BOJ Reports & Research Papers

Financial Markets Report

—— Developments during the Second Half of 2007 ——

Bank of Japan
Financial Markets Department

March 2008

- This is a translation of the Japanese version published on January 31, 2008.
- This report covers the market developments during the second half of 2007, unless otherwise stated.
- In the charts, the shadowed portion represents the period from July to December 2007.

Contents

Executive Summary

Global financial markets in the second half of 2007 experienced large swings due to the turmoil triggered by the U.S. subprime mortgage problem. In securitization markets, which had been rapidly expanding, investors began to reassess risks, and credit spreads widened reflecting downgrades of securitized products caused by the increase in delinquency rates on subprime mortgages. In addition, stock prices in global markets dropped in summer 2007, largely due to position adjustments accompanying investors' risk reduction. In September, when concerns about a deterioration in the U.S. economic conditions faded in response to the Federal Reserve's policy rate cut, stock prices rebounded temporarily, but then followed a downward trend against the background of uncertainty about the financial conditions of major U.S. and European financial institutions and renewed concerns about a slowdown in the U.S. economy. Reflecting expectations of the slowdown in economic growth and a flight to quality during the market turmoil, long-term government bond yields declined with fluctuations. In foreign exchange markets, volatility increased sharply, leading to a large-scale unwinding of carry trades which used leverage to exploit interest rate differentials in an environment of low financial market volatility. As a result, high-yielding currencies depreciated and low-yielding currencies, including the yen, appreciated. The U.S. dollar was on a depreciating trend reflecting the increasing uncertainty about the financial and economic developments in the U.S. In money markets, funding needs mounted and short-term interbank rates came under upward pressure because of heightened concerns about counterparty credit and liquidity risks.

I. Developments in Financial Markets in the Second Half of 2007

Financial markets in Japan experienced swings caused by developments in global financial markets, but the extent of the swings varied depending on the market concerned. In Japan's stock market, stock prices trended downward, and the extent of the decline was even greater than that in U.S. and European stock prices, which were directly hit by subprime woes. The sharp decline was mainly due to the fact that market participants became cautious about the Japanese economy against the background of the yen appreciation and the decrease in housing investment caused by the enforcement of the revised Building Standard Law. Japanese long-term government bond yields declined reflecting the fall in the U.S. and

European long-term yields and the cautious outlook for the Japanese economy. On the other hand, in Japan's credit markets, spreads widened from the summer, but on the whole the extent of the widening was limited compared with that in the U.S. and European credit markets. This was mainly because Japanese financial institutions, whose risk exposure to U.S. and European securitization markets was relatively small, maintained accommodative lending attitudes as firms' creditworthiness and financial fundamentals continued to be favorable. In Japan's money markets, the effects of the tightening of credit conditions in the U.S. and Europe became evident and rates on term instruments with maturities beyond the year-end, for example, came under upward pressure, but fluctuations in these short-term rates were small compared with those in U.S. and European markets.

II. The Subprime Mortgage Problem and Turmoil in Global Financial Markets

There are several reasons why the rise in delinquency rates on U.S. subprime mortgages, which comprise merely a small portion of underlying assets of various securitized products, affected global financial markets substantially. First, unexpected losses on subprime-related securitized products raised strong concerns about the most important functioning of financial markets, i.e., about whether risks had been properly priced under the originate-and-distribute model of financial intermediation. Since the credit risks of various underlying assets were spread among a wide group of investors in the originate-and-distribute model, investors started to reassess risks of securitized products overall. Second, the increase in mark-to-market losses on securitized products caused many investors to want to sell but few to buy, leading to a mutually reinforcing deterioration in market and funding liquidity. The deterioration in liquidity decreased the risk appetite of investors further and affected credit markets overall as well as stock markets. Third, the disruption in securitization markets forced banks to face a reintermediation of risks which they had seemingly transferred off their balance sheets. U.S. and European banks experiencing an involuntary expansion of balance sheets were then confronted with a rise in funding costs, reflecting heightened concerns about counterparty risk in money markets. Finally, concerns mounted that the tightening of bank lending might adversely affect the macroeconomy, raising uncertainty about the outlook for the U.S. economy and leading to an increase in the volatility of asset prices and a further deterioration in market liquidity.

The significant deterioration in market liquidity has made it difficult for investors to reevaluate financial assets adequately. Adjustments in securitization markets and credit markets overall have intensified further. Therefore, developments in global financial markets and their effect on the global economy warrant careful attention.

III. Issues Regarding the Functioning of Financial Markets and the Bank of Japan's Actions in 2007

With a view to supporting the improvement in both the functioning and the efficiency of financial markets in Japan, the Bank addressed the following two major issues concerning the market infrastructure in 2007: (1) the facilitation of active trading in money markets; and (2) the enhancement of business continuity planning (BCP) in financial markets.

As for the first issue, the functioning of money markets has recovered steadily following the termination of the quantitative easing policy in March 2006. From February 2007 to July 2007, the Bank took a series of actions, mainly focusing on practical matters, to support and promote the autonomous improvement of the functioning of money markets. Market participants also took various actions that contributed to the improvement. Through these efforts, money market transactions increased steadily in 2007.

With regard to the second issue, ensuring that necessary transactions can be conducted even in emergency situations, such as earthquakes or terrorist attacks, is in the interest not only of each individual market participant but also contributes to maintaining the stability of the financial markets and the economy as a whole. Moreover, for an international financial center, resilience of the financial markets to disasters is a key requirement. In 2007, significant progress was made in the BCP for money markets (call markets), securities markets, and Tokyo foreign exchange markets.

I. Developments in Financial Markets in the Second Half of 2007

This chapter reviews developments in various financial markets in the second half of 2007, focusing primarily on developments in domestic markets.

1. Money Markets

Due to the effects of the tightening of credit conditions in U.S. and European money markets from August 2007, volatility increased somewhat in Japan's money markets, and interbank rates, especially rates on term instruments maturing beyond the year-end, came under upward pressure. Fluctuations in these short-term rates, however, were small compared with those in U.S. and European markets, and the uncollateralized overnight call rate remained stable at around 0.5 percent. Taken as a whole, the turmoil in U.S. and European money markets had only a limited impact on Japan's money markets.

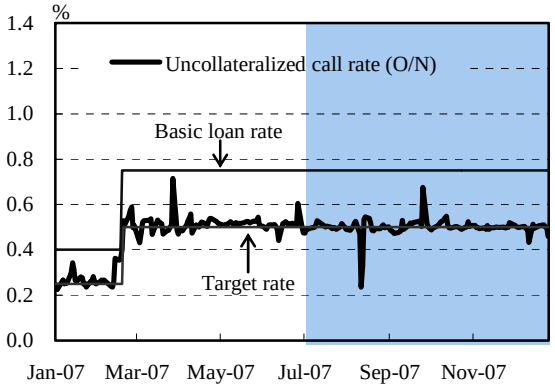
Stable overnight rates

The uncollateralized overnight call rate remained stable at around the Bank's policy interest rate target of 0.5 percent (Chart I-1-1). However, the turbulence in U.S. and European money markets caused a rise in interbank rates on term instruments, especially those with maturities beyond the end of the semiannual accounting period and the calendar year, in turn exerting upward pressure on overnight rates. Particularly in the Euroyen market, where yen funds are traded mainly by foreign financial institutions during London time, as well as the repo market, volatility increased somewhat compared with the period before the summer (Chart I-1-2). Partly reflecting the fact that transactions in these markets were mainly forward-dated contracts, interest rates surged temporarily when concerns over counterparty risk became stronger.

The Bank has been monitoring developments in financial markets at home and abroad carefully, communicating closely with other central banks in major countries. In response to the upward pressure on interest rates described above, the Bank actively supplied funds, especially at the long end of the market, using a variety of tools. As a result of these operations by the Bank as well as arbitrage transactions by the major domestic banks -- such as the raising of funds in the call market, where interest rates were stable, and the investing of these funds in Euroyen and repo markets, where interest rates were relatively high --

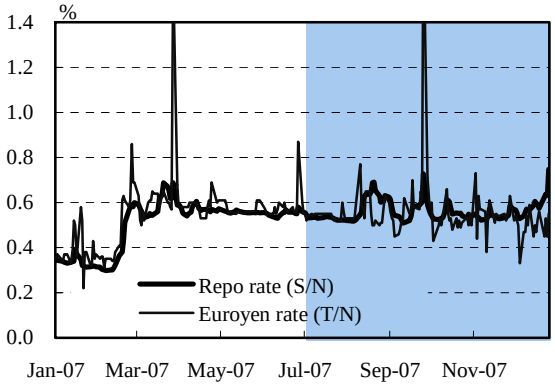
fluctuations in overnight rates on the whole were rather limited.

Chart I-1-1: Uncollateralized call rate



Source: Bank of Japan.

Chart I-1-2: Overnight rates



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

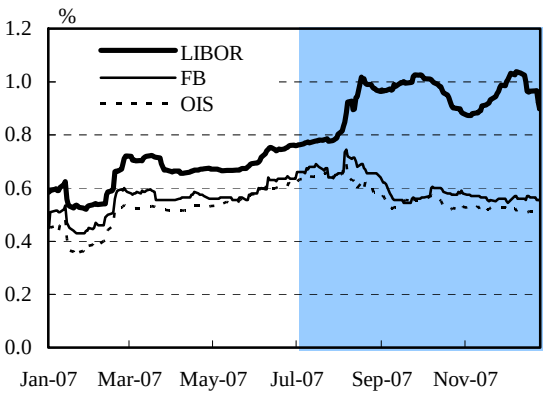
Rates on term instruments showing some increases in volatility

As for rates on term instruments (in yen), interbank rates such as LIBOR and TIBOR started to rise along with rates in U.S. and European money markets triggered by the turmoil in the U.S. asset-backed commercial paper (ABCP) market in early August (Chart I-1-3).[1] Although interbank rates fell temporarily from mid-September -- when the Federal Reserve cut its policy interest rate -- through October, they started to rise again in November against the background of uncertainties about the availability of funds with maturities beyond the year-end. The renewed rise in interbank rates reflected the following: the worsening of the subprime woes led to further losses at U.S. and European financial institutions and impaired their creditworthiness; and this, in turn, aggravated concern among Japanese financial institutions over counterparty risk and thus affected Japan's money markets, albeit to a marginal extent. Moreover, in global money markets, financial institutions became concerned about the availability of funds with maturities beyond the year-end and increasingly raised U.S. dollar funds in the foreign exchange (FX) swap market. This resulted in increased premiums required to convert currencies into the U.S.

[1] In early August, some ABCP programs exercised options to extend the maturity of their papers, and a major financial institution, due to difficulties in asset valuation, temporarily suspended the calculation of net asset values (reference values) and subscriptions/redemptions for affiliated investment funds that invested in subprime-related products.

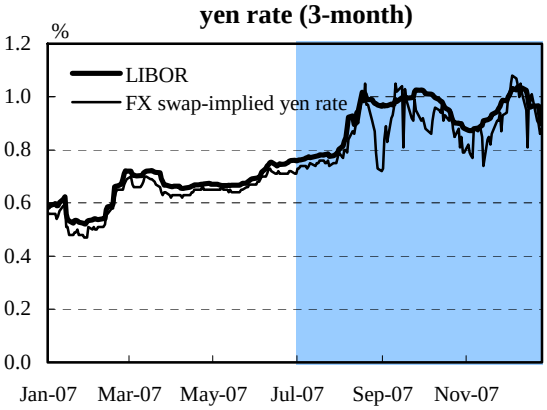
dollar through FX swap transactions (Box 1). For instance, regarding U.S. dollar/Japanese yen swaps, the swap-implied yen rate remained generally lower than the corresponding yen-LIBOR because of the increased premiums for U.S. dollar funding or, put differently, the relative decrease in the cost of Japanese yen funding (Chart I-1-4).

Chart I-1-3: 3-month rates



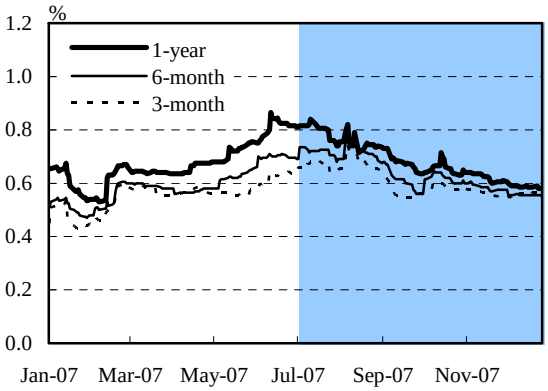
Sources: Bloomberg; Meitan Tradition; Japan Bond Trading.

Chart I-1-4: LIBOR and FX swap-implied yen rate (3-month)



Sources: Bloomberg; Meitan Tradition.

Chart I-1-5: FB/TB rates

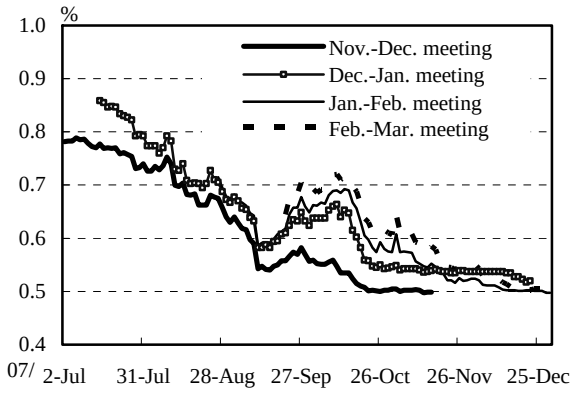


Source: Japan Bond Trading.

On the other hand, yields on FBs/TBs fell slightly (Chart I-1-5). This was partly because some financial institutions became more cautious about interbank lending and preferred to invest in FBs/TBs. A more fundamental reason, however, was the weakening of market expectations that the Bank would raise the policy interest rate target. In fact, the extent of the decline in yields on FBs/TBs was almost equivalent to that seen in overnight index swap (OIS) rates (Chart I-1-3), and OIS rates for intermeeting trade, a forward trade in which the contract period corresponds to the interval between the Bank's Monetary Policy Meetings (MPMs), followed a declining trend (Chart I-1-6). Furthermore, the outlook for 3-month rates implied by Euroyen futures shifted downward during the second

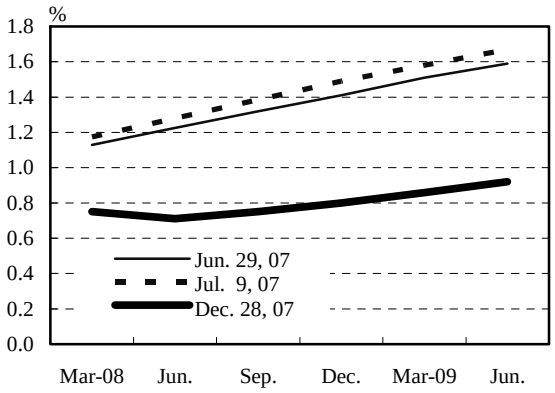
half of 2007 (Chart I-1-7).

Chart I-1-6: OIS rates



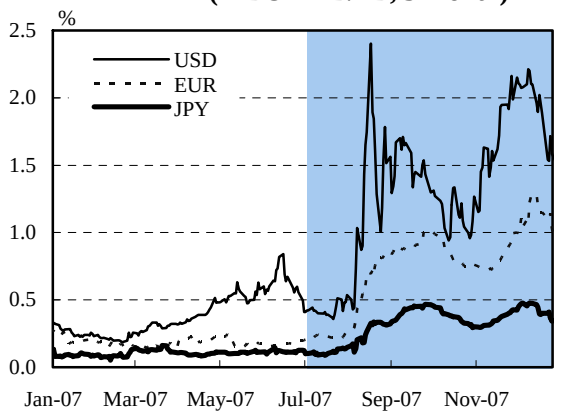
Note: Rates for intermeeting trades.
Source: Meitan Tradition.

Chart I-1-7: Forward rate curves for Euroyen futures



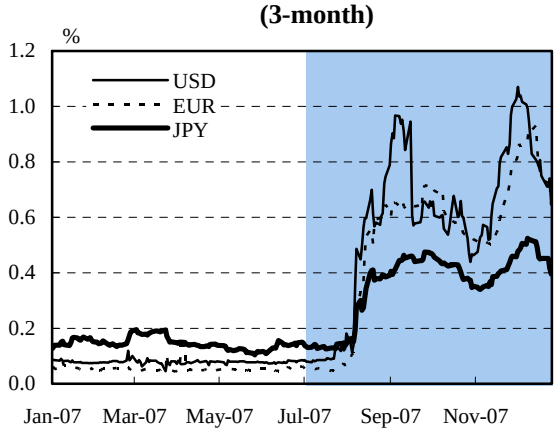
Note: On July 9, 2007, the leading contract marked the highest rate since the latest raise in the policy interest rate on February 21, 2007.
Source: Tokyo Financial Exchange.

Chart I-1-8: TED spreads (LIBOR-TB/FB, 3-month)



Sources: Bloomberg; Japan Bond Trading.

Chart I-1-9: LIBOR-OIS spreads (3-month)



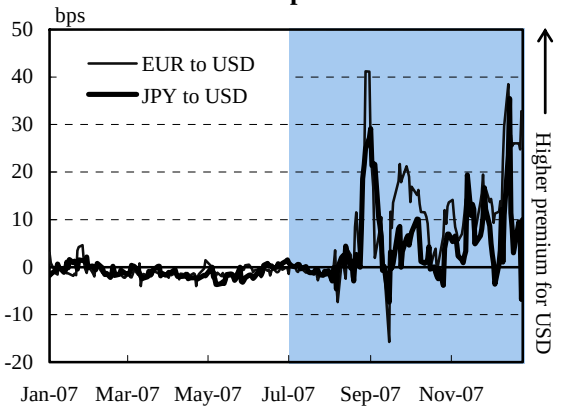
Sources: Bloomberg; Meitan Tradition.

Reflecting the above money market developments, the so-called TED spread (the spread between LIBOR and yields on FBs/TBs), an indicator of premiums for counterparty risk and liquidity risk, started to widen from the summer (Chart I-1-8).[2] The spread between LIBOR and OIS rates also widened (Chart I-1-9). These developments indicated that the effects of the tightening of credit conditions in the U.S. and Europe had spread to Japan's money markets, but the impact was limited: the increase in interbank rates, the widening of the TED spread, and the increase in premiums on U.S. dollar funding in the FX

[2] The TED spread originally referred to the spread between U.S. T-bills and Eurodollars, but now the term refers to the difference between LIBOR and yields on FBs/TBs, regardless of the currency.

swap market were only modest compared with those in the U.S. and Europe (Chart I-1-10). This was mainly due to the following reasons: (1) the deterioration in market and funding liquidity was limited,[3] reflecting the fact that the exposure of Japanese financial institutions to securitized products backed by subprime mortgage loans was low compared with U.S. and European financial institutions; and (2) as a result, Japanese financial institutions did not face serious difficulties in U.S. dollar funding, and thus their U.S. dollar funding needs in the U.S. dollar/Japanese yen swap market were smaller than those of European financial institutions in the euro/U.S. dollar swap market.

Chart I-1-10: USD funding premium implied in FX swap rates



Note: Calculated by the Financial Markets Department of the Bank of Japan.
Sources: Meitan Tradition; Reuters.

Box 1: The Turmoil in U.S. and European Money Markets

From August 2007 onward, the subprime woes led to the tightening of credit conditions in U.S. and European money markets. This situation was caused by several factors: (1) some financial institutions had to raise additional funds to finance an involuntary expansion of their balance sheets;[4] (2) increases in subprime-related losses raised concerns about the creditworthiness of financial institutions and thus about counterparty risk; and (3) under

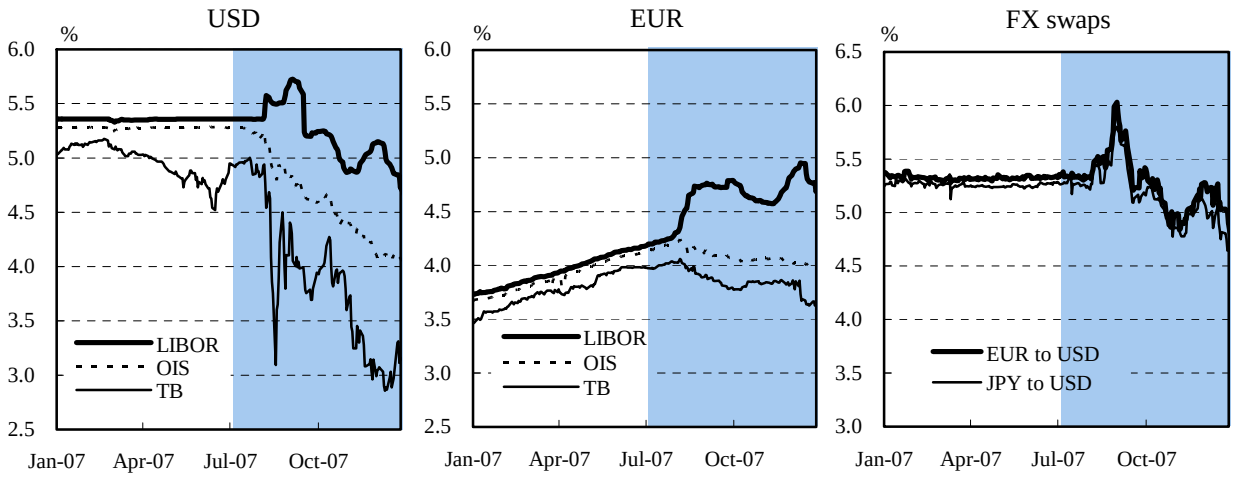
[3] See Box 2 for more details on market and funding liquidity.

[4] The involuntary expansion of banks' balance sheets was caused by a reintermediation of risk, such as providing liquidity support to their affiliated investment vehicles or purchasing assets of those vehicles. In order to finance such transactions, the banks increased their demand for funds in money markets (see Chapter II for details).

heightened uncertainties about funding, financial institutions increased the precautionary demand for liquidity.

