.

Chart II-4-8: Corporate bond issuance by rating



Sources: I-N Information Systems; Capital Eye.

Chart II-4-9: *Samurai* bond issuance



Source: I-N Information Systems.

Sharp widening of CDS premiums for Japanese companies

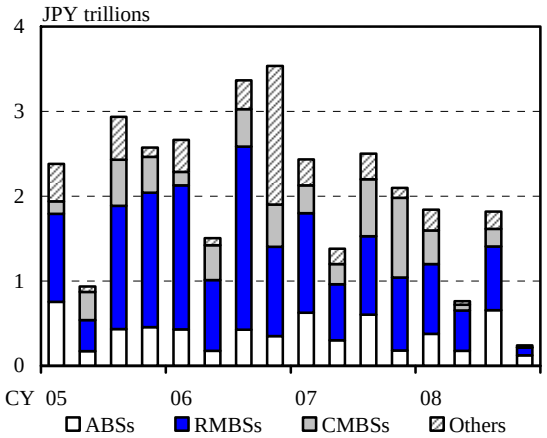
CDS premiums for Japanese companies also widened sharply from September 2008, and were well above the record high observed in March 2008 (Chart II-4-1). Against the background of the world-wide economic downturn and deterioration in corporate earnings, increased concerns over companies' funding conditions toward the end of 2008 accelerated the risk reduction activities by domestic and overseas investors for credit risk of various sectors. From September, the CDS index in Japan remained at a level higher than that in the United States and Europe. This appears to be the result of substantial evaporation of market liquidity as a consequence of investors' concentration on trading in one direction (Box 7).

Sluggish issuance of securitized products

The notional amount and number of securitized products issued decreased significantly on a year-on-year basis (Charts II-4-10 and II-4-11). Domestic investors' demand for various securitized products receded and securities companies reduced their holdings of these products. In addition, the underlying assets for some securitized products, such as CMBSs and collateralized debt obligations (CDOs) backed by credited loans to small firms, shrank as a result of the deterioration in real estate markets and economic activity, and an increasing number of these products saw downgrades to their credit ratings. Against this background,

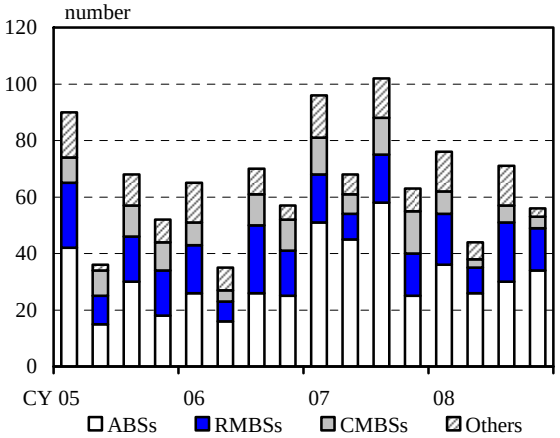
domestic investors became more cautious about investing in such products.

Chart II-4-10: Notional amount of securitized products issued



Note: Issuance in December 2008 is not included in the data for Q4/08.
Source: Deutsche Securities.

Chart II-4-11: Number of securitized products issued



Source: Mizuho Securities.

Box 7: Background to Higher CDS Premiums in Japan in Comparison to the Situation in the United States and Europe

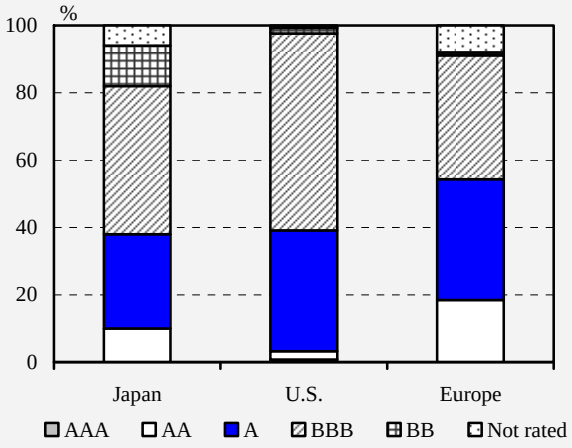
Japan's CDS premium index reached a higher level than that of the United States and Europe, despite the relatively subdued impact of the financial turmoil. This appears to be driven by the difference in credit ratings and sector compositions of CDS index components, and by low liquidity in Japan's CDS market.

Looking at CDS index components by issuer rating, as much as 12 percent of the entities in Japan's CDS index have speculative BB ratings,[22] and thus its average rating of reference entities is below that of the United States and Europe (Box 7 Chart 1). Generally, premiums on lower-rated entities tend to be strongly pro-cyclical and widen with greater magnitude in a recessionary phase. Therefore, the premium of Japan's CDS index with a large weight on lower-rated entities is likely to rise significantly in a recessionary phase.

[22] The prerequisite to be included in the CDS index is to have an investment grade rating, that is, BBB or higher, assigned by at least one rating agency. Thus, an entity with a speculative rating provided by certain rating agencies could be eligible for the index; however, the average rating of such an entity could be BB or lower.

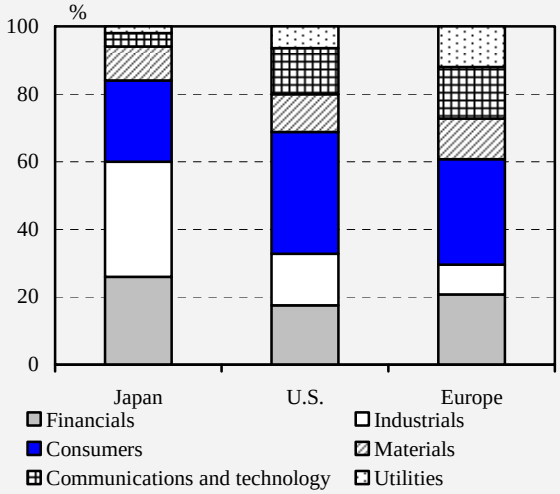
In terms of component entities by sector, Japan's CDS index has the following features: (1) relatively high proportions of "industrials" such as manufacturing and construction and "financials" such as banking, securities, and non-bank financing; and (2) a low proportion of "utilities" such as electric power and gas, which are relatively immune to the economic cycle (Box 7 Chart 2).[23] Thus, the premium of Japan's CDS index has a stronger tendency to rise when market participants take an increasingly cautious stance over the risk of economic deterioration, driven in particular by the negative effects of yen appreciation on exporting companies, and over financial system instability.

Box 7 Chart 1: Breakdown of CDS indices by rating



Note: As of December 24, 2008. Rating classification is based on Markit Group.
Source: Markit Group.

Box 7 Chart 2: Breakdown of CDS indices by sector



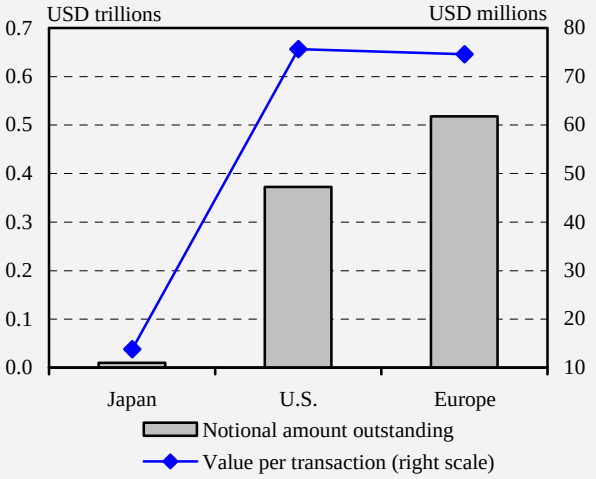
Note: As of December 24, 2008. Sector classification is based on Markit Group.
Source: Markit Group.

In addition, there is a notable difference in the variation of market participants and transaction volume between the Japanese market and U.S. and European markets (Box 7 Chart 3). The amount outstanding of Japan's CDS index transactions is 2 to 3 percent of that of U.S. and European indices, based on a notional amount, and the amount per transaction is only about one-fifth. Thus, as seen in the current market environment, a significant decrease in market liquidity is more likely to occur in Japan than in the United States and Europe when stress emerges from, for instance, market participants' crowding into the same trading

[23] Regarding the composition of sectors, no more than ten entities are to be included in each sector defined by Nikkei sector classification. However, this composition does not necessarily reflect the Japanese industrial structure.

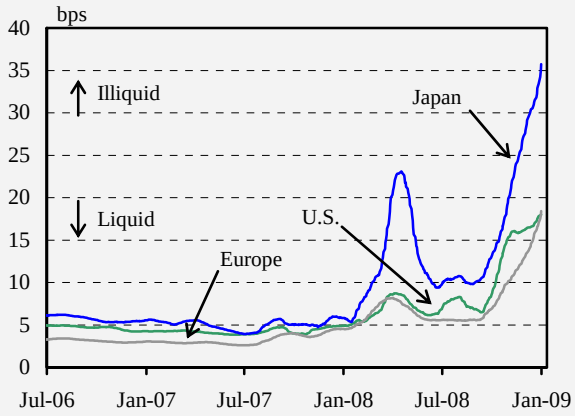
direction.[24] In fact, bid-ask spreads, which represent liquidity in CDS markets, widened most significantly in Japan (Box 7 Chart 4). Such low market liquidity may have been a factor in driving Japan's CDS index higher than the level implied by its actual creditworthiness.

Box 7 Chart 3: Notional amount outstanding and value per transaction of CDS indices



Note: As of December 26, 2008.
Source: Depository Trust and Clearing Corporation.

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



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

5. Foreign Exchange Markets

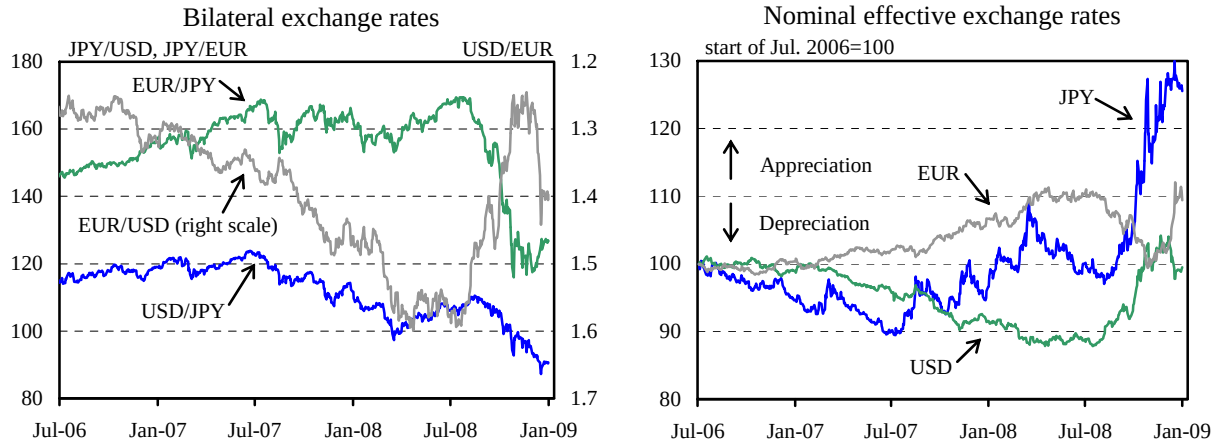
The FX rates fluctuated to a considerable degree as market participants became increasingly risk averse, reflecting heightened concerns about global financial system stability and the rapid deterioration in economic conditions. From summer 2008 through the year-end, market liquidity declined and the U.S. dollar and the euro fluctuated greatly, whereas the yen appreciated considerably. The rapid yen appreciation was mainly caused by unwinding of the yen-carry positions, reflecting investors' diminished risk-taking capacity against the background of the stock price declines and increased volatility, as well as tightening of interest rate differentials between Japan and overseas.

[24] In addition to the declining number of risk takers, such as structured note investors and hedge funds, unwinding of synthetic CDOs composed of single-name CDSs contributed to the decline in market liquidity.

