Financial Markets Report

—— Developments during the First Half of 2006 ——

Bank of Japan
Financial Markets Department

September 2006

- This is a translation of the Japanese version published on July 31, 2006.
- This report covers the market developments during the first half of 2006, unless otherwise stated.
- In the charts, the shadowed portion represents the period from January to June 2006.

Executive Summary

During the first half of 2006 in Japan's financial markets, against the background of solid economic recovery, long-term interest rates rose and briefly moved around 2 percent, the highest level in recent years, and short-term interest rates turned to increase or firm up as the quantitative easing policy (QEP) ended in March 2006. The yen was also stronger against the U.S. dollar than it was at the end of 2005. Stock prices in Japan were supported by strong fundamentals but fell after May affected by investors' withdrawal of funds due to global risk reduction, and were lower at the end of June 2006 than they were at the end of 2005.

In the money markets, rates on short-term instruments such as 1-month and 3-month rose reflecting market participants' expectations of the path of monetary policy changes after the end of QEP. Rates on overnight loans also firmed up after May while the outstanding balance of current accounts at the Bank declined. The money markets overall became active in the first half of 2006. Market functioning gradually recovered and transactions in the money market became somewhat smoother.

In the JGB market, long-term interest rates showed a gradual upward trend against the background of improvements in the outlook on the economy and prices, growing expectations of an increase in target interest rates, and an increase in long-term interest rates in the United States. Long-term interest rates briefly exceeded recent 2004 peak levels and temporarily reached around 2 percent.

Stock prices on the Nikkei 225 Stock Average rose temporarily to a high of around 17,500 yen for the first time since July 2000, reflecting strong fundamentals. They declined, however, after May, reflecting global investors' withdrawal from investment in risk assets. Stock prices as of the end of June were lower than at the end of 2005. The stock prices of small and new corporations, after sharply rising in the latter half of 2005, declined as these stocks were sold off throughout the first half of 2006.

Credit spreads, which had been at extremely tight levels, began to widen from around March. Issuance of lower-rated bonds and Fiscal Investment and Loan Program (FILP) agency bonds became less active. The amounts of CPs outstanding declined year on year. Nevertheless, on the whole, credit spreads continued to move stably at relatively tight levels during the first half of 2006, although investors took a more cautious approach as interest rates and their volatility rose, influenced by a number of idiosyncratic events that triggered concerns over certain issuers in the corporate bond market, municipal bond market, and FILP agency bond market.

In the foreign exchange market, the U.S. dollar widely fluctuated against major currencies against the background of issues such as the U.S. current account deficit and global risk reduction. Despite these fluctuations, the trend of U.S. dollar appreciation against major currencies, which continued throughout 2005, came to a halt in the first half of 2006. The U.S. dollar was on the whole weaker than it was at the end of 2005.

1. Money Market

In the money market, rates on short-term instruments such as 1-month and 3-month rose reflecting market participants' expectations of the path of monetary policy changes after the end of the quantitative easing policy(QEP). Rates for overnight loans also firmed up after May following the end of QEP and the ensuing decrease in the outstanding balance of current accounts.

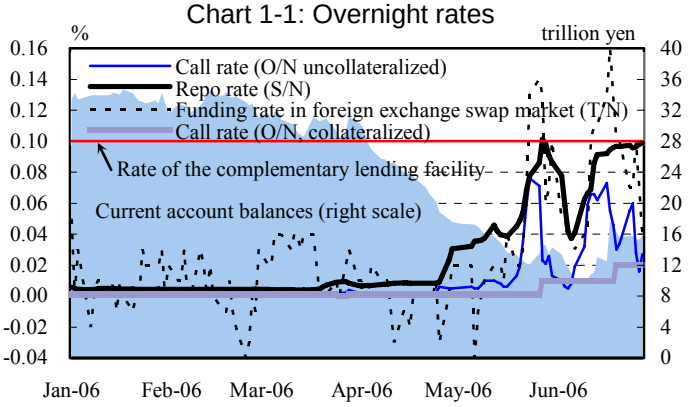
As short-term interest rates turned to increase or firm up and volatility in the money market became higher, the money markets overall became active. Market functioning gradually recovered and transactions in the money market became somewhat smoother. It should be noted, however, that problems remain for further improvement of market functioning. Market participants' efforts to improve credit line availability and trading systems are still under process and arbitrage transactions among markets are not necessarily smooth yet.

(1) Rates for Overnight Loans

Rise in Rates for Overnight Loans from May 2006

At the Monetary Policy Meeting (MPM) held on March 8 and 9, 2006, the Bank of Japan decided to change the operating target of money market operations from the outstanding balance of current accounts at the Bank to the uncollateralized overnight call rate, and to encourage the uncollateralized overnight call rate to remain at effectively zero percent (end of QEP). At the same time, the outstanding balance of current accounts at the Bank was decided to be gradually reduced towards a level in line with required reserves over a period of a few months, taking full account of conditions in the money market.

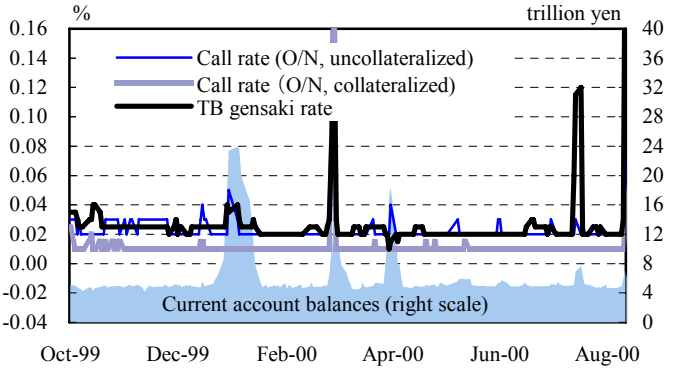
Chart 1-1: Overnight rates



Note: Horizontal axis indicates the dates on which the transactions are started.
Sources: Meitan Tradition Co., Ltd., Association of Call Loan and Discount Companies, Bank of Japan

Following the end of QEP, rates for overnight loans remained stable at around zero percent until the end of April 2006, while the outstanding balance of current accounts remained well above the amount of required reserves. However, from May onwards, rates for overnight loans firmed up as total reductions in the outstanding balance of current accounts became substantially large. This rise is basically a reflection of the increase in market participants' tendency to fund through money markets prompted by the reduction in the amount of funds supplied by the Bank's operations; and also by market participants' move to expand their yen-denominated positions via increased funding in the Japanese markets while the short-term interest rates were increasing. Rates for overnight loans tended to be firm on the whole in May and June, although they showed temporary declines from time to time in response to the Bank's funds-supplying operations (Chart 1–1).

Chart 1-2: Overnight rates (1999-2000)



Note: Horizontal axis indicates the dates on which the transactions are started.
Sources: Association of Call Loan and Discount Companies, Bank of Japan

The outstanding balance of current accounts remained at over 30 trillion yen until the end of March 2006, but declined more or less steadily in April against stable movements of the uncollateralized

overnight call rates, to become 18.9 trillion yen at the end of April. In May and June, the outstanding balance of current accounts was in the range of 10–18 trillion yen, while the Bank conducted funds-supplying operations in response to higher uncollateralized overnight call rates.

Looking at the past situation when interest rates were virtually zero under the zero interest rate policy (ZIRP) in 1999 to 2000, the outstanding balance of current accounts was maintained at around 5 trillion yen and rates on overnight loans were stable at around 0.01–0.04 percent, except for when the effects of extraordinary events, such as the Y2K issue were prevalent (Chart 1–2). After the March 2006 MPM, although the outstanding balance of current accounts exceeded the levels in the 1999 to 2000 period, rates and volatilities for overnight loans were higher.

Rise in Rates for Overnight Loans Triggered by Increases in Repo Rates

There are several types of overnight loan transactions and, therefore, of rates. These include the uncollateralized overnight call rates used by the Bank as the operating target of money market operations, the collateralized overnight call rates, the yen funding rates through foreign exchange swaps, the repo or *gensaki* (bond trading with repurchase agreements) rates (hereinafter, *gensaki* rates are included in the repo rates category),[1] and the euro-yen rates. Transactions pertaining to these rates are similar in the sense that funds borrowed are repaid the next day, but they have different characteristics as well, such as their use and types of collateral and days to settlement after trade date. For example, there are three major types with respect to settlement dates: i.e., for overnight (O/N) transactions, settlements are made on the same date as the trade date (T+0; where T denotes trade date); for tomorrow/next day (T/N) transactions, settlements are made on the following day (T+1); and for spot/next day (S/N) transactions, settlements are made two days after the trade date (T+2). These transactions/rates are closely interrelated but, of these, the first to rise in May and June 2006 were repo rates; the extent of increase of these rates exceeded that of uncollateralized overnight call rates (Chart 1–1).

In more detail, from around the end of April, while other overnight rates were stable, repo rates began to firm up. This trend became clearer from May onwards. Repo rates began to increase and in some cases exceeded the lending rate of the Bank's complementary lending facility at 0.1 percent. Following the increase in repo rates, yen funding costs through foreign exchange swaps and the uncollateralized overnight call rates also began to firm up from May onwards. This occurred as some market participants began to shift their funding activities away from the repo markets to these markets where the funding costs were lower. Some securities firms began to shift from procuring funds in the market to borrowing from banks, which also indirectly induced a shift away from the repo markets and increased funding activities in the call markets and through foreign exchange swaps.

Settlement days of main overnight transactions
(Relationship between trade date and settlement date)

	Main transaction	Days from trade date (T) to settlement date
Call (Uncollateralized)	O/N	T+0
Call (Collateralized)	O/N	T+0
Foreign Currency Swap	T/N	T+1
Repo	S/N	T+2

Note: As for Repos, the following type of transaction, which can be viewed as T+3 transaction, is becoming prevalent.
"Fix the rate and amounts of trade on 3 days before the settlement date, and execute trade by fixing the details of collaterals and other conditions on 2 days before the settlement date."

[1] There are two types of repo transactions, namely (1) special collateral (SC) repo transactions, which are borrowing and lending transactions in specified issues, and (2) general collateral (GC) repo transactions, which are transactions in which issues are not specified. "Repo" in this paper refers to GC repo, unless otherwise specified.

Increase in the Use of the Complementary Lending Facility and Growth in T+0, T+1 Repo Transactions

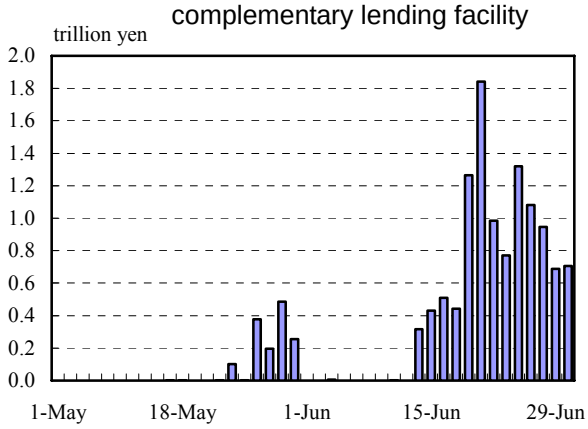
Against the background of rising repo rates, market participants' use of the Bank's complementary lending facility increased notably from mid-June (Chart 1–3). This is because more market participants began to focus on the fact that borrowing from the complementary lending facility has many of the same qualities as procuring funds in the repo markets. For example, both transactions are overnight transactions and both use collateral, mainly JGBs. As such, the complementary lending facility loans were preferred over repo transactions when repo rates were over 0.1 percent, higher than the complementary lending facility loan rate of 0.1 percent.

Correspondingly, T+0 and T+1 repo transactions, which until recently were hardly used, began to pick up gradually (Chart 1–4). Securities firms have the incentive to secure future funding needs at an earlier date. Therefore, T+3 and T+2 repos, in which there are more days from trade to settlement than for T+1 and T+0 repos, tend to have higher rates (premiums are placed on future-date-settlement transactions). As mentioned previously, securities firms can eventually rely on using the complementary lending facility where there are no uncertainties as to availability at T+0. Hence, some of them moved from funding in the repo markets based on T+3 and T+2 settlements to try to find the most favorable funding conditions in a variety of markets, including the T+1 and T+0 repo markets. These developments, however, still remain a small percentage of the overall transactions.

Background to the Tendency for Repo Rates to Rise

As seen above, in May and June, repo rates rose first, triggering an increase in overnight rates in other markets via arbitrage transactions of market participants. Repo rates tended to be higher and more volatile than uncollateralized overnight call rates, despite arbitrage transactions. There were three main contributing factors to this phenomenon. First, market participants, such as securities firms, turned first to the repo markets amid decreases in the Bank's funds-supplying operations. In addition, as will be described in more detail later, the inventory of FBs and TBs at securities firms tended to increase for some periods against the backdrop of rising short-term rates. These funding requirements were one of the factors which led to higher volatility of repo rates.

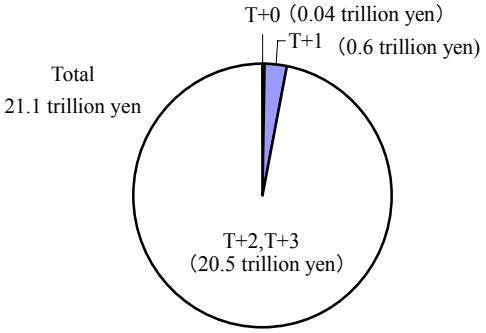
Chart 1-3: Outstanding balances of the complementary lending facility



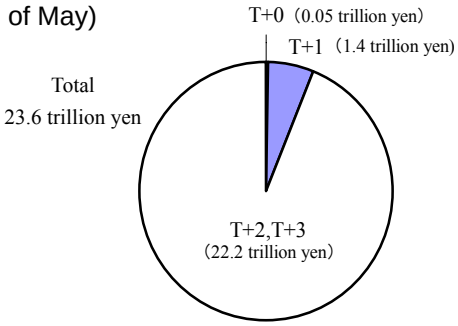
Source: Bank of Japan

Chart 1-4: Outstanding repo (overnight) balances by trade date

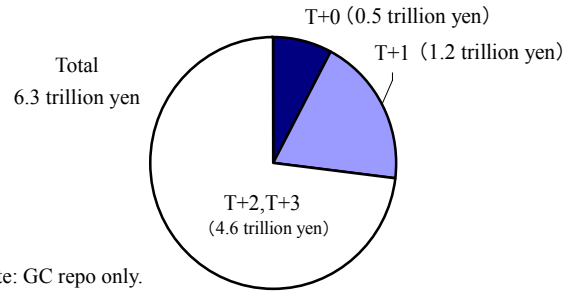
(End of February: Total of eligible counterparties of BOJ market operations)



(End of May)



(June 21: Total of transactions through three major brokers)



Note: GC repo only.
Source: Bank of Japan "Survey on Money Markets"

Second, the shift of borrowers from the repo markets to the uncollateralized call market was not necessarily active because of limitations in credit line availability and the tendency for borrowers to favor future-date-settlement transactions so that they can secure funds earlier.

Third, lenders in the repo markets were limited, so they tended to have the upper hand in rate formation during this period. This is a point which is quite dissimilar to the uncollateralized call market where the lenders are diverse in terms of numbers and sectors, including investment trusts, life insurance companies, and regional banks. For some institutional investors, the amount of daily excess in funds that can be used for lending will only be apparent on that day, so they tend not to use repo transactions, which center on future-date-settlement transactions. Some lenders in the uncollateralized overnight call market do not consider actively lending in the repo markets because they would need to consider operational costs and resources for transactions involving collateral exchange. For these reasons, the shift of lenders to the repo markets from the uncollateralized markets has thus far been limited.