As a result, interbank rates, especially short-term funding rates, in U.S. and European money markets increased sharply, while the corresponding TB rates dropped even further than the OIS rates due to the flight to quality (Chart for this box). In addition, since European financial institutions actively converted euro into U.S. dollar through FX swaps to secure U.S. dollar funding, imbalances arose also in the FX swap market: bid-ask spreads widened and U.S. dollar funding premiums increased.

Box 1 Chart: 3-month rates in global money markets



Sources: Bloomberg; Meitan Tradition; Reuters.

To address this situation, central banks in the major economies, particularly the Federal Reserve and the European Central Bank (ECB), from August 2007 onward initiated efforts to stabilize markets by providing substantial liquidity through flexible open market operations beyond the traditional framework. In December, five central banks announced joint measures to restrain elevated pressures in the money markets. Measures taken under the Federal Reserve's initiative included the establishment of a Term Auction Facility and FX swap lines with the ECB and the Swiss National Bank. The provision of liquidity by these central banks helped to relieve financial institutions' concerns about their funding, and hence short-term rates gradually declined toward the end of the year.

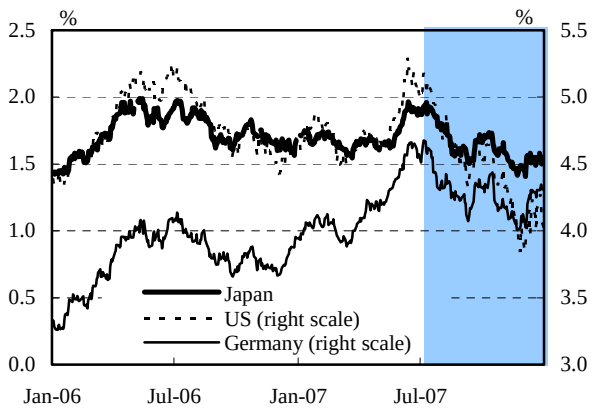
2. The Japanese Government Bond Markets

Long-term government bond yields were on a declining trend in both domestic and overseas markets. In the U.S. and Europe, long-term yields continued their downward trend with some fluctuations, reflecting expectations of the slowdown in economic growth and a flight to quality during the market turmoil. Following these developments in the U.S. and Europe, Japan's long-term yields also declined against the background of the cautious outlook for the Japanese economy due to the slowdown in the U.S. economy.

JGB yields following developments in U.S. and European long-term yields

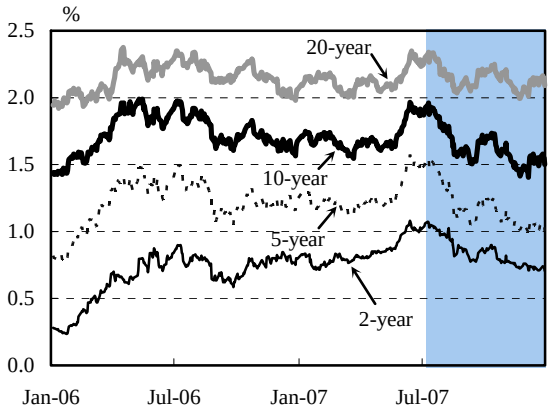
Looking at recent trends more closely, Japanese Government Bond (JGB) yields rose during May through June 2007 but started to decline from July, following the U.S. and European long-term yields (Chart I-2-1). From mid-September to October, JGB yields as well as the U.S. and European yields rebounded slightly because concerns about a deterioration of the U.S. economy abated temporarily in response to the Federal Reserve's policy rate cut. However, JGB yields subsequently declined again, as the U.S. and European long-term yields fell due to heightened concerns about a further worsening of subprime-related woes and downside risk to overseas economies. Yields on newly issued 10-year JGBs continued to decline toward the end of the year to around 1.4 percent, the lowest level since the beginning of 2006, just before the termination of the Bank's quantitative easing policy in March 2006 (Chart I-2-2).

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



Sources: Bloomberg; Japan Bond Trading.

Chart I-2-2: JGB yields by maturity

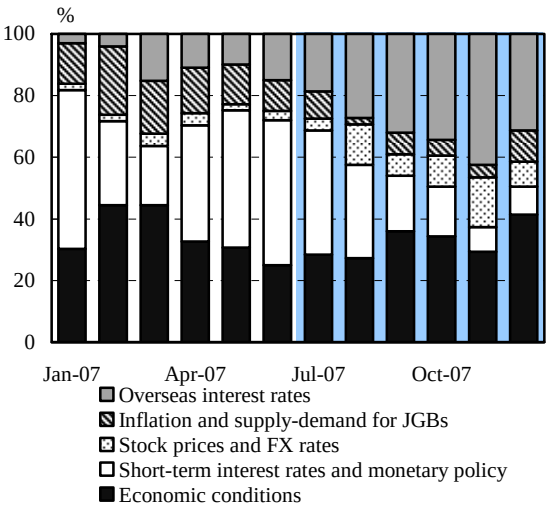


Note: Yields on newly issued JGBs.
Source: Japan Bond Trading.

The results of a market survey indicated that, throughout the second half of 2007,

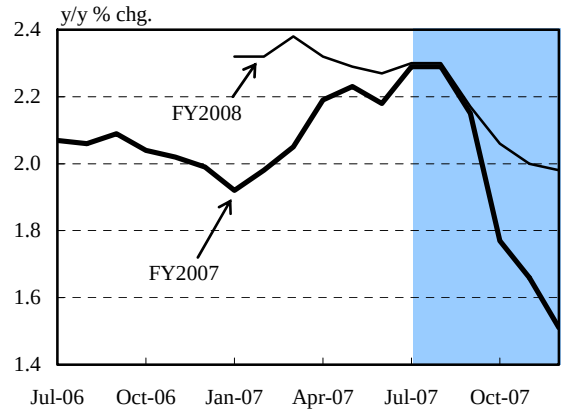
market participants increasingly came to regard "overseas interest rates" as an important factor affecting JGB yields while paying less attention to "short-term interest rates and monetary policy" (Chart I-2-3). The survey results also showed that market participants gradually came to pay more attention to "domestic economic conditions," indicating that the subdued outlook for the Japanese economy also served as one factor causing downside pressure on JGB yields. In fact, although market participants still expected the Japanese economy to remain on a moderate expansionary trend, they revised downward their forecasts of the real GDP growth rate for fiscal 2007 and 2008 in response to the slowdown in the U.S. economy and the sharp decrease in Japan's housing starts caused by the enforcement of the revised Building Standard Law (Chart I-2-4). Market forecasts for CPI inflation for fiscal 2007 and 2008 were revised slightly upward toward the end of the year, reflecting a rise in crude oil prices, but the effects on JGB yields were limited (Chart I-2-5).

Chart I-2-3: Factors affecting JGB yields



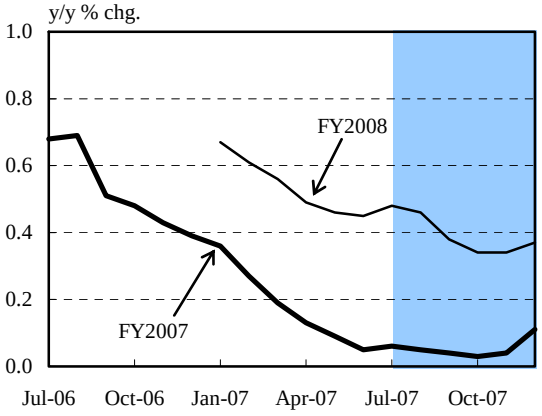
Source: QUICK, "QUICK Survey System Report."

Chart I-2-4: Forecast for Japan's GDP growth



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

Chart I-2-5: Forecast for Japan's CPI inflation

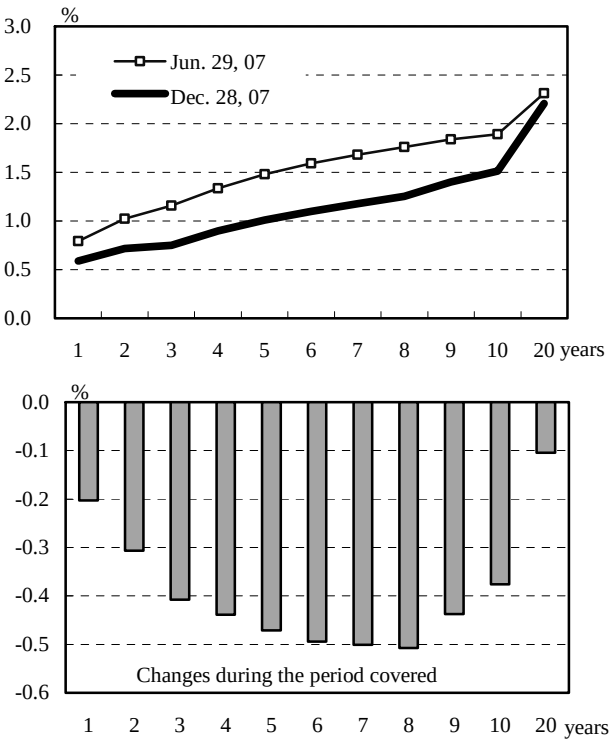


Source: Economic Planning Association, "ESP Forecast Survey."

Decline in yields on JGBs, primarily those with medium- to long-term maturities

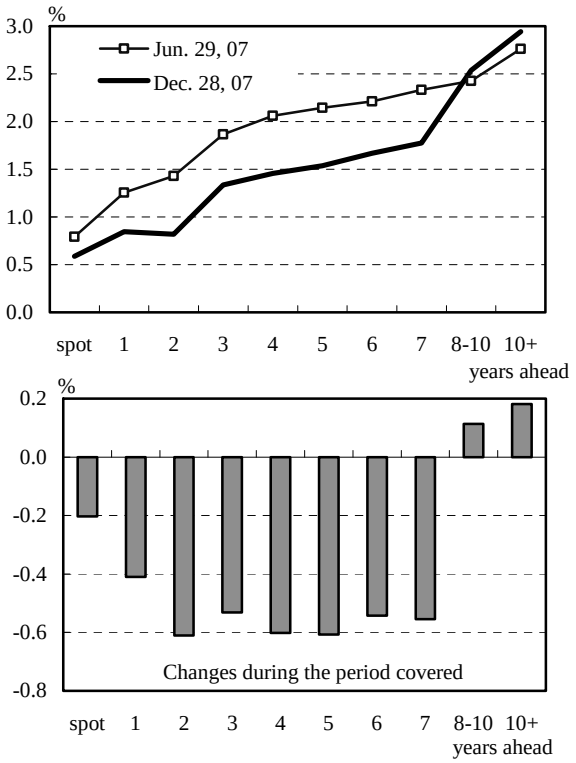
While JGB yields declined across all maturities, the extent of the decline was relatively large for JGBs with medium- to long-term maturities, reflecting the downward revision of market participants' outlook for the Japanese economy (Chart I-2-6). In addition, 1-year forward rates, calculated from JGB spot rates, declined over a time horizon of up to seven years, suggesting that market participants revised downward their outlook for future short-term rates over a time horizon of up to the medium term (Chart I-2-7).

Chart I-2-6: JGB spot rate curves



Source: Japan Securities Dealers Association.

Chart I-2-7: 1-year JGB forward rate curves



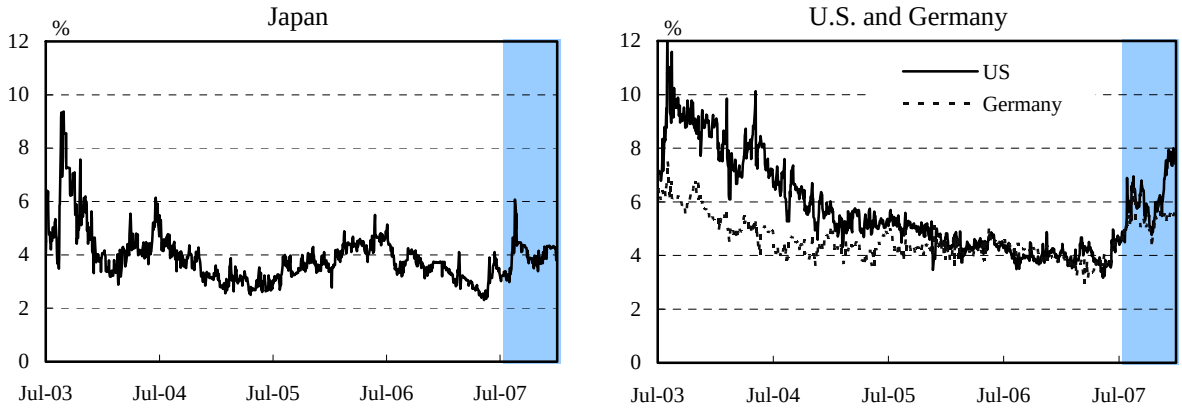
Source: Japan Securities Dealers Association.

Increased volatility

Reflecting heightened uncertainty about the economic outlook and developments in financial markets, volatility in long-term interest rates rose globally (Chart I-2-8). Implied volatility derived from options on long-term government bond futures, which had been stable worldwide in recent years, started to rise in summer 2007, particularly in the U.S., where volatility reached the highest level since June 2004. Implied volatility also rose in Japan, reaching levels last recorded in the first half of 2004, when JGB yields increased

reflecting the upward revision of the economic outlook, and in the first half of 2006 around the time of the termination of the Bank's quantitative easing policy. Given that volatility tends to rise during a period of rising long-term interest rates, the continuous increase in volatility during the current period of falling interest rates suggested strong market concern about the uncertainty regarding economic and financial developments.

Chart I-2-8: Implied volatility of government bond futures

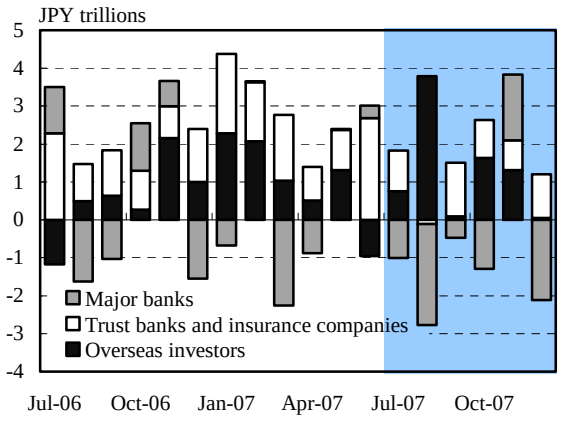


Source: Bloomberg.

JGB trading activity by type of investor

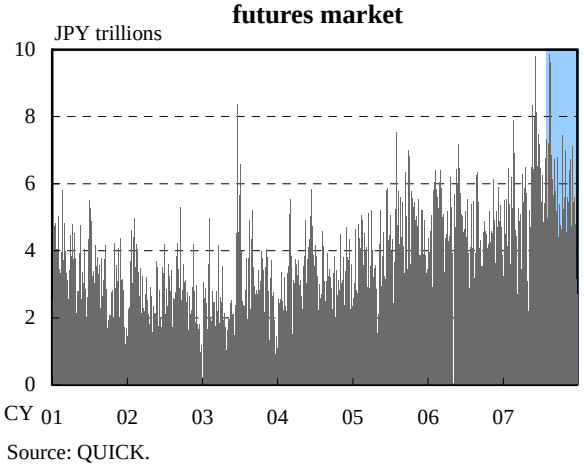
From mid-May through the end of June 2007, when JGB yields rose, overseas investors established short positions in JGB futures in anticipation of a further rise in the yields, but then from July started to unwind those positions (Chart I-2-9). Reflecting such unwinding, the trading volume in the JGB futures market, which had grown since the termination of the Bank's quantitative easing policy in March 2006, increased further from summer 2007 (Chart I-2-10).

Chart I-2-9: JGB trading by type of investor



Source: Japan Securities Dealers Association.

Chart I-2-10: Trading volume in the JGB futures market



Source: QUICK.

As for domestic investors, long-term investors such as pension funds and life insurance companies basically maintained a cautious stance on JGB investments because long-term yields fell below the lower limit set in their investment plans. Under such circumstances, in order to ensure higher yields, some of those investors increased their purchases of domestic credit products including corporate bonds, Fiscal Investment and Loan Program Agency Bonds, and residential mortgage-backed securities (RMBSs). Banks also basically continued to restrain their exposures to interest rate risks. However, as market expectations for a raise in the policy interest rate by the Bank abated toward the end of the year, some banks slightly increased their purchases of JGBs, concentrating on those with medium-term maturities.

3. Stock Markets

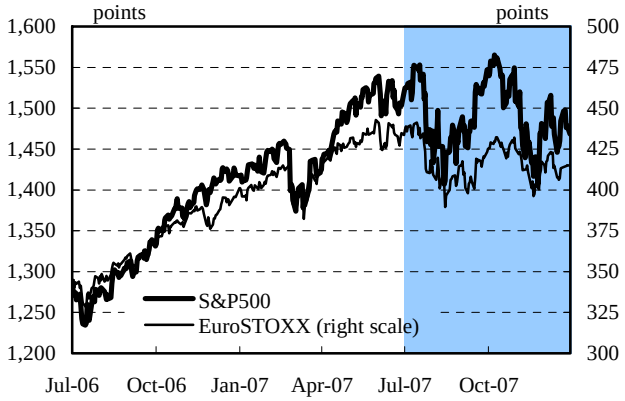
After reaching the highest level of the year in early July, Japanese stock prices trended downward with some fluctuations. The extent of the decline was even greater than that in the U.S. and European stock prices hit directly by subprime woes. The sharp decline in Japanese stock prices seems to be mainly due to the fact that market participants became cautious about the Japanese economy against the background of the yen appreciation and the decrease in housing starts caused by the enforcement of the revised Building Standard Law.

The fall of stock prices in the U.S. and Europe and firmness of those in emerging economies

Stock prices in the U.S. and Europe, particularly those of financial sector, dropped sharply after the summer of 2007 due to concerns over downgrading of securitized products and related losses incurred by financial institutions (Chart I-3-1). In mid-September, when concerns about a deterioration in U.S. economic conditions faded in response to the Federal Reserve's policy rate cut, stock prices rebounded temporarily, but then followed a downward trend against the background of heightened uncertainty about the financial conditions of major U.S. and European financial institutions and renewed concerns about a slowdown in the U.S. economy. However, stock prices did not fall below the level recorded

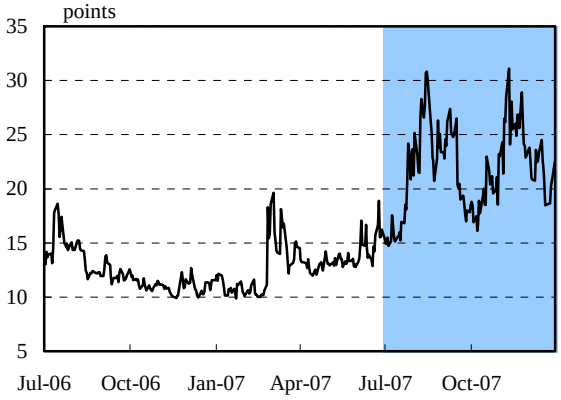
at the time of the "Shanghai shock" in February-March 2007, the lowest level recorded since the beginning of the year. This is partly because market participants expected that the Federal Reserve would ease monetary policy further and the strength of emerging economies would, to a certain extent, offset a possible slowdown of the U.S. and European economies. Stock price volatility, which had remained low until the summer of 2007, rose significantly, reflecting the heightened anxieties of market participants (Chart I-3-2). The U.S. VIX, an index of implied volatility on the S&P 500 index, reached its highest level since March 2003.

Chart I-3-1: Equity indices in U.S. and Europe



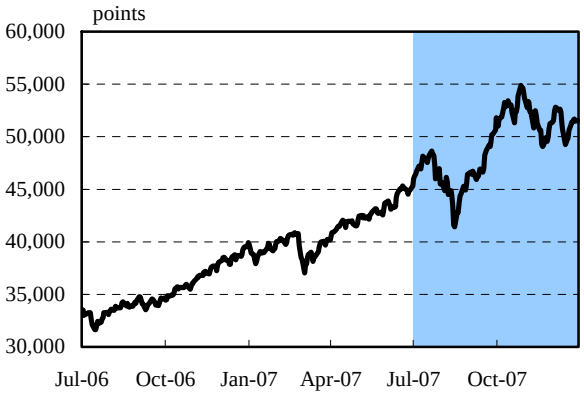
Source: Bloomberg.

Chart I-3-2: U.S. VIX



Source: Bloomberg.

Chart I-3-3: Emerging equity index



Note: MSCI Emerging Markets Index in local currency.
Source: MSCI.

On the other hand, stock prices in emerging economies dropped temporarily during the summer due to the subprime woes, but remained around historical highs throughout the second half of 2007 against the background of the so-called "decoupling" theme, according to which the negative impact of a U.S. economic slowdown would be offset by domestic

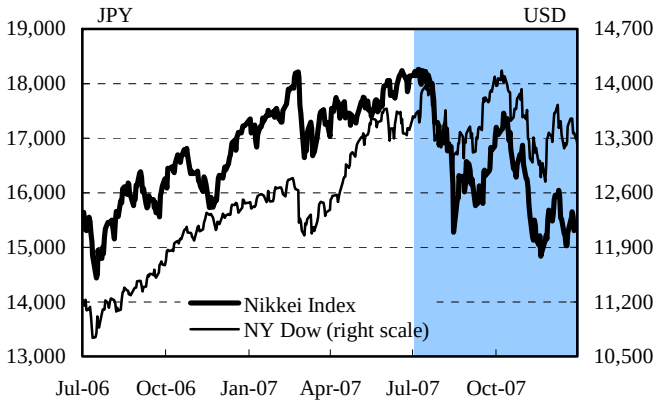
demand-led growth in emerging economies (Chart I-3-3).