Significant fluctuations in FX rates

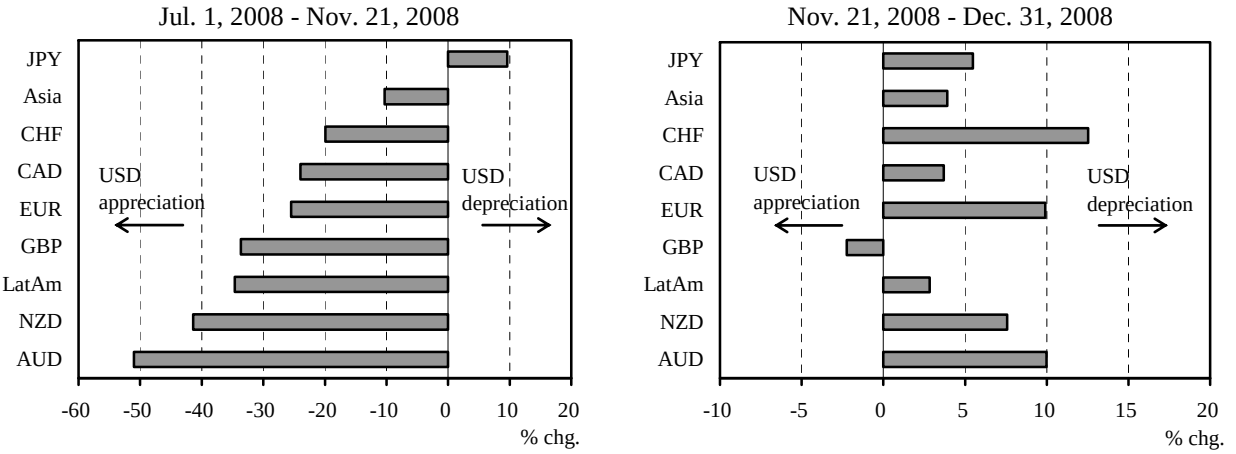
The U.S. dollar depreciated against the yen from summer 2008, partly because of the tightening of the interest rate differentials, while it appreciated considerably against the euro and the currencies of emerging economies until November as the U.S. investors with diminished risk-taking capacity increased their repatriation of funds (Charts II-5-1 and II-5-2). As a result, the nominal effective exchange rate of the U.S. dollar continued to appreciate until November. However, it started to depreciate from the beginning of December due to further deterioration in economic conditions in the United States and a change in the interest rate differentials following substantial monetary easing.

Chart II-5-1: FX rates of three major currencies



Note: The effective exchange rate of the U.S. dollar refers to the broad index.
Sources: Bloomberg; Bank of Japan.

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



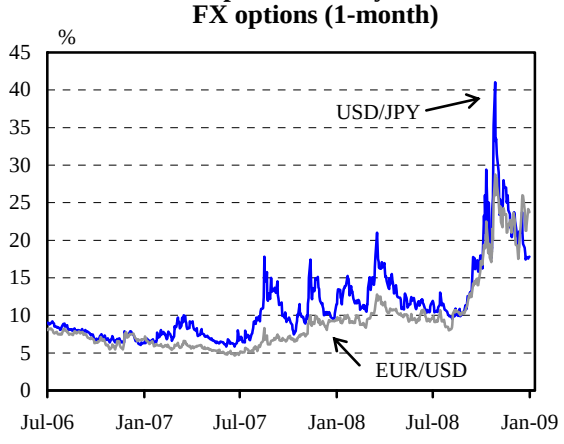
Notes: 1. "Asia" indicates Asian Currency Index, and "LatAm" indicates Latin American Currency Index.
2. The nominal effective exchange rate of the U.S. dollar marked the highest level on November 21 during the second half of 2008.
Source: Bloomberg.

The euro remained solid until the first half of 2008, in line with movements in crude oil prices. From summer 2008, however, it started to depreciate as crude oil prices declined (Chart II-5-1). A sharp rise in concerns about financial system stability in the euro area and surrounding economies, as well as a heightened risk of deterioration in the real economy, led to stronger downward pressure on the nominal effective exchange rate of the euro. From December, it started to appreciate again mainly reflecting the depreciation of the U.S. dollar.

The yen was on an upward trend during the second half of 2008, and its nominal effective exchange rate increased to the highest level since 1995 (Chart II-5-1). The appreciation of the yen was due in part to unwinding of the yen-carry positions, reflecting (1) a decline in investors' risk appetite against the background of heightened uncertainties over the financial and economic environment and (2) a narrowing of interest rate differentials between Japan and overseas as a result of rate cuts by central banks, including those in countries with high-yielding currencies (Box 8).

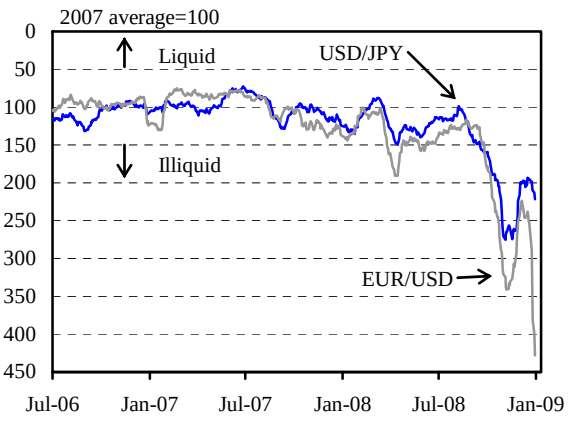
Implied volatility of major currencies rose significantly in October 2008 and remained at high levels thereafter, indicating considerable uncertainties about the outlook for the FX rates (Chart II-5-3). There was a feedback effect between volatility and market liquidity: the increased volatility led to lower liquidity in the FX market, as seen in a rapid rise in the ratio of the intraday high-low spread to trading volume (Chart II-5-4), and then the decreased market liquidity made the market sensitive to news, thereby augmenting volatility.

Chart II-5-3: Implied volatility of FX options (1-month)



Source: Bloomberg.

Chart II-5-4: FX spot market liquidity

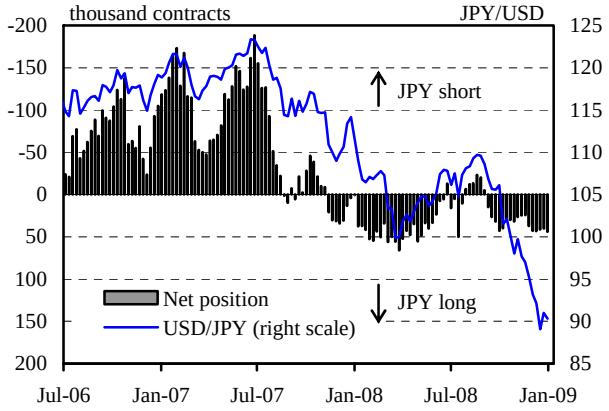


Note: The ratio of intraday high-low spread to trading volume in the Tokyo foreign exchange market (20-day moving average).
Source: Bank of Japan.

Speculators' positions and Japanese retail investors' FX trading

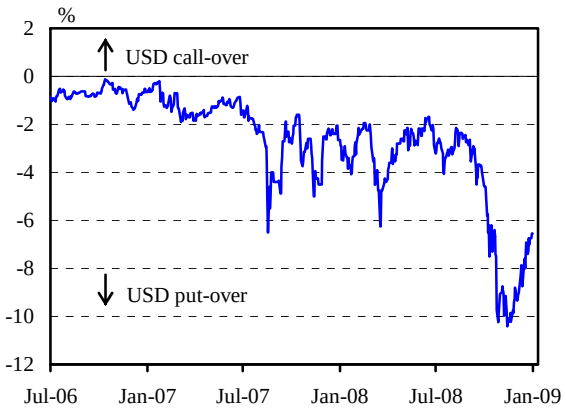
The International Monetary Market (IMM) futures net positions of noncommercial investors on the Chicago Mercantile Exchange showed that speculators kept their long positions in the yen against the U.S. dollar from autumn 2008 as the U.S. dollar continued to depreciate against the yen (Chart II-5-5). Looking at the risk reversal of the U.S. dollar/yen, premiums for U.S. dollar puts over remained high, suggesting speculators were on their guard against significant yen appreciation, and this was a factor behind their long positions in the yen (Chart II-5-6).

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



Source: Bloomberg.

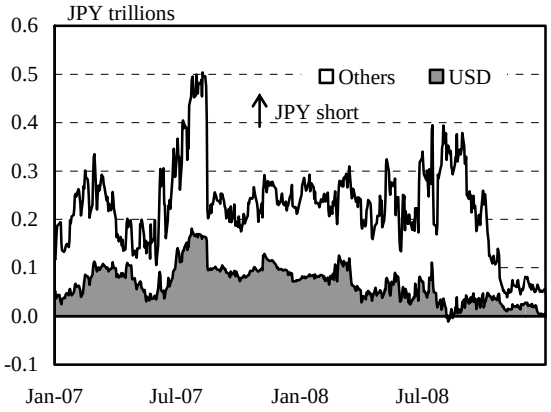
Chart II-5-6: Risk reversal of U.S. dollar/yen (1-month)



Source: Bloomberg.

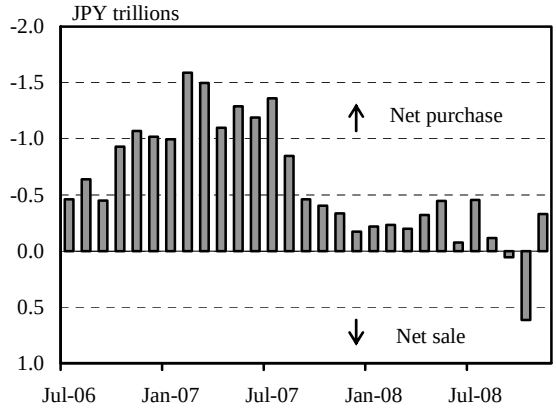
Regarding Japanese retail investors' trading behavior, FX margin traders, who sought profits over a relatively short-term horizon, took contrary positions against short-term market directions through summer 2008: when the yen was appreciating, they took short positions in the yen and long positions in higher-yielding currencies such as the Australian dollar or New Zealand dollar (Chart II-5-7). However, from end-September, they unwound their short positions in the yen in order to cut their losses that materialized with the rapid depreciation of higher-yielding currencies. Retail investors subsequently maintained a cautious stance toward yen carry trades because of diminished risk-taking capacity, policy rate cuts in countries with higher-yielding currencies, and high volatility in the FX markets (Box 8). Moreover, retail investment in foreign currency-denominated assets through investment trusts for longer-term horizons also turned to net sales from September through October, in line with yen appreciation (Chart II-5-8).

Chart II-5-7: FX margin trading on the Tokyo Financial Exchange



Source: Tokyo Financial Exchange.

Chart II-5-8: Foreign securities investment through domestic investment trusts



Source: Ministry of Finance, "Balance of Payments."

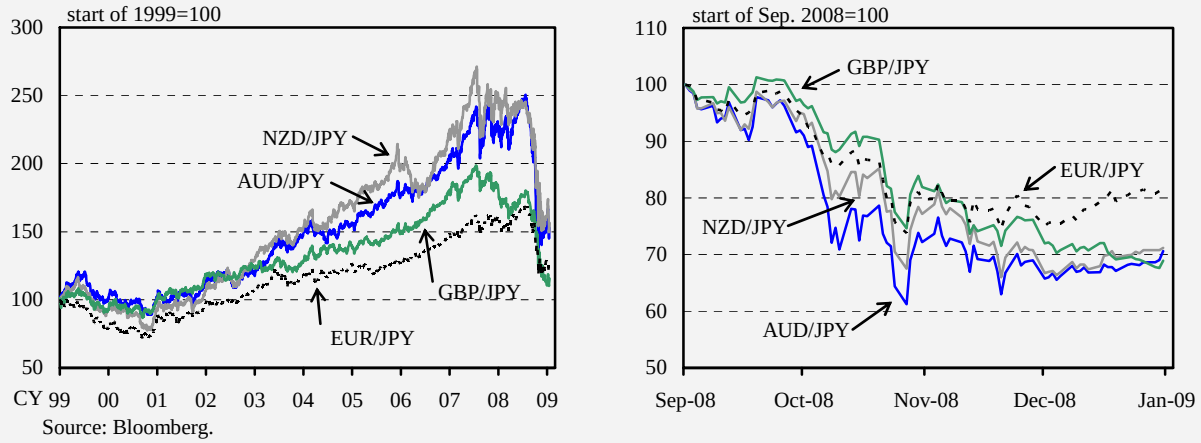
Box 8: Unwinding of Carry Positions

The yen carry trades are generally defined as trades where one makes short positions in the yen, a lower-yielding currency (a funding currency), and long positions in higher-yielding currencies (an investment currency), such as the Australian dollar and New Zealand dollar, to earn profits (hereafter "carry return"). The carry return is expressed as the sum of interest rate differentials between the two currencies and the change in the value of the investment currency. According to the uncovered interest parity condition, investors cannot make excess returns because profits from the interest rate differentials are offset by the depreciation of the investment currency. In reality, however, they can make excess returns, at least in the short term, as the parity condition is not always met. Taking this as an opportunity to make profits, investors may increase their positions in the yen carry trades with leverage. In the process of gaining the carry returns, however, investors may undervalue potential losses from the depreciation in the investment currency and take FX rate risks that can arise from the process of rapid unwinding of positions.

Developments in carry returns show that investors were able to make excess returns from 2002 through 2007, the period when the FX markets were relatively stable (Box 8 Chart 1). During this period, it seems investors such as hedge funds made active yen-carry positions. For example, the IMM data of the Chicago Mercantile Exchange show an increase

in short positions in the yen (Chart II-5-5). However, as volatility in the FX markets rose rapidly in summer 2007 and investors' risk-averse behavior became evident, they rushed to unwind their yen-carry positions and higher-yielding currencies consequently depreciated rapidly.

