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BOJ-NET Funds Transfers after the End of the Quantitative Monetary Easing Policy

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In 2001, the BOJ-NET Funds Transfer System (BOJ-NET) was converted to a full-fledged real-time gross settlement (RTGS) system. RTGS reduces settlement risk in the system compared with deferred net settlement (DNS), but requires participants to take appropriate measures to manage their intraday liquidity. Under the quantitative monetary easing policy (QMEP), the liquidity constraint was not binding and smooth flow of payments could be achieved in the system. With the recent changes in financial environments, the liquidity constraint has become more binding, and participants may encounter, for the first time, issues associated with the management of liquidity and payment flows. This paper analyzes changes in payment activities and intraday settlement exposures before and after the end of QMEP, and reviews possible measures that could be taken to further facilitate smooth flow of payments in BOJ-NET.

Introduction

BOJ-NET is an interbank payment system for the Japanese yen operated by the Bank of Japan. The balances that participants hold in their accounts with the Bank (BOJ accounts) are used as settlement assets to make such payments. The annual total value settled in BOJ-NET reaches as high as forty times Japan's nominal GDP.

In January 2001, the Bank converted BOJ-NET to an RTGS system from a DNS system (see BOX1). While RTGS systems achieve intraday finality and eliminate systemic risk associated with DNS, there are issues specific to RTGS that need to be addressed. For example, since payment instructions are settled individually, RTGS systems require larger amount of liquidity and thus higher liquidity costs compared with DNS systems. In addition, since payments are settled continuously during the day, participants need to manage their liquidity and payment flows throughout the day.

In March 2001, shortly after the introduction of RTGS, the Bank implemented QMEP. Under the policy, participants were able to maintain sufficient amount of liquidity with minimum funding costs because of excess supply of funds in the money market. Participants could easily manage intraday payment flows, and this contributed in maintaining smooth flow of payments in the system. However, with the end of the policy in March 2006, subsequent rise in the policy interest rate, and increase in market transactions, participants may encounter, for the first time, liquidity issues associated with RTGS.

This paper analyzes changes in payment activities and intraday settlement exposures before and after the end of QMEP,[1] and reviews possible measures that could be taken to further facilitate smooth flow of payments in BOJ-NET.

Trends in Payment Activities

The following paragraphs discuss how the changing environment surrounding BOJ-NET has affected payment activities in BOJ-NET.

(1) Increase in the Value Settled

BOJ-NET is utilized for settling money market transactions, the cash legs of securities transactions including Japanese government securities (JGSs), as well as the net positions of private-sector DNS systems. In addition, transactions between participants and the Bank, such as those related to the Bank's money market operations, loans, treasury funds, and deposit/withdrawal of banknotes, are completed by funds transfers through BOJ accounts.

As shown in Chart 1, the daily value of BOJ-NET

[BOX1] DNS and RTGS

In a DNS system, payment instructions are settled on a net basis at pre-specified settlement times. DNS systems have the possibility of unwinding payments, which can be a significant source of systemic risk.

In an RTGS system, payment instructions are settled on a transaction-by-transaction basis immediately after they are accepted by the system, given that a payer has sufficient liquidity at that time. In this way, RTGS systems can achieve intraday finality and eliminate intraday settlement exposures continuously during the day.

At the same time, RTGS systems require larger amount of liquidity. This provides participants with incentives to economize on liquidity costs by delaying submission of payment instructions until they receive incoming payments. This could increase the time-lag between the execution of underlying transaction and its settlement, and create uncertainty regarding the timing of receiving incoming payments.

funds transfers increased at a moderate pace starting from 2002. With the end of QMEP in March 2006, the rate of increase accelerated. During March 2006, the system marked the highest value after the conversion to RTGS, and daily average value exceeded JPY 100 trillion. This indicates that the size of settlement exposures in the system has become larger.