As described above, while there were some corrections in global stock markets in the second half of 2007 in contrast to the first half, stock prices in these markets remained at relatively high levels within the uptrend that had started in 2003.

Japanese stock prices hitting the lowest level since the beginning of 2007

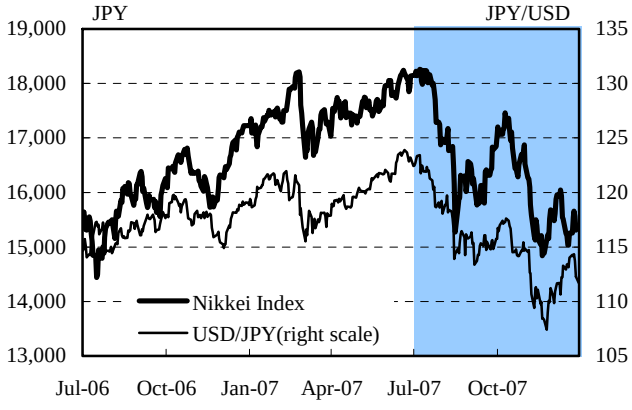
Following the U.S. and European stock prices, Japanese stock prices fluctuated significantly, and the extent of the decline was even greater than that in the U.S. and Europe (Chart I-3-4). The Nikkei 225 Stock Average declined by 11.1 percent from the beginning of 2007 to the year-end, hitting 14,837 yen in late November, the lowest level since July 2006. This large decline may be attributable to the spreading of cautious views on the Japanese economy among investors against the background of concerns about the negative impact of the U.S. economic slowdown, further appreciation of the Japanese yen, and the decrease in housing starts caused by the enforcement of the revised Building Standard Law (Chart I-3-5). Furthermore, it has also been suggested that the underperformance of Japanese stocks reflects the resurgence of misgivings among overseas investors regarding defensive measures introduced by Japanese firms against hostile takeovers as well as the relatively low attractiveness of Japanese stocks in comparison with other Asian stocks with a high growth potential.

Chart I-3-4: Equity indices in U.S. and Japan



Source: Bloomberg.

Chart I-3-5: Equity index and FX rate



Source: Bloomberg.

Developments in the trading volume by type of investor on a semiannual basis show that overseas investors, who had been net buyers since the first half of 2003, became net

sellers in the second half of 2007 (Chart I-3-6). The change in their investment stance served as a factor in pushing down Japanese stock prices, because the Japanese stock market had been driven and pushed up by increased investment by overseas investors until the summer of 2007. As for domestic investors, generally speaking, there were no groups that acted as major buyers during the second half of 2007.

Chart I-3-6: Japanese equity trading by type of investor

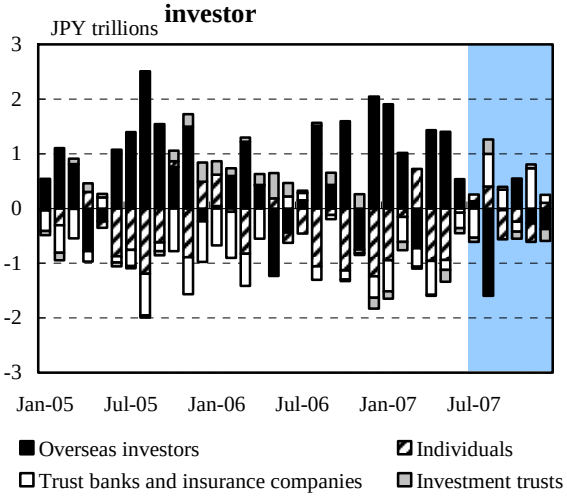
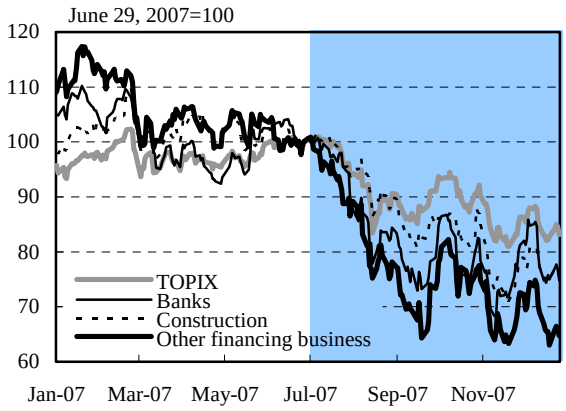


Chart I-3-7: TOPIX sector indices



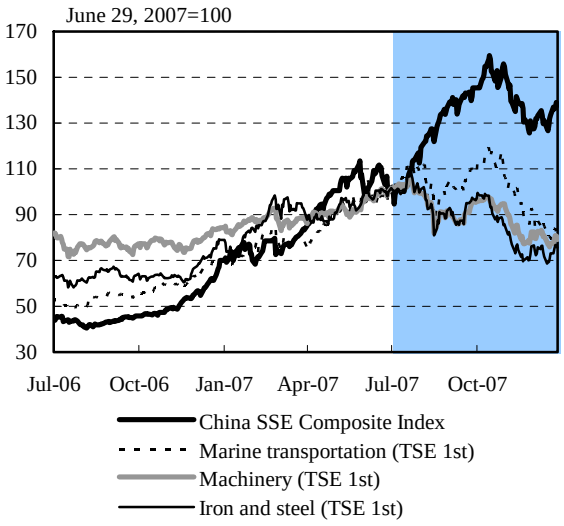
Source: Bloomberg.

Sources: Tokyo Stock Exchange; Osaka Securities Exchange.

By industry sector, the decline in stock prices was notable in "other financing business" including consumer finance companies affected by the revised Money-Lending Business Control and Regulation Law, and in "construction" reflecting the negative effect of the revised Building Standard Law (Chart I-3-7). The stock prices of "banks" also recorded relatively large falls because of sluggish profits and concerns about subprime-related losses, albeit to a smaller degree than those of U.S. and European banks. The stock prices of firms in industries with a strong revenue base in emerging economies such as China, for instance, the "iron and steel," "marine transportation," and "machinery" industries, had been relatively high since the beginning of 2007, but started to weaken in October reflecting the decline in Chinese stock prices (Chart I-3-8).

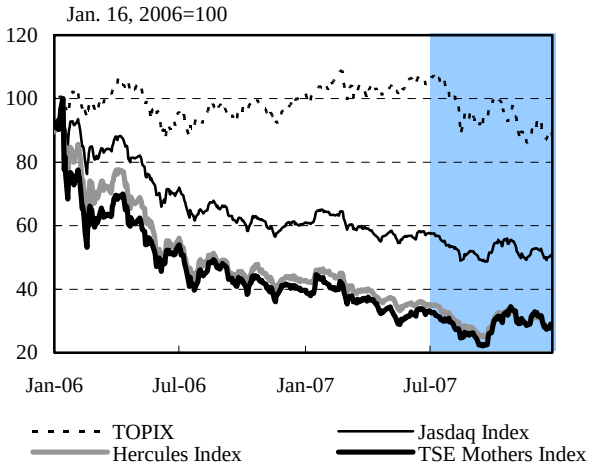
Regarding stock prices listed on Japanese stock exchanges for emerging firms, the downward trend that had started at the beginning of 2006 remained unchanged (Chart I-3-9).

Chart I-3-8: Equity indices in China and Japan



Source: Bloomberg.

Chart I-3-9: Equity indices in Japanese markets for emerging companies

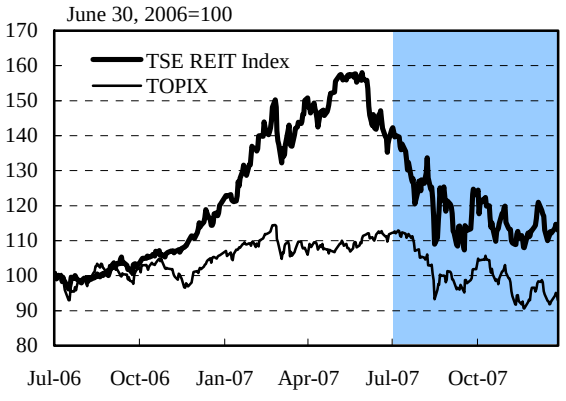


Source: QUICK.

Decline in the prices of real estate investment trusts (REITs)

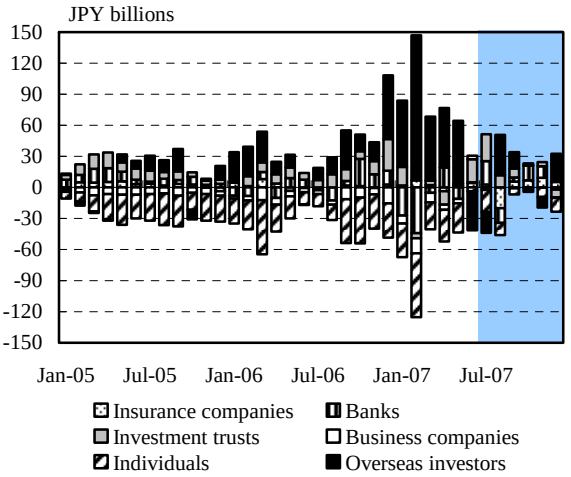
J-REIT prices remained on an upward trend until mid-2007 thanks to net buying by overseas investors, but then declined during the summer as overseas investors became net sellers (Charts I-3-10 and I-3-11). The decline seems to be mainly due to (1) a slight fall in the expected rent of real estate against the background of cautious views toward the outlook for the Japanese economy, and (2) a decrease in the number of profitable properties due to intensified competition in the acquisition of real estate in metropolitan areas.

Chart I-3-10: J-REIT index



Source: Bloomberg.

Chart I-3-11: J-REIT trading by type of investor

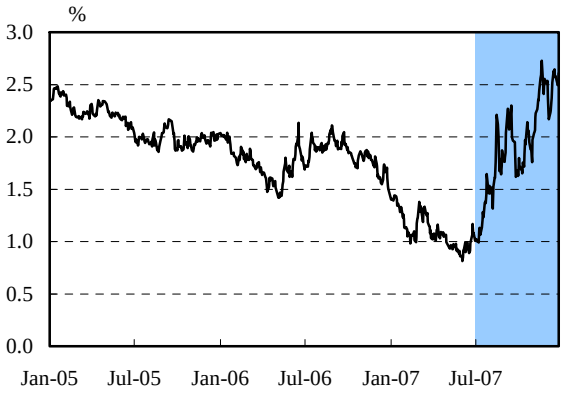


Source: Tokyo Stock Exchange.

However, reflecting the decline in both REIT prices and JGB yields, the J-REIT yield

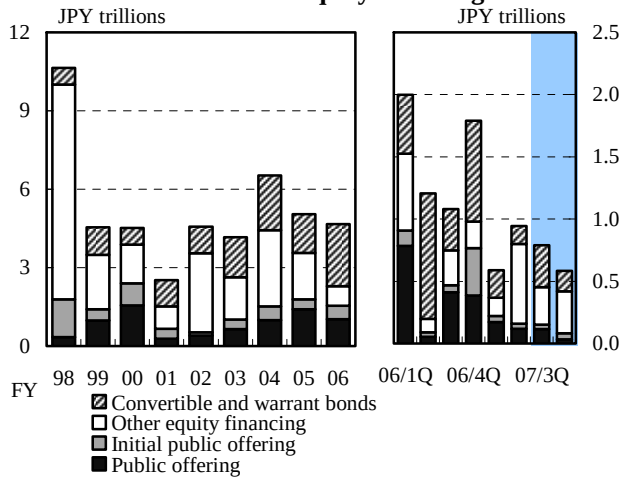
spread (the spread between dividend yields and JGB yields) rose in November to the highest level since March 2004 (Chart I-3-12). The potential appetite of domestic and overseas investors, who attach great importance to dividend yields, for REITs remained strong, and REIT prices thus continued to stay in a narrow range after hitting in September their lowest levels since the beginning of 2007.

Chart I-3-12: J-REIT yield spread



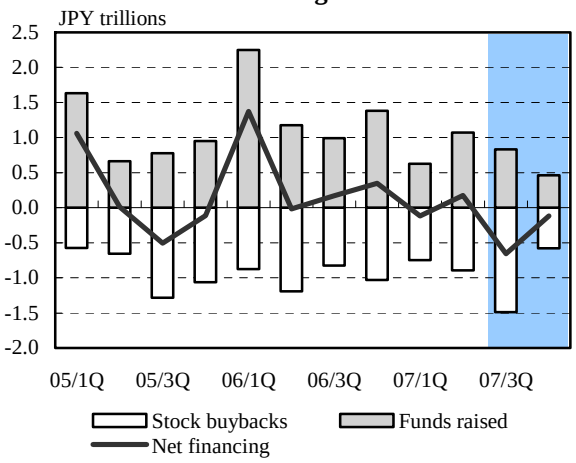
Note: Yield spread = dividend yield – newly issued 10-year JGB yield.
Source: QUICK.

Chart I-3-13: Equity financing



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

Chart I-3-14: Financing from stock markets



Notes: 1. Transactions of companies listed on the TSE.
"Funds raised" is the sum of equity financing (excluding IPOs), warrants exercised, and convertible bonds. "Stock buybacks" excludes purchases from subsidiaries.
2. Transactions in Dec. 2007 are not included in the data for 07/4Q.
Source: Tokyo Stock Exchange.

Decrease in equity financing

Fund-raising through equity financing, such as initial public offerings (IPOs), other public offerings, and convertible bonds issuances, decreased partly due to the decline in stock

prices (Chart I-3-13). Meanwhile, stock buybacks aiming to return profits to shareholders remained at a high level (Chart I-3-14).

4. Credit Markets

In the U.S. and European credit markets, the subprime woes led to the pronounced widening of credit spreads not only on securitized products but also on corporate bonds overall. In Japan's credit markets, following these developments in the U.S. and Europe, corporate bond spreads over JGB yields and credit default swap (CDS) premiums widened, but on the whole the extent of the widening was limited. This is because investors' demand for credit assets continued to be strong in Japan, and the primary issuing environment such as for corporate bonds remained favorable.

A sharp widening of credit spreads in overseas credit markets

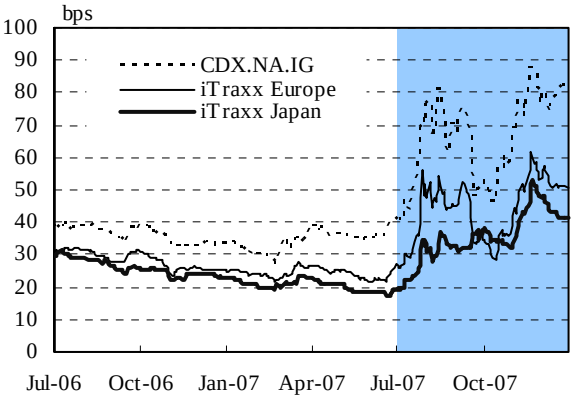
Credit spreads in the U.S. and European markets had been stable since around 2003, but started to widen from summer 2007 against the background of investors' reassessment of risks, which was triggered by downgrades of securitized products (Charts I-4-1 and I-4-2). Spreads temporarily narrowed in mid-September, but widened again from late October, reflecting heightened concerns about the impact of the worsening of the subprime woes on firms' business performance and the overall economy.

Chart I-4-1: Changes in credit spreads

	US	Europe	Japan
Corporate bonds			
AA	+105.0 bps	+54.0 bps	+10.7 bps
A	+132.0 bps	+88.0 bps	+15.7 bps
BBB	+163.0 bps	+86.0 bps	+61.6 bps
CDS indices	+42.39 bps	+25.12 bps	+22.28 bps

Notes: 1. Changes during the second half of 2007.
2. Corporate bond spreads over government bond yields.
Corporate bonds with 3- to 5-year maturity for U.S. and Europe and those with 4- to 6-year maturity for Japan.
3. CDS indices refer to CDX.NA.IG for U.S.; iTraxx Europe for Europe; iTraxx Japan for Japan.
Sources: Markit Group; Merrill Lynch; Japan Securities Dealers Association.

Chart I-4-2: CDS indices



Note: See notes for Chart I-4-1.
Source: Markit Group.

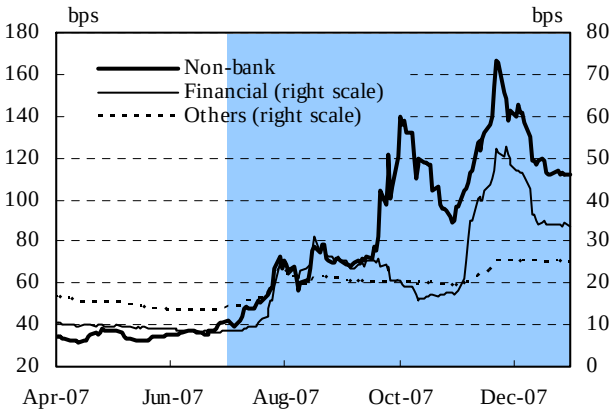
Furthermore, in the U.S. and European markets, the widening of credit spreads spilled over to highly rated corporate bonds, since financial institutions and institutional investors became inclined to liquidate their credit assets and adopted risk-averse investment strategies (Chart I-4-1).

Extent of widening of credit spreads in Japan's markets limited

In Japan's credit markets, overseas investors and financial institutions reduced their risk exposure through CDSs, but the impact of such transactions was limited as a whole (Charts I-4-1 and I-4-2). Instead, the widening of credit spreads in Japan is thought to be mainly due to the following factors: (1) increased concerns over business performance of firms in particular industries; and (2) the increased issuance of corporate bonds against the background of falling long-term yields.

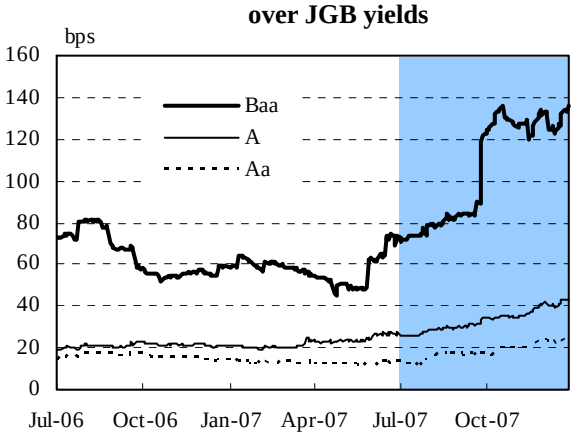
By industry sector, CDS premiums widened in the non-bank sector (including consumer finance companies) due to the deterioration of firms' business performance resulting from overpayment refund claims, and in the financial sector (including some major banks and non-life insurance companies) due to concerns over the possibility that losses and exposures related to securitization would be greater than expected (Chart I-4-3). The extent of the widening of credit spreads in other sectors was very limited. By credit rating, corporate bond spreads over JGB yields widened among Baa-rated firms, including consumer finance companies, but the widening of spreads was quite limited for firms rated A or higher (Chart I-4-4). Meanwhile, spreads on bank bonds, particularly on subordinated bonds, widened as CDS premiums in the financial sector widened (Chart I-4-5).

Chart I-4-3: CDS premiums by sector



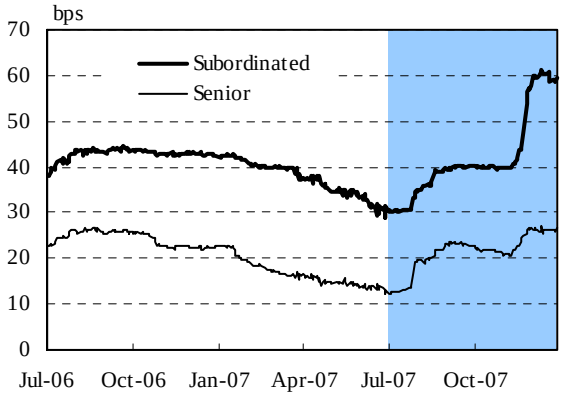
Note: The figure for "non-bank" is the average premium for five non-bank financing companies.
Source: Bloomberg.

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



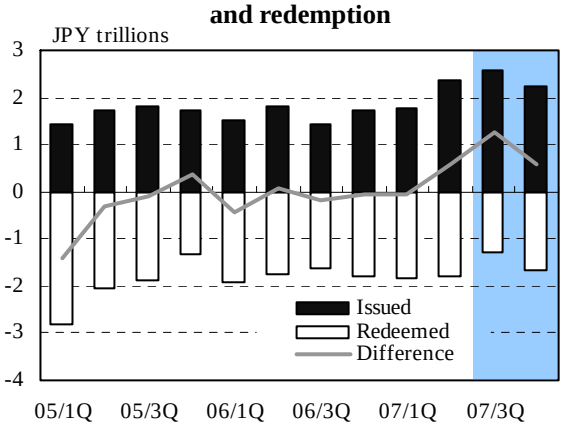
Note: See notes for Chart I-4-1.
Source: Japan Securities Dealers Association.

Chart I-4-5: Bank bond spreads over JGB yields



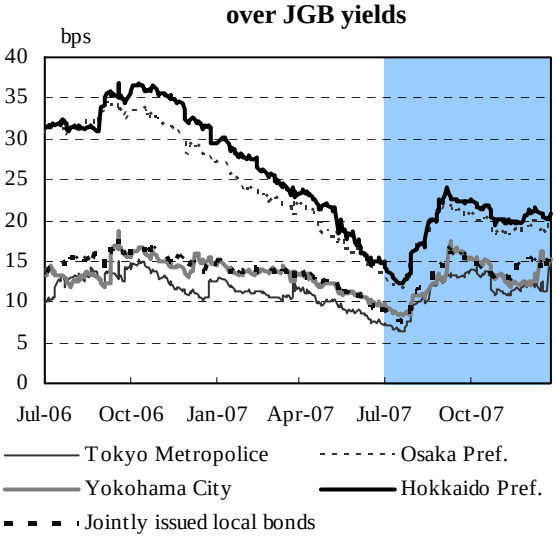
Note: 10-year maturity for subordinated bonds; 5-year maturity for senior bonds.
Source: Japan Securities Dealers Association.