(2) Short-Term Rates

Rise in Short-Term Rates

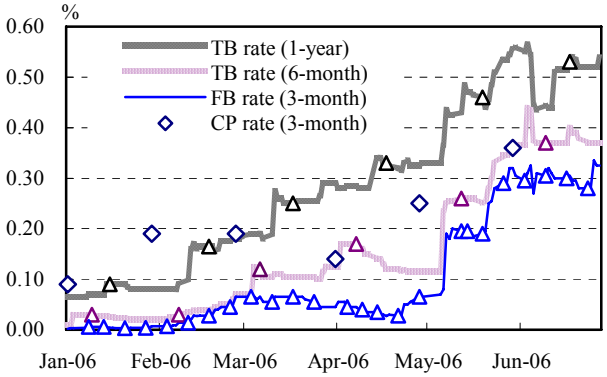
Short-term interest rates, such as 1-month and 3-month, have moved virtually at around zero percent since the latter half of 2005, but rose gradually in the first half of 2006, reflecting market participants' expectations of the end of QEP and the rise in target interest rates thereafter. Rates for 3-month FBs began to increase gradually from mid-February and with increases in extent after May reflecting the strong expectations of increases in target interest rates (Chart 1–5).

Rates for the longer short-term instruments, such as 6-month and 1-year, after increasing somewhat in the latter half of 2005, increased steadily in the first half of 2006. This was a reflection of market participants' growing expectations of the change in monetary policy due to the stronger outlook of the economy and prices. Compared to the months before the ZIRP was lifted in August 2000 and those immediately following, interest rates at the end of June 2006 were higher for all short-term maturities and virtually matched the levels seen in the period during which the Bank encouraged the uncollateralized overnight call rate, its monetary policy target, to remain at around 0.25 percent (Chart 1–6).

Market Expectations of Increases in the Bank's Target Interest Rates Reflected in Short-Term Rates

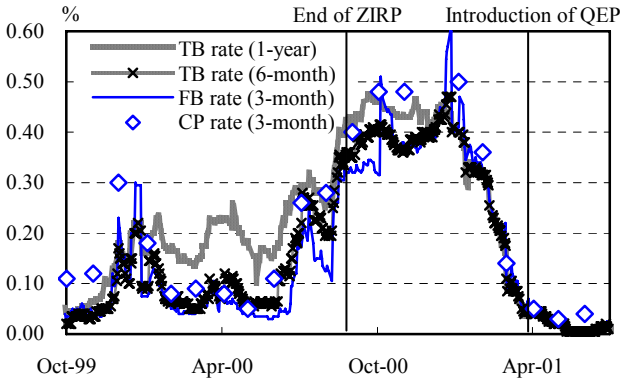
As described above, the increases in the rates for short-term instruments in the first half of 2006 generally reflected the expectations of market participants as to the timing and pace of interest rate increases under the Bank's monetary policy.

Chart 1-5: Short-term rates (Jan-06 to Jun-06)



Note: Triangles indicate rates on auction dates. CP rates are the rates of newly issued CPs.
Sources: Japan Bond Trading Co., Ltd., Bank of Japan

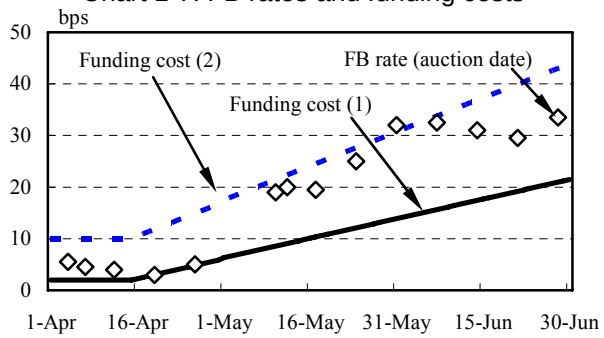
Chart 1-6: Short-term rates (Oct-99 to Jun-01)



Note: CP rates are the rates of newly issued CPs.
Sources: Japan Bond Trading Co., Ltd., Bank of Japan

For example, movements in the 3-month FB rates reflected market participants' assessments on whether there will be gains in the coming 3 months if funds are procured at overnight rates and invested in FBs. Chart 1–7 compares the funding costs in the overnight markets (each point shows a presumed average of the following 3 months) based on a scenario of "an interest rate increase of 0.25 percent as a result of the Bank's monetary policy change in July 2006" with the actual FB rates. As the end of June 2006 approached, the number of days in which the funding rates matched the rates that would be applied after the July change in monetary policy increased. Therefore, funding costs as shown in the chart also show an upward trend. In this chart, funding costs are based on (1) uncollateralized overnight call rates, and (2) repo rates or loan rates from the complementary lending facility (because the loan rate on the complementary lending facility generally constitutes the upper limit of the procurement rate. Here, the rate on the complementary lending facility after the change in monetary policy in July was set as 0.5 percent, in line with market expectations). According to the chart, FB rates remained generally in between the two types of funding rates after mid-May 2006, which indicates that market rates were formed on the premise that there was a high likelihood that the Bank would increase its target rates at the MPM of July 2006. The occasional instances where FB rates were as high as or higher than the second type of funding costs in this graph show the periods where, for a short period of time, market expectations for a rate hike in June became stronger, and where concerns about the repo rates moving higher than the loan rates on the complementary lending facility increased.

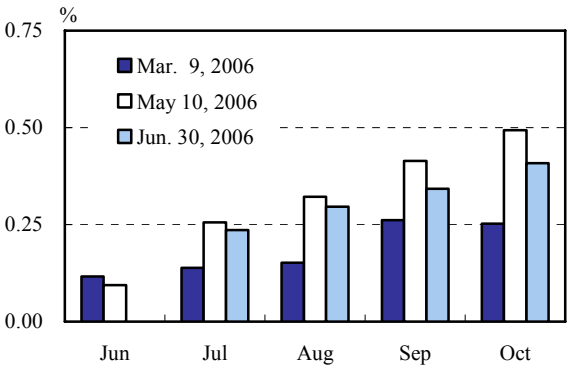
Chart 1-7: FB rates and funding costs



Notes: 1. Funding costs are the averages of overnight rates for the following 3 months. Overnight rates are assumed as follows.
(1) 2 bps until Jul. 13. 25 bps from Jul. 14.
(2) 10 bps until Jul. 13. 50 bps from Jul. 14.
2. FB rates are the closing rates at the issue date.
Sources: Japan Bond Trading Co., Ltd., Bank of Japan

In addition, overnight index swaps (OIS) transactions increased in 2006. OIS are interest rate swaps involving the exchange of uncollateralized call rates (interest rates compounded) for a specified term for certain fixed interest rates. Currently, the participants in this market are limited to foreign financial institutions. Therefore, the rates in this market do not necessarily reflect the views of the market overall, but the outlook on the uncollateralized call rate as seen from OIS transactions reveals that the July MPM decision to increase interest rates was already factored in at the end of June. In addition, OIS transactions in the first half of 2006 indicate increases in rates after October 2006, reflecting expectations of further interest rate increases (Chart 1–8).

Chart 1-8: OIS rates



Note: 1 month forward rate from 15th of each month.
Sources: Meitan Tradition Co., Ltd., Bank of Japan

Euro-yen futures transactions increased sharply just before and after the end of QEP in March 2006 and rates on euro-yen futures increased around mid-May, especially for distant contracts. These developments in the euro-yen futures markets indicate heightening of market participants' expectations of interest rate increases by the Bank. In the last weeks of May and into June, euro-yen futures rates declined temporarily,

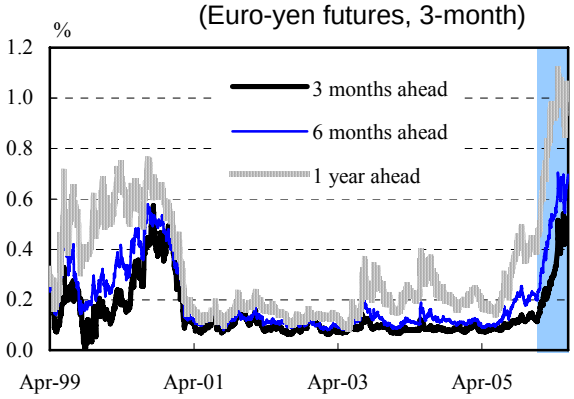
reflecting such factors as stock price declines. However, they started to increase again toward the end of June against the background of halts in stock price declines and announcements of strong economic indicators (Chart 1–9, see Appendix 1 for details on extracting market expectations for interest rate increases from euro-yen futures rates).

Pick-Up in Arbitrage Transactions

With the increase in money market interest rates, as seen above, arbitrage transactions between overnight transactions and short-term instruments, as well as between different short-term instruments, increased. Overseas investors, among others, were active participants in such transactions. By investor segments, the main buyers of FBs and TBs from May were overseas investors (Chart 1-10). This was the result of their active investment in FBs and TBs for arbitrage purposes under the increase in and higher volatility on interest rates. Typical types of such arbitrage transactions conducted by overseas investors in particular were "buying FBs and paying fixed rates in OIS transactions" (in order to profit from the difference in rates between FBs and fixed rates in OIS transactions), and asset swap transactions, such as "buying short to medium-term JGBs and paying fixed rates in interest rate swaps" (with trades reversed when swap spreads widen) (Charts 1–11 and 1–12).

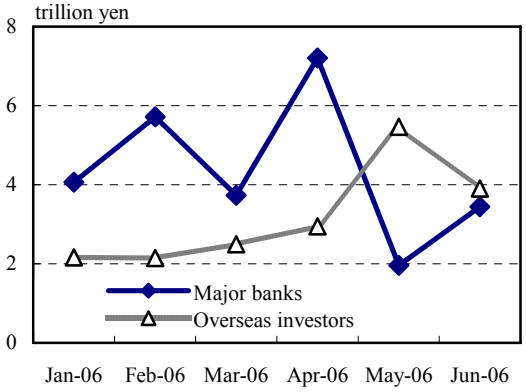
Meanwhile, city banks that had been the main buyers of FBs and TBs took a more cautious buying stance in May and June 2006 (Chart 1–10). With this change in the main buyers of FBs and TBs in May and June, the inventory of FBs and TBs at securities firms tended to temporarily increase during this period. This, in turn, led to an increase in funding requirements at securities firms, which is considered to have been another factor that exerted upward pressure on repo rates during this period. On the other hand, an increase in repo rates led to an increase in funding costs in asset swap transactions, such as those described earlier, inducing the unwinding of trades, and thus led to higher volatility in money market rates at certain times (Chart 1–13).

Chart 1-9: Implied forward rates (Euro-yen futures, 3-month)



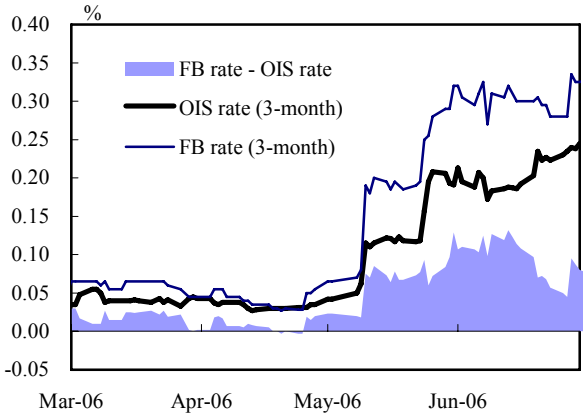
Sources: Tokyo Financial Exchange, Bank of Japan

Chart 1-10: Bond transactions by investor segments (FB/TB)



Note: Major banks include city banks, Shinsei Bank, and Aozora Bank.
Source: Japan Securities Dealers Association

Chart 1-11: OIS rates and FB rates



Sources: Japan Bond Trading Co., Ltd., Meitan Tradition Co., Ltd.

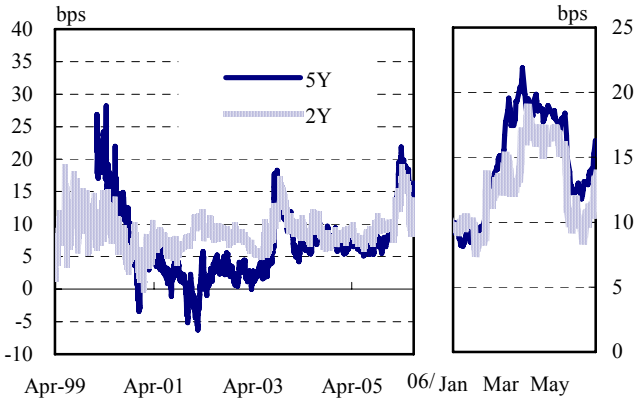
(3) Market Functioning

As seen, transactions in the money markets, including arbitrage transactions across markets, increased in the first half of 2006 against the backdrop of firming-up or increase in interest rates and higher volatility. On the borrower-side, borrowing by securities firms and foreign banks who were the main borrowers in the first half of 2006 have increased, and on the lender-side, the variety of lenders has expanded as well. Credit line availability widened to a certain extent and transactions in the money market became smoother with a recovery in market functioning.

Despite this recovery, there is still room for further improvements in the market. In the uncollateralized call market, credit line availability should be widened further in response to shifting needs of lenders and borrowers. In the repo markets, repo rates in some situations tend to become high or volatile because lenders are limited as many market participants do not have adequately allocated resources to conduct repo trading. In addition, arbitrage trades between repo and other transactions are not always efficiently and effectively carried out.

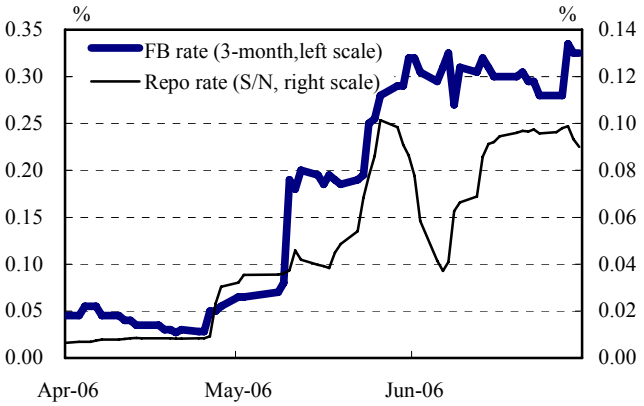
To enable smoother transactions among markets and smooth price formation in short-term markets, two areas deserve special attention. First, smooth trades in the uncollateralized call market by adequately setting and managing (including expanding) credit line availability should be encouraged. Second, efforts should be made to ensure adequate resource allocation by a wide range of market participants to enable them to participate in transactions involving collateral and to enhance the liquidity and efficiency of collateralized markets such as the repo and collateralized call markets (For more detail on this topic, please refer to "*Changes Observed in Money Markets after the Conclusion of the Quantitative Easing Policy,*" Financial Markets Report – Supplement, September 2006).

Chart 1-12: Swap spreads



Note: Spreads are based on an asset swap basis and are the average of the most recent three issues.
Sources: Bloomberg, Reuters, Japan Bond Trading Co., Ltd., Bank of Japan

Chart 1-13: Repo rates and FB rates

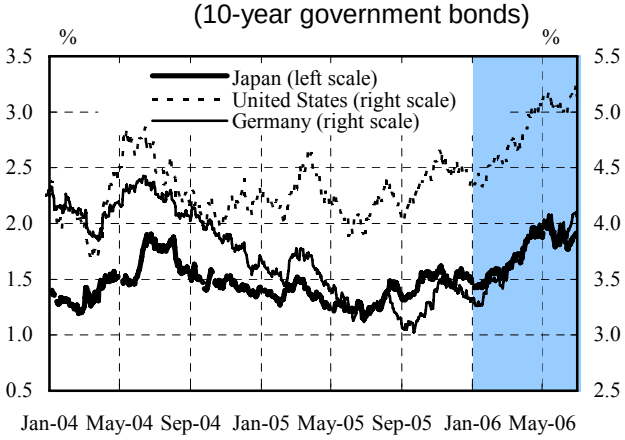


Sources: Japan Bond Trading Co., Ltd., Bank of Japan

2. JGB Market

Long-term interest rates showed a gradually increasing trend against the background of improvements in the outlook on the economy and prices, growing expectations of an increase in target interest rates, and an increase in long-term interest rates in the United States. The yield on newly-issued 10-year JGBs, a benchmark long-term interest rate, increased in the first half of 2006 to briefly exceed the recent June 2004 peak level at 1.905 percent; it even temporarily reached around 2 percent, highs not recorded since August 1999 (Chart 2–1).