Box 8 Chart 1: Cumulative return on yen-carry trade

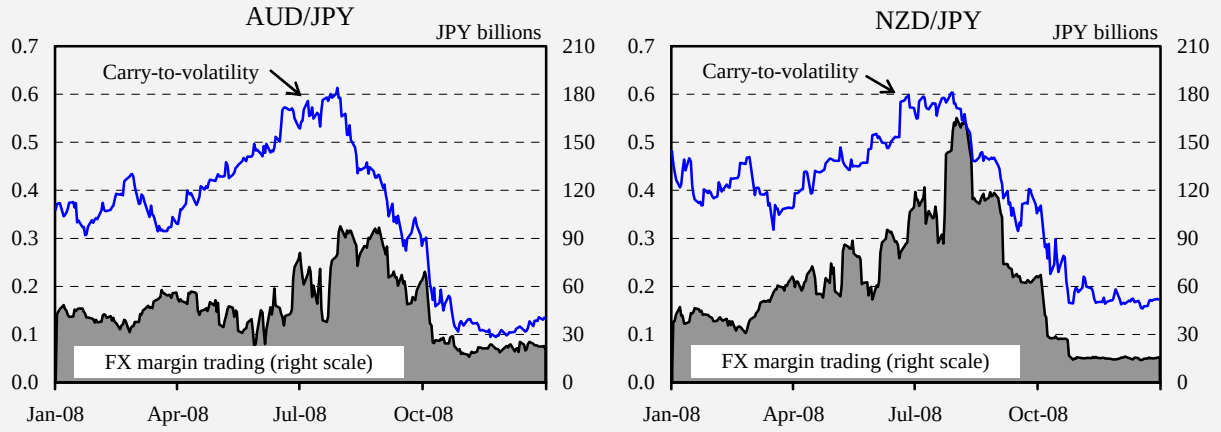


Source: Bloomberg.

Another type of yen carry trade is FX margin trading by Japanese retail investors.[25] When these investors take short positions in the yen and long positions in other currencies in FX margin trading, they are credited with the yen by margin brokers for purchasing foreign currencies by way of depositing the margin, as collateral security, equivalent to a certain portion of credit in the brokers. This enables retail investors to take the yen carry trade with leverage, like hedge funds. Retail investors continued to increase their positions even after summer 2007, when higher-yielding currencies such as the Australian dollar and New Zealand dollar depreciated, or when volatility decreased. In fact, when the carry-to-volatility ratio (i.e., the ratio of the interest rate differentials to the volatility in the two currencies) increased through summer 2008 -- in other words, when investors were able to make returns from the interest rate differentials under the low FX rate risk -- they increased their positions to a remarkable degree (Box 8 Chart 2). Thereafter, however, such positions were rapidly unwound and higher-yielding currencies fell substantially, leading to a decline in the carry-to-volatility ratio.

[25] For details, refer to Terada, Tai, Naoto Higashio, and Jun Iwasaki, "Recent Trends in Japanese Foreign-Exchange Margin Trading," *Bank of Japan Review*, 2008-E-3, 2008.

Box 8 Chart 2: Carry-to-volatility ratio



Note: Carry-to-volatility indicates the ratio of the 3-month LIBOR differentials to the 3-month implied volatility. FX margin trading indicates the net short position in yen.
Sources: Bloomberg; Tokyo Financial Exchange.

III. Policy Responses of Central Banks and Governments to the Financial Crisis

In this chapter, policy responses taken by central banks and governments to the financial crisis following the failure of Lehman Brothers are outlined on the basis of four points: (1) policy rate cuts; (2) increased provision of liquidity to interbank markets; (3) guarantees on bank liabilities and capital injections; and (4) purchases of assets from markets whose functioning has declined significantly.[26] Against the backdrop of the deterioration in economic conditions triggered by financial crisis, central banks in major economies reduced policy interest rates significantly, and also expanded liquidity provisions to financial institutions by implementing various market operations in order to address the situation in which a decline in the functioning of interbank markets lessened the effectiveness of monetary easing. At an early phase of the market turmoil, governments of major countries had conducted supportive measures against problems at their financial institutions on a case-by-case basis. However, the need for more comprehensive initiatives became evident as financial system instability spread globally. From this standpoint, major developed countries took system-wide intervention such as guarantees on bank debt and capital injections from October 2008. Furthermore, as the deterioration in the functioning of financial markets led to tighter funding conditions not only for financial institutions but also for all economic agents, including companies and households, central banks and governments implemented several measures such as asset purchases to restore liquidity to the markets whose functioning had deteriorated noticeably.

1. Policy Rate Cuts

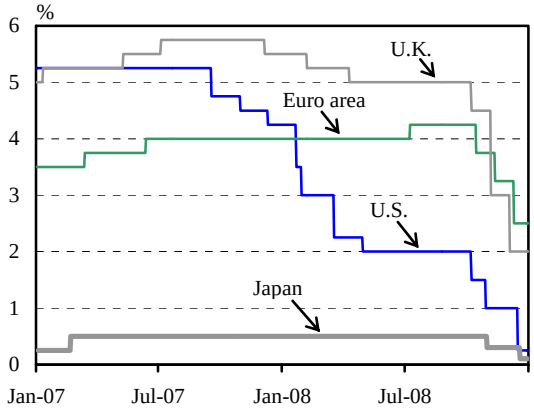
Amid the increase in downward risks to the economic outlook resulting from the deepening global financial crisis, the central banks of six developed economies took the unprecedented coordinated policy action of reducing policy rates on October 8, 2008 (Chart III-1-1).[27] They

[26] See the following paper for details on the market operations that central banks took in the year after August 2007: Bank of Japan, "Central Bank Responses to the Money Market Turmoil Stemming from Subprime Woes: Review of the Initial Phase from August 2007 until July 2008," Bank of Japan Research Paper, 2009.

[27] The six central banks that took the coordinated policy actions of reducing rates were the Bank of Canada (BOC), the Bank of England (BOE), the ECB, the Federal Reserve, Sveriges Riksbank, and the Swiss National Bank (SNB). The Bank of Japan announced that it welcomed the policy decisions by the six central banks and hoped these actions would contribute to securing the stability of both the financial

subsequently lowered their policy rates in succession as recessionary pressure on economies became elevated globally. The Federal Reserve, the ECB, and the Bank of England (BOE) reduced their policy rates by a cumulative 1.75 percentage points, 1.75 percentage points, and 3.0 percentage points, respectively, from summer 2008. In December 2008, the Federal Reserve decided to establish a "target range" for the federal funds rate of 0.00 to 0.25 percent, in place of the explicit "target rate." The Federal Reserve also noted in its statement that "the Committee anticipates that weak economic conditions are likely to warrant exceptionally low levels of the federal funds rate for some time," which encouraged pricing of long-term interest rates to be consistent with the path of monetary policy that policymakers saw as most likely.

Chart III-1-1: Policy interest rates



Note: The 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 Bank of Japan, on the other hand, maintained its monetary policy stance until early October, on its view that the policy rates were already at low levels and the monetary environment remained accommodative. However, as further downside risks to the economy became evident, the Bank decided to lower the target for its policy rate (i.e., the uncollateralized overnight call rate) to around 0.3 percent from around 0.5 percent at the end of October, and to around 0.1 percent in December 2008, to ensure accommodative monetary conditions.

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systems and economies of these countries.

2. Further Provision of Liquidity to the Interbank Market

In order for the effects of monetary easing to spread widely into the economy, the top priority is to ensure that the effects of the rate cuts permeate across the various interest rates through arbitrage activities of market participants in money markets, where market operations are conducted by central banks. However, when the functioning of money markets is impaired, as in a situation where counterparty risk and liquidity risk are high, financial institutions' funding costs would not decline to the level central banks intended, and thus arbitrage activities would not be active. For this reason, central banks implemented various liquidity provision measures to underpin the effectiveness of monetary easing. In the following section, actions taken by central banks, particularly the Federal Reserve, the ECB, the BOE, and the Bank of Japan, will be discussed from the following four perspectives: (1) enhancements in measures to provide U.S. dollars; (2) an increase in the amount and frequency of term-funding operations; (3) expansion of eligible collateral for money market operations and enhancements in the securities lending facilities; and (4) a change in deposit and lending facilities.

Enhancements in measures to provide U.S. dollars

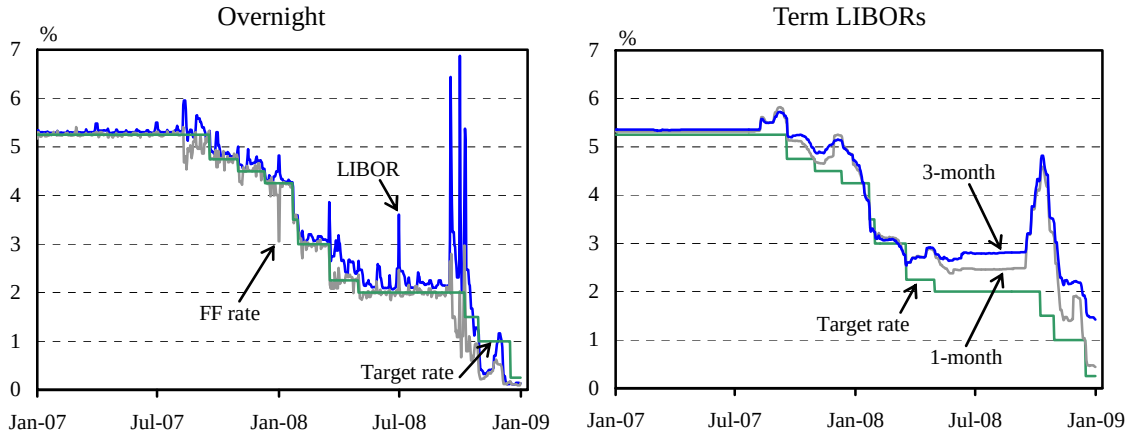
During the global credit boom that continued until summer 2007, European financial institutions became increasingly dependent on interbank market transactions to obtain U.S. dollar funds as they expanded their businesses in global financial markets. For this reason, from summer 2007, they faced higher funding liquidity constraints as funding conditions became tighter in uncollateralized markets such as the federal funds (FF) and euro-dollar markets.[28] In this situation, European banks began to access secured funding markets such as FX swap markets for U.S. dollar funding; however, market liquidity continued to decline as market participants there also became reluctant to lend U.S. dollars. Consequently, the ECB and the Swiss National Bank started providing U.S. dollars in these markets by entering into reciprocal currency arrangements (swap lines) with the Federal Reserve in December 2007. After the failure of Lehman Brothers in September 2008, however, liquidity in the U.S. dollar funding market contracted sharply as counterparty risk became higher and market participants

[28] For details on the mechanisms with which the influences of the tightness in the U.S. dollar funding market spread to global markets, see Imakubo, Kei, Takeshi Kimura, and Teppei Nagano, "Cross-currency Transmission of Money Market Tensions," *Bank of Japan Review*, 2008-E-2, 2008.

increased their precautionary demand for liquidity, signifying a sudden heightening of U.S. dollar liquidity constraints not only on European financial institutions but also on non-U.S. financial institutions overall.

To address the situation, the BOE, the Bank of Japan, and the Bank of Canada (BOC) entered into reciprocal currency arrangements with the Federal Reserve in mid-September. The number of central banks agreeing to set up swap lines with the Federal Reserve continued to increase, reaching a total of 14 by the end of 2008. U.S. dollar funds with maturities ranging from overnight to a three-month term were provided under these arrangements, and the provision amounts increased progressively. In particular, the ECB, the SNB, the BOE, and the Bank of Japan decided to conduct tenders of U.S. dollar funding at fixed interest rates for full allotment in mid-October 2008. These measures were effective in terms of encouraging a decline in term funding rates, which had been widening, and soothing movements in overnight rates (Chart III-2-1).