Chart I-4-6: Corporate bond issuance and redemption



Source: I-N Information Systems.

Chart I-4-7: Municipal bond spreads over JGB yields



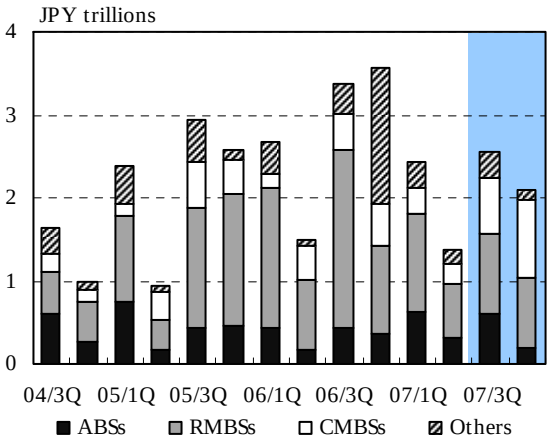
Note: 10-year maturity.
Source: Japan Securities Dealers Association.

In the second half of 2007, issuance of corporate bonds increased as long-term interest rates declined (Chart I-4-6). The change in supply-demand conditions resulting from this increase in issuance volume also contributed to the widening of corporate bond spreads. However, as firms' creditworthiness and financial fundamentals continued to be favorable, domestic investors' appetite for credit assets remained strong, and hence the extent of the widening of corporate bond spreads was limited as a whole.[5] Spreads on municipal and Fiscal Investment and Loan Program Agency Bonds also remained stable, and the issuing environment for these bonds continued to be favorable (Chart I-4-7).

Stability in Japan's securitization market

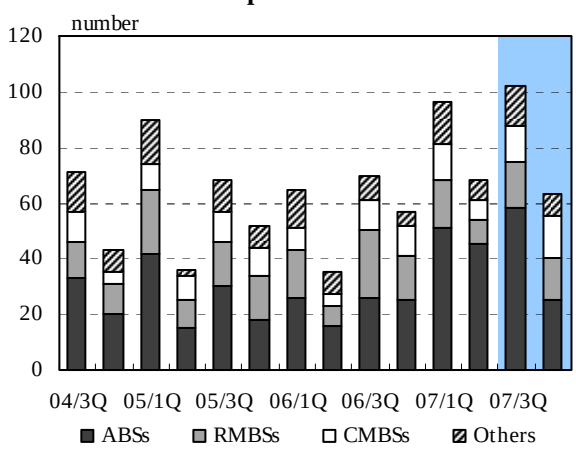
In contrast to the U.S. and European markets, where market functioning was impaired significantly, Japan's securitization market remained largely unaffected by the subprime woes (Charts I-4-8 and I-4-9). The outstanding amount of newly-issued securitized products decreased on a year-on-year basis partly because (1) large-scale issuance of RMBSs by private financial institutions dwindled after years of rapid growth; and (2) the figures for the previous year included a large-scale telecommunications business-related transaction. Adjusting for these factors, the issuing environment remained stable.

Chart I-4-8: Notional amount of securitized products issued



Source: Deutsche Securities.

Chart I-4-9: Number of securitized products issued



Source: Mizuho Securities.

As in the case of corporate bonds, spreads on securitized products in the secondary market in Japan widened slightly, but the extent of the widening was quite limited compared

[5] When long-term yields declined to around 1.4 percent, some investors hesitated to invest in corporate bonds due to their low issue yields. However, this was only a temporary phenomenon.

with spreads on securitized products in overseas markets. This is because most participants in Japan's securitization market are domestic investors, as a result of which the market remained immune from the impact of the risk reduction by overseas investors, and also because, unlike in the U.S. and European markets, trading of securitized products backed by subprime mortgage loans, resecuritized products, and collateralized loan obligations (CLOs) backed by leveraged loans has been quite rare.

5. Foreign Exchange Markets

In FX markets, the yen appreciated with some fluctuations, while the U.S. dollar depreciated against other major currencies due to the increased uncertainty about the U.S. economy triggered by the subprime woes. FX market volatility, which had remained at a relatively low level until the first half of 2007, surged from the summer. Under such circumstances, investors became more risk-averse and unwound their yen carry trade positions. In addition, yen selling by Japanese retail investors, through FX margin trading and purchasing foreign currency-denominated investment trusts, also slowed down. Meanwhile, given the increase in the foreign reserves of emerging economies and resource-rich countries, the diversification of the allocation of these reserve assets, and in particular the investment behavior of sovereign wealth funds (SWFs), drew increasing attention.[6]

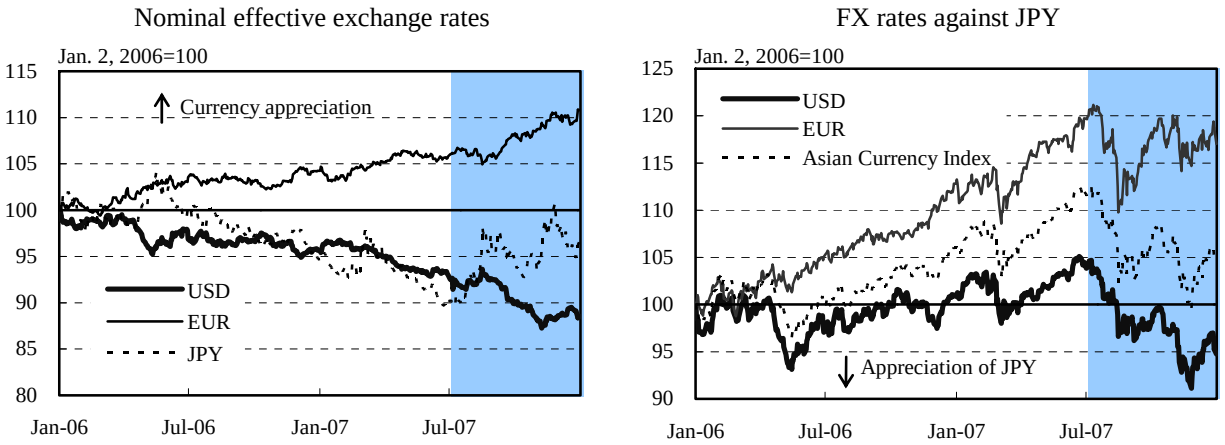
Acceleration in the depreciation of the U.S. dollar

Due to weakness vis-à-vis the euro and other currencies, the U.S. dollar on a nominal effective basis steadily depreciated over the past few years (Chart I-5-1). This trend accelerated in the second half of 2007 because of increased uncertainty about the outlook

[6] SWFs are investment funds that manage state-owned assets. These funds are broadly categorized into two types: (1) commodity-based funds, which are financed by profits earned from selling state-owned natural resources including oil; and (2) non-commodity-based funds, which are financed by foreign reserves and budget surpluses. In recent years, the SWFs of Middle Eastern oil-producing countries, which benefited enormously from soaring crude oil prices, and of China, whose foreign reserves increased significantly as a result of its expanded trade surplus, have increased their presence in international financial markets.

for the U.S. economy triggered by the subprime woes, and the U.S. dollar hit its lowest level since 1996. The yen, which had continued to depreciate even against the U.S. dollar until the first half of 2007, started to appreciate in the summer not only against the U.S. dollar but also against the euro and other Asian currencies.

Chart I-5-1: FX rates

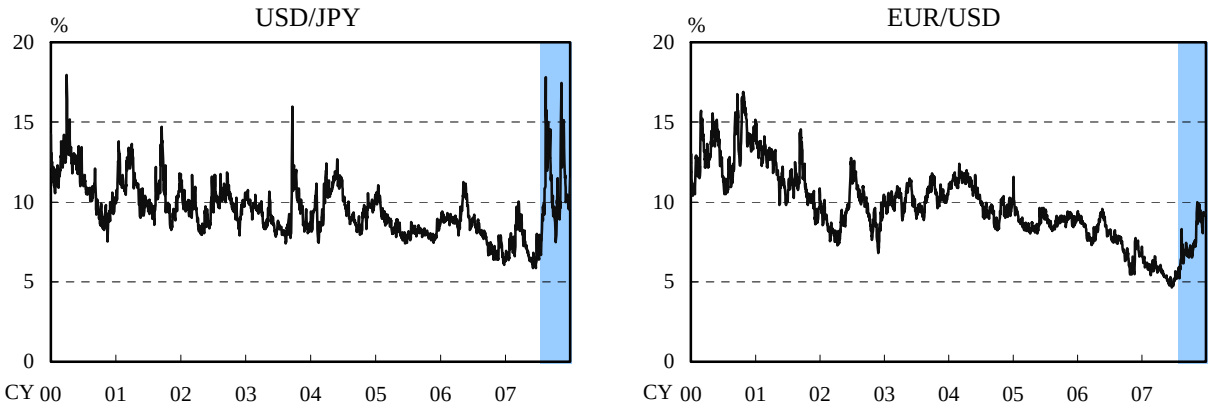


Note: USD effective exchange rate refers to the broad index. JPY effective exchange rate is calculated by the Financial Markets Department of the Bank of Japan.
Sources: Bloomberg; Bank of Japan.

Sharp increase in market volatility

In the FX markets, implied volatility, which had remained at a relatively low level over a period of several years until the first half of 2007, started to rise in the summer (Chart I-5-2). By currency pair, the volatility of the yen against the U.S. dollar, in particular, increased significantly and recorded 18 percent, the highest level since March 2000. This recent spike in volatility far outstripped the temporary increases at the time of the so-called "global risk reduction" in May-June 2006 and of the "Shanghai shock" in February-March 2007.

Chart I-5-2: Implied volatility of FX options (1-month)

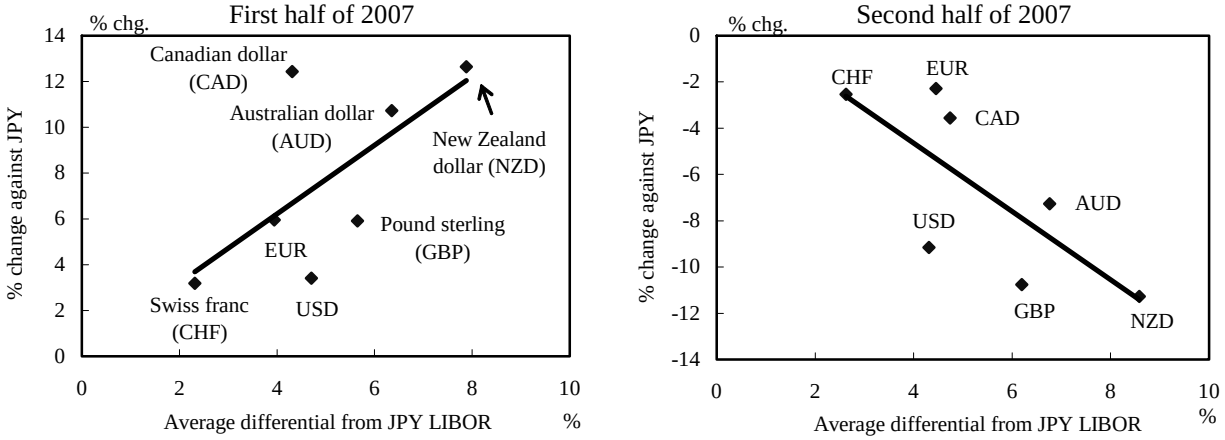


Source: Bloomberg.

Unwinding of carry trade positions

As for the relationship between "changes in FX rates" and "short-term interest rate differentials" for individual major currencies against the yen, a positive correlation was observed in the first half of 2007 (Chart I-5-3). This indicates that the yen depreciation during that period resulted from the yen carry trade, which combines (1) short positions in the yen, a low-yielding currency, and (2) long positions in high-yielding currencies. However, as shown in the right panel of Chart I-5-3, the correlation became negative in the second half of 2007, implying that carry trade positions were unwound due to the increased instability in financial markets. In particular, both the appreciation of the yen, a low-yielding currency, and the depreciation of high-yielding currencies, such as the New Zealand and Australian dollars, were notable in July-August 2007, when the FX markets fluctuated significantly (Chart I-5-4). Similarly, the Swiss franc, another low-yielding currency, appreciated together with the yen in November-December, when FX market volatility rose again, while the pound sterling and the Canadian dollar as well as the Australian dollar depreciated further. This indicates that unwinding spilled over into a wider range of currency pairs.

Chart I-5-3: 3-month LIBOR differentials and changes in FX rates

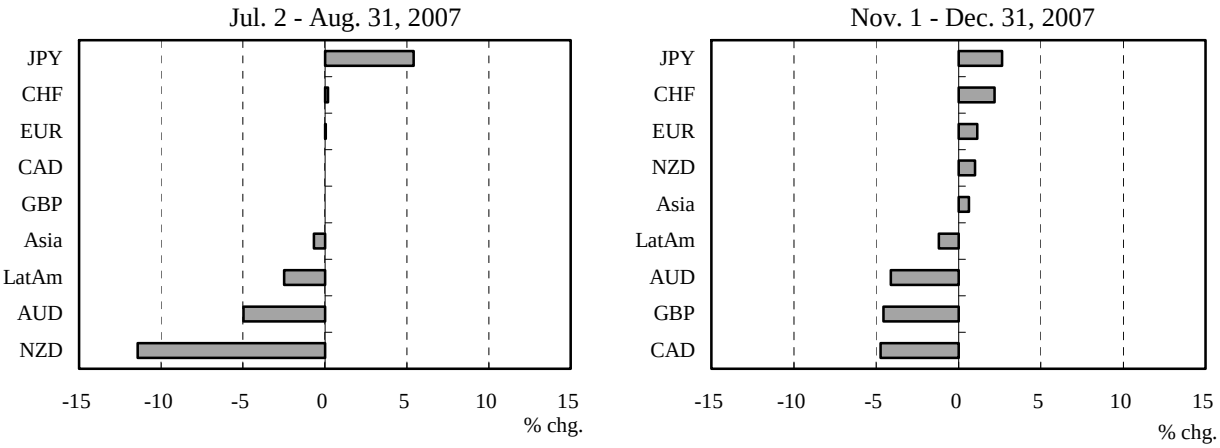


Source: Bloomberg.

Because carry trades use leverage to exploit interest rate differentials in an environment of low financial market volatility, an important factor in position-taking in carry trades is whether exchange rate volatility is expected to remain low. Therefore, the increase in volatility from summer 2007 triggered by the subprime woes seems to have

reduced investors' risk appetite and led them to liquidate their carry trade positions. This unwinding of carry trades led to a further increase in volatility to a degree not seen in recent years.

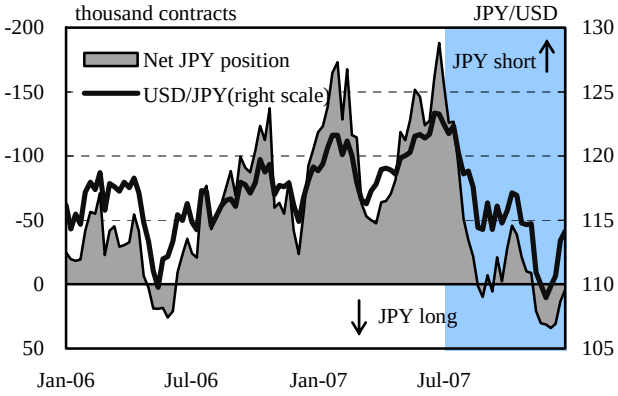
Chart I-5-4: Changes in FX rates against USD



Note: "Asia" indicates Asian Currency Index and "LatAm" indicates Latin American Currency Index.
Source: Bloomberg.

Indeed, IMM futures positions of non-commercial investors on the Chicago Mercantile Exchange show that speculators reduced their short positions in the yen in July-August 2007 (Chart I-5-5). Although the temporal decline in market volatility in the subsequent period prompted investors to hold back from reducing short positions, they restarted to reduce their positions in November, resulting in net long yen positions, albeit small, at the end of the year.

Chart I-5-5: Net JPY position against USD of non-commercial investors on IMM

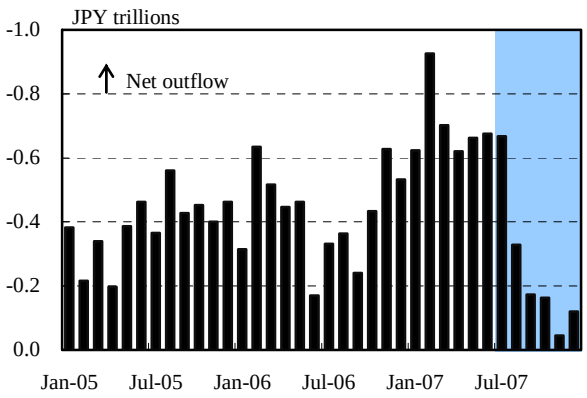


Note: Each contract is worth 12.5 million yen.
Sources: Bloomberg; CFTC.

Japanese retail investors more cautious about FX trading

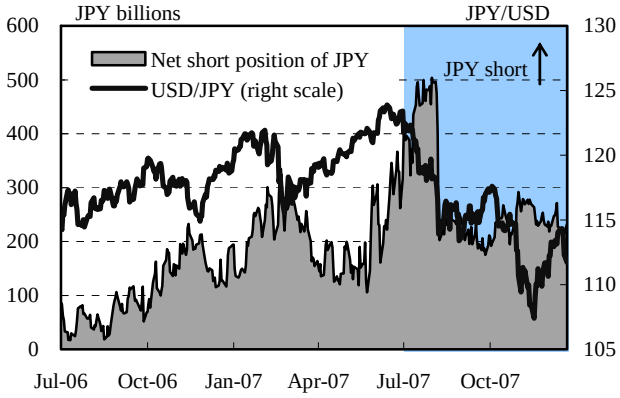
The trading behavior of Japanese retail investors, who had recently increased their presence in FX markets, changed significantly in the second half of 2007. While they continued to invest in foreign securities through investment trusts, the rate of increase in such investment slowed down considerably compared with the first half of 2007 (Chart I-5-6). Retail investors also reduced their positions in FX margin trading by almost half after the sharp appreciation of the yen in August (Chart I-5-7). In the past several years, even when there was pressure for the yen to appreciate -- for example, at the time of the "Shanghai shock" in February-March 2007 -- retail investors had maintained a high level of short yen positions in FX margin trading, which had kept the yen from strengthening further. However, in the second half of 2007, their margin trades accelerated the yen appreciation with their loss-cutting actions taken to avoid the expansion of losses. Thus, overall, yen selling by retail investors slowed down significantly from the summer, and this also served as a factor contributing to the appreciation of the yen.

Chart I-5-6: Foreign securities investment through domestic investment trusts



Note: Based on reports from designated major investors.
Source: Ministry of Finance, "International Transactions in Securities."

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



Sources: Bloomberg; Tokyo Financial Exchange.

II. The Subprime Mortgage Problem and Turmoil in Global Financial Markets

As mentioned in Chapter I, global financial markets in the second half of 2007 experienced turmoil caused by the "subprime problem." The trigger of the turmoil was a rise in delinquencies on subprime mortgages in the U.S. and the resultant decline in the prices of subprime RMBSs. The problem affected rapidly not only securitization markets but also a wide range of financial markets, including credit, stock, and money markets. This chapter, looking at developments up until the end of 2007, provides an overview of how financial markets were affected, and explains the background to and mechanisms of why the effects became so widespread.

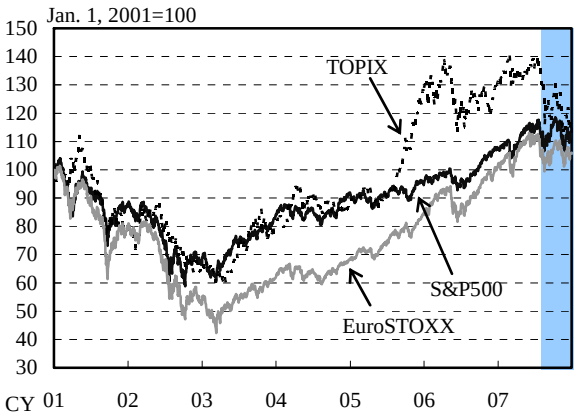
1. The Background to the Turmoil in Financial Markets

The background to the turmoil in financial markets, triggered by the subprime problem in the second half of 2007, is closely related to market participants' investment behavior from around 2003 through the first half of 2007 and the business model of financial intermediation that underpinned their investment activities.

Record-low interest rates and investors' "search for yield"

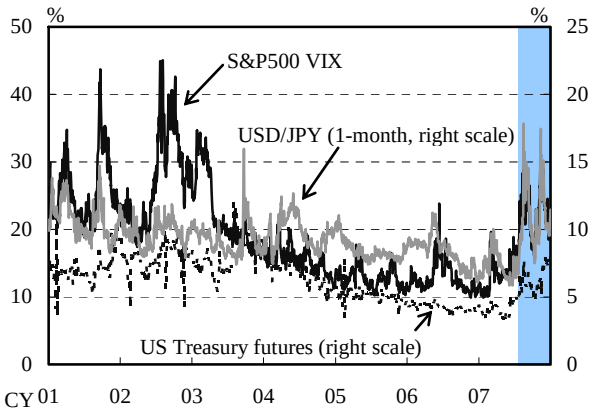
From around 2003, when the post IT-bubble corrections were completed, through the first half of 2007, the general trend in financial markets was characterized by rising asset prices, decreasing volatility, and narrowing credit spreads (Charts II-1-1, II-1-2, and II-1-3). The main factor behind this was the favorable fundamentals of sustained high economic growth and low and stable inflation that continued for several years amid progress in economic globalization. The expectation about the continuation of these stable economic conditions, or the Great Moderation, reduced risk premiums and contributed to the record-low level of long-term interest rates in major countries (Chart II-1-4). Against the background of the low long-term interest rates and narrowing credit spreads, global investors accelerated their "search for yield," taking higher risks to maintain high returns. As returns on investment-grade assets decreased, investors expanded their range of investments to include higher-return assets, thereby taking on higher credit and liquidity risks.