Chart 2-1: Global long-term interest rates (10-year government bonds)



Sources: Japan Bond Trading Co., Ltd., Bloomberg

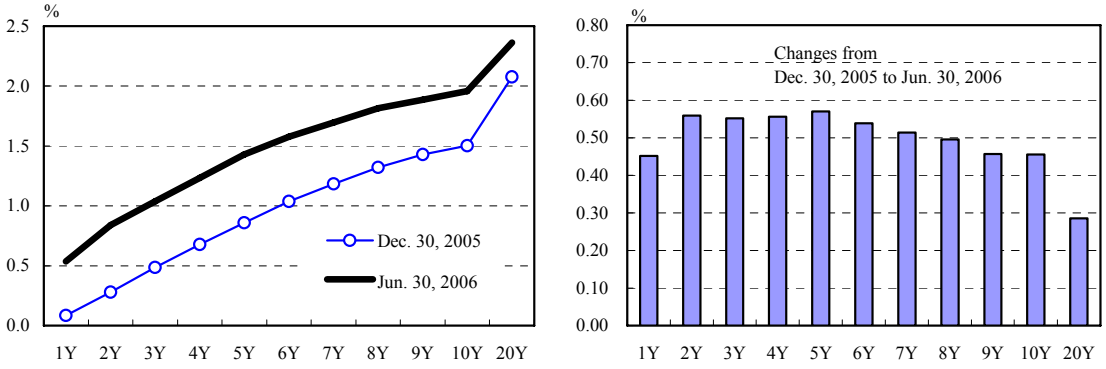
Long-Term Interest Rates Increasing to Nearly 2 Percent

Looking at rates for newly-issued 10-year JGBs in the first half of 2006, they moved within the same 1.4-1.6 percent range as in the latter half of 2005 until the end of February. After that, they rose to nearly 2 percent by the beginning of May (reaching intraday highs over 2 percent on several days, including April 18 and May 10; such highs were last recorded in August 1999). The contributing factors to these increases included, (1) stronger outlook on the economy and prices following the announcement of favorable results on a number of economic indicators, (2) higher expectations of market participants on the pace of interest rate increases after the end of QEP in the March 2006 MPM, (3) increase in interest rates in the United States to over 5 percent, above the range in which they had been moving. From mid-May to mid-June, interest rates for 10-year JGBs declined somewhat, influenced by the significant decline in stock prices, but they were over 1.9 percent at the end of June.

Rates for Short to Medium-Term Maturities Rose the Most

Looking at the government bond yield curve against time to maturity, the rise in short to medium-term interest rates was the most significant (Chart 2–2). This basically reflected the higher expectations of interest rate increases by the Bank following the end of QEP and the widening of the risk premium based on uncertainty concerning the pace of interest rate increases. Meanwhile, the rise in yields for bonds with maturities longer than 10 years was limited.

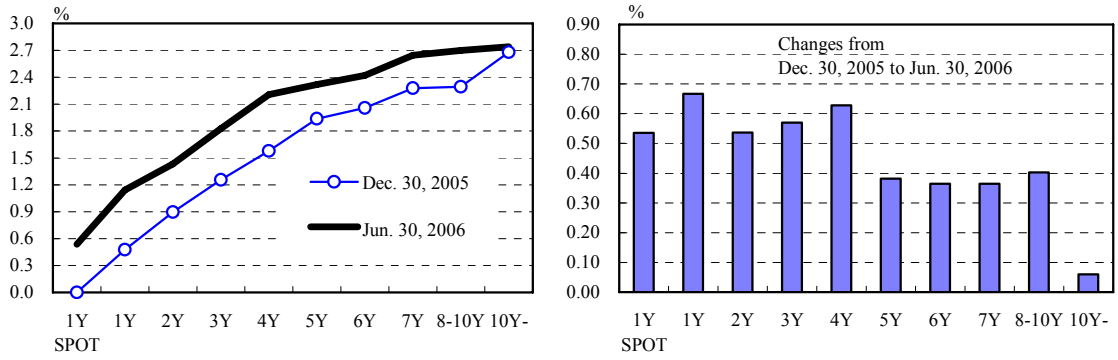
Chart 2-2: Government bond yields (spot rate)



Sources: Japan Securities Dealers Association, Bank of Japan

In terms of 1-year forward rates, the rates for 1 to 4-years ahead, which are strongly influenced by policy rate developments showed large increases, but those for 10 years ahead hardly changed (Chart 2–3). This indicates that there is no significant change in the longer-term outlook on the growth rate of the economy and inflationary rates. The same can be observed through the developments in 10-year forward rates 10 years ahead. These rates, which have generally been moving in line with the longer-term outlook on the economy and prices, remained unchanged during the first half of 2006 (Chart 2–4).

Chart 2-3: Government bond yields (1-year forward rates)



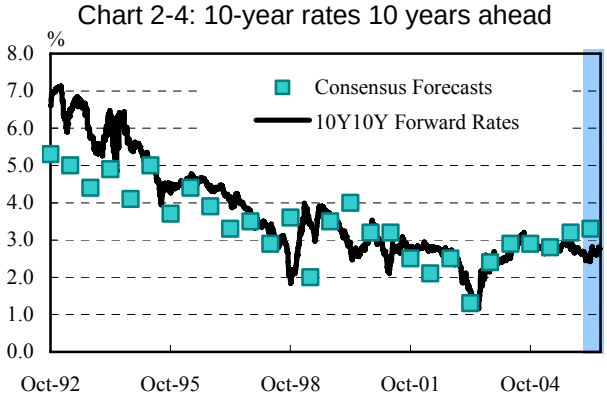
Note: "8-10Y " is the average of 1-year forward rates which start 8-10 years ahead. "10Y- " is the average of 1-year forward rates which start 11-19 years ahead.

Sources: Japan Securities Dealers Association, Bank of Japan

Volatility Was Highest for Short to Medium-Term

As long-term interest rates rose, volatility also became higher on the whole, with that of shorter-term rates showing the largest increases. Looking at the implied volatility in swaptions, the increase for the longer term has been relatively small, but the increase for 1 year and 2 year reached near-historical highs (Chart 2–5). This indicates that the longer-term outlook on the economy and prices has hardly changed but that market participants are concerned about uncertainty on the pace of interest rate increases in monetary policy.

Chart 2-4: 10-year rates 10 years ahead



Note: "Consensus Forecasts" are the sum of forecasts of real GDP growth rates and CPI changes 5-10 years ahead.

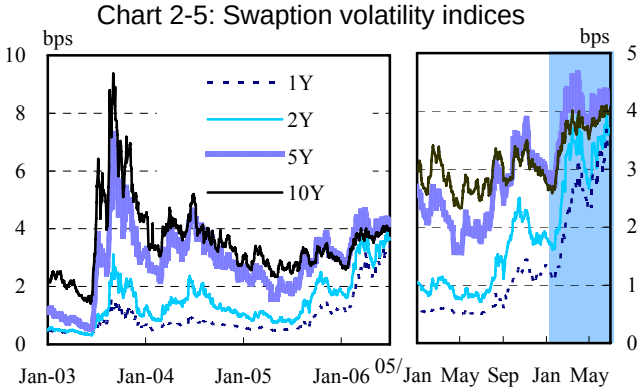
Sources: Bloomberg, Japan Securities Dealers Association, Consensus Forecasts, Bank of Japan

Investors' Behavior and Demand for JGBs

By maturities, the increase in rates for the short to medium term was relatively large and that for the longer term was small. The investment behavior of major market participants and the supply-demand conditions for JGBs that led to such yield curve developments are described below (Chart 2–6).

For longer-term JGBs, life insurance companies and pension funds that had large amounts of long-term debt on their books continued to buy bonds with longer maturities constantly, and they bought large amounts of longer-term JGBs especially during the first quarter. This can mainly be explained by their

Chart 2-5: Swaption volatility indices



Note: A swaption is an option on a swap. In this chart, the underlying asset is a 1-year, 2-year, 5-year or 10-year interest rate swap and the term to expiry is one-month. "Volatility Index" expresses the implied volatility of each swaption in terms of basis points: multiplying the forward yields by the implied volatility of the swaption in terms of percentages.

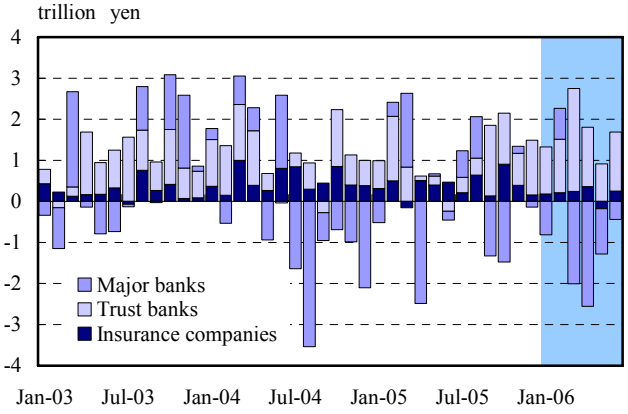
Sources: Bloomberg, Reuters, Bank of Japan

more active buying of JGBs with maturities of over 10 years, which itself was partly a result of their shifting from foreign-currency-denominated bonds and stocks as they concentrated on matching the duration of debt to assets, against the background of increasing long-term interest rates.

Pension funds typically invest based on predetermined asset allocation policies and set guidelines on the ratio of individual assets, such as stocks and bonds. For many pension funds, the value of stocks exceeded the predetermined weight in their asset allocation policies as stock prices rose steadily in fiscal 2005 including the first quarter of 2006. Therefore, many pension funds sold stocks to buy bonds or allocated a large portion of new investment to bonds in the first half of 2006. In the past few years, life insurance companies have been increasing their purchase of bonds with maturities of over 10 years as a part of their asset liability duration matching, under the condition that the yield of bonds exceed the assumed interest rates. In the first half of 2006, although there was a temporary pause in purchases of bonds with a pick-up in the pace of increases in long-term yields, the demands of institutional investors have been strong as long-term JGB rates were higher than these investors' hurdle rates.

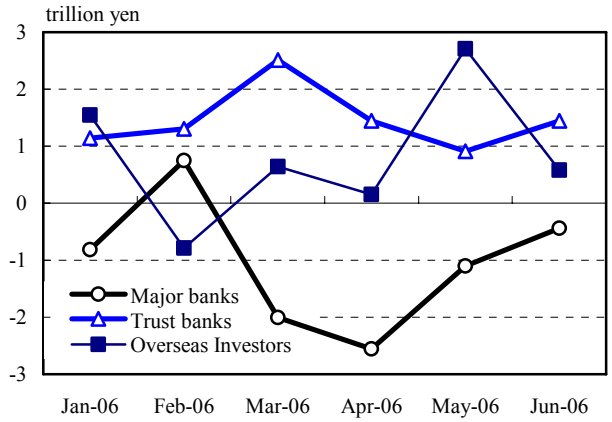
As for JGBs with medium-term maturities, banks tended to sell based on the outlook that QEP would end and that target interest rates would be raised thereafter. In addition, banks braced themselves for the expected increase in interest rates by hedging their positions using trades, such as interest rate swaps in which they acted as payers (paying fixed interest rates and receiving floating rates) and selling euro-yen futures. In terms of supply-demand conditions, selling by banks, the major investors in short to medium-term JGBs, was one factor which led to the increase in short to medium-term interest rates. Meanwhile, overseas investors, as was the case with the money market described in the first section of this report, took on risks actively and vigorously traded medium to long-term JGBs in anticipation of taking advantage of arbitrage opportunities once interest rates increased. Since overseas investors tend to change their positions quickly, it is hard to generalize, but they seem to have been major buyers of medium to long-term JGBs in the second quarter of 2006 (Chart 2–7).

Chart 2-6: Bond transactions by investor segments



Note: Excluding FB and TB transactions. Major banks include city banks, Shinsei Bank, and Aozora Bank.
Source: Japan Securities Dealers Association

Chart 2-7: Bond transactions by investor segments



Note: Excluding FB and TB transactions. Major banks include city banks, Shinsei Bank, and Aozora Bank.
Source: Japan Securities Dealers Association

3. Equity Market

Stock prices on the Nikkei 225 Stock Average (Nikkei Index) rose temporarily to a high of around 17,500 yen by early April 2006, for the first time since July 2000, reflecting strong fundamentals such as economic recovery and expectations of stronger corporate profits. They declined, however, after May, reflecting global investors' withdrawal from investment in risk assets (Chart 3–1; for more on the "global risk reduction" noted during this period, see Appendix 2). The Nikkei Index was 15,505 yen at the end of June, which was lower than the level at the end of 2005. The stock prices of small and new corporations, after rising in the latter half of 2005, declined as these stocks were sold off throughout the first half of 2006.

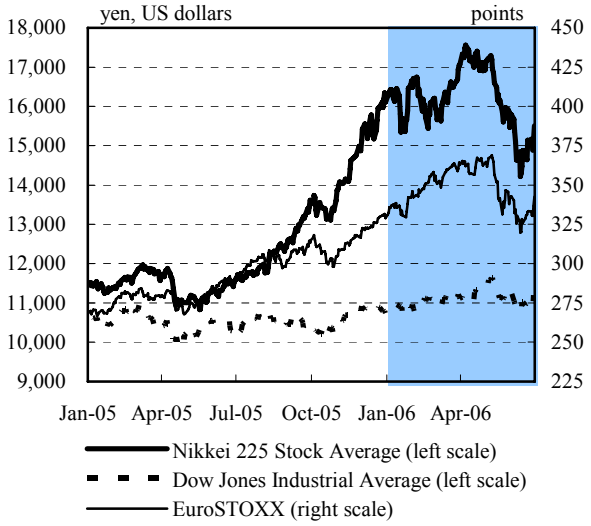
Stock Price Developments

In January and February 2006, the Nikkei Index drifted within the range of 15,000–17,000 yen, with relatively large fluctuations. There were two main factors contributing to these fluctuations, as market participants were becoming more aware of rapid increases in stock prices from the second half of 2005. First, individual investors adopted a more cautious investment stance as stocks of many small and new corporations declined after the domiciliary search of an IT-related company on January 16, 2006. Second, market participants showed increased concerns about the influences of adjustments in the easy monetary policies of major economies and of the effects that the global absorption of liquidity would have on stock prices in the first few months of 2006.

From March, however, market participants once again focused on the strong fundamentals in Japan, such as recovery in the economy and improvements of corporate earnings. Coupled with strong stock prices in the U.S. and European markets, this led to a rise in stock prices in Japan. In early April, the Nikkei Index increased to over 17,500 yen for the first time since July 2000. In March 2006, the quantitative easing policy (QEP) was ended, but at the time, this change in policy was perceived as a sign that uncertainty over Japan's monetary policy had eased, or as confirmation that the economy was recovering and that the likelihood of an end to the deflationary trend in prices was stronger. As such, stock prices continued an upward trend after the end of QEP.

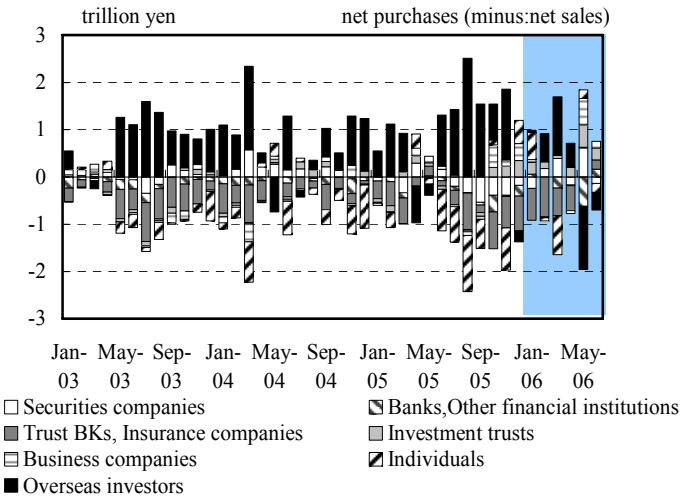
From May, prompted by global risk reduction and the resulting decline in prices in the U.S. and European stock markets, the Nikkei Index declined toward a level of around 14,000 yen in mid-June. After investors' global risk reduction activities calmed somewhat in mid-June, stock prices in Japan recovered. At the end of June, however, the Nikkei Index was at 15,505 yen, still below the level seen at the end of December 2005.