Chart III-2-1: U.S. dollar funding rates



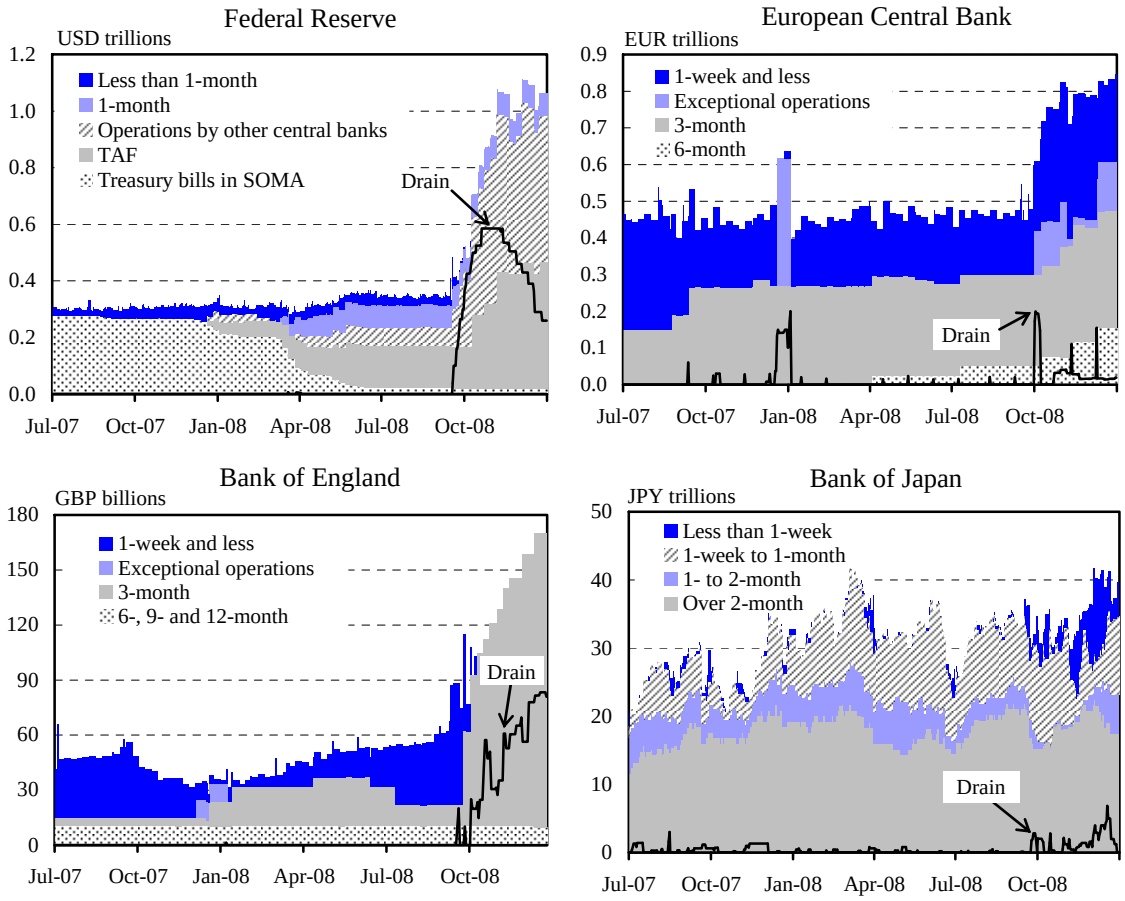
Note: Target rate from December 16, 2008 shows the upper range of the target.
Sources: Bloomberg; Federal Reserve.

Meanwhile, after autumn 2008, as instability in the financial system rapidly spread to the euro area and surrounding economies, some financial institutions began to face liquidity constraints not only for U.S. dollar funds but also for euro and Swiss franc funds. Thus, several European central banks entered into reciprocal currency arrangements with the ECB and the SNB, and began providing euro and Swiss franc funds.

Increase in the amount and frequency of term-funding operations

Against the background of the global financial crisis, deterioration in the functioning of money markets became widespread in a short period of time, in both the U.S. dollar markets and the markets for many other currencies. In particular, participants in many markets became reluctant to lend term funds given heightened concerns over counterparty risk and higher precautionary demand for liquidity, prompting central banks in many economies to increase the frequency and amount of money market operations (Chart III-2-2).

Chart III-2-2: 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, etc.

The Federal Reserve, as mentioned earlier, provided ample amounts of U.S. dollar term funds under its swap lines with other central banks. Moreover, in early October 2008, it increased the sizes of both one- and three-month Term Auction Facility (TAF) auctions to 150

billion U.S. dollars each. In addition, in November 2008, the Federal Reserve offered forward auctions of a two-week TAF to extend credit over the year-end.

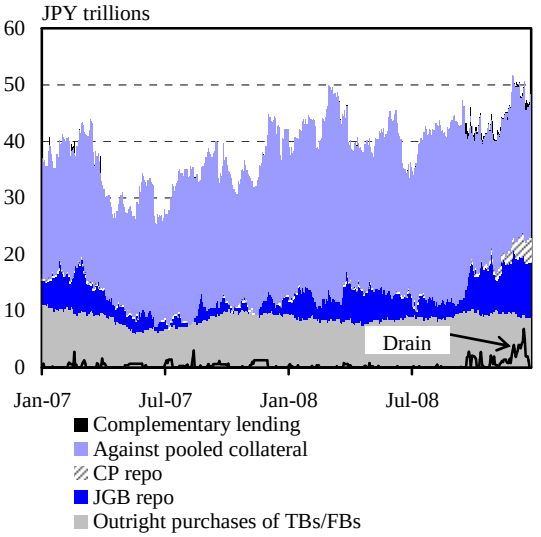
The ECB, at end-September, conducted a special term refinancing operation using a variable rate tender with no pre-set amount, and in mid-October it decided to carry out three- and six-month refinancing operations until and including March 2009. Also, as a temporary measure, the ECB changed the variable rate tender procedure of one-week and over three-month refinancing operations to a fixed rate tender procedure with full allotment. Furthermore, the conditions for quick tender fine-tuning operations were expanded and the number of counterparties to these operations consequently increased more than tenfold, to about 1,700.

The BOE, with a view to addressing funding pressure over the year-end for financial institutions, increased the amount of funds provided through its repo operations; for example, by increasing three-month auctions from end-September 2009.

Meanwhile, the Bank of Japan started to provide funds over the year-end at an early stage, as it considered that funding constraints among financial institutions might become tight toward the end of the year. The outstanding amount of funds maturing over the year-end reached 40 trillion yen in 2008, exceeding by around 7 trillion yen the level reached in 2007, which was relatively high compared to the historical average. In addition, in order to address the deterioration in the functioning of repo markets, the Bank expanded the frequency and size of its JGB repo operations from mid-October and continued to provide funds amounting to about 4 trillion yen to the market daily. In addition, as the corporate financing environment became increasingly tight, evidenced by the heightened upward pressures on CP issuance rates, the Bank decided in the middle of October to use its CP repo operations more actively, gradually increasing the frequency and size of operations from quarterly to twice-a-week offers, and from about 300 billion yen to about 600 billion yen per operation. 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 the year. This marked the largest amount since the quantitative easing period, while the share of JGB repo and CP repo operations in the total amount rose (Chart III-2-3). Additionally, in December 2008, in order to reduce the burden of short-term funds-supplying operations, the Bank increased the monthly amount of outright purchases of JGBs, which provided longer-term funds, from

about 1.2 trillion yen to 1.4 trillion yen.[29]

Chart III-2-3: Bank of Japan's market operation outstanding by type of operation



Source: Bank of Japan.

Expansion of eligible collateral for money market operations and enhancements in the securities lending facilities

Central banks in major economies, as part of their efforts to flexibly enlarge the size of funds-supplying operations, expanded the range of eligible collateral in their operations. In addition, to address the decline in liquidity in the secured markets, these central banks implemented measures aimed at improving financial institutions' funding conditions; for example, by enhancing securities lending facilities.

The Federal Reserve, in mid-September, broadened the eligible collateral to be pledged at the Primary Dealer Credit Facility (PDCF).[30] Furthermore, it expanded the collateral for

[29] In addition, the range of JGBs accepted in outright purchases was expanded; namely, 30-year bonds, floating-rate bonds, and inflation-indexed bonds. Regarding outright purchases of fixed-rate coupon-bearing bonds, a scheme was introduced to purchase JGBs from specific maturity segments, which are defined as one year or less, more than one year through ten years, and more than ten years, in order to prevent the remaining maturities of JGBs purchased from becoming too short or too long.

[30] The PDCF, a discount window program for primary dealers, was established in March 2008 to provide financing to participants in securitization markets. Eligible collateral had previously been limited to investment-grade debt securities, but was broadened in September 2008 to closely match the types of collateral that can be pledged in the tri-party repo systems of clearing banks.

the Term Securities Lending Facility (TSLF) and increased the frequency of TSLF auctions from biweekly to weekly, as well as the amount to be offered from a total of 125 billion U.S. dollars to 150 billion U.S. dollars.[31]

The ECB, in mid-October 2008, expanded the list of assets eligible as collateral in Eurosystem credit operations to include marketable debt instruments denominated in currencies other than the euro, and lowered the credit threshold for assets from A- to BBB-, with this expansion remaining into force until the end of 2009.

The BOE also announced an extension of the collateral eligible in its sterling three-month repo operations with a view to ensuring access to sufficient liquidity maturing over the year-end. In addition to agency bonds and RMBSs, which had been added as eligible collateral at the end of 2007, the range of eligible collateral was expanded to include ABSs of some consumer and corporate loans, and CMBSs. The BOE also announced that the drawdown period for its Special Liquidity Scheme (SLS), a U.K. Treasury Bills lending facility, would be extended to January 30, 2009, and that at least 200 billion pounds sterling would be made available under the SLS.[32] In addition, it announced that it would accept as collateral bank debt that is guaranteed under the government's bank debt guarantee scheme. Furthermore, as a replacement for the SLS, which expired at end-January 2009, the BOE established a standing Discount Window Facility, through which eligible institutions can borrow U.K. government securities or cash against a broad range of collateral classified into several groups depending on quality. The facility is designed to help contain financial system stress by providing financing against assets that may become illiquid in stressed conditions.

The Bank of Japan, in mid-October 2008, added floating-rate bonds, inflation-indexed

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[31] The TSLF, introduced together with the PDCF in March 2008, is a facility to offer Treasury securities held by the Federal Reserve for loan to primary dealers against other securities including MBSs, as financing in the repo markets had become difficult. In effect, the TSLF offered securities that primary dealers could use as collateral in the markets. The eligible collateral for the TSLF was expanded in September 2008 to include all investment-grade debt securities. In addition, at the end of July, the Federal Reserve introduced the TSLF Options Program (TOP), which offers primary dealers options to borrow Treasury securities; four auctions were conducted in the second half of 2008.

[32] The SLS, launched in April 2008, is a securities lending facility similar to the U.S. TSLF. The scheme aimed to improve the liquidity positions of the banking system and to restore the functioning of financial markets by allowing financial institutions to swap an overhang of RMBSs on their balance sheets for U.K. Treasury Bills.

bonds, and 30-year government bonds to the list of eligible JGBs for its repo operations. As explained in Chapter II. 1, liquidity shrank considerably in repo markets and the spread between GC repo and uncollateralized call rates expanded, making it difficult to finance illiquid floating-rate and inflation-indexed JGBs in repo markets. Such JGBs were included in the list of eligible collateral for the Bank's repo operations with the intention of improving repo markets' liquidity conditions, by alleviating funding costs at financial institutions.[33]

Furthermore, in view of the sharp tightening in the corporate financing environment, and in an effort to facilitate corporate financing, the Bank decided in mid-October 2008 to broaden the range of eligible ABCP as collateral, as a temporary measure until end-April 2009.[34] Regarding the treatment of corporate debt as eligible collateral, in December 2008, the Bank eased the criteria on credit ratings from A-rated or higher to BBB-rated or higher.[35] In addition, in order to enhance flexibility in funds-supplying operations collateralized by corporate debt, the Bank introduced a new operation, with the first auction to be implemented in January 2009. This new operation was set up with the intention of facilitating corporate financing in the run-up to the fiscal year-end, by offering an unlimited amount of funds against the value of corporate debt pledged as the standing pool of eligible collateral, at an interest rate equivalent to the target for the uncollateralized overnight call rate -- a favorable rate compared to the average rates at which financial institutions obtain funds in money markets.

Change in deposit and lending facilities

As a result of central banks' efforts to increase the amount of longer-term funds provided

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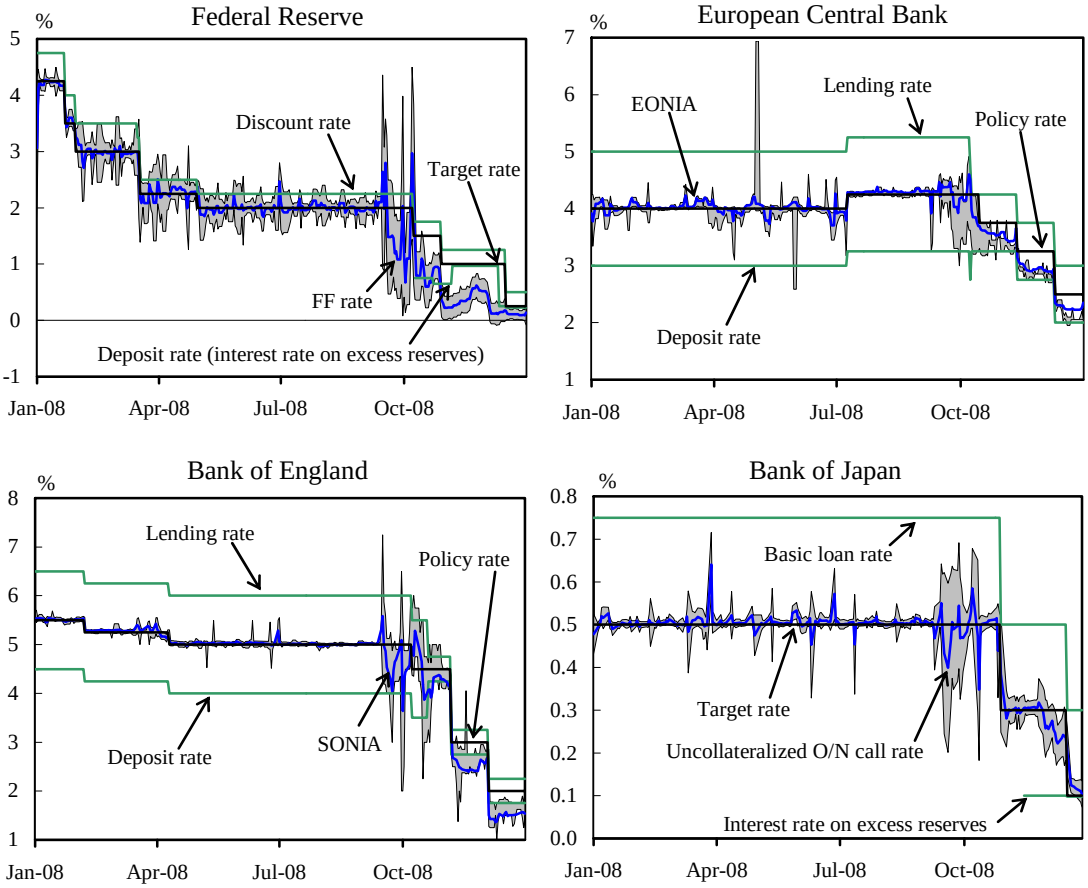
[33] The Bank also relaxed conditions for conducting its Security Lending Facility and lowered the minimum fee rates applied to the facility from 1 percent to 0.5 percent, as a temporary measure, with a view to increasing the availability of JGBs eligible for repo transactions and enhancing the market liquidity.