Chart II-1-1: Equity indices



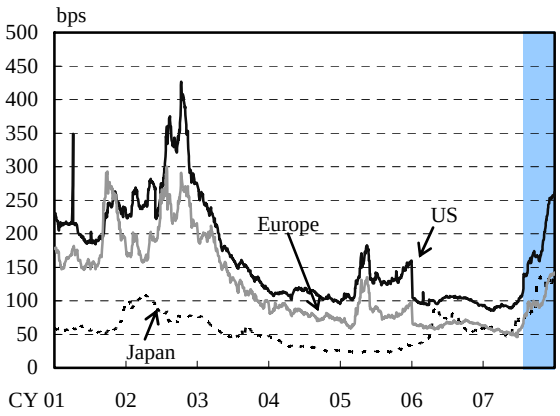
Source: Bloomberg.

Chart II-1-2: Implied volatility in U.S. markets



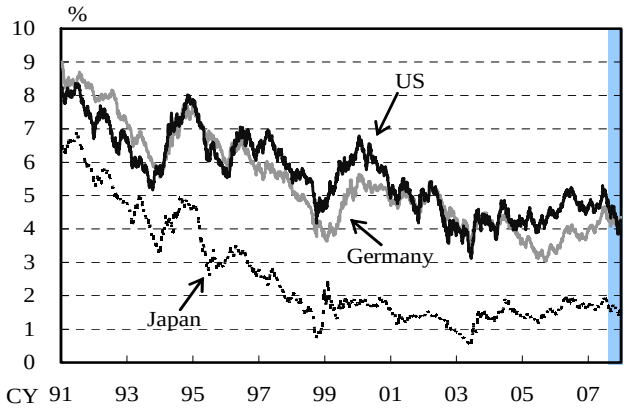
Source: Bloomberg.

Chart II-1-3: Corporate bond spreads



Notes: 1. BBB-rated.
2. See notes for Chart I-4-1.
Sources: Merrill Lynch; Japan Securities Dealers Association.

Chart II-1-4: Government bond yields (10-year)



Source: Bloomberg.

Meanwhile, stress in financial markets occurred several times, for example, the "global risk reduction" in May-June 2006 and the "Shanghai shock" in February-March 2007. Those shocks, however, were swiftly absorbed by ample market liquidity (Box 2). This bolstered investors' active risk-taking stance, and as a result, corrections in the markets ended in a short period of time.

Box 2: Market Liquidity and Investors' Risk-Taking

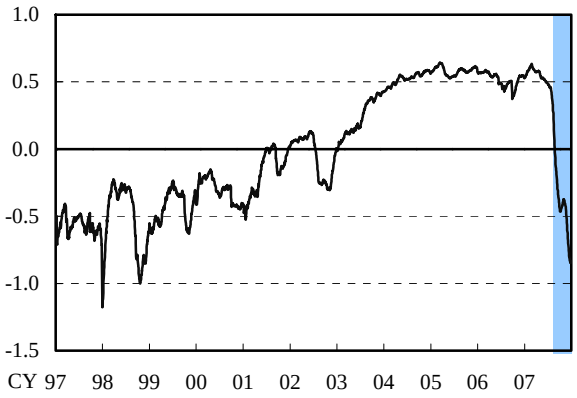
"Market liquidity" refers to how readily a financial asset can be bought or sold without causing a significant movement in its price. When financial market liquidity is low, the difference between prices quoted by buyers and sellers -- that is, the bid-ask spread -- widens, and in this situation large-volume transactions are likely to have a significant price

impact and take time to complete, exposing market participants to the risk of price volatility.

Market liquidity is closely related to market participants' funding liquidity, which refers to their ability to raise sufficient funds in financial markets as and when needed. When market participants face funding liquidity risk -- that is, when it has become difficult for them to raise necessary amounts of funds in the market -- they may be forced to sell assets for funding. If, at this time, market liquidity is low, they are forced to dispose of those assets at a very low price. Such fire sales may lead to a decline in asset prices, and raise investors' funding liquidity risk through, for example, margin calls. This may in turn trigger additional fire sales, a further decline in asset prices and an increase in price volatility, resulting in a reduction of market liquidity.

Conversely, if market liquidity is abundant, such a vicious cycle is unlikely to arise. Since abundant market liquidity allows market participants to sell financial assets at a fair price, they can take risk positions in a more aggressive manner without much concern about funding liquidity risk.

Box 2 Chart: Financial market liquidity



Note: Exponentially weighted 30-business-day moving average.
Sources: Bloomberg; QUICK; Japan Securities Dealers Association.

To examine recent trends in market liquidity, Chart for this box shows an indicator of liquidity in global financial markets. This indicator is composed of several measures of market liquidity such as bid-ask spreads, return-to-volume ratios, and liquidity premiums.[7]

[7] The indicator of market liquidity is an unweighted average of the following individually normalized measures of market liquidity. The underlying measures are the following: (1) the bid-ask spreads in bilateral foreign exchange transactions (spot and 3-month swaps) between the U.S. dollar,

The indicator suggests that market liquidity increased substantially from around 2003, and after remaining at a high level until the first half of 2007, declined sharply.

Several reasons can be identified to explain the ample liquidity in global markets from 2003 to the first half of 2007. The first is the increase in macroeconomic liquidity -- i.e., the increase in liquid assets in global financial markets -- against the backdrop of low and stable long-term interest rates, which resulted from the decline in risk premiums as well as a global saving glut.

The second reason is structural changes in financial markets. On the one hand, innovations in financial markets such as securitization and credit derivatives have enhanced the efficient transfer and distribution of risk; on the other hand, highly active participants such as hedge funds and investment banks have taken on risk and increased their presence in global markets. These developments have increased the number and diversity of market participants, and hence added to the liquidity of financial markets. At the same time, there has been a positive feedback as the increase in market liquidity itself attracted new participants and motivated further innovation in financial products.

The third reason is market participants' greater confidence in risk assessment. Market participants faced less uncertainty about asset price changes as a result of the sustained low volatility of asset prices against the backdrop of stable economic growth and inflation rates. Moreover, even when financial stresses emerged, such as the "global risk reduction" or "Shanghai shock," the adjustment that followed did not take long and the stresses were quickly absorbed by the markets. This experience gave rise to a sense of optimism among market participants and boosted their confidence in risk assessments. Underlying this

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the euro (before 1998, the Deutsche mark), the pound sterling, and the Japanese yen; (2) the return-to-volume ratios of components comprising the S&P500, the EuroSTOXX, and the Nikkei 225 Stock Average; and the average of bid-ask spreads on 1- and 3-month futures corresponding to each of these indices; (3) the 5-year spreads between high-rated corporate bonds and government bonds in the U.S., Europe, and Japan; and the bid-ask spreads of CDSs comprising the CDX.NA.IG, the iTraxx Europe, and the iTraxx Japan; and (4) the 3-month spreads between U.S. dollar-, euro-, and yen-LIBOR and the corresponding government bonds; the average of bid-ask spreads on the 1- to 3-month futures corresponding to the federal funds rate, Euribor, and Euroyen. As for the method employed here, see the Bank of England's *Financial Stability Report* of April/October 2007 and the ECB's *Financial Stability Review* of June/December 2007.

confidence was a self-fulfilling mechanism in which financial asset prices came to be instantaneously and readily determined in the market, i.e., financial market liquidity became abundant, raising investors' risk appetite, causing asset prices to rise, and thereby further reinforcing investors' confidence in their risk assessment.

Proliferation of securitized products and the increasing leverage

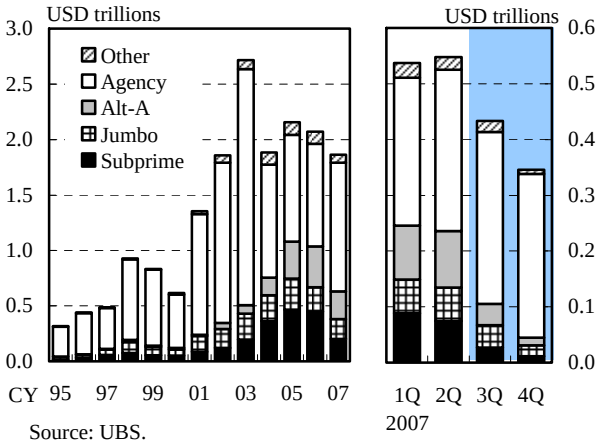
Investors' search for yield led to the growing demand for securitized products. The two main features of securitized products are that pooling large amounts of assets helps to reduce idiosyncratic risks, i.e. risks related to individual underlying assets, and that tranching of liabilities backed by the asset pool generates products with various risk-return profiles which meet investors' risk preferences. The risk-return balance of securitized products is assessed using quantitative models, and the product is given a credit rating that matches the probability of default. Even with loans to borrowers whose creditworthiness is low, high-rated securitized products can be generated by pooling a sufficient number of such loans, because it is unlikely that they will be defaulted on simultaneously. The repayment of these high-rated products is sure up to a certain percentage of the total amount, while the residual tranche of such securitization carries a higher risk than the underlying assets.[8]

Residential mortgage loans are one of the major underlying assets of securitized products. Reflecting investors' great appetite for higher yields, the issuance volume of securitized products backed by subprime mortgages, which are loans to low-income borrowers with a poor credit history, increased substantially through the first half of 2007 (Chart II-1-5). Investors' search for yield also led to a substantial increase in the issuance volume of securitized products backed by loans other than residential mortgages, such as CLOs backed by loans to finance leveraged buyouts (LBOs) and commercial mortgage-backed securities (CMBSs) (Charts II-1-6 and II-1-7).[9]

[8] Examples include senior debt, which has a high rating, mezzanine debt, which ranks below senior debt, and equity tranches, which package a high concentration of credit risk.

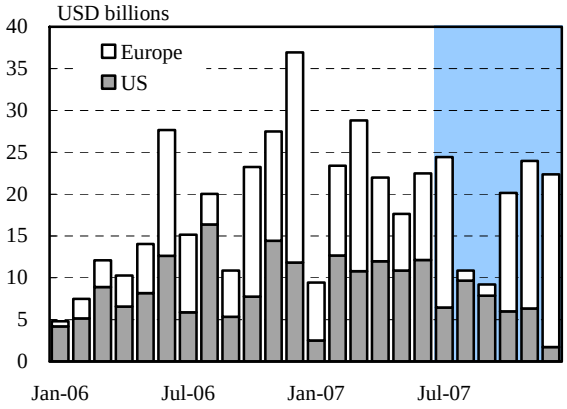
[9] CMBSs are securitized products backed by non-recourse loans whose collateral is cash flows generated from commercial property, such as office buildings, commercial facilities including retail

Chart II-1-5: U.S. RMBS issuance



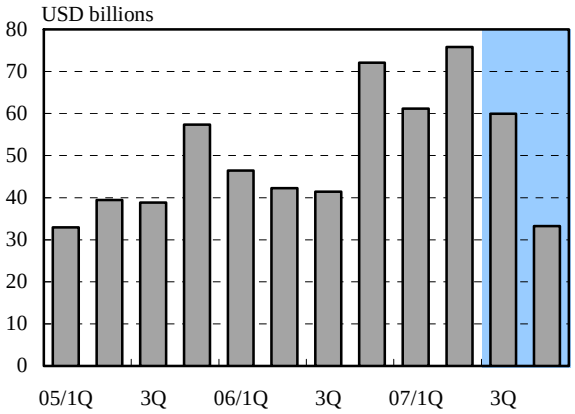
Source: UBS.

Chart II-1-6: CLO issuance



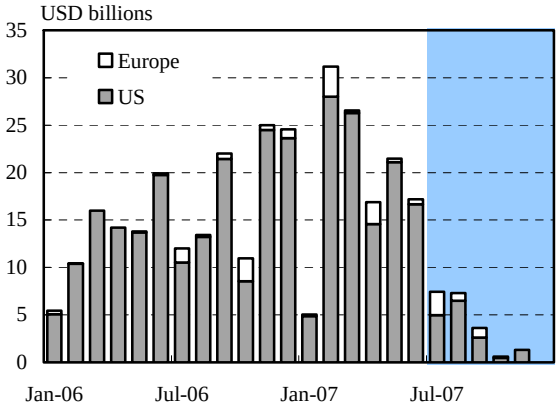
Source: JPMorgan.

Chart II-1-7: U.S. CMBS issuance



Source: JPMorgan.

Chart II-1-8: ABS CDO issuance



Note: The sum of high-grade and mezzanine CDOs.
Source: JPMorgan.

Asset-backed securities collateralized debt obligations (ABS CDOs), that is, resecuritized products backed by primary securitized products such as RMBSs, also became increasingly popular (Chart II-1-8). ABS CDOs, hereafter simply referred to CDOs, provide a wider range of risk-return profiles, since CDOs contain exposure to a greater variety of assets compared with the case of primary securitized products. By pooling low-priced primary securitized products and selling tranches that meet investor demand, issuers of CDOs facilitated arbitrage between products and improved efficiency in their pricing. Cash CDOs backed by securities and synthetic CDOs backed by CDSs also became popular and contributed to increasing market liquidity for securitized products.[10] Moreover, in this securitization process of various products, some investors such as hedge funds increased

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stores, rental apartments, and hotels.

[10] Investors seeking high risk and high return increased their demand for CDOs backed by subprime RMBSs and equity tranches of other CDOs.

their leverage by using purchased securitized products as collateral to raise funds for reinvestment.

In addition, investment programs such as ABCP conduits and structured investment vehicles (SIVs), which issue short-term instruments backed by RMBSs and CDOs, also became popular. Given the trend of narrowing spreads on RMBSs and CDOs, these programs benefited from the spread between short- and long-term interest rates and took on risk of a mismatch between short-term funding and long-term investing.

The originate-and-distribute model and the laxity in risk assessment

As noted above, investors' search for yield became aggressive under the "originate-and-distribute" model of financial intermediation, in which originators transfer credit risks of the underlying assets to a wide range of investors through the market (Box 3). The advantages of this business model are that, through the provision of securitized products that better meet investors' risk preferences, credit risk is allocated more efficiently to a more diverse range of market participants and that economic agents can raise funds more easily.

On the other hand, however, the model carries the risk of giving rise to various distortions in related agents' incentives as the demand for securitized products increases the demand for underlying assets. Since financial institutions which originate loans and construct securitized products are not required to hold related risk assets on their balance sheets, they face weaker incentives to produce sufficient information regarding borrowers' creditworthiness through examination and monitoring. In fact, in the period from around 2004 through the first half of 2007, financial institutions relaxed their lending standards amid continuing favorable economic and financial conditions. For example, they increased loans with high loan-to-value and high loan-to-income ratios, loans with no or low-required documents for qualification, and non-traditional loans with preferential interest rates set for an initial fixation period. There seem to have been many cases of easing lending standards based on the expectation of continued house price appreciation. Lending standards were eased for not only mortgage loans but also other types of loans such as those to finance

LBOs.[11] These cases indicate that problems related to information asymmetries between borrowers and lenders were largely underestimated when loans, i.e., underlying assets of securitized products, were extended.

Investors in securitized products also may have relaxed their due diligence in assessing risks. They possess less information regarding the risks involved in securitized products and in the underlying assets than the originators, i.e., financial institutions that extend the loans and construct securitized products. That is, they lack sufficient information about not only borrowers' creditworthiness but also the extent to which financial institutions examine and monitor borrowers. In addition, end-investors face difficulties in assessing the model assumptions to measure risks for complex credit products such as resecuritized products. Therefore, it would have been necessary for end-investors to develop their own risk management methods, but in reality, end-investors increased their reliance on the rating agencies when making investment decisions. This is because, in spite of the relaxation of banks' lending standards, end-investors came to have confidence in the credit ratings and risk assessment models on which the credit ratings were based. Their confidence resulted from the fact that the relatively favorable credit cycle had continued for several years -- in other words, default rates in credit markets and the volatility of asset prices had been falling and house prices had followed an upward trend. These imply that the problems related to information asymmetries between originators and end-investors also may have been underestimated and not sufficiently addressed.

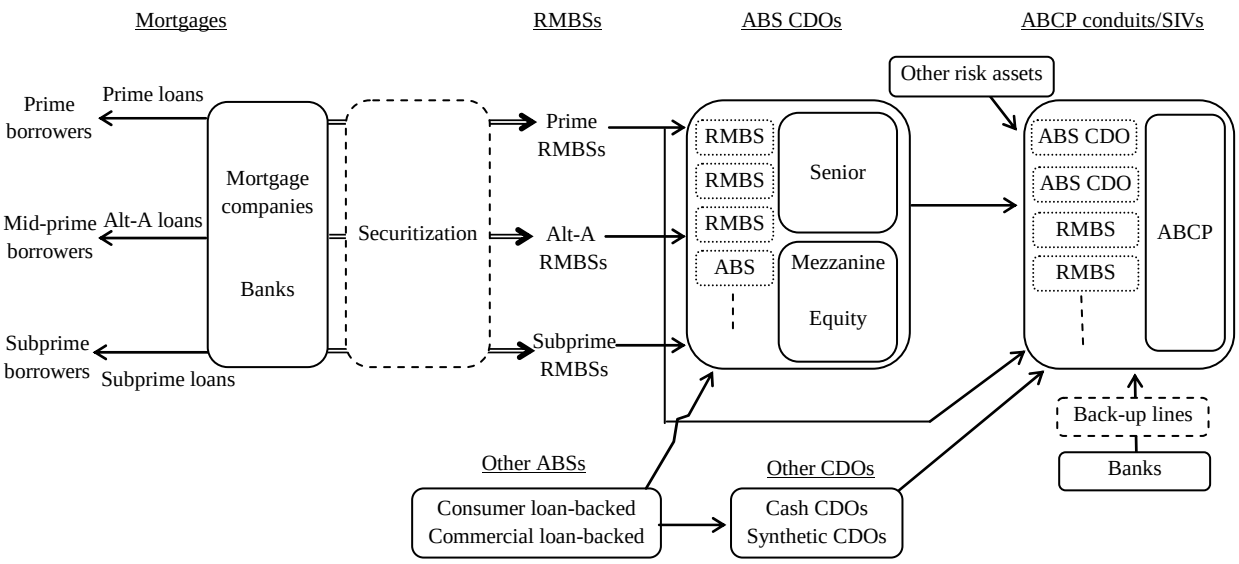
Box 3: The Originate-and-Distribute Model

This box provides a brief overview of the "originate-and-distribute" model of financial intermediation, focusing on mortgage loans as an example (Chart for this box). In this business model, financial institutions originate mortgage loans, repackage these loans into RMBSs, and then sell them on to investors. Since mortgage lenders can raise funds through this securitization process and originate further mortgage loans, even mortgage

[11] Issuance of so-called "covenant-lite" loans, which lack traditional financial rules that allow banks to require minimum levels of leverage and interest rate coverage, increased from around 2006.

companies, which do not have stable funding sources such as deposits, have been able to take a large share of the housing loan market in the U.S.

Box 3 Chart: Originate-and-distribute model



RMBSs were pooled with other asset-backed securities and resecuritized into CDOs with different tranches in order to meet investors' diverse needs. Moreover, investment vehicles such as ABCP conduits and SIVs, which hold long-maturity RMBSs and ABS CDOs financed largely by short-maturity ABCP, became widespread.

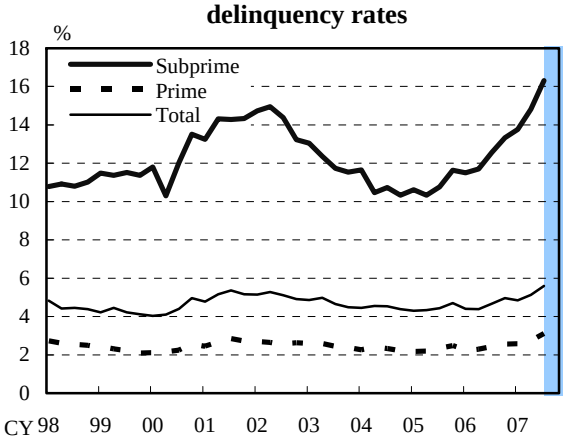
This type of risk transfer based on the originate-and-distribute model has also increasingly spread in the financing of LBO transactions. Because of the huge debt burden on the acquiring company, LBO loans involve relatively high risks; however, LBOs became very popular since (1) financial institutions could distribute these loans as CLOs and easily move them off the balance sheet, and (2) investors tended to prefer the higher returns commensurate with the higher risk that CLOs offered. These developments, coupled with the M&A boom from around 2003 onward, led to the increased issuance of CLOs.

The corollary of these practices is that while on the one hand the originate-and-distribute model has reduced the concentration of credit risk in the banking system by diversifying risk through securitization, on the other hand it has also made it difficult to identify who holds the ultimate risk, as securitization markets in the U.S. and Europe have become increasingly multilayered.

The unwinding of the virtuous cycle

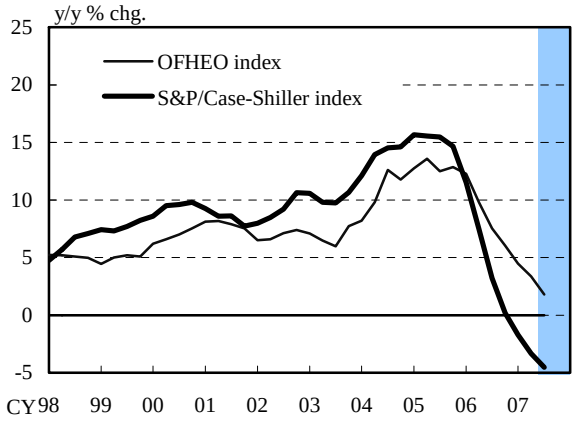
Investors' search for yield in the originate-and-distribute model led to the virtuous cycle of rising asset prices, decreasing volatility, and increasing market liquidity. All these reinforced each other until the first half of 2007. However, this virtuous cycle turned into a vicious cycle with the rise in delinquency rates on mortgages (Chart II-1-9). Delinquency rates on subprime mortgages started to rise gradually from around the end of 2005 and reached 14 percent in the April-June quarter of 2007, reflecting the rise in interest rates and the deceleration in the house price inflation rate (Chart II-1-10). With the rise in irrecoverable subprime mortgage loans, major financial institutions increased provisions for credit losses and the number of mortgage companies in financial difficulty increased. In July 2007, rating agencies started to conduct a thorough review of credit ratings of subprime RMBSs to downgrade them, triggering a plunge in their market values, the effects of which then began to spread throughout financial markets.