Chart 3-1: Global equity prices



Source: Bloomberg

Chart 3-2: Net trading value by investor segments



Note: Net trading value is the sum of traded amounts of cash stocks in the Tokyo, Osaka, and Nagoya Stock Exchanges, and traded amounts of Japanese stock price index futures on the Tokyo and Osaka Stock Exchanges.

Sources: Tokyo Stock Exchange, Osaka Stock Exchange

The Tokyo Stock Exchange's Japanese real estate investment trust (J-REIT) index also declined in May and June, reflecting declines in stock prices among other factors (see Box for details).

Global Risk Reduction and Overseas Investors Turning into Net Sellers

In the first half of 2006, the aggressive investment positions of overseas investors and individual investors, which had supported the strength in the stock markets in the latter half of 2005, changed.

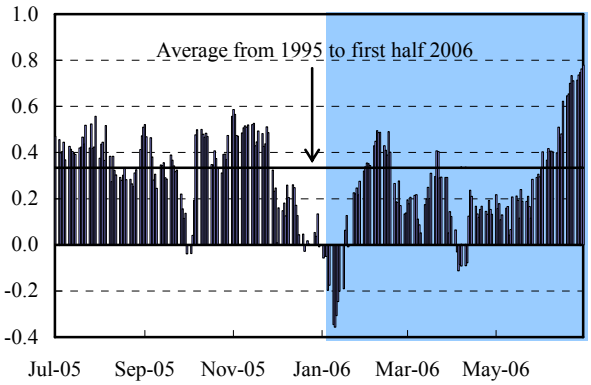
Looking at the activities by investor segments (Chart 3–2), overseas investors, who overall had been active buyers of Japanese stocks over the past few years, became net sellers from May. At this point, global investors stepped up efforts at risk reduction, which led to price declines in not only the U.S. and European stock markets, but also in a wide range of markets, including commodities and emerging markets. Japanese stocks were also strongly affected by this global decline. The fact that the correlation between Japanese and U.S. stock prices became increasingly stronger after May also supports this view (Chart 3–3).

The global risk reduction during this period may be considered as an adjustment to a medium-term price increase that had continued since 2003 in many markets around the globe. More specifically, a view emerged that the easy monetary environment, which had acted as a major backdrop for investors' search for yield since 2003, was changing. In addition, the risk that the U.S. economy would decelerate while inflationary concerns remained high began to attract attention. Consequently, investors increasingly re-evaluated the risk involved in their investments, which led to a decline in global market prices.

Meanwhile, the market participants' positive views of the fundamentals in Japan, including the Japanese economy and corporate earnings (Charts 3–4 and 3–5), did not change significantly, although there were times when the influences of the appreciation of the yen (appreciated from 118–119 yen against the U.S. dollar as of mid-April to 109–110 yen as of mid-May) and the overall cautious outlook on fiscal 2006 corporate earnings exerted temporary downward pressures.

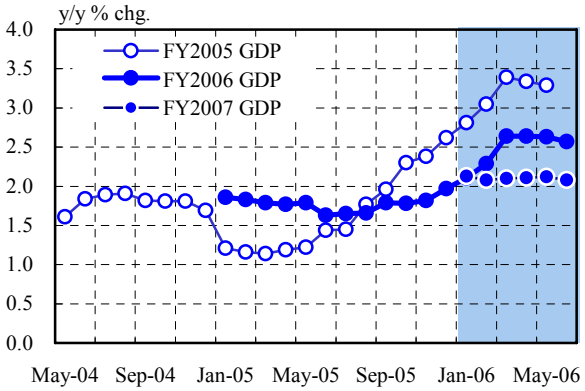
Risk reduction by market participants seems to have paused by mid-June, and prices in many markets began to recover. However, the price levels in most markets did not recover to the levels before the

Chart 3-3: Correlation of equity prices between Japan and the U.S.



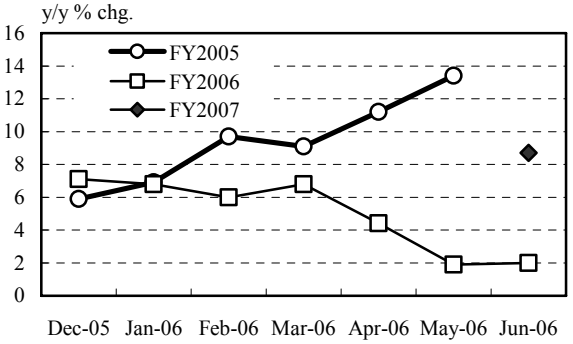
Note: 20-day correlation of daily price changes between TOPIX and S&P500 (previous day). Data for holidays are supplemented by taking the average of prices before and after the holiday.
Sources: Bloomberg, Bank of Japan

Chart 3-4: Outlook for real GDP: Survey of economists



Note: Latest survey period: May 29-Jun 5.
Source: Economic Planning Association "ESP Forecast"

Chart 3-5: Outlook for corporate earnings



Note: Weighted average of forecasts in consolidated recurring profit growth
i) listed on the Tokyo Stock Exchange, First Section;
ii) not categorized in the financial services sector;
iii) ends fiscal year in March;
iv) have not changed accounting practices materially in the past fiscal year;
v) not involved in mergers in the past fiscal year;
vi) not subsidiaries of listed companies.
Source: Daiwa Institute of Research based on data from Toyo Keizai Inc.

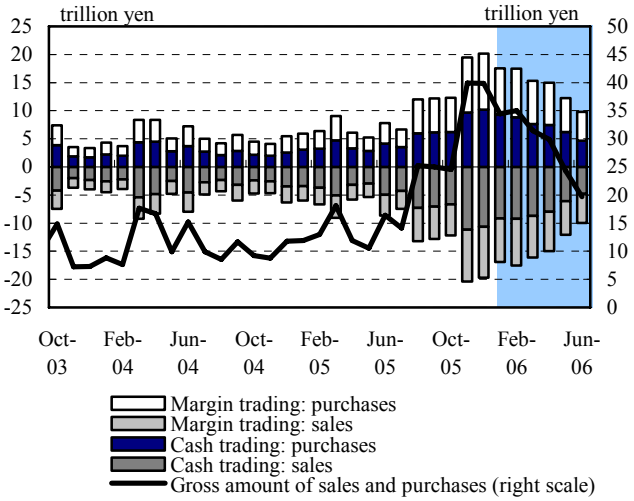
adjustments began, and there are dispersions in the amount of money flowing back in, depending on the type of market. In regard to Japanese stocks, prices have been recovering since mid-June, but they have yet to reach the level they were at the end of 2005. Price developments in the Japanese stock market will most likely continue to be susceptible to the influences of global markets because of the recent expansions of cross-border fund flows. Since July 2006, such risk factors include the heightened geo-political risks in the Middle East and in other areas of the world, the stock market and economic developments in the United States, and the behavior of investors around the globe reflecting these developments.

Decline in Stock Prices of Small and New Corporations and Increase in Cautiousness of Individual Investors

Individual investors' activities, after surging in the second half of 2005, were considerably subdued in the first half of 2006 (Chart 3–6). The main reason for this is that market participants' overall perceptions of small and new corporations were altered following the domiciliary search of an IT-related company (January 16, 2006). Increasing concern about the corporate governance of mainly small and new corporations also became an issue as a prominent auditing firm was punished for misconduct and as financial statements of some companies were revised. Prompted by these developments, prices of stocks listed on emerging stock exchanges followed a downward trend in the first half of 2006 (Chart 3–7). Margin trading by individual investors, which had been active in the second half of 2005, also declined, partly reflecting requests for additional margins (Chart 3–8).

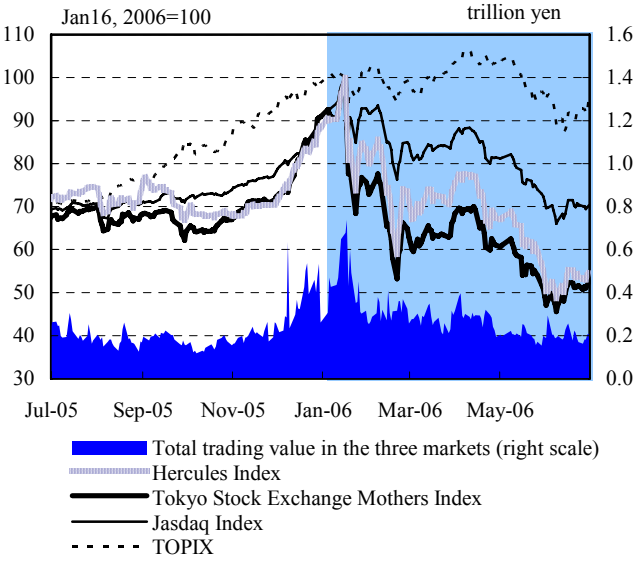
Meanwhile, inflows into Japanese equity investment trusts continued. By investor segments, investment trusts were constant net purchasers of stocks in Japan during the first half of 2006, including May onwards. Individual investors were also net purchasers in May, while stock prices declined (Chart 3–2).

Chart 3-6: Investment trends of individuals



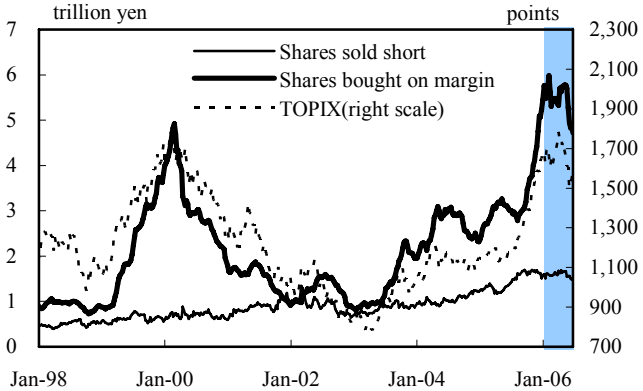
Note: Total amount of the First and Second sections of the Tokyo, Osaka, and Nagoya Stock Exchanges.
Source: Tokyo Stock Exchange

Chart 3-7: Prices of emerging stock exchanges



Sources: Tokyo Stock Exchange, Osaka Stock Exchange, Jasdaq Securities Exchange, QUICK

Chart 3-8: Margin trading



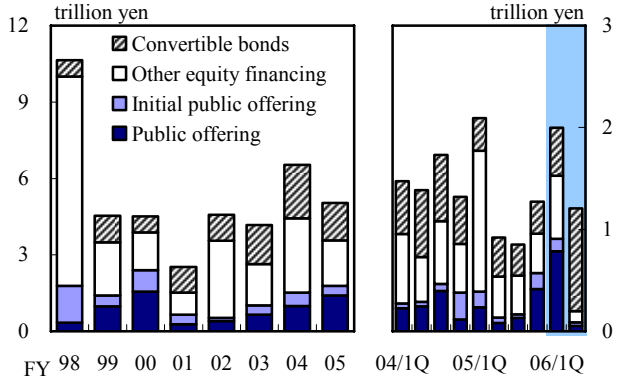
Note: Total amount of the First and Second sections of the Tokyo, Osaka, and Nagoya Stock Exchanges.
Source: Tokyo Stock Exchange

Increase in Equity Financing

Although stock prices were weak, fund raising in equity markets, or equity financing, grew compared to the second half of 2005 (Chart 3–9).

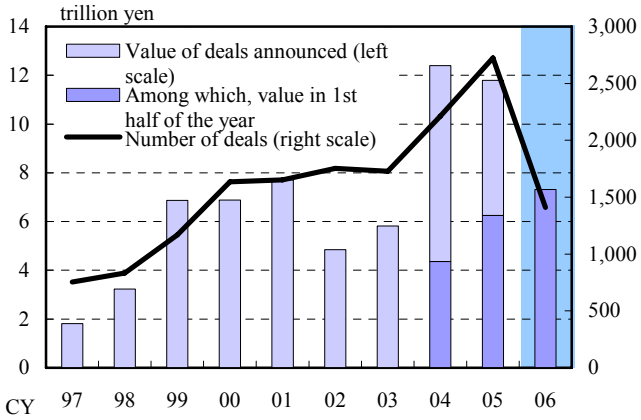
In the first half of 2006, refinancing was active against the background of recovery in the creditworthiness of firms and of increases in stock prices in the second half of 2005. Such refinancing supported the financing of firms undergoing corporate restructuring, and repayments by banks of loans from the Deposit Insurance Corporation which they had used to fortify their capital adequacy ratios. Firms also stepped up equity financing in line with a pick-up in capital expenditures, mergers and acquisitions, and tie-ups (Chart 3–10). A number of large leveraged buyouts (LBO: finance related to a company takeover where the target company's assets and future earnings serve as collateral) were conducted, and some of these were financed using moving strike convertible bonds (MSCB: convertible bonds with conditional clauses allowing change of convertible prices). While active equity financing to support aggressive corporate business expansions increased in the first half of 2006, as seen above, the quest for attaining higher return on capital through buying back shares and dividend payouts continued to be strong, as it has been since 2005 (Chart 3–11).

Chart 3-9: Equity financing



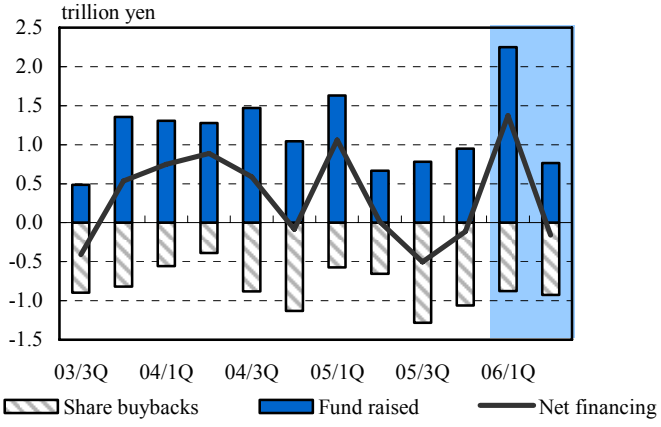
Note: "Other equity financing" includes allotment to shareholders and to third parties.
Source: Japan Securities Dealers Association

Chart 3-10: M&A activity



Note: Transactions that involve Japanese companies. Data includes mergers, acquisitions (purchase of more than 50% of the shares of the target by the acquirer), business transfers, and minority and increased interests (purchase of less than 50% of the shares of the target by the acquirer).
Source: Recof

Chart 3-11: Financing from equity markets



Notes: 1. Transactions of companies listed on the Tokyo Stock Exchange. "Fund raised" is the sum of equity financing (including preferred stock and distribution of treasury stock, and excluding IPOs), warrants exercised, and convertible bonds. "Share buybacks" excludes purchases from subsidiaries.
2. Transactions in June 2005 are not included in data for 06/2Q.
Source: Tokyo Stock Exchange

[BOX] Current Trends in the J-REIT Market

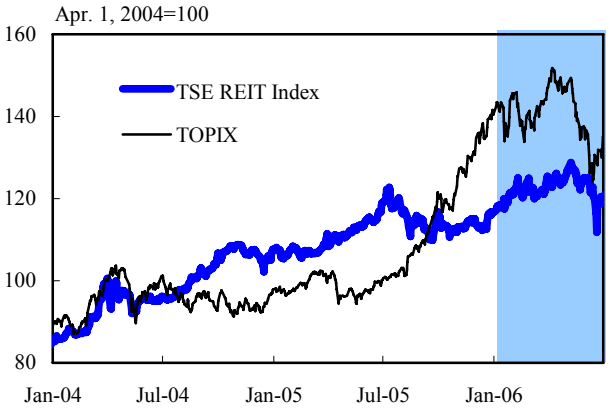
In the first half of 2006, the Tokyo Stock Exchange's Japanese real estate investment trust (J-REIT) index continued an upward trend until early May (BOX Chart 1).

By investor segments, (1) overseas investors continued to invest focusing on the yield spread (difference between dividend yield and the government bond yield, BOX Chart 2) on the J-REIT, which was higher than those overseas, and on the pick-up in activity in the real estate market reflecting economic growth; and (2) individual investors continued to invest through investment trusts (BOX Chart 3). After the lackluster performance of the J-REIT index in the second half of 2005, investors have become more selective in screening funds to guard themselves from investing in REITs that own over-priced properties. In response, many REITs now take care to avoid real estate investments that do not generate enough returns compared to acquiring costs. The upward trend in the J-REIT index in the first half of 2006 partly indicates the acknowledgements of investors of these J-REIT managers' strategies.