[34] As a basic rule, the Bank does not accept the debt obligations held or guaranteed by its counterparty financial institutions as collateral, as this would virtually signify provision by the Bank of uncollateralized credit. However, the Bank decided, as a temporary measure, to accept ABCP guaranteed by its counterparty financial institutions as collateral.

[35] Based on figures for eligible debtors, or those deemed by the Bank to have met the eligibility standards as issuers of corporate debt for its operations, the measure resulted in an increase in eligible collateral of about 450 billion yen in corporate bonds and 1.6 trillion yen in loans on deeds to companies as of the end of 2008.

through their operations, the supply of shorter-term funds exceeded market demand and this posed downward pressure on overnight rates (Chart III-2-4). In light of this situation, central banks changed deposit and lending facilities with a view to accomplishing smooth provision of funds while maintaining policy rates at the target level.

Chart III-2-4: Interest rate control



Note: Shadow indicates the range of the target rate plus/minus intraday one standard deviation for the Federal Reserve and Bank of Japan, and the range of high-low euro deposit rates for the European Central Bank and Bank of England.
Sources: Bloomberg; Federal Reserve; European Central Bank; Bank of England; Bank of Japan.

The Federal Reserve, in early October, announced that it would begin to pay interest on depository institutions' required and excess reserve balances.[36] Paying interest on excess balances should help to establish a lower bound on the FF rate, and would permit the Federal Reserve to provide the liquidity necessary to support financial stability while maintaining the

[36] The U.S. Treasury also introduced a Supplementary Financing Program in mid-September 2008. The Treasury bill auctions under the program are in effect expected to supplement the funds-absorbing functions of the Federal Reserve (Chart III-2-2).

FF rate close to the target.[37]

The ECB, in early October 2008, decided to reduce the corridor of the marginal lending facility and deposit facility from 200 basis points to 100 basis points around the interest rate on the main refinancing operation, to keep short-term rates close to the policy rate, as a temporary measure at least until January 2009.

The BOE replaced the existing Standing Lending Facility, which was rarely used because potential users feared reputational risk, with a new Operational Standing Lending Facility.[38] The principal aim of the new facility is not provision of liquidity insurance in the event of stress, but rate-setting and so absorbing essentially technical frictions in the overnight money markets.[39] The lending and deposit rates on the Operational Standing Facilities were set at plus/minus 25 basis points relative to the policy rate, while the rates on the existing Standing Facility were set at plus/minus 100 basis points.

The Bank of Japan endeavored to keep the uncollateralized overnight call rate at around the target level, by absorbing funds through flexible conduct of outright sales of bills while providing a large amount of funds almost daily. Moreover, at end-October 2008, the Bank decided to introduce a Complementary Deposit Facility, as a temporary measure effective from the November reserve maintenance period to the March 2009 reserve maintenance

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[37] Despite these intentions, the FF rate was often below the interest rate paid under the facility. The reasons for this include that (1) GSEs, which were not included in counterparties receiving interest payments on reserve balances, provided funds to the financial market at rates lower than the interest paid; and (2) arbitrage activities did not pick up because financial institutions faced strong balance sheets constraints, although, under normal market conditions, such arbitrage activities would be expected to arise, to gain on the differences in rates on funds procured from GSEs and reserve funds deposited with the Federal Reserve .

[38] The existing Standing Lending Facility became stigmatized after August 2007, when operational use was misinterpreted as a sign of financial difficulty. In order to remove the possibility of adverse commentary following any large use, the BOE amended its disclosure of the use of the Operational Standing Facility. Disclosure of daily use is not available, and only that of average use is made after the end of the relevant maintenance period.

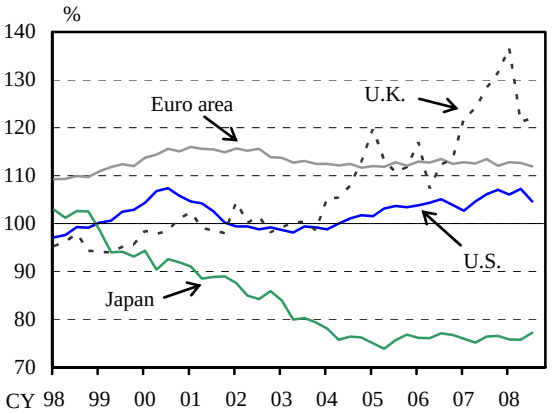
[39] On the other hand, the principal function of the Discount Window Facility, which was introduced along with the Operational Standing Facilities in October, is to provide liquidity insurance in the event of stress. Meanwhile, in early October, the BOE also introduced an operation to drain reserves by offering BOE sterling bills as part of its reserve management, on top of its overnight funds-absorbing operations (Chart III-2-2).

period, under which it pays interest on excess reserve balances.[40] Introduction of the facility in effect placed a lower limit on uncollateralized overnight call rate movements.

3. Guarantees on Bank Debt and Capital Injection

Aiming to underpin the effectiveness of monetary easing and ease financial institutions' funding liquidity constraints, central banks implemented various liquidity provision measures and substituted market functioning by acting as counterparties. In the United States and Europe, not only did the central banks provide more liquidity to interbank markets, but the governments also began to guarantee banks' debt, that is, bearing the counterparty risk involved, in order to support the market funding activities of banks. Banks in the United States and Europe have a high loan-to-deposit ratio (Chart III-3-1) and depend to a considerable degree on wholesale funding. In light of these factors, the U.S. and European governments implemented financial stability measures in the form of providing public guarantees on wholesale bank debt, so as to alleviate banks' funding liquidity constraints.

Chart III-3-1: Loan-to-deposit ratios



Note: Ratios of loans to deposits to and from home and abroad.
Inter-regional data for the euro area.
Sources: European Central Bank; Federal Reserve;
Office for National Statistics, U.K.; Bank of Japan.

[40] At end-October 2008, the basic loan rate applicable under the Complementary Lending Facility and the interest applied on the Complementary Deposit Facility were set at plus/minus 0.2 percent around the target for the uncollateralized overnight call rate, which was 0.3 percent. In mid-December, the Bank lowered its target for the uncollateralized overnight call rate by 0.2 percentage point, to around 0.1 percent. At the same meeting, the Bank lowered the basic loan rate applied to the Complementary Lending Facility by 0.2 percentage point, to 0.3 percent, while the interest rate applied to the Complementary Deposit Facility was unchanged, at 0.1 percent.

However, neither the liquidity provision measures by central banks nor the government guarantees on bank debt in themselves have the effect of comprehensively reducing counterparty risk, and do not immediately signify a recovery in the functioning of financial markets. Therefore, the U.S. and European governments implemented additional measures in the form of injection of public funds to financial institutions.[41] Injection of public funds provides some insurance to financial institutions against economic downturns and deterioration in the funding environment, and thus leads to lower default probabilities, in essence contributing to alleviating uncertainty regarding the asset values on financial institutions' balance sheets. In this way, capital injection is expected to contribute to improving the intermediary function of financial institutions via reducing counterparty risk in interbank markets, easing funding liquidity constraints, and lowering funding costs.

Government guarantees on bank debt

In the United States, as a temporary measure, the Federal Deposit Insurance Corporation (FDIC) announced a new program to guarantee newly issued senior unsecured debt of banks through special fees. The FDIC guaranteed a total of 83 issuances, with an overall worth of about 100 billion U.S. dollars, in November and December 2008. The governments of the United Kingdom, Germany, and France also decided, as a temporary measure, to guarantee financial institutions' debt issuance for refinancing.

In addition to the guarantees on banks' wholesale obligations, the U.S. and European governments expanded their guarantees on retail deposits, with the aim of stabilizing the banking system.[42] In the United States, as a temporary measure extending only until the end of 2009, the Emergency Economic Stabilization Act of 2008 raised the basic limit on federal deposit insurance coverage from 100 thousand U.S. dollars to 250 thousand U.S. dollars per depositor, and provided unlimited coverage for deposits held in non-interest bearing

[41] For a detailed explanation of the financial stability measures implemented in Japan and other countries, including guarantees on bank debt and capital injection, see the March 2009 *Financial System Report*.

[42] In the United States, guarantees were also introduced on MMFs, which had been considered safe assets alongside bank deposits. This measure was implemented to curb the market turmoil, because the failure of Lehman Brothers significantly affected the asset allocation decisions of MMFs, which play an important role in the U.S. money markets as lenders, in turn placing considerable stress on CP markets (Chapter I. 2, Box 2).

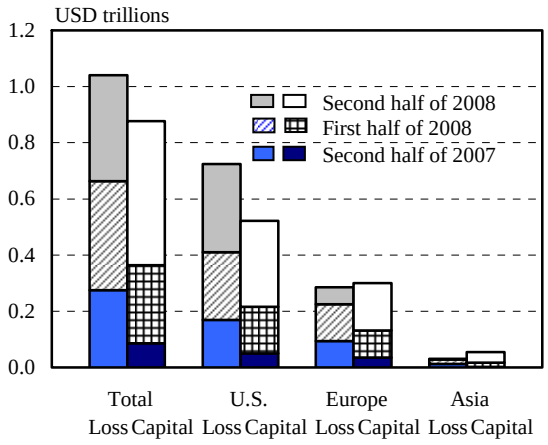
transaction accounts. The compensation limit for bank deposits was increased in the United Kingdom, and it was announced in Germany that the government would guarantee all personal bank deposits.

Capital injection

Financial institutions in the United States and Europe have sought to improve their capital base in order to offset the downward pressure on their capital ratios exerted by the expansion of their balance sheets, due to a reintermediation of risk, and by means of the increase in securitized product-related losses. However, following the failure of Lehman Brothers, financial institutions' business conditions deteriorated on a further decline in stock prices and a rise in the costs of raising capital. Thus, it became difficult for these financial institutions to raise further capital in order to calm fears about their solvency, and this prompted them to receive injections of public funds from their governments.

In the United States, under the Troubled Asset Relief Program (TARP), a total of more than 200 billion U.S. dollars from the 700 billion U.S. dollar financial rescue package were injected into over 200 institutions, including major banks, regional banks, and an insurance company, AIG. Nevertheless, it seems that the capital increases by U.S. financial institutions are still insufficient to cover the cumulative losses posted since the emergence of the subprime mortgage problem (Chart III-3-2).

Chart III-3-2: Financial institutions' capital injections



Note: As of January 26, 2009. U.S. data cover all countries in the Americas.
Source: Bloomberg.

In Europe, the United Kingdom, Germany, and France decided to inject up to 50 billion pounds sterling, 80 billion euros, and 40 billion euros, respectively, of public funds into financial institutions, and started these measures in the second half of 2008. As a result, the capital reinforcements at European financial institutions as of the end of 2008 were about the same amount as the cumulative losses posted since the second half of 2007.

In Japan, the amended Act on Special Measures for Strengthening Financial Functions was enacted in December 2008 with a view to enhancing financial institutions' intermediary function, as well as supporting regional economies and small and medium enterprises that faced the severe situation. Under the amended act, the quota for funds for capital injection was raised by 10 trillion yen from 2 trillion yen in the fiscal 2008 budget to 12 trillion yen.

4. Purchasing Assets in Markets Where the Functioning Deteriorated Significantly

The financial crisis caused not only financial institutions but also companies and households to become increasingly risk averse, as they faced rapid deterioration in funding conditions. This led to the weakening in the functioning of both interbank markets and capital markets where various economic agents participate. If the funding liquidity constraints and capital constraints on banks are alleviated through central banks' liquidity provision and governments' capital injection measures, the effects of monetary easing are expected to spread throughout the economy including nonfinancial sectors, and this will ultimately lead to improvements in the functioning of financial markets overall. However, it takes time for end-investors' risk appetite and funding conditions to recover. Thus, the longer it takes for the functioning of financial markets to be restored, the longer the deterioration in the real economy will continue, consequently producing a greater risk that the financial soundness of financial institutions would be negatively affected. With this in mind, in order to restore liquidity to financial markets where the functioning had deteriorated significantly, the central banks and governments of the United States and Japan implemented measures such as purchasing assets.