Chart II-1-9: U.S. residential mortgage delinquency rates



Note: Adjustable/fixed rate mortgages delinquent for 30+ days.
Source: Bloomberg.

Chart II-1-10: U.S. house price inflation



Note: While the OFHEO index consists of conventional conforming mortgage transactions obtained from Freddie Mac and Fannie Mae, the S&P/Case-Shiller index (10-city composite) includes both nonconforming and conforming mortgage transactions.
Sources: OFHEO; Standard and Poor's.

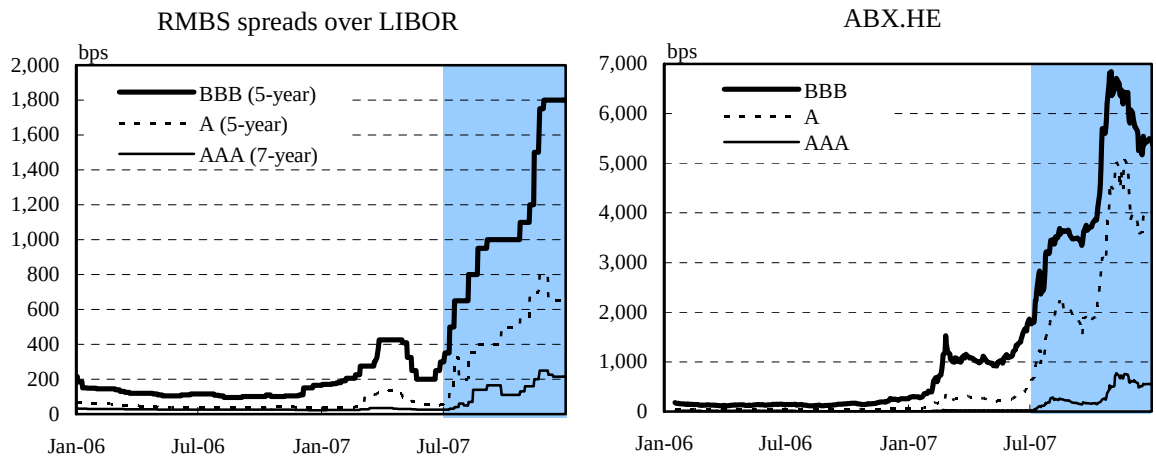
2. The Impacts of the Subprime Problem on Financial Markets

This section explains the impacts of the subprime problem on financial markets, focusing on the following: (1) subprime RMBSs and resecuritized products backed by them; (2) securitization markets overall; and (3) other financial markets.

Subprime RMBSs and resecuritized products backed by them

The spread on subprime RMBSs (i.e., the spread over benchmark rates such as government bond yields) expanded rapidly in July-August 2007 due to downgrades by rating agencies (Chart II-2-1). Particularly BBB or lower-rated tranches of 2005-06 vintage were downgraded in summer 2007. However, from autumn, downgrades on credit ratings spread to higher-rated tranches and 2004-07 vintage, and the degree of downgrades increased. Toward the end of 2007, spreads on subprime RMBSs and resecuritized products backed by them widened further, affecting spreads on A or higher-rated tranches as well as BBB tranches. In addition, ratings downgrades due to the rise in delinquencies increased among RMBSs backed by alternative-A (Alt-A) loans, whose risk category falls between prime and subprime loans, and as a result spreads on those RMBSs expanded.

Chart II-2-1: Subprime RMBS and ABX.HE in U.S.



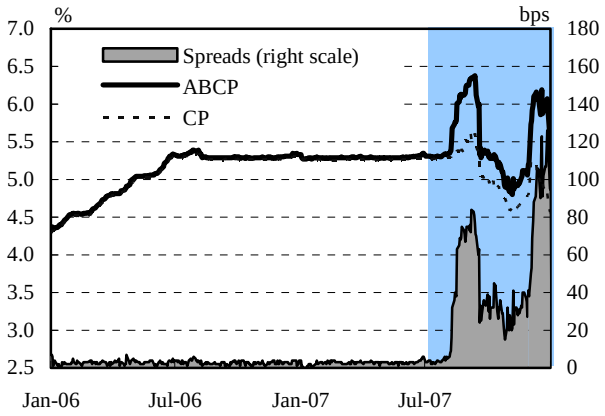
Note: ABX.HE is a set of value indices linked to CDSs on 20-subprime RMBSs. Data are spreads converted from prices.
Source: JPMorgan.

The widening of spreads on subprime RMBSs also led to an expansion in spreads on ABCPs and CDOs backed by subprime RMBSs (Charts II-2-2 and II-2-3). Ratings downgrades of ABCPs increased from August 2007, and those of CDOs from mid-October, and such downgrades accelerated the expansion in the spreads. In this situation, the issuance volume of subprime RMBSs, Alt-A RMBSs, and CDOs decreased substantially in the second half of 2007 (Charts II-1-5 and II-1-8). In particular, deals for resecuritized products such as CDOs became difficult from summer 2007 because the uncertainty regarding risk assessment was high and investors were extremely cautious about purchasing them.[12] The

[12] Spreads on ABS CDOs from October 2007 shown in Chart II-2-3 are estimates based on

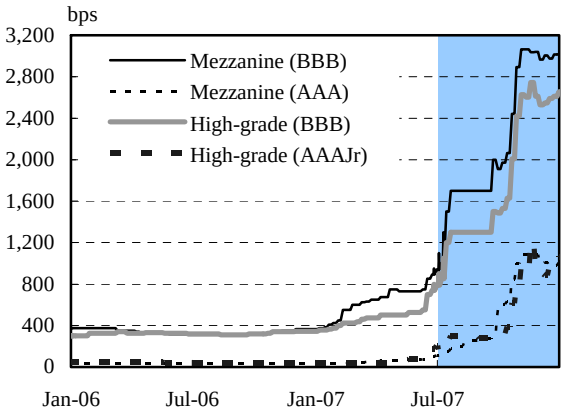
amount outstanding of ABCPs issued, which was on the rise until mid-2007, fell substantially (Chart II-2-4).

Chart II-2-2: U.S. ABCP spreads over CP rates



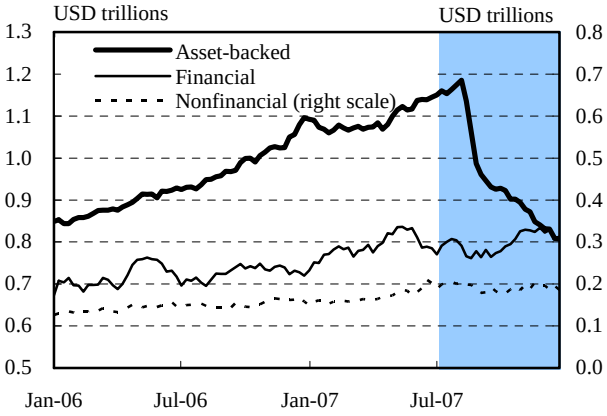
Note: 1-month maturity.
Source: Bloomberg.

Chart II-2-3: U.S. ABS CDO spreads over LIBOR



Note: Data from Oct. 2007 are estimates by JPMorgan.
Source: JPMorgan.

Chart II-2-4: U.S. ABCP outstanding



Source: FRB.

Impacts of the subprime problem on securitization markets overall

Disruptions in the U.S. markets for subprime RMBSs and resecuritized products backed by them affected securitization markets overall, including markets for CLOs, CMBSs, and even European RMBSs. Unlike in the U.S. RMBS market, the performance of underlying assets in these markets did not necessarily deteriorate as of the second half of 2007. Nevertheless, some conditions in these markets were similar to the U.S. RMBS market: lending standards for underlying loans were eased, and the credit ratings and risk

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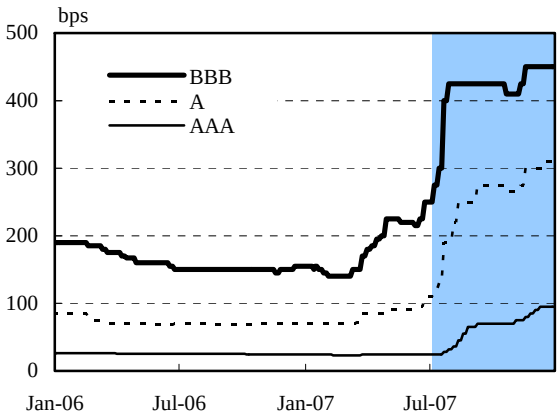
ABX.HE, since there were no trades of ABS CDOs.

assessments of these securitized products were based on default data from a relatively favorable credit cycle. For this reason, an increasing number of investors in these markets started to reassess risks and take a more cautious stance in their investment decisions.

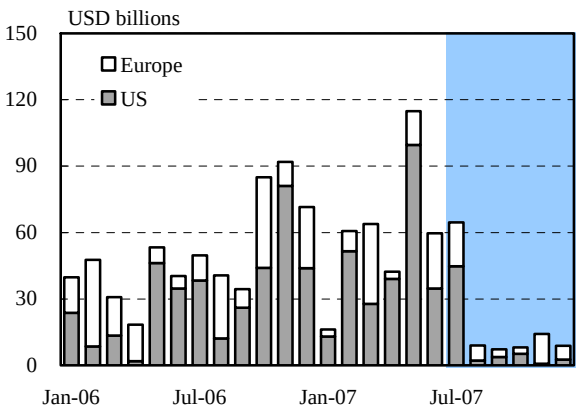
In the U.S. CLO market, spreads widened markedly from the summer of 2007 onward (Chart II-2-5). Since more information was disclosed regarding the underlying assets of CLOs when compared with RMBSs,[13] some CLOs still attracted a certain number of investors. However, the amount of newly issued CLOs in the U.S. market in the second half of 2007 decreased from the first half (Chart II-1-6). Given the sluggishness in CLO issuance and the rise in issuance cost, the number of LBO deals also decreased (Chart II-2-6).

Chart II-2-5: U.S. CLO spreads over LIBOR



Source: JPMorgan.

Chart II-2-6: LBOs



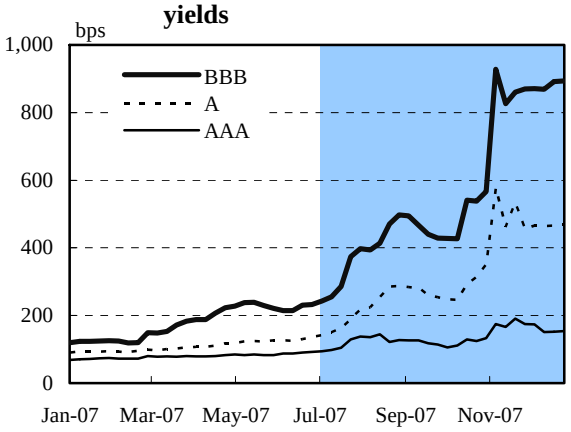
Source: Thomson Financial.

In the U.S. CMBS market, too, spreads started to widen gradually from the summer of 2007 (Chart II-2-7). Spreads on the CDS indices for CMBSs and those on commercial real estate (CRE) CDOs, which are resecuritized products backed by CMBSs, also widened. These spreads rose sharply from around November as market participants became concerned about the negative impacts of a tightening of bank credit, and as a result, CMBS issuance volume decreased (Chart II-1-7). In the U.S., spreads on ABSs backed by consumer loans as well as by corporate loans and mortgage loans widened rapidly around

[13] For example, information about loans to finance LBOs is disclosed in each individual M&A case, including the amount of funds required to finance the M&A deal, the amount of bank loans required by the acquiring company, and the financial conditions of the acquired company. Thus, uncertainties about risk assessment of CLOs are smaller compared with subprime RMBSs.

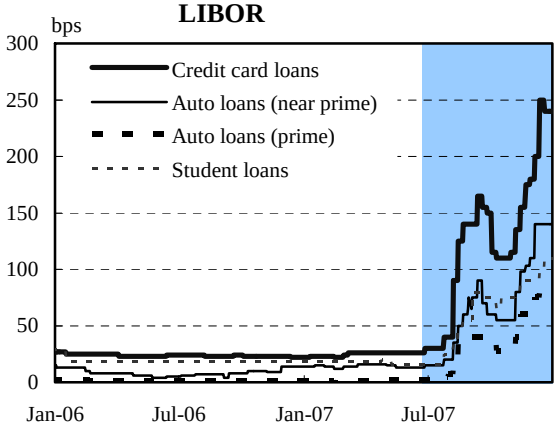
the year-end (Chart II-2-8). This reflected market participants' concern that the decline in house prices would impair households' capacity to repay their debts.

Chart II-2-7: U.S. CMBS spreads over Treasury yields



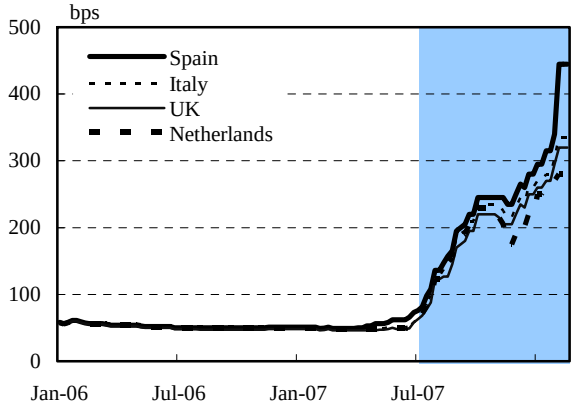
Source: JPMorgan.

Chart II-2-8: Consumer loan ABS spreads over LIBOR



Source: JPMorgan.

Chart II-2-9: European RMBS spreads over LIBOR



Note: BBB-rated five-year spreads over LIBOR except for Spain, for which the data are 10-year spreads over LIBOR.
Source: Lehman Brothers.

In the European and U.K. RMBS markets, spreads widened from the summer 2007 onward, although the extent of widening was smaller than that in the U.S. market (Chart II-2-9). The widening pertained to the following factors. First, non-traditional residential mortgage loans, which allow borrowers to reduce the initial burden of repayments, had increased in Europe in recent years, leading to concerns about their creditworthiness. Second, European financial institutions became risk-averse as they also incurred losses from investments in U.S. subprime-related products. Unlike in the U.S., however, the mortgage market in Europe (with the exception of some countries) was not in an adjustment phase, and therefore the issuance volume of RMBSs seems to have maintained a reasonable

amount.

Impacts of the subprime problem on financial markets overall

As explained in Chapter I, the impacts of disruptions in securitization markets spread widely throughout global financial markets. The following factors contributed to this. First, against the background of increased losses in securitized products and concerns about liquidity shortages, market participants reevaluated other risk assets and reduced their exposure to those assets. Second, market participants became concerned that the turmoil in global financial markets might depress the macroeconomy through, for example, a tightening of bank credit. Following is a summary of developments observed in the financial markets overall.

Beginning with U.S. and European credit markets other than securitization markets, corporate bond spreads and CDS premiums, especially low-rated ones, widened (Charts I-4-2 and II-1-3). Spreads on municipal bonds, whose principal and interest are guaranteed by U.S. monoline insurers, also widened because monolines suffered losses from insurance of securitized products and market participants became concerned about the deterioration in their business performance (Box 4). Compared with the spreads on securitized products, the widening of spreads on corporate and municipal bonds was small, and their issuance volume maintained a reasonable amount in the second half of 2007. However, the issuance volume of speculative-grade corporate bonds was somewhat sluggish, and funding costs for those issuing firms increased.

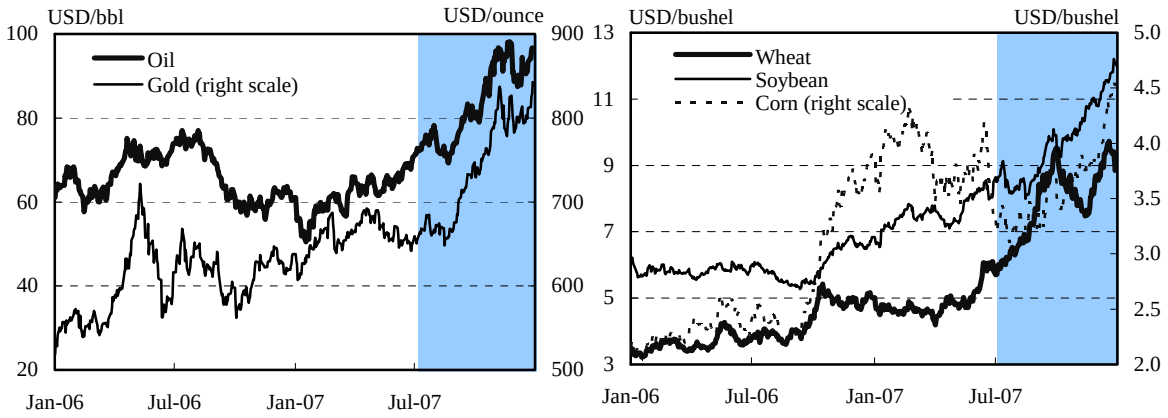
Stock markets came under downward pressure in the U.S. and Europe (Chart I-3-1). In foreign exchange markets, the depreciation of the U.S. dollar accelerated and the unwinding of yen carry trades, which aim at benefiting from low volatility and interest rate differentials, became more evident (Chart I-5-1). In addition, the turmoil in securitization markets triggered by the subprime problem caused temporary tension in money markets (Box 1).

With the continuing instability in global financial markets, the risk appetite of investors decreased, prompting a "flight to quality" and causing an inflow of funds into government bond markets, and as a result, long-term interest rates in major economies declined throughout the second half of 2007 (Chart I-2-1). As for short-term financial assets,

investors that had been major buyers of ABCP, such as money market funds (MMFs), shifted their funds from risk assets to Treasury bills, leading to a sharp widening of the TED spreads (Chart I-1-8).

With the heightening of uncertainty over the risk assessment of financial assets, there was also a growing tendency among investors to flee from financial markets to commodity markets, since the risks involved in real assets are relatively transparent. The speculative inflow of funds to international commodity markets led to across-the-board rise in prices of commodities such as crude oil and grain amid the continued increase in global demand (Chart II-2-10).[14] The rise in these commodity prices intensified market participants' concerns about inflation and downward pressure on industrialized economies, especially in the U.S. and Europe, and this in turn seems to have increased uncertainties regarding future economic and financial developments.

Chart II-2-10: Commodity prices



Note: Data for oil and gold are the nearest contracts traded on NYMEX; those for grains are the nearest contracts traded on CBOT.
Source: Bloomberg.

Box 4: Monoline Insurers

U.S. monoline insurers, or monolines for short, guarantee the payment of bond principal and interest when an issuer defaults. Monolines have a high rating, and the financial products that they insure receive the same rating as the monolines. As of the second half of

[14] The rise in international commodity prices seems to have been supported by market participants' view that, despite the slowdown of the U.S. economy, global demand for crude oil and grain would continue to be firm because of the expansion of emerging economies.

2007, there were in total seven monolines with an AAA rating, guaranteeing 1.2 trillion U.S. dollars worth of U.S. municipal bonds and 600 billion U.S. dollars worth of securitized products. By conferring their own creditworthiness on the insured products, monolines have come to function as part of the market infrastructure that keeps market liquidity high.

Amid the recent decline in the prices of securitized products, monolines suffered losses from insurance of securitized products and reported large losses in the third quarter of 2007. Moreover, some rating agencies announced that they would review whether the major monolines possessed sufficient capital for an AAA rating and that, if this was not the case, they would downgrade them. When this news hit the market, the monolines' stock prices dropped and their CDS premiums rose.[15] The review for possible downgrade of the monolines was considered likely to have a negative impact on financial markets through the downgrade of the financial products guaranteed by the monolines and the reappraisal of off-balance-sheet transactions with them. These concerns led to a widening of the yield spreads on securitized products and municipal bonds.

3. How and Why the Market Turmoil Spread

The proliferation of the originate-and-distribute model is originally expected to develop securitization markets and promote efficient transfer/allocation of credit risk by providing various securitized products that meet investors' risk preferences. Compared with the "originate-and-hold" model whereby banks hold risks until loan maturity, the originate-and-distribute model was considered to enhance the shock-absorption capacities of the financial system by diversifying risks throughout the market. As explained in the previous section, however, the rise in delinquencies on subprime mortgages, which merely comprised a small portion of underlying assets of securitized products, triggered the deterioration in the functioning of securitization markets in the second half of 2007. And the negative effects spread widely to other risk asset markets, including stock markets, and furthermore to money markets. This section discusses how and why the subprime problem

[15] In 2008, several monolines were indeed downgraded, and this triggered a simultaneous downgrade of the municipal bonds, securitized products, and corporate bonds guaranteed by those monolines.

spread throughout financial markets in a short period of time, focusing on four aspects: (1) information asymmetries and the mispricing of risks; (2) mark-to-market valuations and deleveraging; (3) maturity mismatches between assets and liabilities; and (4) involuntary expansion of banks' balance sheets. Note that the following assessment is tentative, since the financial market turmoil is still ongoing.