In the last two weeks of June, however, the J-REIT index fell (1,653.15 at the end of June 2006, 3.2 percent higher compared to the end of 2005). This reflected the influences of stock price declines, and of recommendations from the Securities and Exchange Surveillance Commission that administrative disciplinary action be taken against a REIT and REIT asset management company (for lack of due diligence in assessments of real estate acquisitions).

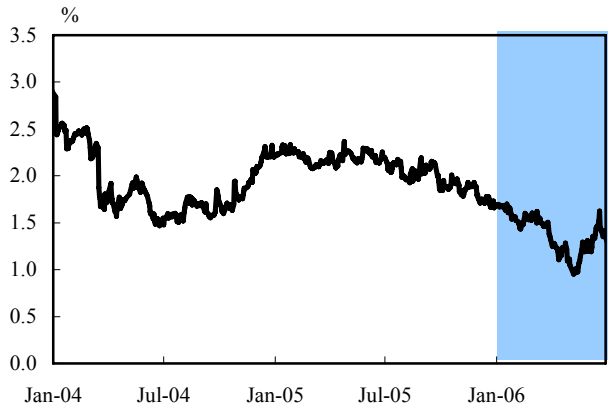
In the first half of 2006, eight funds were newly listed on the Tokyo Stock Exchange. The J-REIT market grew to 3.5 trillion yen in market value as of the end of June 2006.

BOX Chart 1: J-REITs



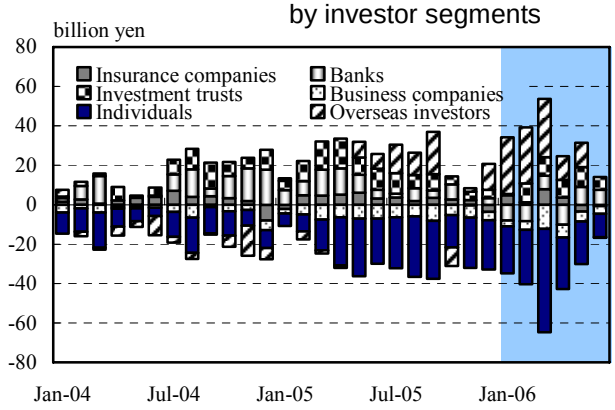
Note: TSE REIT Index is a capitalization-weighted index based on all REITs listed on the Tokyo Stock Exchange.
Source: Bloomberg

BOX Chart 2: J-REIT yield spread



Note: Yield spread is dividend yield minus newly-issued 10-year JGB yield.
Source: Bloomberg

BOX Chart 3: Net trading value by investor segments



Note: Net trading value is purchase value minus sales value.
Source: Tokyo Stock Exchange

4. Credit Market

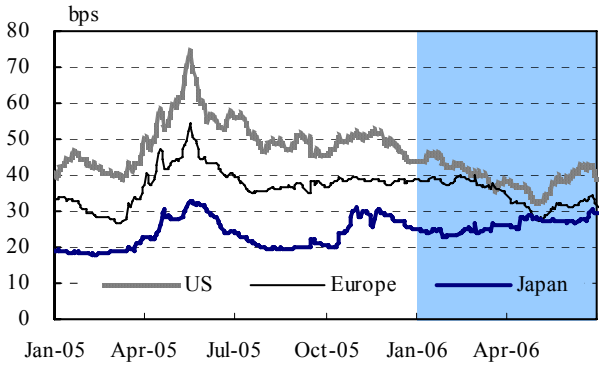
In the credit market, credit spreads, which had been at extremely tight levels, began to widen from around March. Issuance of lower-rated bonds and Fiscal Investment and Loan Program (FILP) agency bonds became less active. Two factors seem to have contributed to these developments. First, investors took on a more cautious approach to investments following the rise and increased volatility of interest rates. Second, several idiosyncratic events triggered concerns over certain issuers in the corporate bond market, municipal bond market, and FILP agency bond market, which affected investors' behaviors.

Of the factors that had supported stable developments in the credit market in recent years, solid corporate earnings, recovery of corporate balance sheets, and positive lending attitudes of the banks have not changed in the first half of 2006. In addition, the widening of spreads was limited for bonds with rating of single A or higher for which events triggering concerns over issuer quality did not arise; investors' demands were robust for securitized products. As such, the credit market as a whole remained stable with overall spreads being tight. Spreads on the CDS index, which covers 50 major corporate names, widened somewhat from spring 2006, but remained tight compared to May 2005 when credit markets became unstable, triggered by sluggish performance of some U.S. automobile companies (Chart 4–1). Meanwhile, global risk reduction, which affected equity and other markets, did not exert much influence on the credit market in Japan as well as on global markets.

Corporate Bond Spreads Remained Stable for Single A or Higher, and Widened for Triple B or Below

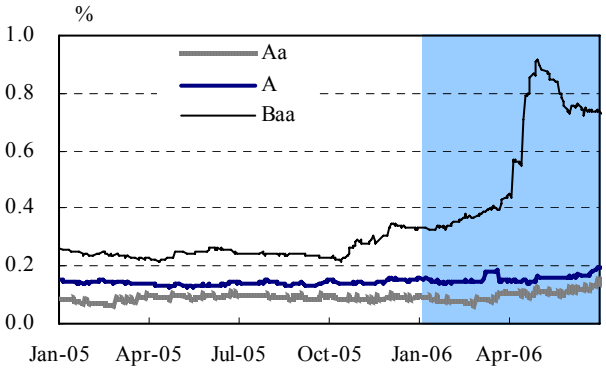
In respect to corporate bond spreads (Chart 4–2), spreads for firms with higher credit ratings, such as single A or double A, remained stable on the whole, albeit slightly widening after March. This widening reflected the more cautious approach to investment of some investors due to the rise and higher volatility of long-term interest rates, which in some cases led to their selling of corporate bonds on hand. Overall, though, spreads have not widened much and they continue to move at tight levels compared to the past underpinned by strong corporate earnings and recovery in firms' creditworthiness (Chart 4–3).

Chart 4-1: CDS indices



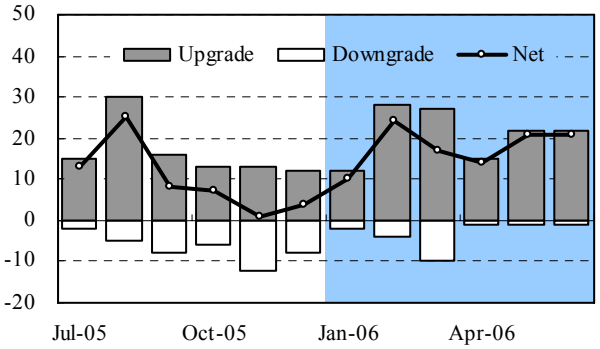
Note: Japan: iTraxx CJ, US: DJ CDX NA.IG, Europe: iTraxx Europe
Source: Markit Group

Chart 4-2: Corporate bond spreads



Notes: 1. Spreads on bonds with 4 to 6-year maturities against 5-year bonds.
2. The ratings indicated are those by Moody's.
Source: Japan Securities Dealers Association

Chart 4-3: Number of changes in credit ratings



Note: Total number of rating changes by R&I, JCR, Moody's, and S&P.
Source: Bloomberg

Meanwhile, credit spreads for bonds with triple B ratings have widened considerably since April 2006. Developments in credit spreads have become more stable since then, but spreads were still at the highest levels since 2001 and 2002 when steep widening was observed after the default of bonds issued by Mycal, one of Japan's largest retailers at the time. This was the result of idiosyncratic widening of spreads for bonds of several firms, reflecting events that were specific to those companies or industries and affecting the overall movements. Such idiosyncratic widening of spreads included those for bonds of some firms that conducted large-scale leveraged buyouts (LBOs), and bonds of several consumer finance companies following disciplinary actions against these firms and discussion to lower cap rates on lending. Meanwhile, the spreads of bonds for other triple-B-rated firms were fairly stable in the first half of 2006.

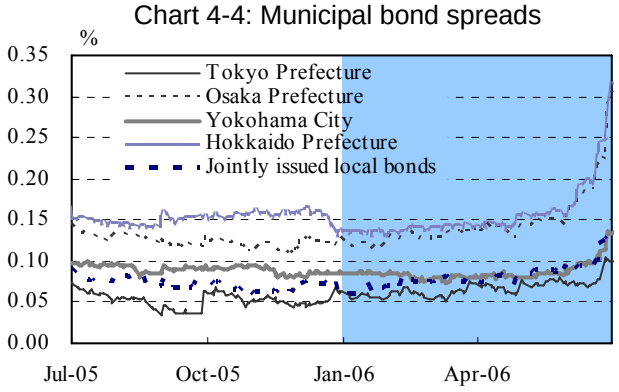
Credit Spreads for Municipal Bonds and FILP Agency Bonds Widened

Credit spreads for municipal bonds and FILP agency bonds, whose ratings are mostly double A or higher, widened in the first half of 2006. This was partly because of investors becoming somewhat more cautious in their investment activities, as with corporate bonds, but in the case of municipal bonds, the debate over financial reconstruction of municipal governments and agencies under government control and the actual filing of finance rehabilitation by a municipal government were also contributing factors. In the first half of 2006, not only did the credit spreads of municipal bonds widen on the whole, but the spread differences among issues became clearer (Chart 4–4). In respect to credit spreads for FILP bonds, credit spreads began to widen from April as investors became concerned about the effects of reforms of government finance measures, such as privatization of public-sector financial institutions (Chart 4–5).

Decrease in CPs Outstanding and in Corporate Bond Issuances

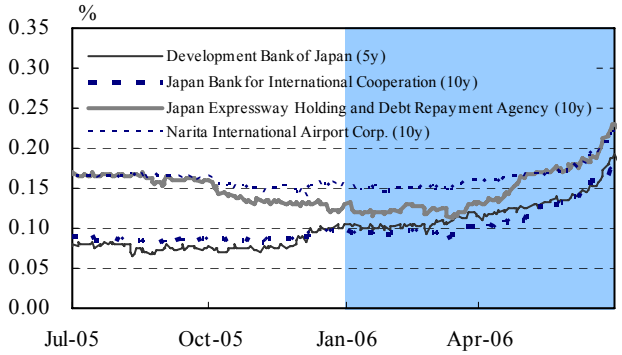
In the CP market, the amounts outstanding declined year on year since March 2006 (Chart 4–6). This was mainly because firms suppressed CP issuances with the increase in rates for newly-issued CPs as interest rates and volatility in short-term instruments rose, reflecting market participants' expectations of the increase in the Bank's target rates, and turned to some extent to bank borrowing where they could expect to borrow at relatively lower rates.

Chart 4-4: Municipal bond spreads



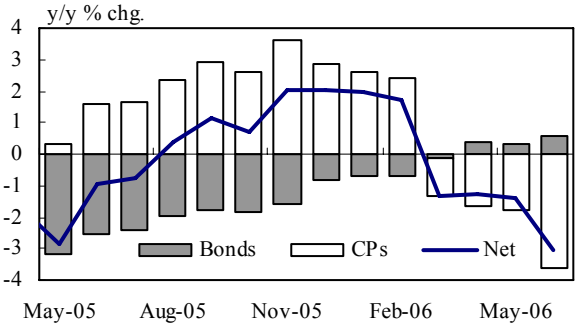
Note: Spreads on 10-year bonds against T-bonds.
Source: Japan Securities Dealers Association

Chart 4-5: FILP agency bond spreads



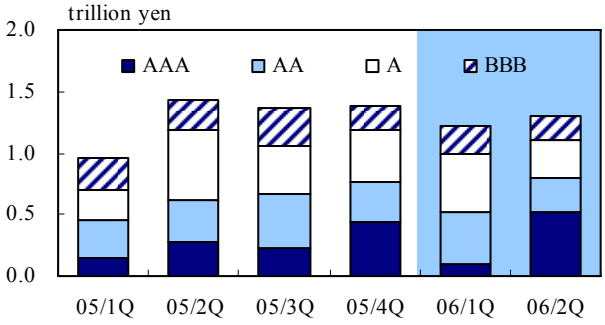
Note: Spreads against T-bonds.
Source: Japan Securities Dealers Association

Chart 4-6: Corporate bonds and CPs outstanding



Note: Number of corporate bonds in June are preliminary.
Sources: Bank of Japan, Japan Securities Dealers Association, I-N Information Systems

Chart 4-7: Corporate bond issuance by ratings (excluding banks)



Note: Bonds are classified by the highest ratings among S&P, Moody's, R&I, and JCR.
Source: I-N Information Systems

As for corporate bonds, issuance increased year on year in the first quarter of 2006, but declined slightly year on year in the second quarter as investors showed reluctance to invest in newly issued bonds during this period, reflecting prospects for long-term interest rates to rise (Chart 4–7).

Issuance amounts of FILP agency bonds and other public-sector bonds also decreased in the first half of 2006 (Chart 4–8). Issuance of Deposit Insurance Corporation bonds decreased as banks repaid loans from the Deposit Insurance Corporation. Issuance of FILP agency bonds decreased as spreads widened. As of June 2006, the percentage of FILP agency bonds issued in the fiscal 2006 issuance schedule is lower year on year.

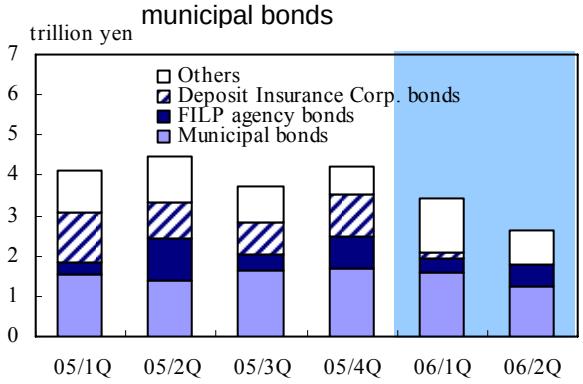
Steady Developments of Various Credit Channels

Syndicated loans have increased year on year in the first quarter of 2006, despite the fact that there were no large-scale corporate revitalization activities like those in 2005. In the second quarter of 2006, they seemed to have increased further, partly boosted by large-scale financing related to LBOs (Chart 4–9).

The issuance of securitized products has continued an upward trend in terms of increases in issuance amounts year-on-year supported by robust investor demand, particularly for products backed by real-estate mortgage loans, such as RMBSs and CMBSs (Chart 4–10). In March 2006, the accounting treatment of synthetic CDOs (a type of securitized product) was changed so that accumulation/ amortization could be applied for low-credit-risk products. There is a view that this change will generate new demands from investors for synthetic CDOs.

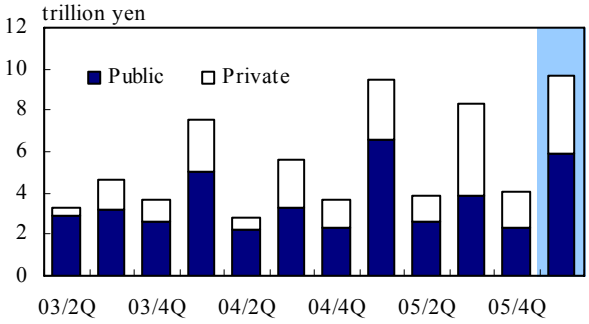
In the yen-denominated foreign bonds (Samurai bonds) market, issuances have decreased significantly because of uncertainty over the tax treatment in the countries of issuers after the book-entry system for corporate bonds was applied to these bonds in January 2006 (Chart 4–11).