The situation in the United States

In the United States, considerable strains built up in the CP market after the failure of Lehman

Brothers, as MMFs that faced a wave of redemption requests from investors began to reduce their CP investments (Charts I-2-5 and I-2-6). In light of this situation, the Federal Reserve announced the creation of three facilities to purchase CP in September and October 2008. These were (1) the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF), through which non-recourse loans would be extended to U.S. depository institutions and bank holding companies to finance their purchases of ABCP from MMFs; (2) the Commercial Paper Funding Facility (CPFF), through which recourse loans would be extended to a special purpose vehicle (SPV) established by the Federal Reserve Bank of New York (FRBNY) to finance its purchase of unsecured and asset-backed CP from eligible issuers; and (3) the Money Market Investor Funding Facility (MMIFF), through which recourse loans would be extended to a series of SPVs established by the private sector to finance their purchase of certificates of deposit and CP from U.S. MMFs.[43] These initiatives were intended to improve liquidity and functioning in the CP market, and thereby enhance the ability of banks to accommodate the credit needs of companies and households.

In addition, in order to restore liquidity to the housing market and reduce mortgage rates, the Federal Reserve announced in November 2008 that it would initiate a program to purchase up to 600 billion U.S. dollars in agency bonds and MBSs. This followed the continued weakness in the market functioning of the U.S. mortgage market even after the U.S. Treasury placed two GSEs in conservatorship, established a Senior Preferred Stock Purchase Agreement with each GSE, and initiated investing in new agency MBSs in September 2008 (Charts I-1-11 and I-2-2).[44]

Furthermore, the Federal Reserve created a facility to enhance the functioning of the ABS markets and to restore liquidity to them. In the United States, the ABS markets had historically funded a substantial share of consumer credit and small business loans. However, new issuance of ABSs declined precipitously in September and came to a halt after October 2008, with interest rate spreads soaring in the secondary market (Charts I-3-6 and I-3-7). Continued disruption of those markets significantly limited the availability of credit to households and small businesses and thereby contributed to further weakening of the real

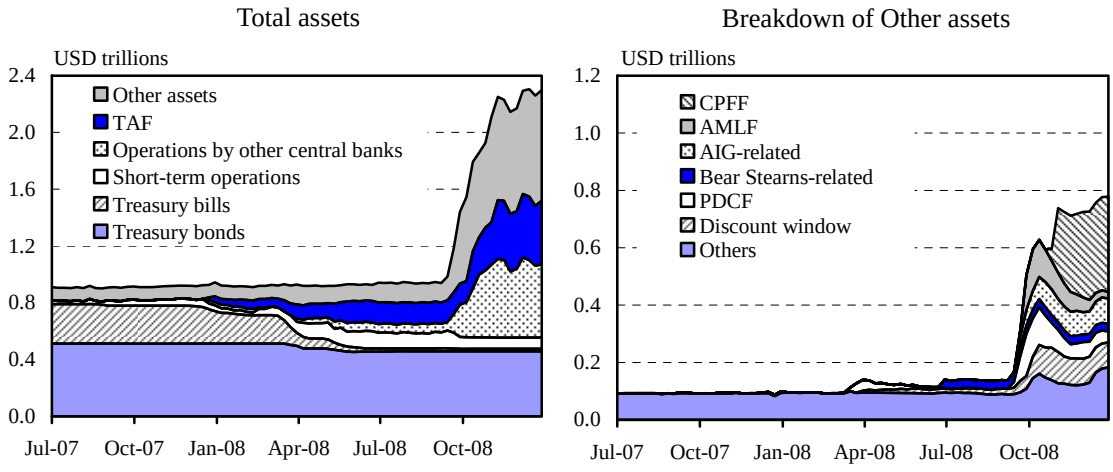
[43] For more on the role of MMFs in the U.S. CP market, see Box 2.

[44] The Treasury's temporary program to purchase will expire at the end of 2009. As of the end of 2008, the Treasury purchased an average of 20 to 25 billion U.S. dollars of new agency MBSs per month.

economy. To address this situation, the Federal Reserve announced the creation of the Term Asset-Backed Securities Loan Facility (TALF), a facility that would lend up to 200 billion U.S. dollars on a non-recourse basis to holders of certain ABSs, to commence in 2009. By alleviating the credit constraints faced by ABS holders, the facility aimed to encourage investors to purchase ABSs.

As a result of the series of measures taken, the Federal Reserve's balance sheet expanded to more than 2 trillion U.S. dollars, doubling in the second half of 2008 (Chart III-4-1).[45] In order to minimize credit risk exposure relating to balance sheet assets, the Federal Reserve added credit enhancements as necessary for the facilities they extended, and set certain conditions in these purchases so as to hedge the credit risk as much as possible. Moreover, in case losses should incur, the U.S. Treasury, under the TARP, will provide 20 billion U.S. dollars of credit protection in connection with the TALF.

Chart III-4-1: Federal Reserve's balance sheet



Sources: Federal Reserve, etc.

The situation in Japan

As with the United States, the CP market in Japan saw a significant deterioration in functioning (Box 4). This owed not only to the heightening of credit risk surrounding companies and other issuers against the backdrop of rapid weakening in the economic outlook, but also to the more cautious purchasing stance of end-investors, reflecting the decline in their

[45] In Chart III-4-1, purchases of agency bonds are categorized under "others" in the breakdown of "Other assets."

risk appetites. For example, investment trusts shifted their funds from the CP market to the more liquid FB/TB and call markets. Insurance companies also became more cautious about investing in risk assets, as stock prices declined notably after October 2008.[46]

Under these circumstances, the Development Bank of Japan (DBJ), in accordance with government policies, initiated its temporary CP purchasing operations.[47] The Bank of Japan also decided to begin outright purchases of CP as a temporary measure, with the aim of facilitating corporate financing.[48] In implementing these CP purchases, the Bank of Japan adopted an appropriate scheme such as competitive auctions among financial institutions in order to prevent such purchases from functioning as arbitrary funds allocation among individual firms. The Bank also decided to conduct purchases only for a term required, and set a minimum yield on the auctions, so as to reduce financial institutions' incentive to sell CP to the Bank as the market turns to recover its functioning. In addition, with a view to ensuring the Bank's financial health, certain conditions were set on CP to be purchased in terms of the creditworthiness and residual maturities, as well as a limit on the outstanding amount of total CP purchased and of a single issuer's CP purchased.

5. Effects of Policy Measures and Further Issues

Further instability of global financial markets was contained for a period of time, against the background that central banks in major economies provided liquidity aggressively, and governments made large amounts of fiscal commitments through capital injection and guarantees on bank debt. Conditions in money markets improved somewhat in many

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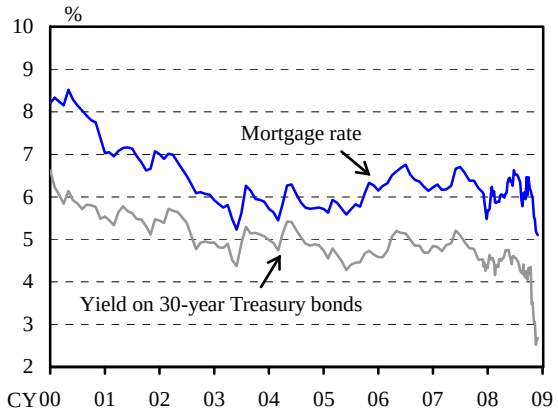
[46] As explained in Box 2, looking at the breakdown of investors in the CP market in Japan, investment trusts hold a share of around 20 percent and insurance companies hold about a 10 percent share.

[47] In the second supplementary budget of fiscal 2008, and in the fiscal 2009 budget, the Japanese government allowed the Japan Finance Corporation to provide, under the crisis response operations, up to 2 trillion yen for the DBJ to purchase CP. Subsequently, the DBJ began its CP purchasing as its normal operations in late December 2008. The amount purchased in 2008 is estimated at about 100 billion yen.

[48] In addition, in January 2009, the chairman of the Policy Board of Bank of Japan instructed to investigate ways to implement outright purchases of corporate bonds with a residual maturity of up to one year, with the purpose of enhancing the conditions in the corporate bond market, where the decline in market functioning led to tight corporate financing conditions on the whole. The Bank of Japan established the basic principles regarding the outright purchases of corporate financing instruments to facilitate corporate financing, and released "Outright Purchases of Corporate Financing Instruments" in January 2009.

economies, as illustrated by the decline in LIBOR-OIS spreads through the end of 2008 (Chart I-2-7). In the United States, the CP market began to stabilize to some extent in mid-October 2008, following the CP purchases under the CPFF (Charts I-2-5 and I-2-6). Furthermore, the Federal Reserve's announcement that it would purchase agency MBSs and bonds led to a significant decline in spreads of MBS rates over Treasury yields (Chart I-2-2). As a result, with a drop in Treasury yields, mortgage rates declined by about 1 percentage point (Chart III-5-1).

Chart III-5-1: U.S. mortgage rate (30-year)



Sources: Bloomberg; Freddie Mac.

However, despite the decline in the LIBOR-OIS spreads, strains in the interbank markets remained virtually unchanged, as evidenced by the three-month U.S. dollar spreads staying at high levels of over 1 percent as of the end of 2008 (Chart I-2-7). Moreover, in major economies, spreads for corporate bond and other credit markets continued to be wide through the second half of 2008, with no signs of fundamental improvements (Chart II-4-2), the liquidity in government bond markets did not recover, and volatility in stock prices and FX rates remained high (Charts I-3-1 and II-5-3). These developments suggest that tensions in global financial markets still remained at a heightened level. In addition, uncertainty concerning the depth and span of the global recession remained very high, as further downward revisions had been made in the outlook for the global economy.

As described above, there had been little progress in terms of a recovery in financial market functioning, despite various policy measures implemented in and across many countries. This is mainly because, as noted in Chapter I, the "financial imbalances" accumulated in the credit boom preceding the current financial crisis were considerable in size,

and thereby widened the extent of necessary adjustments. In addition, many U.S. and European financial institutions' funding structures remained weak, and thus adjustments to reduce financial imbalances bore large costs and generated severe difficulties for these financial institutions as liquidity risk and counterparty risk began to emerge. This also contributed to a delay in any improvement in the financial environment.

Although adjustments to reduce financial imbalances are essential to normalizing economic conditions, downward pressures tend to be exerted on economic activity in the adjustment phase. For example, financial institutions that increased their leverage come under inevitable pressure to decrease the size of their balance sheets, leading to more stringent lending policies toward companies and households. Additionally, in order to avoid further exposure to liquidity risk, financial institutions try to raise the share of liquid asset holdings while selling illiquid assets, which causes a further increase in liquidity risk premium, thereby leading to deterioration in the funding environment for companies and households.

It is important to underpin the funding environment for the nonfinancial sector, in order to facilitate the progress of the adjustment process while averting protracted and substantial deterioration in the real economy. Therefore, public authorities need to alleviate burdens on the nonfinancial sector, while stabilizing the financial system by implementing appropriate policies including liquidity provision, guarantees on debt, and capital injection. Public authorities in major economies took policy actions with full consideration of the aforementioned points, but their measures did not immediately resolve financial imbalances, and thus uncertainty over the outlook for economic activity remained high. Many countries continued to face downside risk stemming from the adverse feedback loop between the financial sector and the real economy. There remained a concern that the shock-absorbing mechanisms available in the current financial system and policy frameworks might not be sufficient to buffer the materialization of imminent risks, and this was one factor that hampered the lifting of uncertainty over the economic outlook.

On a global basis, the cumulative amount of capital reinforcements at financial institutions, including public fund injections from summer 2007 -- when the financial turmoil emerged -- was not enough to cover their cumulative losses in the same period (Chart III-3-2). The extent of losses and capital inadequacy at financial institutions tends to be aggravated by the adverse feedback loop between the financial sector and the real economy. Therefore, the

amount that would be necessary to address the loss and capital inadequacy issues would remain uncertain, and there is a possibility that the current capital base at financial institutions would be insufficient to address further deterioration in the real economy and funding environment.

Furthermore, the effects of rate cuts by central banks had not sufficiently permeated these countries' economies because the efficiency of monetary policy transmission had decreased (Box 9). For example, as mentioned earlier, ABS spreads widened and consumer loan rates did not decline materially in the United States, notwithstanding the significant rate cuts by the Federal Reserve. In addition, the decline in asset prices, such as housing prices, reduced the ability of companies and households to honor their debt obligations and lowered the availability of credit, which also eroded the effectiveness of monetary easing. The decline in the effectiveness of the conventional channel of monetary policy, such as interest rate and credit channels, was one of the key motives that prompted some central banks to implement unconventional policy measures including purchasing assets in markets where the functioning had deteriorated, thereby directly supporting specific credit markets.[49] Meanwhile, market participants increasingly expected further fiscal support by governments, so as to reduce uncertainty over the macroeconomic outlook and strengthen financial and economic conditions. However, at the same time, it should be noted that new sources of uncertainty might have arisen in connection with the deterioration in governments' fiscal conditions associated with the transfer of risk to the public sector, as evidenced by the widening of sovereign CDS premiums (Chart III-5-2).