Information asymmetries and the mispricing of risk

As mentioned earlier, the relaxation of risk assessment in the originate-and-distribute model is related to two sets of information asymmetries: first, asymmetries regarding the risk profiles associated with underlying assets between "borrowers (households and firms)" and "lenders (financial institutions)"; and second, asymmetries regarding the risk profiles associated with securitized products between the "originators (financial institutions who extend loans and construct those products)" and "end-investors." Until summer 2007, against the background of favorable credit conditions due to the continuing rise in house prices, financial institutions relaxed their lending standards and maintained accommodative lending attitudes, while end-investors' confidence in their risk assessment strengthened and their reliance on credit ratings increased. This seems to have resulted in an underestimation of problems arising from information asymmetries.

The increase in delinquency rates on subprime mortgages and the associated ratings downgrades on securitized products raised market participants' awareness about the asymmetric information problems. As it became clear that risks had not been assessed adequately, i.e., that they had been mispriced, financial institutions tightened lending standards and end-investors in securitized products became concerned about the increasing uncertainty about risk assessments. While rating agencies and monolines had contributed to the expansion of securitization markets by mitigating the asymmetric information problems, the subprime problem triggered growing concerns about the quality of credit ratings and about the financial conditions of monolines, which also seem to have heightened uncertainty about risk assessments (Box 4). This increase in uncertainty then made it difficult to reassess or reprice the risks associated with securitized products, leading to a deterioration in market liquidity (Box 2).

The asymmetric information problem is not unique to subprime mortgages and

securitized products backed by them, but common to all stages of the originate-and-distribute model, although to a varying degree. In this sense, the subprime problem can be interpreted as the "trigger" that revealed the asymmetric information problems in the originate-and-distribute model rather than the "source" of the recent turmoil in financial markets.

Mark-to-market valuation and deleveraging

The repricing of the risks associated with securitized products set off a process of deleveraging through mark-to-market valuations (Box 5). For example, some investors who had increased their leverage in pursuit of high returns were forced to sell their assets because the decline in the market value of subprime-related securitized products made investors face margin calls (higher collateral requirements) or because the decline exceeded their stop-loss limits.

When market liquidity for securitized products deteriorates, investors are often forced to deleverage by disposing of assets at fire-sale prices, leading to heavy losses (Box 2). As a result, investors are likely to face higher funding liquidity risk, and will be required to sell a wider range of financial assets, such as stocks, in order to secure liquidity. Such selling of assets may be followed by a further drop in asset prices and an increase in volatility, thus leading to a further decline in market liquidity.[16] In fact, deleveraging triggered the mutually correlated deterioration in market liquidity and funding liquidity, causing the closure of several hedge funds in summer 2007.

[16] The economic value of securitized products derives from the returns on underlying assets when they are held to maturity. The market value of securitized products is affected by not only changes in the economic value but also market liquidity. Investors may continue to hold securitized products if they expect that the economic value of those products will remain unchanged despite the decline in the market value. However, in reality the following factors increased selling pressure on securitized products and caused large fluctuations in their market value: (1) mark-to-market valuations of securitized products and increases in margin calls, as described in the text; (2) funding difficulties of SIVs and ABCP conduits; and (3) the breach of the overcollateralization tests on some CDOs.

Box 5: Deleveraging and Asset Price Falls

Suppose that an investor's initial balance sheet is as follows.

Assets	Liabilities/Capital
A100	D90
	E10

$$Leverage = \frac{A}{E} = \frac{A}{A-D} = 10$$

Here, *A*, *D*, and *E* are the market values of total assets, debt, and equity, respectively. Leverage is defined as the ratio of total assets to equity, hence is 10.

Next, suppose that, through a decline in prices of securitized products related to subprime mortgage loans, the market value of assets falls by 5 percent, i.e., *A* decreases from 100 to 95. The decrease in *A*, in turn, impairs equity capital, causing a decline in *E* from 10 to 5 as shown in the next balance sheet, and the leverage increases from 10 to 19. Note that the market value of debt, *D*, is assumed to be roughly constant regardless of changes in the market value of assets, *A*.

Assets	Liabilities/Capital
A95	D90
	E5

$$Leverage = \frac{A}{A-D} = \frac{95}{95-90} = 19$$

When there is downward pressure on asset prices, the investor may decide that the increase in leverage is undesirable and, as part of risk management, try to keep it constant. In other words, in order to restrain the increase in leverage arising from the decrease in *A*, the investor will deleverage by selling assets and at the same time reducing debt. Then, the new balance sheet will be as follows.

Assets	Liabilities/Capital
A50	D45
	E5

$$Leverage = \frac{A}{A-D} = \frac{50}{50-45} = 10$$

Compared to the outset, the size of the balance sheet has decreased by 50 percent, meaning that the decrease is far larger than the initial fall in the market value of assets by 5 percent.

Deleveraging through the sale of assets, as in this example, is likely to cause an additional fall in asset prices, leading to another round of asset sales. Moreover, when asset prices are on a downward trend, risk-sensitive investors may try to keep leverage ratios below their initial level, 10 in this example, by selling a larger amount of assets, and asset

prices may in turn fall further. Indeed, it has been pointed out that there is a tendency for the leverage of investment banks and some hedge funds to become pro-cyclical, with leverage increasing as asset prices rise and decreasing as prices fall.[17]

Maturity mismatches between assets and liabilities

The deterioration in both market and funding liquidity was attributable not only to investors' deleveraging but also to the materialization of risks associated with the maturity mismatches on the balance sheets of investment vehicles. Many U.S. and European financial institutions organized and sponsored investment vehicles such as SIVs and ABCP conduits (Box 3). With the aim of profiting from differences between short- and long-term interest rates, these vehicles invested in medium- to long-term assets such as securitized products to hold them until maturity, and financed those assets through the issuance of short-term ABCPs.[18] Although market liquidity for securitized products was lower than that for government securities and stocks, there was no strong concern about liquidity risks associated with maturity mismatches until summer 2007 because investment vehicles found it easy to roll over their ABCPs.

From summer 2007 onward, however, the key investors in ABCPs, including money market mutual funds, took a very cautious investment stance against the background of the decline in market value of underlying securitized products of ABCPs. In early August, as some ABCP programs exercised options to extend the maturity of their papers, yields on ABCPs rose sharply and financing conditions for SIVs and ABCP conduits tightened (Chart

[17] See Adrian, T., and H. S. Shin, "Liquidity and Leverage," a paper presented at the annual conference of the Bank for International Settlements titled "Financial System and Macroeconomic Resilience" in Brunnen on June 18-19, 2007.

[18] Both ABCP conduits and SIVs invest in medium- to long-term securitized products by financing them with short-term funding. Whereas ABCP conduits essentially raise funds themselves with ABCPs, SIVs fund their own capital base through the issuance of capital notes and finance highly leveraged investments by raising funds with medium-term notes and ABCPs. ABCP conduits are normally provided with full liquidity support for their ABCPs from the sponsoring financial institutions, while SIVs have different levels of liquidity support where about 10 percent of total funding is covered.

II-2-2).[19] As a result, SIVs and ABCP conduits faced funding liquidity risks and some were forced to sell their securitized products (Chart II-2-4). This was followed by an increase in volatility in market prices and a further drop in the market value of those products, thus leading to a further decline in market liquidity and making their assets difficult to value or trade.

Involuntary expansion of banks' balance sheets

Facing difficulty in funding, some SIVs and ABCP conduits drew on back-up liquidity facilities provided by their sponsoring banks. The banks which provided liquidity support expanded their balance sheets by making loans secured against assets held by SIVs and conduits. Two German banks, IKB and Sachsen LB, had to raise a massive amount of funds to provide liquidity support to their affiliated SIVs and ABCP conduits, which were experiencing difficulty in rolling over ABCPs, and as a result, these banks themselves faced funding liquidity risk.[20] In addition, some other banks were forced to purchase the assets of their affiliated SIVs and take them onto their own balance sheets in order to prevent SIVs from liquidating assets at fire-sale prices.[21]

The involuntary expansion of banks' balance sheets also resulted from the deterioration in market liquidity for CLOs. The decline in investors' appetite for CLOs left banks holding a large share of already arranged loans for LBOs which they had expected to transfer off their balance sheets.

As these examples show, the disruption in securitization markets since summer 2007

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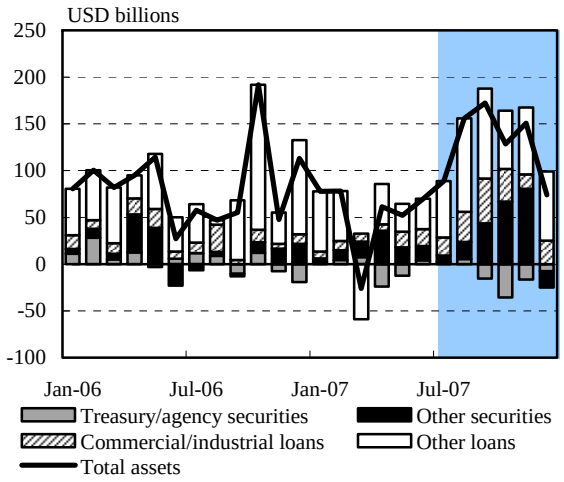
[19] Extendible ABCP is essentially the same as traditional ABCP except that, in the event of a market disruption, if specific criteria are met, issuers have the option to extend the maturing ABCPs in exchange for paying a premium. If issuers exercise options and find it difficulty in rolling over ABCPs in the predetermined extended rolling period, they are required to raise funds for redemption through, for example, the sale of assets.

[20] In the U.K., Northern Rock, a medium-sized mortgage bank, had little exposure to subprime-related products but relied heavily on short-tem financing, and as a result it faced sudden liquidity difficulties when money market conditions tightened. Given this, the Bank of England provided emergency financial support to Northern Rock.

[21] Three major U.S. banks proposed the creation of a Master Liquidity Enhancement Conduit (M-LEC) to avoid fire sales of assets by distressed SIVs. However, the plan was later abandoned and it was left to the individual efforts of sponsoring banks to restructure the SIVs.

led to the reintermediation of risk whereby banks took back onto their balance sheets the risk assets that had been once transferred off their balance sheets under the originate-and-distribute model (Chart II-3-1).[22] This reintermediation of risk, in turn, affected the financial intermediation process significantly through the following two channels.

Chart II-3-1: Monthly changes in U.S. banks' assets



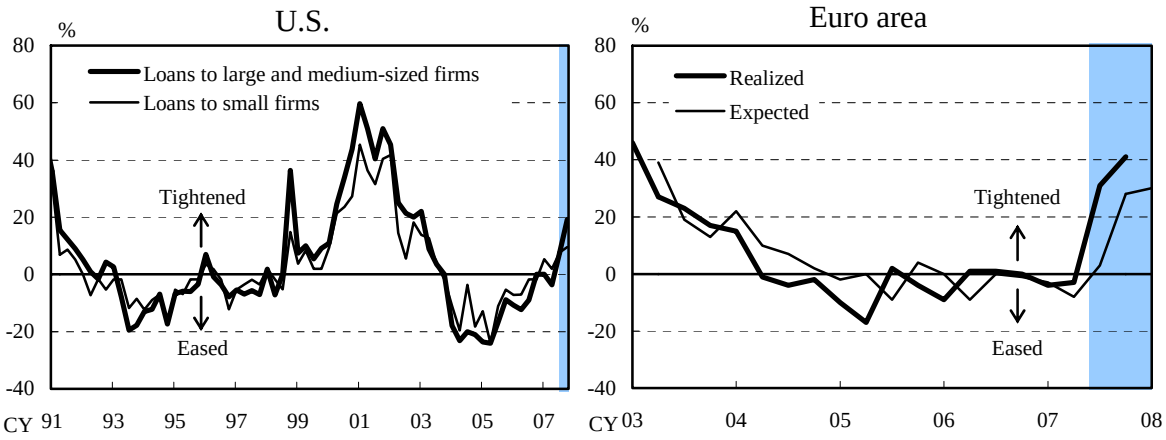
Note: Seasonally adjusted.
Source: FRB.

The first channel was through the rise in banks' funding liquidity risk. Banks increased their demand for funds in money markets to finance the involuntary expansion of their balance sheets. Banks providing liquidity in the interbank market, on the other hand, became wary of lending funds to other banks due to concerns about counterparty risk. As a result, the upward pressure on interbank rates intensified and precautionary demand for funds increased further among banks that became concerned about funding liquidity risk. Through this channel, the subprime problem caused a tightening in money markets (Box 1). The second channel was through the downward pressure on banks' capital ratio caused by the increase in risk assets and their mark-to-market losses and in a provision for credit losses. It seems that through these two channels the reintermediation of risk made banks become more restrictive in their lending in the second half of 2007, as shown in loan

[22] In Chart II-3-1, the increase in "other securities" reflects the fact that U.S. banks took the assets of their affiliated ABCP conduits and SIVs onto their own balance sheets. The increase in "commercial/ industrial loans" reflects banks' provision of liquidity support to their affiliated ABCP conduits and SIVs and extension of bridge loans to finance LBOs.

surveys conducted by the Federal Reserve and ECB (Chart II-3-2).

Chart II-3-2: Bank lending practice



Sources: FRB, "Senior Loan Officer Opinion Survey on Bank Lending Practices"; ECB, "The Euro Area Bank Lending Survey."

Toward the end of 2007, these effects of the reintermediation of risk gradually raised concerns that the turmoil in financial markets might, via the banking system, adversely affect the macroeconomy. For example, the tightening of bank lending reduces the availability of residential mortgages, thereby weakening housing investment and in turn increasing downward pressure on house prices. This then pushes down the market value of securitized products, leading to an increase in banks' losses and a reduction in the collateral value of houses, and eventually reduces banks' lending appetite further. In the U.S. residential mortgage market, not only commercial banks and other mortgage companies but also government-sponsored enterprises (GSEs) play an important role in ensuring the smooth financing of housing loans. Although the turmoil in financial markets did not affect GSE securitization and the availability of conforming loans as of the second half of 2007, the yield spreads on GSE bonds (over U.S. treasuries) expanded somewhat from summer 2007 onward (Box 6).

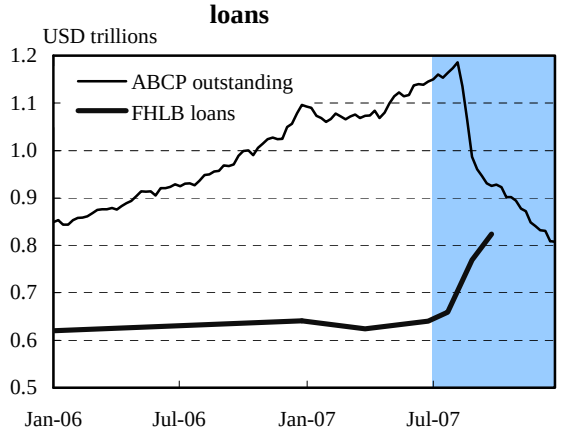
Box 6: Government-Sponsored Enterprises in the Financial Sector

In the U.S., GSEs play a large role in the housing finance market. Among these, the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac) are principally engaged in purchasing and securitizing prime mortgage loans, called conforming loans, while also investing in securities, especially

RMBSs. The Federal Home Loan Banks (FHLBs) are principally engaged in providing cost-effective funding to their members for home mortgage, small business, and agricultural lending.

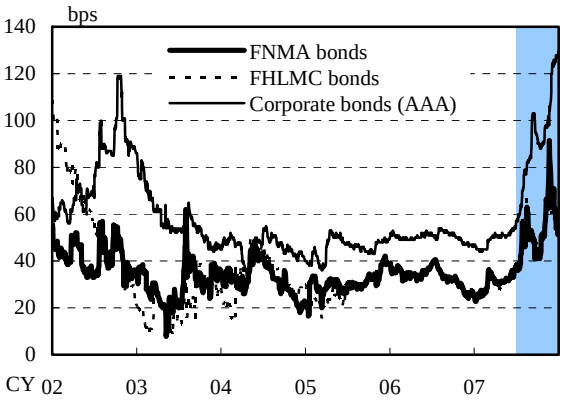
From August 2007 onward, FHLBs increased loans to their members who faced difficulties in raising funds in money markets and,[23] as a result, FHLBs increased bond issuance to secure funds for lending. This increase in lending by the FHLBs seems to have helped to ease the tightness in money markets to some extent (Chart for this box).

Box 6 Chart 1: ABCP outstanding and FHLB loans



Sources: FRB; FHLB.

Box 6 Chart 2: GSE bond spreads over Treasury yields



Notes: 1. Five-year GSE bonds.
2. See notes for Chart I-4-1 regarding corporate bonds.
Sources: JPMorgan; Merrill Lynch.

Meanwhile, Fannie Mae and Freddie Mac posted net losses in the third quarter of 2007 primarily due to provisions for credit losses on purchased mortgage loans and losses on mark-to-market items, including RMBSs. For this reason, and also due to the increase in bond issuance by the FHLBs reflecting the surge in their lending, the GSE bond spreads over U.S. treasuries widened somewhat (Chart 2 for this box).

[23] Reasons why borrowing from the FHLBs was preferred to that from the Federal Reserve's discount window are the following: (1) funding costs for members are lower than the discount window rate; (2) term funding is available; and (3) the stigma associated with directly approaching the central bank can be avoided.

4. Conclusion

The recent turmoil triggered by the subprime problem in the originate-and-distribute financial system differs in two ways from past financial crises, such as the U.S. Savings and Loan (S&L) crisis and Japan's nonperforming-loan (NPL) problem which occurred in the traditional originate-and-hold system.

The first difference is that disruptions spread much "faster" in the recent turmoil. This is because, in the originate-and-distribute system whereby loans are converted into marketable securities, changes in market prices of financial assets tend to affect market participants' activities more strongly than in the originate-and-hold system. Although the significant deterioration in market liquidity made it difficult for investors to reevaluate financial assets adequately, one of the advantages over the originate-and-hold system is that market vigilance forces financial institutions to take prompt action.

The second difference is that disruptions spread much more "broadly" in the recent turmoil. It is generally believed that in the originate-and-distribute system, securitization enhances financial stability because of its advantages in risk diversification. However, as recent events have shown, when uncertainty about market values of financial products and about market structure increases, financial shocks are likely to affect a broader range of markets than in the originate-and-hold system. One of the reasons is that, due to the multilayered market structure and information asymmetries, a wide range of market participants is likely to become greatly concerned about the complexity of risks embedded in securitized products and the difficulty of identifying where the risks end up. Furthermore, investment behavior of market participants, such as deleveraging, is likely to immediately affect not only the securitization market but also the credit market overall and the stock market, leading to mutually correlated deterioration in market liquidity and funding liquidity. If the deterioration in market participants' funding liquidity is left unattended, their credit risk is likely to increase, resulting in even more severe turmoil in financial markets. For this reason, central banks in the U.S. and Europe took steps outside the usual policy framework to provide markets with ample liquidity, and this has been effective in that these steps alleviated funding liquidity risk and prevented mutually correlated deterioration in market liquidity and funding liquidity.

On the other hand, the recent turmoil and past financial crises such as the U.S. S&L

crisis and Japan's NPL problem have a common implication, namely, that the soundness of banks is extremely important for financial stability irrespective of the business model of financial intermediation. The malfunctioning of the originate-and-distribute model has forced banks to take back onto their balance sheets the risk assets that had been transferred off them. Banks' shock-absorbing capacity for the reintermediation of risk relies on the level of capital buffers. Major U.S. and European financial institutions have taken a series of measures to strengthen their capital bases with the aim of restraining the downward pressure on the capital adequacy ratio stemming from involuntary increases in risk assets and mark-to-market losses of securitized products. It seems that to some extent these measures have been successful in preventing a spiraling deterioration of markets.

Central banks' provision of liquidity and financial institutions' efforts to strengthen their capital bases have been effective in preventing a further instability of markets, but in order to end the turmoil more progress in repricing of risk by market participants is needed. While tension in money markets eased in January 2008, adjustments in the securitization market and the credit market overall have intensified further. In the process of risk repricing, financial institutions and investors may have to make further provisions for losses. Therefore, a full recovery of the functioning of the markets is likely to take more time, and developments in global financial markets and their effects on the global economy warrant careful attention.

Finally, securitization does have its advantages, that is, it can enhance the stability of financial intermediation by transferring and allocating risks efficiently to a wide range of market participants, but in order to exploit these it is necessary to take certain steps. Discussions have already taken place at such occasions as international forums regarding the accounting and rating systems, and it is also necessary that market participants make further efforts with regard to the following issues. One of the most important tasks is to design incentive mechanisms that enhance appropriate assessment and pricing of risk, given that the causes of the recent turmoil were related to information asymmetries and the laxity in risk assessment under the originate-and-distribute model. In order to design such mechanisms, financial institutions originating loans should produce sufficient information regarding the credit risks of the underlying assets and provide an environment in which issuers of securitized products, rating agencies, and investors can collect, process, and

assess such information appropriately. Moreover, from the experience of the recent turmoil, it has become clear that if liquidity in securitization markets dries up, financial institutions may be forced into a reintermediation of risks, for example, by providing liquidity support to their affiliated investment vehicles or holding loans extended on the premise that they could be distributed to the market. Market participants should take the above points into account when assessing and pricing risk.

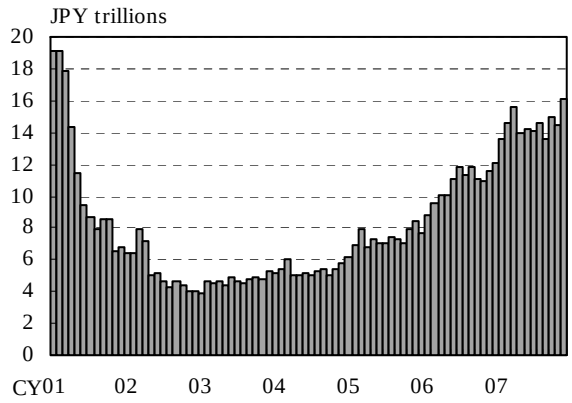
III. Issues Regarding the Functioning of Financial Markets and the Bank of Japan's Actions in 2007

With a view to supporting the improvement in both the functioning and the efficiency of financial markets in Japan, the Bank addressed the following two major issues concerning the market infrastructure in 2007: (1) the facilitation of active trading in money markets; and (2) the enhancement of BCP in financial markets.