Chart 4-8: Issuance of government guaranteed bonds, FILP agency bonds, and municipal bonds



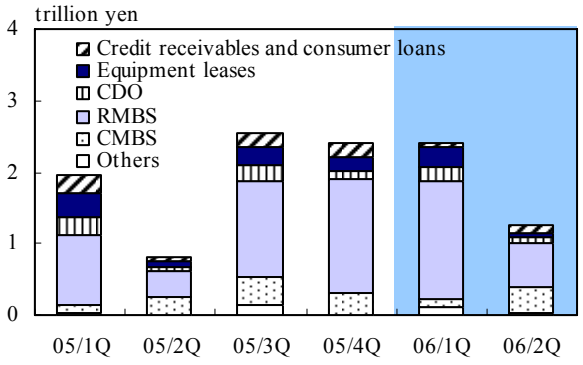
Note: RMBSs issued by the Government Housing Loan Corporation are excluded.
Source: I-N Information Systems

Chart 4-9: Origination of syndicated loans



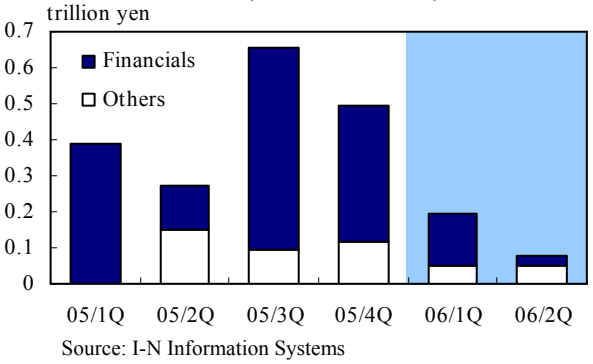
Source: Bank of Japan

Chart 4-10: Issuance of securitized products



Sources: Bank of Japan, Japan Securities Dealers Association

Chart 4-11: Issuance of yen-denominated foreign bonds (Samurai bonds)



Source: I-N Information Systems

5. Foreign Exchange Market

In the foreign exchange market, the U.S. dollar (USD) widely fluctuated against major currencies against the background of issues such as the U.S. current account deficit (April) and global risk reduction (May and June). Despite these fluctuations, the trend of USD appreciation against major currencies, which continued throughout 2005, came to a halt. The USD was on the whole weaker than it was at the end of 2005 (Chart 5–1).

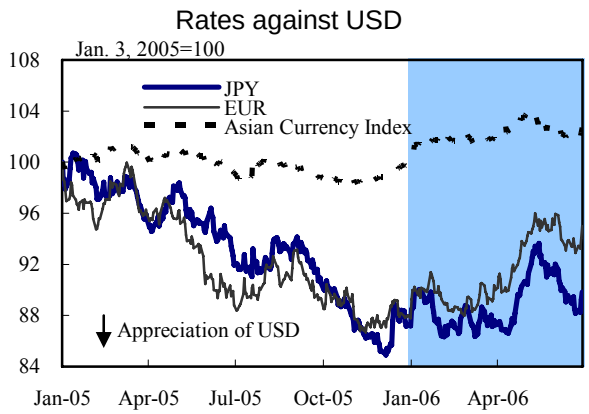
Correction of the Appreciation of the USD against the Yen that Had Continued since 2005

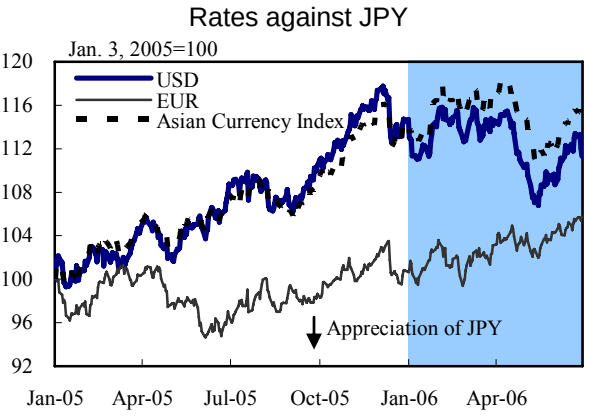
The yen (JPY) moved at around 114–119 JPY/USD in the first 4 months of 2006, as the appreciation of the USD against the JPY, which had continued throughout the whole of 2005 came to a halt. More specifically, market participants had a strong notion of a widening trend in the short-term interest rate differentials between Japan and the United States, and this led to the appreciation of the USD against the JPY in 2005. Since the beginning of 2006, however, market participants began to consider that such widening of short-term interest rate differentials would end based on the monetary policy outlook for the two countries. This change in the outlook on interest rates in part contributed to the halt in the depreciation of the JPY against the USD that had continued throughout 2005.

From late April, the USD fell against other major currencies following such developments as the release of a Statement by G7 Finance Ministers and Central Bank Governors, which strengthened concerns over the U.S. current account deficit. The JPY appreciated considerably, to move at just over 108 JPY/USD at one point. Although the USD strengthened again following investors' global risk reduction activities from mid-May, the JPY/USD rate was at about 114 as of the end of June 2006; the JPY was stronger against the USD than it was at the end of 2005.

The euro (EUR) trod a similar path against the USD as the JPY in the first half of 2006. As of the end of June 2006, the EUR was stronger than it was at the end of 2005, at over 1.27 USD/EUR. In the first half of 2006, the EUR also rose against the JPY against the background of stronger market expectations of interest rate increases by the ECB. The JPY/EUR hit 146 JPY/EUR as of the end of June 2006.

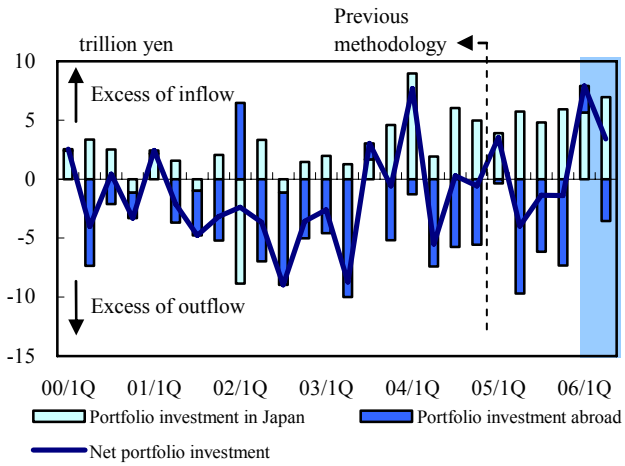
Chart 5-1: Exchange rates





Note: Asian Currency Index (against JPY) is calculated from Asian Currency Index (against USD) and USD/JPY.
Source: Bloomberg

Chart 5-2: Portfolio investment



Note: There is a break in data due to a revision in methodology from Jan 2005. Data before 2005 are based on trades settled, data after 2005 are based on trades contracted. The figures for April and May 2006 are preliminary. The figure for June 2006 is based on reports from designated major investors.
Sources: Ministry of Finance, Bank of Japan

Portfolio Investment Shifted to Net Inflows

In the first half of 2006, not only was there a halt in the depreciation of the JPY against the USD that had continued in 2005, as seen above, but there was also a change in regard to cross-border capital flows into Japan. In respect to portfolio investments in Japan, although with fluctuations, outward investments exceeded inward investments on the whole until the end of 2005. From the beginning of 2006, this trend seems to have changed as inflows have exceeded outflows in the first and second quarters (Chart 5–2).

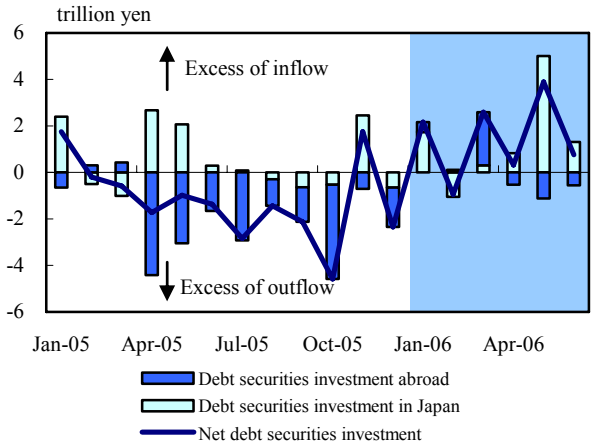
In more detail, after a trend of excess outward investments until the end of 2005, outward investment in debt securities by domestic investors decreased considerably in the first half of 2006, and inward investment in debt securities by overseas investors surged in the second quarter of 2006 (Chart 5–3). Both of these developments basically reflect changes in the outlook on interest rates. The former change in the behavior of domestic investors can mainly be accounted for by moves to decrease investments in foreign debt securities by domestic financial institutions against the background of shrinking interest rate differentials between long and short-term U.S. interest rates. The latter change in the behavior of overseas investors is mainly due to increase in holdings of Japanese debt securities with the aim of taking advantage of arbitrage transactions in response to rising interest rates in Japan.

Appreciation of Asian Currencies

Major Asian currencies strengthened against the USD up to around early May, with some appreciated to new highs after the 1997 Asian Currency Crises (Chart 5–4). Major Asian currencies, on the whole, were upheld by steady inflows of foreign investments into the equity and bond markets against the background of robust fundamentals and global investors' search for yield, despite weakness in some Asian currencies due to downward pressures exerted by political unrest and other country-specific issues. For example, investments in countries in the Asia Pacific region by overseas investors show a clear upward trend into March 2006 (Chart 5–5).

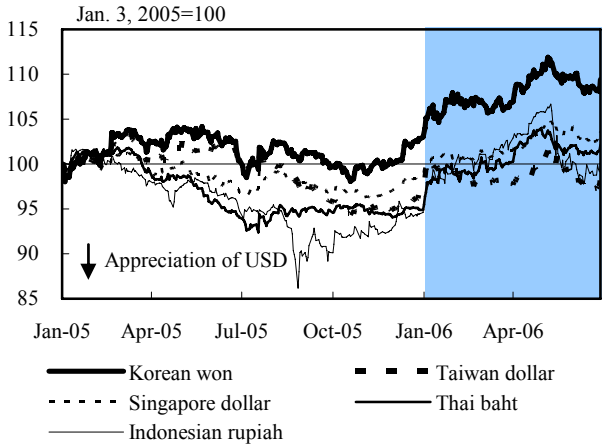
From mid-May 2006, global risk reduction activities contributed to decreases in stock prices in Asian countries, which in turn led to the depreciation of Asian currencies against the USD. Since then, Asian currencies have regained their strength against the

Chart 5-3: Debt securities investment



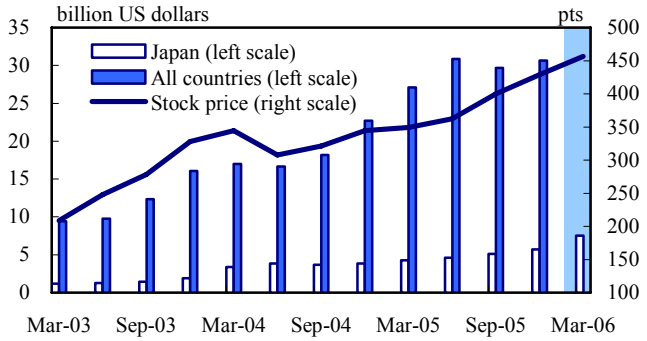
Note: There is a break in data due to a revision in methodology from Jan 2005. Data before 2005 are based on trades settled, data after 2005 are based on trades contracted. The figures for April and May 2006 are preliminary. The figure for June 2006 is based on reports from designated major investors.
Sources: Ministry of Finance, Bank of Japan

Chart 5-4: Major Asian currencies/USD exchange rates



Source: Bloomberg

Chart 5-5: External asset position vis-à-vis Asia and Pacific

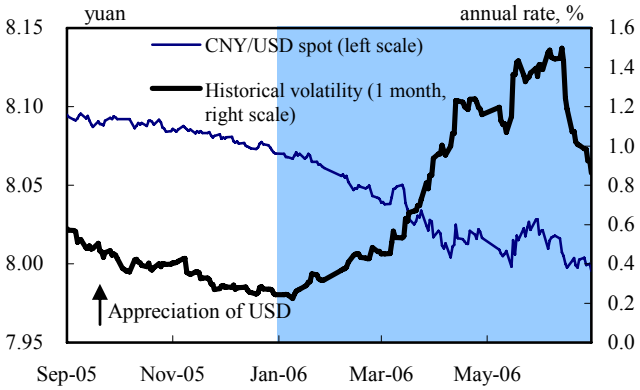


Note: Assets outstanding of non-bank sector denominated in domestic currency. Stock price is MSCI Emerging Asia Index (local currency).
Sources: BIS, Bloomberg

USD along with a recovery in stock prices from mid-June. As of the end of June 2006, Asian currencies showed an average 3 percent rise in value against the USD compared to the end of 2005 (Charts 5–1 and 5–4).

Meanwhile, since its revaluation in July 2005, the Chinese yuan (CNY) has, on the whole, shown a gradual upward trend against the USD, accompanied by larger daily fluctuations than before (Chart 5–6).

Chart 5-6: CNY spot and historical volatility (1 month)



Sources: Bloomberg, Bank of Japan

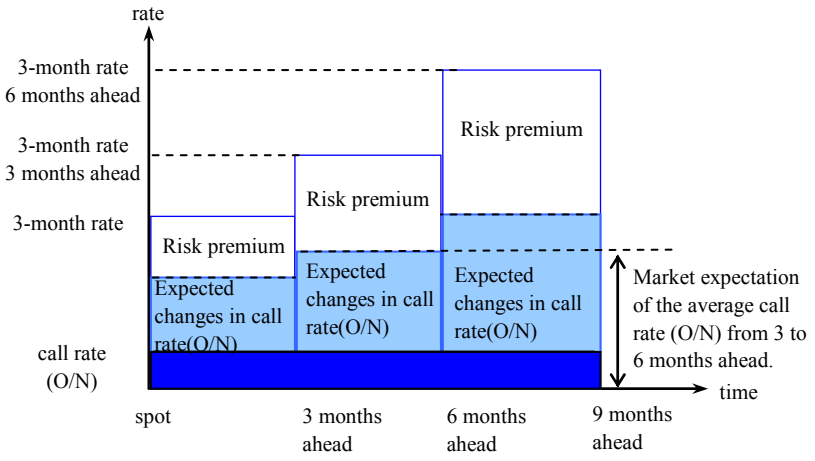
Appendix 1: Rate Increases Implied in Euro-Yen Futures

As seen in Section 1, a gradual expansion has been noted for transactions of derivatives products that have rates on overnight loans as underlying assets, such as overnight index swaps (OIS). Observing movements in OIS is an effective way to follow the market perceptions of the Bank's target rate increases, as these derivatives directly trade market's views of the target rates under the Bank's monetary policy, the uncollateralized overnight (O/N) call rates. The constraints are that there are only few participants and that the trade volume is limited.

A realistic alternative to OIS in extracting information on the outlook on the uncollateralized O/N call rates from market rates is to observe movements in short-term forward rates such as 3-month forwards. Short-term forward rates are traded directly in markets such as 3-month euro-yen futures for which underlying assets are 3-month euro-yen TIBOR. They can also be observed as implied forward rates in FBs, TBs, and JGBs with shorter remaining maturities. Developments in these markets can be considered to widely reflect the views of market participants, as these markets are much deeper and more liquid than the OIS market, and are frequently arbitraged with interest rate swaps and other transactions.

Short-term forward rates, in concept, can be considered to be the sum of market participants' expected uncollateralized O/N call rates and the risk premium for future uncertainty (Appendix Chart 1–1).

Appendix Chart1-1: Forward Rates and Risk Premiums



Therefore, the risk premium needs to be deducted from forward rates when trying to extract market expectations of the future uncollateralized O/N call rates. However, it is difficult to distinguish whether forward rates moved because of changes in risk premiums, or because of changes in the expected rates of the uncollateralized O/N call rates. This is because risk premiums are not directly observable and are not easily estimated.

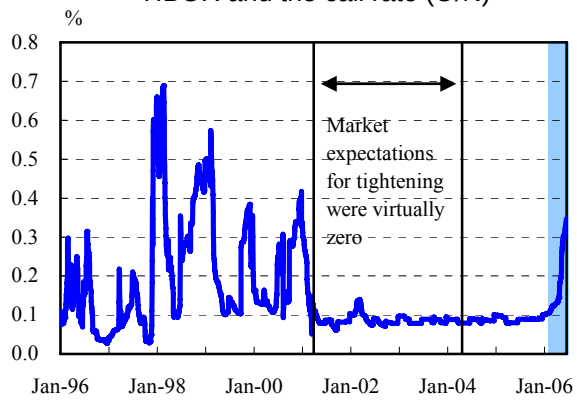
When the market is feeling that future uncertainty is higher, risk premiums should be estimated with due consideration of the traits of the corresponding financial products and the level of uncertainty involved, as risk premiums will most likely be larger. Here, market expectations of the future uncollateralized O/N call rates are approximated by estimating and deducting risk premiums from widely used forward rates, such as the 3-month forward rate 1 year ahead, extracted from euro-yen futures.