In sum, efforts to address the severe strains in the economy call for a number of measures by the public authorities and other parties involved. Determining the most appropriate policy measures requires careful assessment of financial and economic conditions, with due consideration to the issues described in this report.

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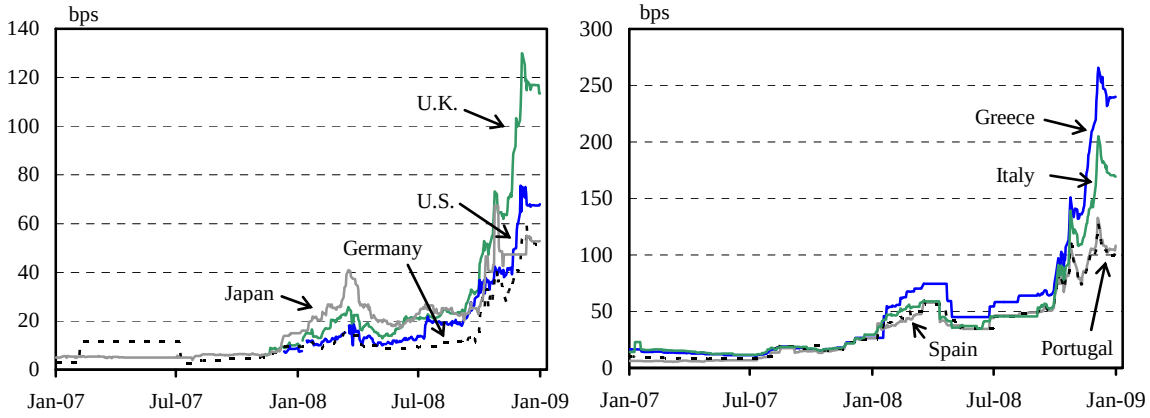
[49] At the Federal Open Market Committee meeting in December 2008, members discussed how best to employ the Federal Reserve's balance sheet to promote monetary policy goals, and agreed that a continued focus on the quantity and the composition of Federal Reserve assets would be necessary and desirable. Meanwhile, in January 2009, the BOE set up the Asset Purchase Facility, which purchases high-quality private-sector assets through a specially created fund, to increase the availability of corporate credit.

Chart III-5-2: Sovereign CDS premiums



Note: 10-year maturity.
Source: Bloomberg.

Box 9: Monetary Policy Transmission -- Efficiency and Uncertainty

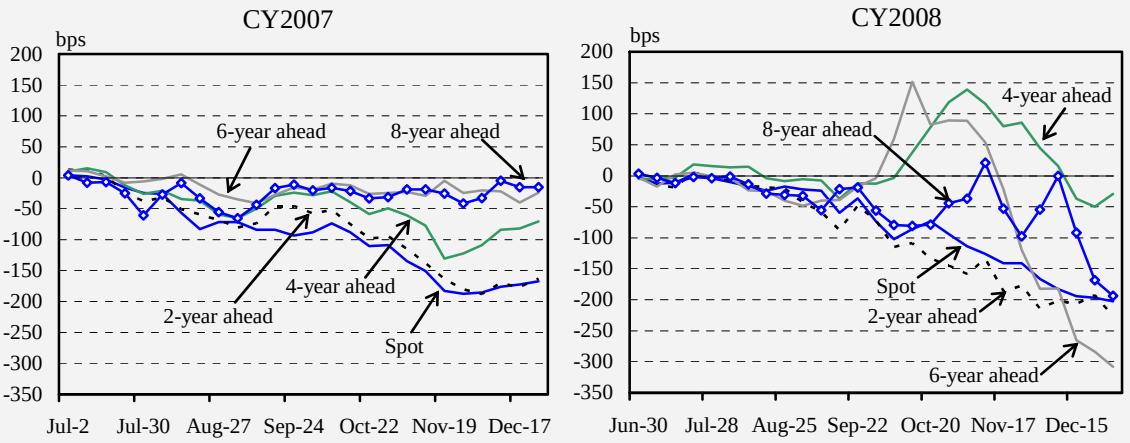
If monetary policy is transmitted efficiently via financial markets to the real economy, the economy converges relatively fast to its steady state even when a strong shock affects the economy materially, as the effect of policy rate changes permeates economic activity and alleviates the influences of the shock. For example, the output gap and inflation rate return to the levels seen before the shock, and hence the policy rate is also expected to revert to the original level when the economy returns to the steady state in the long run. This is because the steady-state interest rate does not change so long as the central bank's target rate of inflation and equilibrium real interest rate remain the same. Therefore, a policy rate change in response to a shock is expected to translate into a shift in the shorter end of the forward interest rate but have no significant reverberations at the medium to longer end.

On the other hand, when the transmission mechanism is not efficient -- for example, when monetary policy becomes ineffective due to deterioration in the financial intermediary functions or contractions in financial market liquidity -- restoring economic stability becomes difficult and movements in the medium- to longer-end forward interest rates are likely to become unstable.

Looking at developments in the one-year forward interest rates in the United States (cumulative changes of *n*-year-ahead one-year forward rates), we find that forward interest

rates at the medium to longer end seem to have been stable in the second half of 2007, when policy rates were being reduced, suggesting that the transmission of monetary policy had been efficient (Box 9 Chart). However, in the second half of 2008, when policy rates were again being reduced, large fluctuations were noted in forward interest rates at the medium to longer end, suggesting that the efficiency of monetary policy transmission had eroded. Some factors that might have influenced this include the following: (1) when liquidity in the Treasury market is low, arbitrage activities among market participants become inactive (Box 5) and the interest rates do not change as central banks intended; and (2) when the financial intermediary functions of banks deteriorate, the effects of rate cuts are less likely to spread to the real economy. The forward interest rates at the longer end, such as six- and eight-year-ahead forward rates, declined considerably toward the end of 2008, and this could be interpreted as a sign that market participants expected the sluggishness in the economy to prevail for some time. Alternatively, it could simply indicate that the Treasury market sent an incorrect signal under the low market liquidity.[50] In either case, it could be concluded that uncertainty over the effectiveness of monetary policy had increased.

Box 9 Chart: 1-year forward interest rates in the United States



Note: Weekly accumulated changes in forward interest rates.
Source: Bloomberg.

[50] It might also be possible that market participants looked for the central bank to lower its target rate of inflation or expect a lower potential growth rate (and hence, a lower equilibrium real interest rate).

IV. Issues Regarding the Functioning of Financial Markets and the Bank of Japan's Actions in 2008

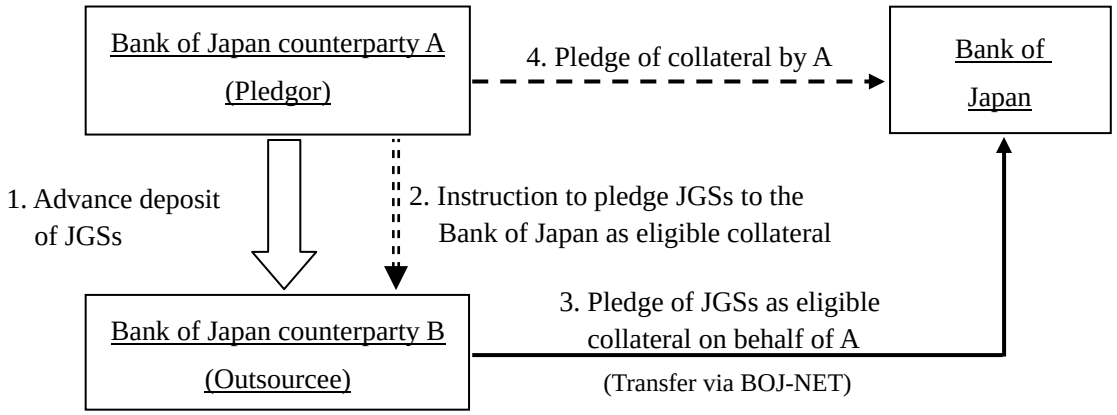
With a view to supporting improvement in the functioning and efficiency of financial markets in Japan, the Bank addressed the following major issues concerning the market infrastructure in 2008.

1. Money Markets

Measures taken by the Bank to improve the functioning of money markets

In December 2008, the Bank enabled financial institutions to outsource transfers of Japanese government securities (JGSs) pledged to/returned from the Bank as eligible collateral, thereby contributing to an increase in efficiency of the transactions in repo markets (Chart IV-1-1). This is one of the Bank's measures to support and promote improvement in the functioning of the markets after March 2006, focusing mainly on practical matters.

Chart IV-1-1: Outsourcing of the pledge of collateral



In addition, the Bank is engaged in ongoing discussions with the Japan Securities Depository Center (JASDEC) and market participants to improve the statistics of interest rates on newly issued CP. The revised statistics are likely to be released starting in autumn 2009, further facilitating the availability and quality of information on money markets (Chart IV-1-2).

Chart IV-1-2: Revision of CP rate statistics

		After revision	Present
Source		JASDEC	Bank of Japan
Frequency of release		Daily (release of weekly and monthly data is under discussion)	Monthly
Contents		All CP issues on that day	Issues underwritten by the counterparties of BOJ's CP repurchase operation
Average rates		Weighted average	Simple average
Number of categories			
	Maturities	Six (Up to 1W, 2W, 1M, 2M, 3M, and over 3M)	Three (2W, 1M, and 3M)
	Sectors	Seven (Financial institutions, other financial companies, electricity/gas, business companies [except other financial companies and electricity/gas], total of business companies, SPC, and others)	One (Total of business companies)
	Ratings	Three (Equivalent to a-1+, a-1, and a-2 or lower)	One (Equivalent to a-1 or higher)
Source of release		JASDEC's web site	BOJ's web site

Developments and issues regarding money markets

The Bank carried out the Tokyo Money Market Survey in order to identify the challenges and developments related to the functioning of the money markets after March 2006. A total of 172 money market participants, including 155 open markets operations counterparties of the Bank, responded during August and early September 2008. The survey included a comprehensive study of trends in money market transactions and changes in market participants' activities given the increasing uncertainties surrounding the U.S. subprime mortgage problem. It also examined the progress made in terms of challenges regarding repo transactions and Yen-OIS transactions.

In the wake of Lehman Brothers' filing for civil rehabilitation proceedings on September 16 in Japan, the Bank interviewed major market participants and conducted an additional survey for fail transactions in JGS and repo markets. The Bank published a report that includes data from the Tokyo Money Market Survey, as well as the findings from the interviews regarding the impact of the failure of Lehman Brothers on the functioning of

money markets, particularly on repo markets, which were most heavily affected.[51]

While coping with the market turmoil after the failure, market participants had become well aware of problems regarding repo markets and called for the following: (1) establishing and modifying fail guidelines; (2) improving the function of the Japan Government Bond Clearing Corporation (JGBCC), and increasing participants in the JGBCC; and (3) enhancing risk management, such as shortening the settlement period. These are matters to be discussed and resolved by all related parties in the money markets. The Bank considers it vital to achieve efficiency in the collateralized cash market in order to strengthen the robustness of the money markets in case of emergency. The Bank will continue to hold discussions with market participants and support private-sector initiatives related to improving market practices and infrastructure.

2. Measures Taken by Market Participants in Securitization Markets

As the subprime mortgage problem intensified, regulators represented by the Financial Stability Forum (FSF) and the International Organization of Securities Commissions (IOSCO), and market participants such as the Institute of International Finance (IIF) and the Counterparty Risk Management Policy Group (CRMPG), started to discuss and consider measures to address the following challenges of securitization markets: (1) improving investors' risk management; (2) conducting proper accounting of securitized products; (3) introducing stricter regulation and supervision of credit rating agencies; and (4) enhancing the transparency of the markets.

Securitized products in Japanese markets remained relatively simple, and their risks have been identified rather easily. However, as a preventative measure, the Working Group on Distributions of Securitized Products, under the Japan Securities Dealers Association (JSDA) and formed of major market participants, held discussions to fix the self-regulatory rule about enhancing the transparency of transactions of securitized products by ensuring traceability to the underlying assets.[52]

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[51] For details, see "Developments and Issues of Money Markets in Japan: The Tokyo Money Market Survey in August 2008 and the Impact of the Failure of Lehman Brothers" (available only in Japanese).

[52] The Financial Services Agency of Japan provided new supervisory checkpoints to ensure the traceability

Under the new rule, distributors of securitized products are required to ensure internal procedures and regulations, and to give their customers relevant information on the nature and risk of the underlying assets. Moreover, the working group developed standardized information reporting packages (SIRPs) to provide a common platform for individual items that would be necessary to disclose for major securitized products. The new rule is scheduled to become effective after the public consultation. It is likely that reviews will be conducted from time to time concerning disclosure and evaluation of risks that securitized products imply. The new rule is intended to support improvement in the functioning of securitization markets in Japan.[53]

Box 10: Recent Developments in Over-the-Counter Derivatives

Over-the-counter (OTC) derivatives markets have expanded rapidly in recent years.[54] Market participants and regulators in the United States and Europe had made progress in this area since summer 2005, including the implementation of new market practices and development of new market infrastructure. Namely, in the CDS market, major market participants and the FRBNY conducted joint efforts to improve the markets with following items: (1) improvement in market practices such as prompt post trade confirmation and the prohibition of a novation without consent of the counterparty; (2) development of market infrastructure such as electronic processing, electric confirmation, a trade repository, and automated settlement; (3) introduction of trade compression; (4) compilation and publication of statistics; and (5) the commitment of regulators and prudential supervisors to mitigate the

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of securitized products in the "Guidelines for Financial Instruments Business Supervision." The working group conducted a detailed study on establishing a self-regulatory rule for distributors of securitized products to comply with the checkpoints. The Bank participated in this study as an observer.