1. Facilitation of Active Trading in Money Markets

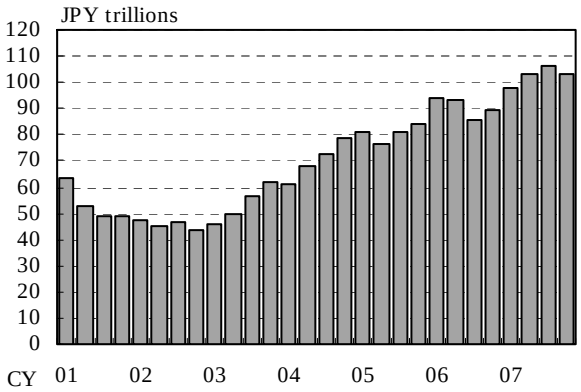
Money market transactions have increased gradually and the functioning of money markets has recovered steadily following the termination of the quantitative easing policy in March 2006 and the subsequent raises of the policy interest rate in July 2006 and February 2007 (Charts III-1-1 and III-1-2). From February to July 2007, the Bank took a series of actions, mainly focusing on practical matters, to support and promote the autonomous improvement of the functioning of the markets.

Chart III-1-1: Uncollateralized call markets



Notes: 1. Figures are based on transactions made through *tanshi* companies, which exclude direct dealing.
2. Figures are the monthly average of the amount outstanding.
Source: Bank of Japan.

Chart III-1-2: Repo markets



Notes: 1. Sum of securities lending against cash collateral and securities sales with repurchase agreements, excluding transactions involving the Bank of Japan, the Japanese government, and other public institutions.
2. Figures are the quarterly average of the amount outstanding at the end of each month.
Source: Japan Securities Dealers Association.

In taking the actions, the Bank identified the issues that needed to be addressed and promptly took specific measures. The Bank held a forum on March 1, 2007 to exchange views with market participants to identify issues concerning money markets. The Bank also sought comments from various market participants in the period from April 4 to 20, 2007. Among the wide range of issues that were raised through this process, the following were

considered as being particularly important: (1) improving the availability and quality of market information; (2) developing more efficient collateralized markets; and (3) promoting the active trading of short-term interest rate derivatives.

Having identified the issues to be addressed, the Bank then started to take prompt action on those issues that could be addressed (Box 7).

Market participants also took various actions. In order to improve the efficiency of collateralized money markets, they deliberated on offering or using clearing bank services[25] and on the introduction of tri-party repo transaction services.[26] More financial institutions registered with the Japan Government Bond Clearing Corporation (JGBCC). Furthermore, an electronic brokerage service for repo transactions was introduced in June 2007, and market practices for collateralized call markets were revised on July 25, 2007 to allow mark-to-market valuation of collateral and delivery versus payment (DVP) of collateral and funds. As for improving the availability and quality of market information, market participants exchanged views on the revision of statistics on the amount outstanding of repo transactions, including the lending/borrowing of securities against cash collateral and securities transactions with repurchase agreements; and the Japan Securities Depository Center (JASDEC) on January 9, 2008 started the weekly release of the amount outstanding of short-term corporate bonds, classified by the type of issuer. Meanwhile, as part of the efforts to promote active trading of short-term interest rate derivatives, the Tokyo Financial Exchange listed new instruments, overnight call rate futures and spot-next repo rate futures, on December 3, 2007

[25] Some banks started offering clearing bank services such as the clearing/settlement of government securities and of funds by acting as a clearing house for customers, including other financial institutions.

[26] In a triparty general collateral (GC) repo transaction, in which the lender and the borrower use the same clearing bank and set the terms and conditions in advance, the clearing bank can carry out the following operations without receiving specific directions from the lender or the borrower: (1) choosing and transferring the securities to be used as collateral; (2) keeping track of the value of collateral; and (3) transferring funds.

Box 7: Measures Taken by the Bank to Improve the Functioning of Money Markets

1. Improving the Availability and Quality of Information on Money Markets

(a) Provision of New Market Data (Box 7 Chart 1)

To facilitate the smooth formation of short-term interest rates by distributing more information useful in projecting supply and demand conditions for funds in money markets, the Bank decided on an earlier release of projections of daily reserve balances and on the release of the amount outstanding of the Bank's current account balances by sector, starting from April 16 and June 18, 2007, respectively.

Furthermore, the Bank, with the cooperation of money market broker-cum-dealers (*tanshi* companies), started to release amounts outstanding in uncollateralized call markets by maturity from June 7, 2007.[27] By providing more information, the Bank aims to improve liquidity of term instruments, that is, transactions with maturities longer than overnight.

(b) Introduction of the New Benchmark Rate for Japanese Government Securities (JGS) Repo Transactions in Tokyo (Box 7 Chart 2)

The Bank, together with market participants, set up a working group on the introduction of a benchmark rate for JGS repo transactions in Tokyo, and deliberated on the benefits and specifications of the benchmark rate. Based on the results of the discussions, the Bank started to calculate the Tokyo Repo Rate and released it for the first time on October 29, 2007 as the new benchmark rate for repo transactions.

(c) Conduct of a Survey on the OIS Market in Tokyo

While many banks, securities companies, and other financial institutions have shown interest in participating in the yen-denominated OIS market, data on the market have been scarce, partly due to the fact that it has only been traded actively for just over a year. To assist market participants in gaining a better understanding of the market and developing their trading strategies, the Bank, with the cooperation of financial institutions already

[27] The Bank started to release the time-series data both in English and Japanese from August 9, 2007.

trading in the market, conducted a survey on the transaction volume and the structure of the OIS market.[28]

Box7 Chart 1: Changes regarding the distribution of market data

(1) Earlier release of projections of daily reserve balances (from April 16, 2007)

	Before the change	After the change
Release time	At around 9:20 a.m. every business day.	At around 8:00 a.m. every business day.
Rounding of figures	Rounded to the nearest 200 billion yen.	Rounded to the nearest 100 billion yen.

(2) Release of "Amounts Outstanding in the Uncollateralized Call Money Market by Term" (from June 7, 2007)

Release time	• 3:00 p.m. on the fifth business day of the month.
Data released	• Amount outstanding in the uncollateralized call market at the end of the month and the average amount outstanding of the month.
Breakdown of maturity	• Overnight, 2 to 6 days, 1 week to less than 2 weeks, 2 weeks to less than 3 weeks, 3 weeks to less than 4 weeks, 1 month to less than 2 months, 2 months to less than 3 months, 3 months to less than 4 months, 4 months or more, and the total.

(3) Release of "BOJ Current Account Balances by Sector" (from June 18, 2007)

Release time	• 5:00 p.m., on the next business day from the last day of each maintenance period.
Data released	• Average outstanding amounts of current account balances and required reserves for the maintenance period, and amounts outstanding of the current accounts at the previous month-end.
Breakdown of sector	• Major banks, regional banks, foreign banks, trust banks, other institutions subject to the reserve requirement, other institutions holding current accounts with the BOJ, and the total.

Box 7 Chart 2: Outline of the Tokyo Repo Rate

Calculation method	• Average of the rates that exclude the highest and lowest 15 percent of all rates reported by reference financial institutions (23 as of January 2008).
Relevant Transactions	• General Collateral (GC) repo transactions,[1] including transactions under repurchase agreements and securities lending with cash collateral.
Reported rates	• Rates that reference financial institutions considers as the prevalent market rates for each maturity and are the mid rates of offer and bid rates at a designated time.
Maturity	• Overnight (T+0, T+1, S/N[T+2]), 1 week, 2 weeks, 3 weeks, 1 month, 3 months, 6 months, and 1 year.
Designated time, reporting time, and release time	• Rates of all maturities as of 11:00 a.m. should be reported by 11:45 a.m. • The Tokyo Repo Rate, with the rates reported by each reference financial institution, is released at around 12:30 p.m. through the financial information providers designated by the Bank. • The Tokyo Repo Rate is also available on the Bank's web site.
Publisher	• For the time being, the Bank of Japan will calculate and release the rate.

Note: 1. These transactions are the lending/borrowing of funds against securities collateral.

2. Other Measures

(a) Revision of Margin Ratios for Collateralized Call Transactions

Raising the efficiency of collateral use by financial institutions for collateralized call transactions by, for example, revising margin ratios, is likely to be an effective means to attract more participants to the collateralized call market and to raise the volume of

[28] See “Survey on Yen-OIS Market in May 2007”, July 27, 2007.

transactions. For this reason, the Bank has supported market participants' efforts to review market practices concerning collateral in collateralized call transactions. Taking into account the discussions among market participants, some margin ratios were lowered in March 2007 to allow more efficient use of collateral.

(b) Enabling the Outsourcing of Transfers of JGSs to the Bank as Collateral

Market participants have been considering that one major option to increase the efficiency of transactions in repo markets is to outsource the transfer of JGSs. Taking this into account, the Bank started to modify the Bank of Japan Financial Network System (BOJ-NET) to enable financial institutions to outsource transfers of JGSs pledged to/returned from the Bank as eligible collateral. The Bank plans to complete the modifications during fiscal 2008, which may be as early as December 2008.

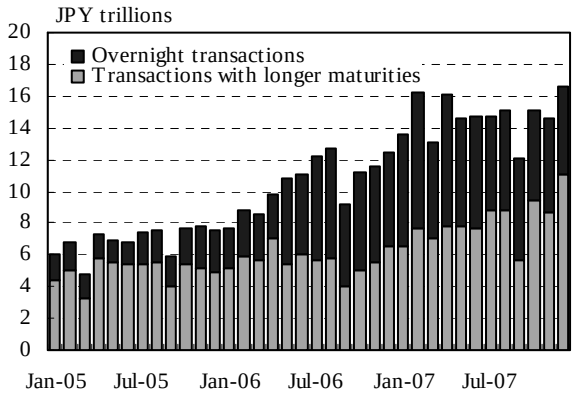
(c) Extension of the Schedule of Monetary Policy Meetings (MPMs)

To further enhance the transparency of the conduct of monetary policy, the Bank decided to release the schedule of MPMs for twelve months ahead immediately after the MPMs in June and December, taking into account requests of market participants. The first extended schedule was released in June 2007. Prior to this decision, the schedule of MPMs for six months ahead had been released immediately after the MPMs in March, June, September, and December. As a result of this change, the schedule of MPMs for at least six months ahead is now always available.

Through the above efforts, money market transactions increased steadily in 2007. The range of market participants and the amount outstanding of uncollateralized call markets and repo markets expanded (Charts III-1-1 and III-1-2). The amount outstanding of term instruments in uncollateralized call markets also increased (Chart III-1-3). Arbitrage transactions across money markets, such as uncollateralized call markets, repo markets, and Euroyen markets, became more active. Transactions in Euroyen futures and OIS remained at a relatively high level compared with the period through 2006, although they decreased somewhat from the early autumn of 2007 due to the abatement of market expectations of a rise in the policy interest rate (Charts III-1-4 and III-1-5).

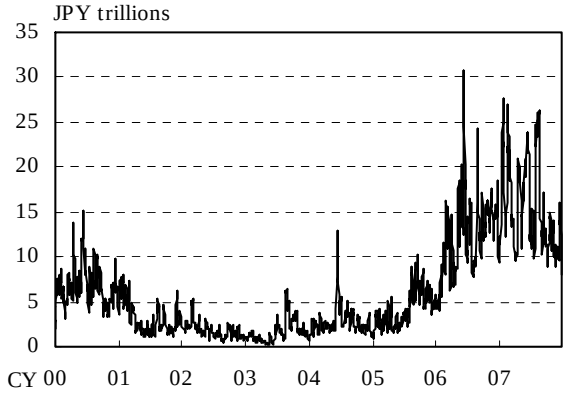
The Bank has a keen interest in developments in money markets, which play a core role in Japan's financial markets and are also a place where the Bank carries out market operations in conducting monetary policy. In 2008, the Bank will continue to hold discussions with market participants and push ahead with efforts to further enhance the functioning of the markets.

Chart III-1-3: Uncollateralized call markets



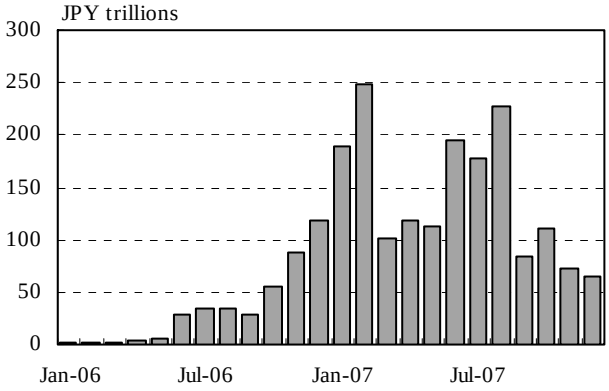
Notes: 1. Figures are based on transactions made through *tanshi* companies, which exclude direct dealing.
2. Figures are the amount outstanding as of the end of the month.
Source: Bank of Japan.

Chart III-1-4: Euroyen futures



Note: Five-business-day moving average of the sum of traded value for all contracts.
Source: Tokyo Financial Exchange.

Chart III-1-5: OIS transactions through brokers



Source: Money Brokers Association.

2. Enhancement of 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. In order to maintain the functioning and stability of the market, measures to execute transactions and settlement of those traded before the occurrence of a disaster are

necessary. Market participants would still need 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 could lead to more heightened uncertainties and anxiety that could adversely affect the price-formation mechanism. Not only is the BCP, therefore, in the interest of each market participant, it also contributes to maintaining the stability of financial markets and the economy as a whole. Moreover, for an international financial center, resilience of the financial markets to disasters is a key requirement. Taking these considerations into account, the Bank, in addition to improving its own BCP arrangements, has placed great emphasis on the strengthening of the BCP in financial markets, since 2003, by exchanging views with market participants and making efforts to put necessary arrangements into place.

While the arrangements put in place by individual market participants form the basis of the BCP, in order to maintain the functioning of financial markets it is also important to develop BCP in financial markets by (1) ensuring the transmission and sharing of information at times of a disaster, (2) preparing and putting into place contingency procedures, and (3) conducting market-wide exercises to assess the effectiveness of these arrangements before a disaster strikes.

In 2007, significant progress was made in the BCP for money markets (call markets), securities markets, and Tokyo foreign exchange markets. With regard to objectives mentioned above, the construction of a BCP-designated web site for each type of market to ensure the transmission and sharing of information is now almost complete (Chart III-2-1) and contingency procedures for each of the markets have largely been put in place. Thus, development of the BCP in each market is entering the stage to test the effectiveness of the arrangements through market-wide exercises.

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 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 site can mutually confirm such information. The web site also enables members of the command center to discuss issues such as recommendations for modifications to transaction practices by using an online bulletin board system. Whereas

communications such as telephones may not function well during a disaster and the bilateral exchange of information may be difficult, web sites have the great advantage that they provide information at a glance, allowing market participants to share information necessary for market transactions.

Chart III-2-1: Market-wide BCP arrangements

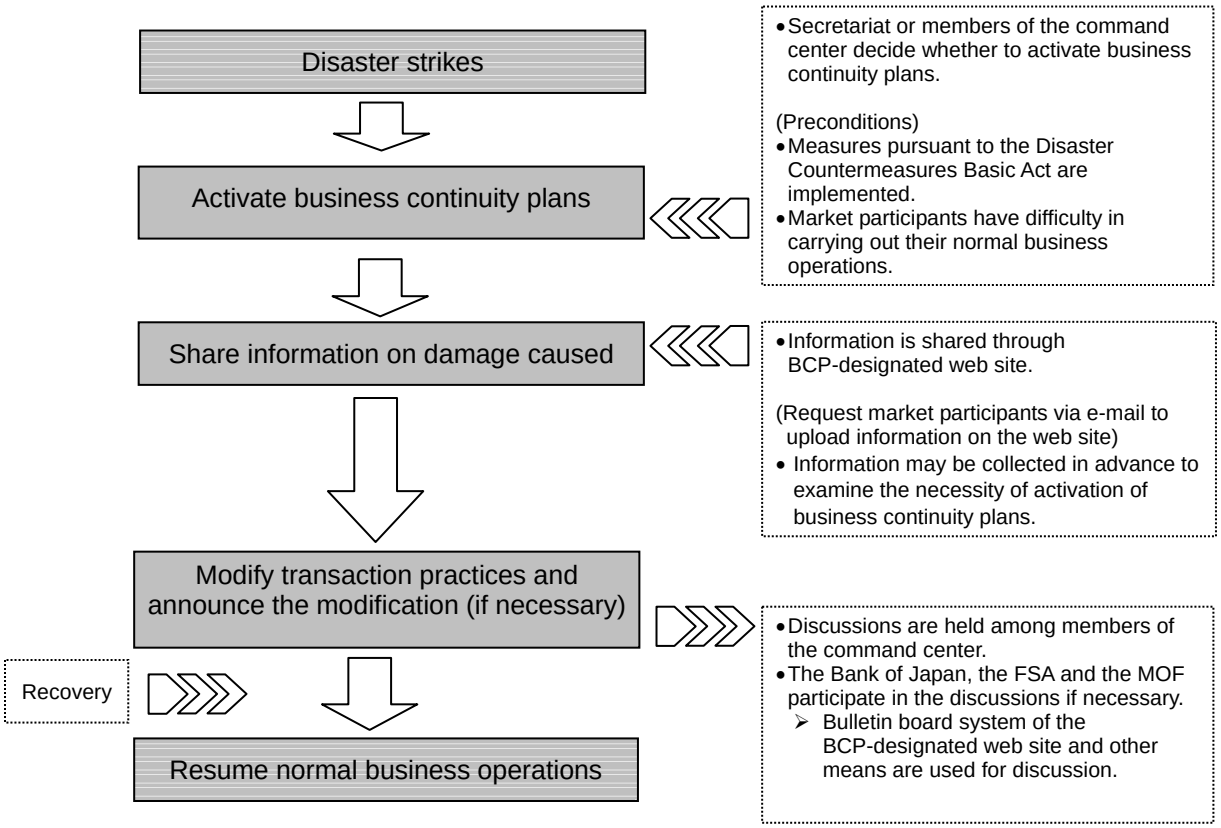
	Money markets	Foreign exchange markets	Securities markets
Secretariat	• Japanese Bankers Association (JBA).	• Tokyo Foreign Exchange Market Committee (TFEMC).	• Japan Securities Dealers Association (JSDA).
Participants/users of the BCP-designated web site	• Approximately 180 institutions. • Banks, *shinkin* banks, securities companies, *tanshi* companies, life insurance companies, non-life insurance companies, investment trusts, 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 Companies, Japan Securities Depository Center (JASDEC), Japan Government Bond Clearing Corporation (JGBCC), Japan Securities Clearing Corporation (JSCC), Tokyo Stock Exchange (TSE), and Tokyo Financial Exchange (TFX). • Financial Services Agency (FSA) and Bank of Japan.	• Approximately 25 institutions, including institutions planning to participate (the initial participants are mainly the members of the TFEMC, and 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 Bank of Japan.	• Approximately 300 institutions (the number of participants is planned to increase). • TSE, Osaka Securities Exchange, Nagoya Stock Exchange, Fukuoka Stock Exchange, Sapporo Securities Exchange, and Jasdaq Securities Exchange. • JASDEC, JSCC, and JGBCC. • FSA and Bank of Japan.
The launch of the site	• April 2006.	• January 2008.	• To be announced (the site was constructed in October 2007).

The basic contingency procedures in case of a disaster consist of the following three steps: (1) deciding whether to activate business continuity plans; (2) sharing information on the damage caused by the disaster; and (3) modifying transaction practices, such as adopting trading and settlement hours different from ordinary market practices (Chart III-2-2). Throughout this process, the command center plays the central role in decision making. In 2007, progress was made in deliberations on how to develop BCP for securities markets and foreign exchange markets, relating to, for example, the formulation of guidelines for the above three steps of the basic contingency procedures, the identification of possible modifications to market practices, and the organization of the command center (Chart III-2-3). The basic contingency procedures for money markets were established in 2006.

With regard to market-wide exercises, the second exercise in money markets took

place in September 2007. While the first exercise, held in September 2006, focused on familiarizing users with the BCP-designated web site, the second exercise was conducted in a more practical manner, with participants, for example, not being informed beforehand about certain aspects of the scenario, such as the extent of damage caused by the disaster.[29] Market-wide exercises will also be held in the securities markets and foreign exchange markets.

Chart III-2-2: Basic contingency procedures in case of a disaster



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.

[29] Specifically, the disaster scenario consisted of an earthquake hitting the Tokyo metropolitan area on a weekday at 10:00 a.m. The epicenter was assumed to be in the northern part of Tokyo Bay (very close to the heart of Tokyo), the magnitude 7.3 on the Richter scale, and the maximum seismic intensity 6 (higher end). Participants were informed of the details of this scenario prior to the exercise and were asked to estimate the expected extent of the damage caused to their operations by the earthquake. The impact on the market overall, based on market participants' reports regarding their operational status to the BCP-designated web site, was then only revealed on the day of the exercise.

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

	Money markets	Foreign exchange markets	Securities markets
Membership of the command center	• Nine members from major banks, regional banks, trust banks, securities companies, *tanshi* companies, and central financing organizations for financial cooperatives. • The FSA and the Bank of Japan 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.	• Under consideration.
Modifications to transaction practices[1]	• Extend or shorten trading hours. • Extend settlement hours. • 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.	(Stock markets) • At the TSE, suspend trading if an institution with a market share of over 20 percent is unable to trade. (Bond markets [including repo markets]) • Under consideration.

Note: 1.Transaction practices regarding trading/settlement hours and trading methods, etc., in the above markets may be modified at times of a disaster.