As mentioned earlier, euro-yen futures are futures based on the underlying assets of 3-month euro-yen TIBOR. For this reason, the risk premium on these products can be considered to consist of

two components: (1) the spread between the 3-month euro-yen TIBOR and the uncollateralized O/N call rates (hereinafter, basis spread), and (2) the risk premium for future uncertainty. As the basis spread component has more or less stayed at around 10 bps except when concerns over credit risks or expectations of increases in the Bank's target rates were strong, this spread can be assumed to remain largely unchanged (Appendix Chart 1–2). In contrast, the risk premium component seems to change significantly based on the level of future uncertainty.

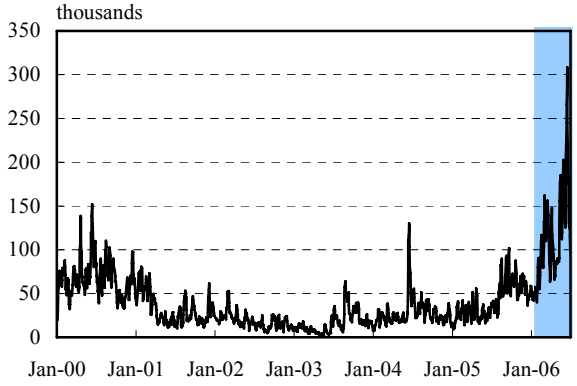
This is due to the fact that euro-yen futures are widely used to hedge trades or to take speculative positions in the money markets. For instance, Japanese financial institutions that have sizable short-term assets and liabilities including deposits and loans, particularly major Japanese banks, often use euro-yen futures to hedge short-term interest rate risk as part of their asset liability management (ALM). Overseas investors also became more active in taking speculative positions in the Japanese markets using euro-yen futures from the latter half of 2005, in line with stronger expectations of the end of the quantitative easing policy (QEP) by the Bank and of a rise in market interest rates in Japan. Trading volume in the euro-yen futures market surged in the first half of 2006, which indicates that euro-yen futures transactions have picked up significantly, reflecting market expectations of increases in short-term interest rates in Japan (Appendix Chart 1–3).

Appendix Chart 1-2: Spreads between the 3-month TIBOR and the call rate (O/N)



Notes: 1.Call rate is the target rate except for during QEP period. During QEP period, the call rate is regarded as zero.
2. TIBOR before Feb-98 is the Japanese-yen TIBOR. From Mar-98, TIBOR indicates the Euro-yen TIBOR.
3. The period "market expectations of tightening were virtually zero" (Apr-01to Apr-04) is derived from the survey by Kyodo News.
Source: Bloomberg

Appendix Chart 1-3: Transaction amounts of euro-yen futures



Note: 5 days' backward moving average of the sum of traded amounts for all contracts.
Source: Tokyo Financial Exchange

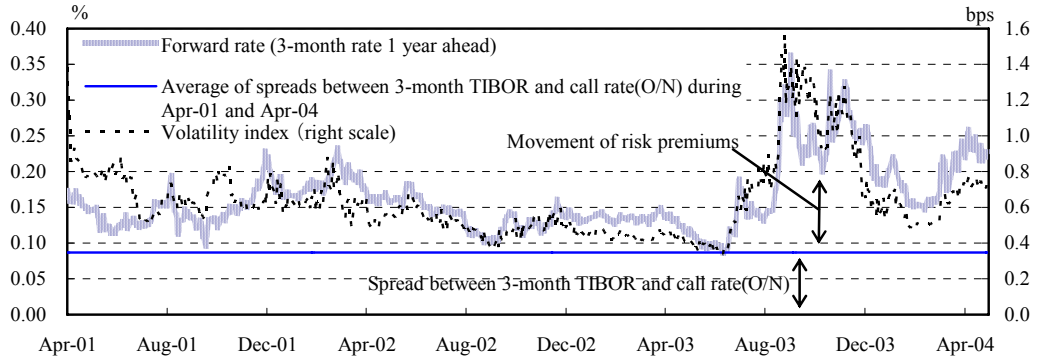
Below, a risk premium for future uncertainty is calculated based on the simple assumption that "the extent of increase in risk premium relative to basis spread is proportional to movements in the implied volatility of swaptions." Specifically, after defining the period where market expectations of a tightening of target rates by the Bank were virtually zero (April 2001 to April 2004 based on a survey by Kyodo News), risk premiums were calculated using the following methodology (Appendix Chart 1–4).

1. The average spread between the 3-month euro-yen futures TIBOR and the uncollateralized O/N call rates for the term (8.7 bps) is used as the basis spread.

2. The assumption that "the increase in forward rate minus the basis spread indicates the amount of expansion in risk premium" is used. This assumption is based on the premise that the increase in forward rates for the term examined does not reflect the expectations of an increase in the uncollateralized O/N call rates within a year.

3. For the term, the relationship parameters between “the extent of expansion in risk premium” and “implied volatility of swaptions” is estimated.

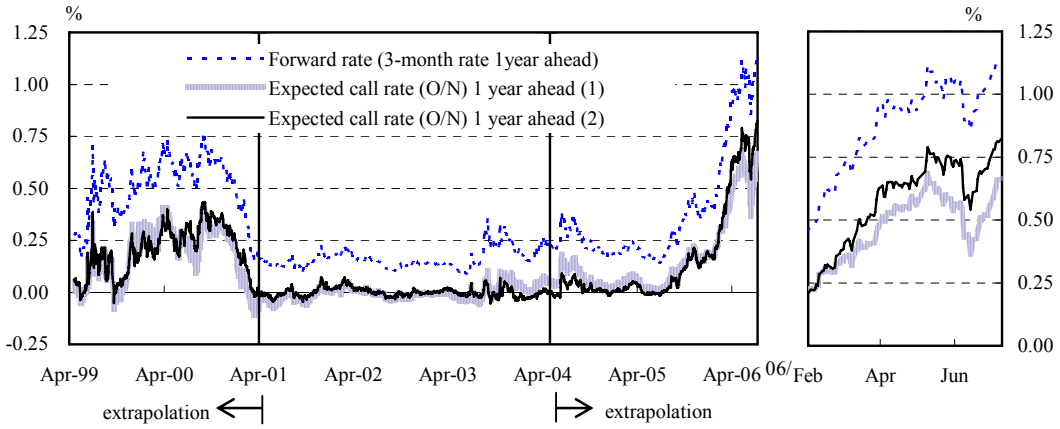
Appendix Chart 1-4: Forward rates and risk premiums (3-month rate 1 year ahead)



Note: Volatility index is calculated from 1M into 1Y swaptions.
Sources: Bloomberg, Reuters, Tokyo Financial Exchange, Bank of Japan

Risk premiums for the periods between April 1999 to March 2001 and May 2004 to June 2006 were estimated from implied volatility of swaptions by extrapolating the parameters derived through the above method. As shown in Appendix Chart 1–5, the outlook on the uncollateralized O/N call rates “1 year ahead” is the 3-month forward rate minus the basis spread and estimated risk premiums. Because swaptions on 3-months rates 1 year ahead that match the forward rates used here does not exist, the implied volatility is based on two different swaptions: (1) 1-month swaption on 1-year swap (1M into 1Y swaption), and (2) 1-year swaption on 1-year swap (1Y into 1Y swaption). The market participants’ expectations of uncollateralized O/N call rates for 1 year to 1 year and 3 months ahead that are extracted from the above procedures are shown below.

Appendix Chart 1-5: Expected call rate (O/N) at around “1 year ahead”



Note: (1) deducts the risk premiums estimated from 1M into 1Y swaptions. (2) deducts the risk premiums estimated from 1Y into 1Y swaptions. Risk premiums are estimated as follows.

Risk premium = β × volatility index of swaption + Error

	(1)	(2)
β	0.123	0.059
	(0.005)	(0.001)

Figures in parentheses are standard errors. Parameters are significant at the 1% level.
Standard errors are Newey-West HAC estimates.

Sources: Bloomberg, Reuters, Tokyo Financial Exchange, Bank of Japan

1. The outlook on the uncollateralized O/N call rates 1 year ahead (hereafter, the expected call rates) were virtually zero until the end of July 2005, but increased gradually after that. The expected call rate exceeded 0.25 percent in early February 2006.

2. The expected call rate continued to rise gradually, before and after the end of QEP by the Bank. The fact that fluctuations in estimated risk premiums have become wider after April 2006 suggests that the expected call rates should be viewed with reservation.

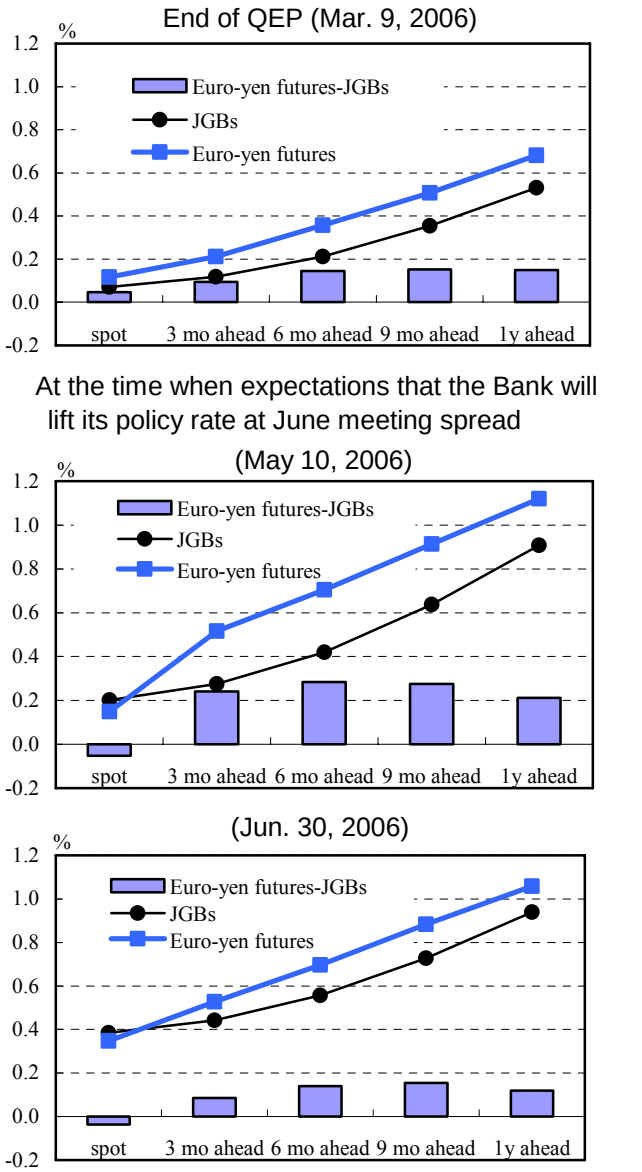
3. For the term before April 2001, the expected call rates indicate that market participants anticipated to some extent the lifting of the zero interest rate policy in August 2000, the following target rate decrease by the Bank, and the introduction of QEP.

These estimates are derived from data on euro-yen futures, which is only a particular segment of the money market, and are based on certain assumptions. Reservations include the fact that it is not certain whether the relationship between the implied volatility of options and risk premiums is stable, and that there are relatively large gaps in the calculated results depending on which options are used. In addition, because large-lot transactions from major Japanese banks, as part of their ALM activities, and overseas investors are considered to have accounted for a large share of transactions in the euro-yen futures market despite the relatively healthy depth and liquidity of this market as described earlier, there are periods when rates tend to move significantly in one direction. This was seen in the last few months when interest rates were rising. The results of comparisons of forward rates extracted from euro-yen futures and JGBs show that these rates followed a similar path on the whole, but that they diverged in early May when market expectations of "the Bank increasing target rates in June 2006" became stronger (Appendix Chart 1–6).

There are a wide range of participants in the FB and TB markets, but liquidity is not high because investors tend to hold these securities until maturity. In addition, as described in Section 1, rates on FBs and TBs are easily influenced by fluctuations in funding rates such as repo rates. OIS, meanwhile, have merit in that they are not susceptible to influences from changes in basis spreads, as the uncollateralized O/N rates are the underlying assets for these transactions. However, the downside is that they do not necessarily reflect market consensus as market participants in the OIS market are currently limited to foreign financial institutions.

Therefore, there are both advantages and disadvantages when using any specific product, so a range of markets should be considered when interpreting the market outlook on policy changes.

Appendix Chart 1-6: 3-month forward rates implied in euro-yen futures and JGBs



Sources: Tokyo Financial Exchange, Japan Securities Dealers Association, Bank of Japan

Appendix 2: Global Risk Reduction

The sharp decline in prices in the commodities and emerging markets in May affected a wide range of markets including the stock markets in major economies toward June. These global price adjustments are generally referred to as "global risk reduction."

On the whole, prices in each market had continued an upward trend from 2003 after the adjustment process, triggered by the bursting of the IT bubble, had subdued. The common factors that supported the upward trend in these markets were (1) strong fundamentals in the United States and the global economy, such as economic expansion and low inflation, and (2) a global trend of investors' search for yield against the background of an easy monetary environment in major economies, as reflected in stronger demands of investors for investments in risk assets with high returns. Additionally, institutional investors increasingly began to invest in a wider range of markets, such as commodities and emerging markets, through various channels, including not only traditional channels such as mutual funds, but also hedge funds and other funds and securitized products. This contributed in part to strengthening the correlation among global markets.

The extent of price declines from May 2006 varied by markets and products, and was particularly large in the commodities and emerging markets, where price increases in the second half of 2005 were especially steep and where the inflow of investments from overseas investors and non-commercial investors was significant, compared to the size of these markets. It was pointed out that hedge funds and other investors have taken large positions in a similar direction in these markets; crowded trades.

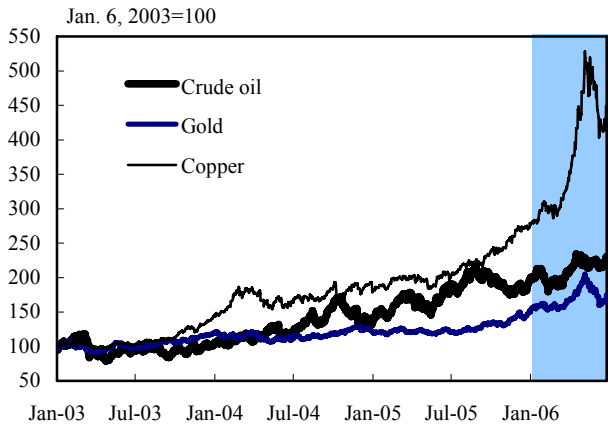
Meanwhile, market participants generally seemed to expect these markets to return to an upward trend in the medium term because the strong fundamentals have not changed much in most of these markets. On the other hand, market participants also seemed to foresee changes in the factors described above that have supported the upward trend in these markets since 2003. More specifically, market participants seemed to widely anticipate that the easy monetary environment will change eventually, as monetary policy in Japan, U.S., and Europe have come to a turning point. In addition, with respect to the strong fundamentals of the global economy, market participants were concerned about the possible deceleration of the U.S. economy while inflationary pressures remained high. Prices ceased to decline and turned up in many markets, reflecting a pause in investors' global risk reduction activities after mid-June 2006. However, the strengths of recovery in investment inflows differ among markets and price levels in these markets overall have yet to recover to the levels they were at before the global risk reduction began. Additionally, since the beginning of July, geo-political risk in the Middle East and other regions has increased. Therefore, it will take some time to discern whether the price adjustments seen in May and June 2006 are transitory developments.

In this Appendix, the price adjustments in May and June in major markets will be explained in more detail, by market.