[53] The SIRPs cover RMBSs, ABSs, CLOs, and CMBSs, which are debt types of primary securitized products. The SIRPs for RMBSs, ABSs, and CLOs are adjusted based on the model format of the Bank's Workshop on Securitization. The SIRP for CMBSs is based on the Investor Reporting Package of the Japan Office of the Commercial Mortgage Securities Association.

[54] In July 2005, the report "Toward Greater Financial Stability: A Private Sector Perspective" by CRMPG II, a group consisting of the risk management managers of European and U.S. financial institutions, highlighted issues regarding OTC derivatives trades, such as confirmation backlog and a lack of transparency in the market.

systemic risk in OTC derivatives trades. Future developments in market practices and infrastructure will likely follow in line with such progress.

As the subprime mortgage woes deepened further and the soundness of U.S. and European financial institutions came into question, concerns over counterparty risk intensified in the OTC derivatives markets including the CDS market. An insurance company that was a major player in the CDS market suffered a considerable loss, and its credit condition worsened. As a result, concerns arose over the financial loss of large financial institutions, which were counterparties of the insurance company in CDS transactions, and these concerns impacted the stability of the financial system. Furthermore, as a consequence of bailouts and the default of investment banks, which were major participants in OTC derivatives, other market participants became well aware that counterparty risk must be reduced urgently, and this accelerated efforts to improve risk management for OTC derivatives.[55] In November 2008, the U.S. President's Working Group on Financial Markets (PWG) noted that successful implementation of a central counterparty (CCP) for CDSs was the top priority for the near term.[56] In addition, the G-20 Summit on Financial Markets and the World Economy adopted a declaration calling for improving the transparency and reviewing the infrastructure of the OTC derivatives market.

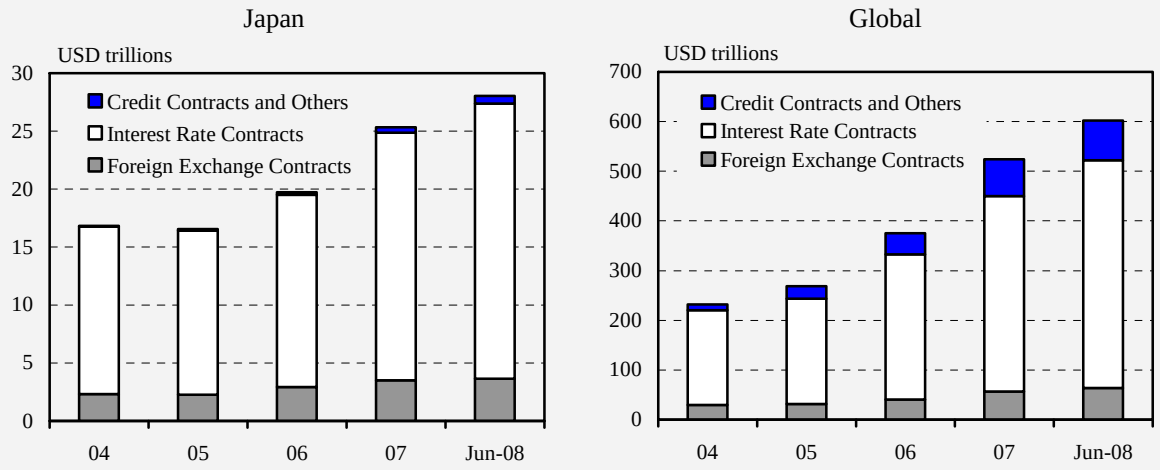
The OTC derivatives market in Japan, although smaller than the markets in the United States and Europe, began to grow rapidly. Market participants set up working groups to discuss the needs for a CCP and other measures to improve the infrastructure. From the viewpoint of developing a safe and sound OTC derivatives market, it is essential not only to have such discussions but also to progress in line with overseas OTC derivatives markets. The

[55] In terms of interest rate swaps and derivatives, LCH.Clearnet, which is the clearing house of securities, derivatives, and commodities, began operating as a CCP. LCH.Clearnet dealt with the default of Lehman Brothers in orderly fashion and settled its derivatives positions. This confirmed that a properly designed CCP could be effective in dealing with the default of OTC derivatives trades.

[56] After the report by the PWG, the establishment of a CCP for CDSs has moved forward. On December 22, 2008, Liffe, a U.K. subsidiary of NYSE Euronext, and LCH.Clearnet announced that they had launched a clearing service for European CDS index contracts. On December 23, 2008, the Securities and Exchange Commission (SEC) announced that it had allowed LCH.Clearnet to temporarily operate as a CCP for CDSs in the United States. Additionally, on the same day, the Chicago Mercantile Exchange (CME) announced that the FRBNY and Commodity and Futures Trading Commission had determined that the CME met regulatory requirements to clear CDSs (the CME is awaiting approval from the SEC).

Bank, for its part, aims to support the market participants' initiatives.

Box 10 Chart: Amounts outstanding of the OTC derivatives market



Notes: 1. Notional amounts.
2. Data for Japan are not adjusted for inter-dealer double counting.
Sources: Bank of Japan; Bank for International Settlements.

3. Enhancement of the Business Continuity Plan (BCP) in Financial Markets

At the time of an earthquake or terrorist attacks, the operational ability of each market participant would be undermined and thus market transactions and settlements would tend to be restrained. However, market participants still might need to make payments and settlements for existing transactions, as well as execute transactions such as funding and position closing even when a disaster strikes. A contagious situation when each market participant remains unable to execute minimal transactions over an extended period of time potentially could impair the stability of and confidence in the financial markets, which in turn could have a negative impact on the price-formation mechanism. Therefore, not only is the BCP in the interest of each market participant, it also helps stabilize financial markets and the economy as a whole.

In order to maintain the functioning of the markets, it is important to enhance the BCP in financial markets by (1) ensuring the transmission and sharing of information in the event of a disaster, (2) preparing and putting into place contingency procedures, and (3) conducting

market-wide exercises to assess the effectiveness of these arrangements. The Bank, in addition to improving its own BCP arrangements, continued to place great emphasis on the strengthening of the BCP in financial markets by exchanging views with market participants and making efforts to put necessary arrangements into place.

Chart IV-3-1: Market-wide BCP arrangements

	Money markets	FX markets	Securities markets
Secretariat	- Japanese Bankers Association (JBA)	- Tokyo Foreign Exchange Market Committee (TFEMC)	- Japan Securities Dealers Association (JSDA)
Participants/users of the BCP-designated web site	- Approximately 180 institutions - Banks, *shinkin* banks, securities companies, *tanshi*, insurance companies, investment trust management companies, securities finance companies, and others - Organization for Management of Domestic Fund Transfers, Tokyo Bankers Association (TBA), CLS Bank International, Association of Call Loan and Discount Co., JASDEC, JGBCC, Japan Securities Clearing Corporation (JSCC), Tokyo Stock Exchange (TSE), and Tokyo Financial Exchange (TFX) - Financial Services Agency (FSA) and the Bank	- Approximately 25 institutions (the number of participants is planned to increase). - Banks and other financial institutions - TBA, CLS Bank International, and TFX - Ministry of Finance (MOF), FSA, and the Bank	- Approximately 360 institutions (the number of participants is planned to increase). - Securities exchanges, such as TSE and OSE, JASDEC, JASDEC DVP Clearing Corporation, JGBCC, and JSCC - FSA and the Bank
Launch of the site	- April 2006	- January 2008	- April 2008

In 2008, significant progress was made in the BCP for money markets (call markets), FX markets, and securities markets. With regard to ensuring the transmission and sharing of information, the BCP-designated web sites[57] for FX markets and securities markets were launched in January and April, respectively, following the launch of the web site for money markets in April 2006 (Chart IV-3-1).

[57] The BCP-designated web sites are secured by a user ID and password and can be accessed only by authorized users to upload and view information related to the BCP. In case of a disaster, each market participant reports its operational status, for example, whether it can execute and settle transactions and whether it is operating at its primary or backup site, and users of the web sites can mutually confirm such information. The web sites also enable discussion of issues by using an online bulletin board system. Whereas communications such as telephones may not function well during a disaster, these web sites and corresponding e-mail system provide a considerable advantage.

Chart IV-3-2: Participants in the command center and modifications to transaction practices by market

	Money markets	FX markets	Securities markets
Participants in the command center	- Nine members from major banks, regional banks, trust banks, securities companies, *tanshi*, and central financing organizations for financial cooperatives - FSA and the Bank may participate in the discussion among members of the command center regarding such issues as modifications to transaction practices.	- Eight major members (chairperson, vice chairpersons, secretary of the TFEMC, and chairpersons of the subcommittees) - MOF and FSA may participate in the discussion among members of the command center regarding such issues as modifications to transaction practices.	- 19 members from major securities companies, banks, TSE, OSE, Jasdaq Securities Exchange, JASDEC, JGBCC, JSCC, as well as representatives of the command center of bond markets, FSA, and the Bank - The command center of bond markets is organized by 16 members from major securities companies, banks, TSE, JASDEC, JGBCC, and the Bank. - With regard to stock markets, each securities exchange, JSCC, JASDEC, the Bank, and fund settlement banks take necessary coordination and each of them exercises its BCP.
Modifications to transaction practices	- Modify trading hours. - Extend settlement hours. - Manage fund settlements flexibly. - Postpone settlement dates.	(Settlement) - Extend settlement hours or postpone settlement dates of transactions processed through the Foreign Exchange Yen Clearing System or the CLS system. (Trade) - Restrain yen trading and electronic trading of all currencies. (Confirmation) - Confirm promptly the terms of the trades agreed earlier in the day with counterparties in Japan.	(Bond markets, including repo markets) - Modify trading hours. - Modify settlement hours. - Postpone settlement dates. (Stock markets) - At TSE, suspend trading if over 20 percent of trading amounts is unable to trade.

Preparation of the contingency procedures[58] also progressed in each market. In securities markets, measures to modify transaction practices including trading hours and settlement hours were identified and the command center, which plays a central role in decision making, was established (Chart IV-3-2). In money markets, contingency procedures were improved. Major improvements included providing a more detailed breakdown of the classification relating to the extent of damage caused by a disaster and adding a new measure to modify transaction practices.

[58] The basic contingency procedures in case of a disaster consist of three steps: (1) deciding whether to activate the BCP; (2) sharing information on the damage caused by the disaster; and (3) modifying transaction practices including trading hours and settlement hours.

Enhancement of the BCP in financial markets made it possible to test the effectiveness of the arrangements through market-wide exercises. In 2008, the third and fourth exercises in money markets were conducted in February and December, and the first exercises in FX markets and securities markets were conducted in July and October, respectively. The exercises in money markets were conducted in a more practical manner: (1) requiring each participant to estimate its own operating status in a given disaster; and (2) assuming disaster scenarios such as floods and early-morning earthquakes. On the other hand, the first market-wide exercises in FX markets and securities markets focused on familiarizing users with the BCP-designated web sites and confirming the contingency procedures (Chart IV-3-3). In addition to improving practical exercises in each market, it is desirable to promote close cooperation between the markets in order to strengthen the resilience of financial markets as a whole in response to a disaster.

Chart IV-3-3: Major events relating to market-wide BCP during 2008

Money markets	FX markets	Securities markets
Feb.: The third exercise (assuming a flood)	Jan.: Launch of the BCP-designated web site	Mar.: Setup of the command center and identification of the contingency procedures
	Jul.: The first exercise (assuming an earthquake in Tokyo during the daytime)	Apr.: Launch of the BCP-designated web site
Oct.: Launch of the web site for a drill of the BCP	Sep.: Addition of the explanation of the BCP to the Code of Conduct	Oct.: The first exercise (assuming an earthquake in Tokyo during the daytime)
Dec.: The fourth exercise (assuming an earthquake in the early morning)		

Setting up the BCP to handle a pandemic influenza outbreak[59] is an issue that needs to be addressed. The Japanese government continued to promote measures aimed at responding to a pandemic influenza outbreak, and the private sector, including the JBA, JSDA, and

[59] Pandemic influenza is caused by infection from any influenza virus that has become capable of infecting humans and transmitted efficiently between them, as a result of mutation from an animal (particularly avian) influenza virus. The virus remains something of an enigma, and very few people are immune to it. The possibility of a rapid and massive outbreak cannot be discounted.

individual financial institutions, started to consider the relevant and required BCP arrangements in such an eventuality. Thus, in considering future BCP arrangements in financial markets, coverage needs to include both traditional types of disasters such as earthquakes and pandemic influenza outbreaks.

In order to strengthen the resilience of the financial markets, the Bank will continue not only to enhance its own BCP arrangements but also to support initiatives by related parties to improve their arrangements.