Commodities Markets

The markets that declined most significantly from spring 2006 were commodities (Appendix Chart 2–1). Precious metals such as gold and silver, and base metals such as copper and zinc, declined 20–30 percent from their recent highs, although energy prices, including crude oil, have been exceptions and have stayed at high levels. That is, after commodities prices continued an upward trend in the past few years, reflecting a surge in demand from developing countries

Appendix Chart 2-1: Commodities prices

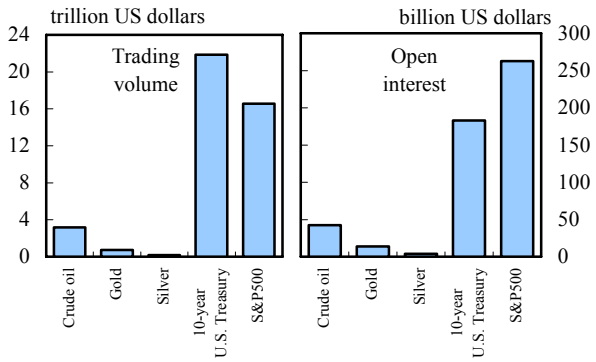


Note: Prices for crude oil and gold are NYMEX nearby contract prices. Price for copper is LME price of contract for delivery in 3 months.
Source: Bloomberg

and an increase in concerns over steady supply, the fast pace of increases in commodities prices since the beginning of 2006 prompted funds that had large concentrated positions in these markets to realize profits and reduce risks. Prices turned up after mid-June 2006, and by mid-July, recovered about half of their declines since spring, although the situation varies among commodities.

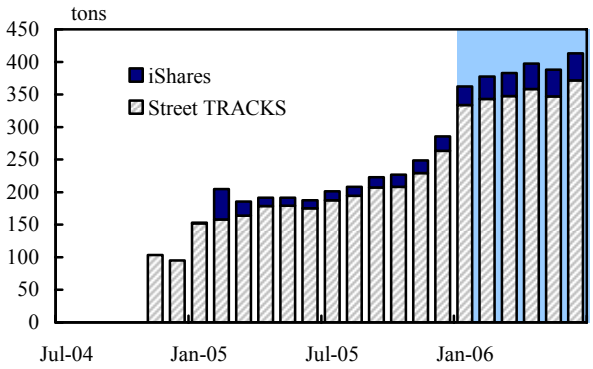
The commodities markets are still small in terms of volume and liquidity compared to traditional financial markets, and their main use had been to hedge exposures gained through economic activities and to take relatively short-term speculative positions (Appendix Chart 2–2). In recent years, U.S. and European pension funds have increased investments in these relatively small markets to diversify their assets. This is in part due to the development of new channels like the Commodities Trading Advisor (CTA), derivatives based on indices in these markets, and the Exchange Traded Fund (ETF) (Appendix Chart 2–3). The extent of declines in the commodities market was magnified by the fact that outflows of these investors were large.

Appendix Chart 2-2: Comparison of futures markets



Note: Trading volume is the sum of traded amounts for all contracts from Oct. 2004 to Sep. 2005. Open interest is the average of the month-end amounts of all contracts from Oct. 2004 to Sep. 2005.
Sources: CFTC, Bloomberg

Appendix Chart 2-3: Gold ETF (net asset value)

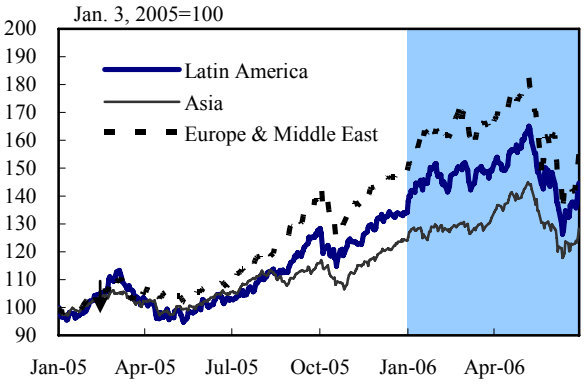


Note: Figures are those of the month-end. Gold ETF is the gold-backed exchange-traded fund. "StreetTRACKS" and "iShares" are listed and traded on the NYSE and AMEX, respectively.
Source: Bloomberg

Emerging Markets

Price declines in emerging stock markets in the first half of 2006 were also relatively large. Although in various degrees according to regions, the MSCI emerging market indices, which are widely used indices for emerging market stocks, declined about 20 percent from their peaks (Appendix Chart 2–4). Credit spreads in emerging markets also widened, although the changes were not as large as those seen in stock markets (Appendix Chart 2–5).

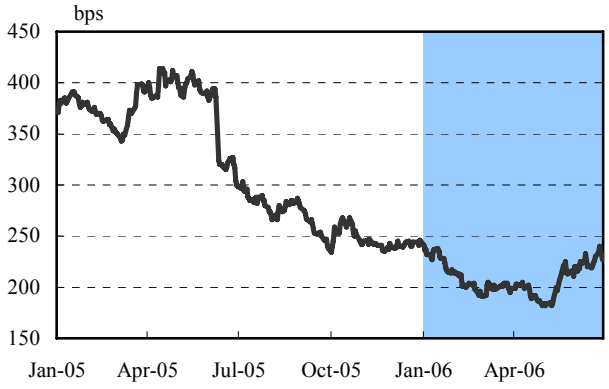
Appendix Chart 2-4: MSCI emerging market indices (in local currency)



Source: Bloomberg

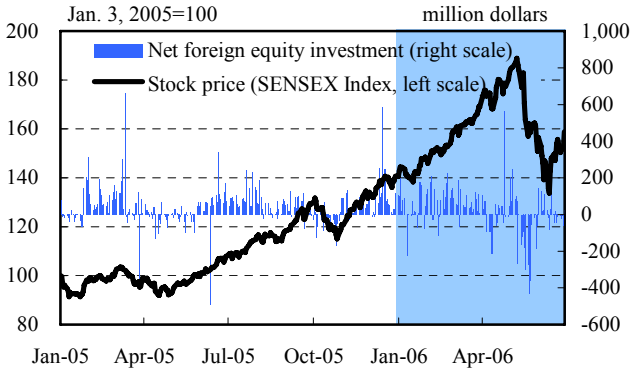
In the past few years, inflows of investments into emerging markets by mutual funds in major economies and hedge funds have grown, and, as with the commodities market, an outflow of a portion of these investments led to major price adjustments in emerging markets. Looking at stock prices in India (SENSEX), which showed relatively large decline of about 30 percent from their recent highs, a large net selling by overseas investors was seen during its downturn (Appendix Chart 2–6). From mid-June to early July, although the magnitude differs by country, stock prices of emerging market countries have increased to recover about half of their cumulative declines since spring 2006.

Appendix Chart 2-5: Emerging market bond spread



Note: EMBI, sovereign spread over US treasuries.
Source: JP Morgan

Appendix Chart 2-6: Stock price and net foreign equity investment in India

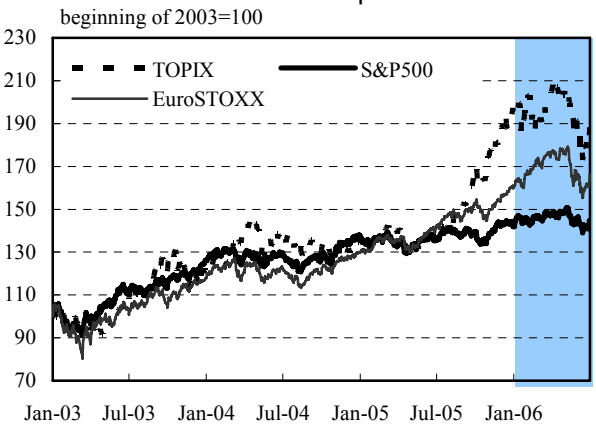


Source: Bloomberg

U.S. and European Stock Markets

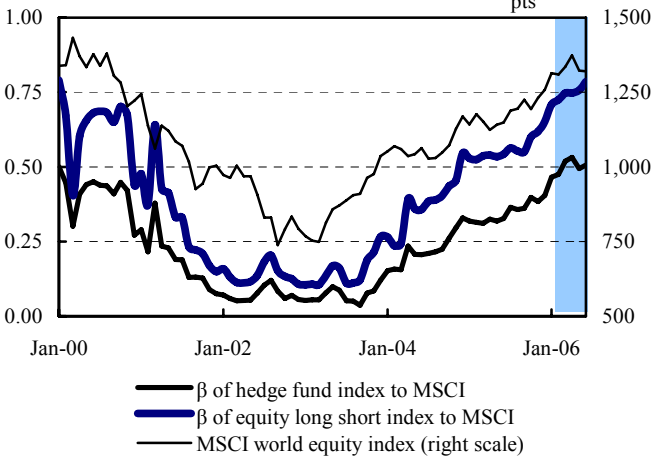
Although the magnitude was quite limited compared to the commodities and emerging markets, prices in the U.S. and European stock markets were down 8 percent and 13 percent, respectively, from their peaks in the first half of 2006 (Appendix Chart 2–7). Despite their relatively large trading volume and liquidity, the growing influence of hedge fund activities in these markets has been noted. Particularly since 2004, hedge funds that use a "Long/Short Equity" strategy have increased, and they have been skewing their positions to net-long equity positions (the relationship between returns of hedge fund investments and stock markets <β, beta> has become increasingly stronger since fall 2005; Appendix Chart 2–8). Some point out that in the recent price adjustment phase, the unwinding of these positions by hedge funds was one factor that made the decline in stock prices in the U.S. and European markets larger.

Appendix Chart 2-7: Equity prices of Japan, U.S. and Europe



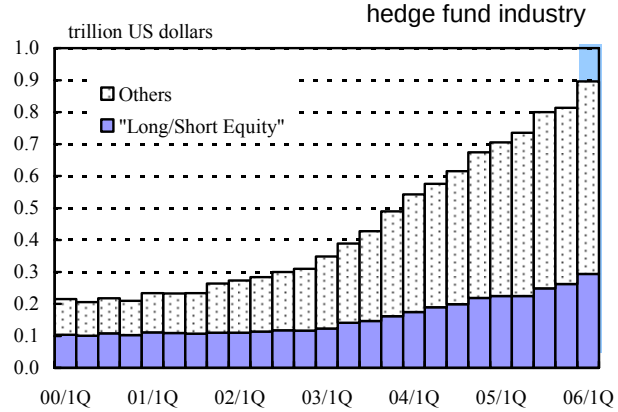
Source: Bloomberg

Appendix Chart 2-8<2>: Sensitivity (ß) of hedge fund return to equity index return



Note: 12-month backward moving average. Data are those registered on the Lipper TASS Database.
Sources: Credit Suisse/Tremont, Bloomberg, Bank of Japan

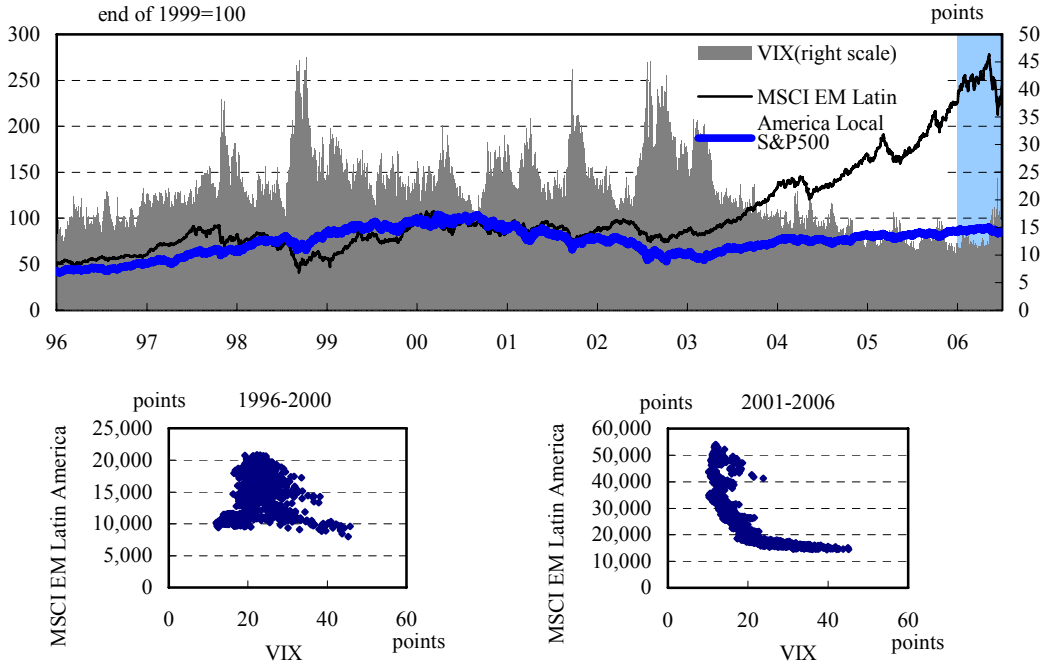
Appendix Chart 2-8<1>: Assets outstanding in the hedge fund industry



Note: Quarterly data. Data are those registered on the Lipper TASS Database.
Source: Tremont Capital Management

The correlation between movements in the Japanese stock markets and those in U.S. stock markets seems to have become stronger, as was mentioned in Section 3. Other stock markets, including emerging markets, also seem to be more strongly affected by developments in the U.S. stock markets. For example, stocks in Latin American countries have shown inverse correlations to U.S. stock price volatilities in recent years (in the period between 2001 and 2006, when U.S. stock prices were more volatile, Latin American stock prices showed declines; Appendix Chart 2–9). This means that although a pick-up in cross-border capital flows and arbitrage transactions between markets generally contributes to enhancing the stability and efficiency of markets, it also leads to wider influences on other markets when prices in certain markets plunge, through investors' loss-cutting behaviors and position reductions. As the range of assets included in investors' portfolios has diversified, the extent of the influence exerted by events in certain markets on other markets seems to also have expanded.

Appendix Chart 2-9: Correlation between volatility of equity prices in the U.S. and equity prices in Latin America

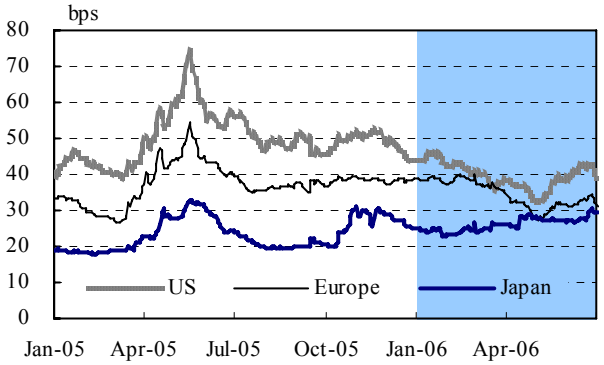


Notes: 1. Charts in the second row are scattered plots of daily data of volatility of equity in the U.S. and MSCI EM Latin America Local.
2. VIX is used to indicate volatility of equity in the U.S.
Source: Daiwa Institute of Research, Bloomberg

U.S. and European Credit Markets

The withdrawal of investments in risk assets by investors on a global scale also influenced spread developments in the U.S. and European credit markets to a certain extent, especially for those with lower credit ratings. The widening of spreads in these markets, though, was quite limited (Appendix Chart 2–10). In recent years, as with other markets, the inflow of abundant liquidity into these markets through funds and securitized products such as CDOs

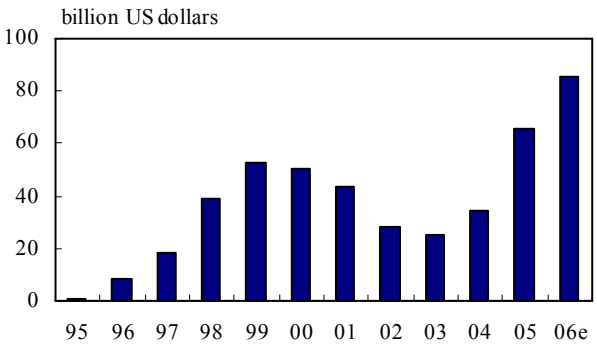
Appendix Chart 2-10: CDS indices



Note: Japan: iTraxx CJ, US: DJ CDX NA.IG, Europe: iTraxx Europe
Source: Markit Group

had positive impacts in the form of narrower credit spreads. However, unlike in other markets, the large capital outflows from May onwards and the subsequent price declines were not noted in these markets (Appendix Chart 2–11).

Appendix Chart 2-11: CDO issuance



Note: 1. Underlying assets of the figures are HY bonds, IG bonds, and Leveraged Loans.
2. The figure for 2006 is an estimate.
Source: Lehman Brothers