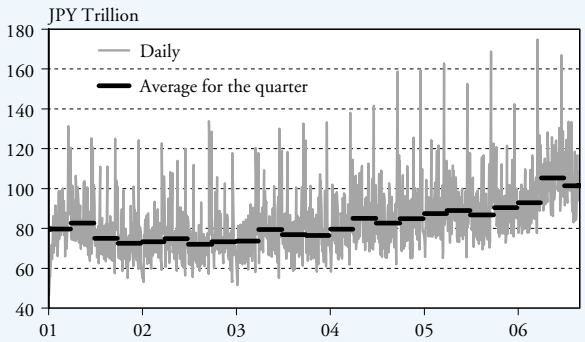
The increase in the total value settled reflected an upward trend in the number of JGS transactions, whose cash legs are settled on a delivery-versus-payment (DVP) basis in BOJ-NET. As shown in Chart 2, the daily value of DVP for JGSs surged after the end of QMEP in response to an increase in repo transactions for funding purposes. The value of interbank transfers, mostly related to call money transactions, also showed a moderate upward trend starting from 2002.

(2) Decrease in the Total Amount of Liquidity

The total amount of liquidity used for BOJ-NET funds transfers consists of the total amount of overnight balances at BOJ accounts and intraday overdrafts. Intraday overdrafts are extended by the Bank to participants on a collateralized basis without any fee. A borrower is required to repay the full amount by the end of the day. Chart 3 shows the trend in the total amount of liquidity in the system.

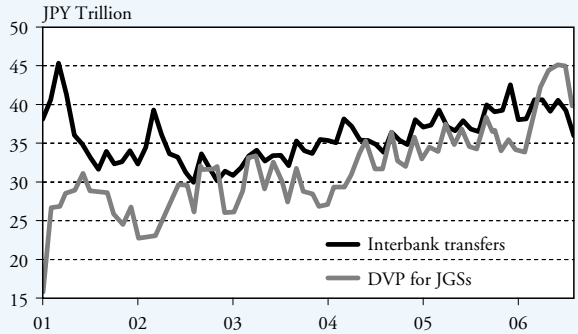
Under QMEP, the outstanding balance of BOJ accounts was the operating target of the Bank's money market operations, and its target range was increased several times. During January 2004 to March 2006, the amount of overnight balances exceeded JPY 30 trillion. With the end of the policy in March 2006, the total amount of overnight balances declined significantly to about one-third of its peak, almost the same level as that at end-2001.

Chart 1: Value of BOJ-NET Funds Transfers



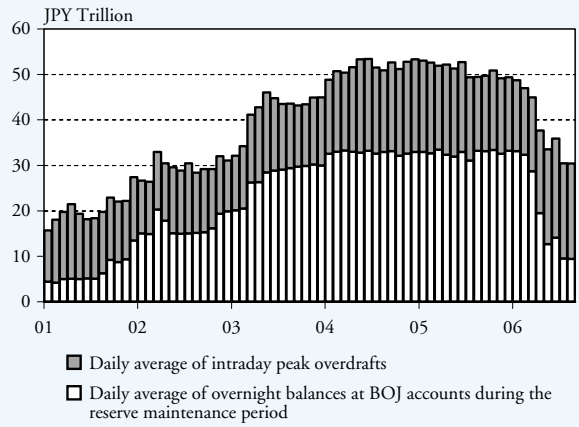
Source: Bank of Japan.

Chart 2: Daily Average Value by Transfer Type



Source: Bank of Japan.

Chart 3: Total Amount of Liquidity

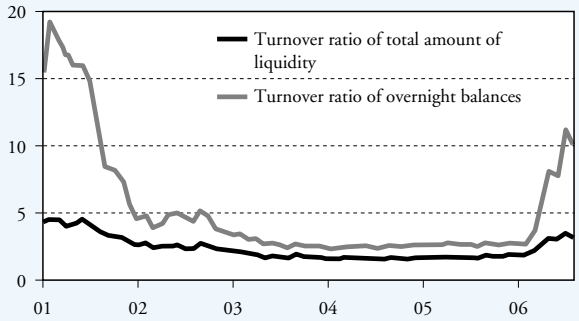


Source: Bank of Japan.

In contrast, the daily value of intraday peak overdrafts remained stable, though a slight increase could be observed after March 2006. This increase is attributable to the increase in the share of DVP for JGSs. Participants usually use the SPDC facility,[2] which includes intraday overdrafts, for settling JGS transactions.

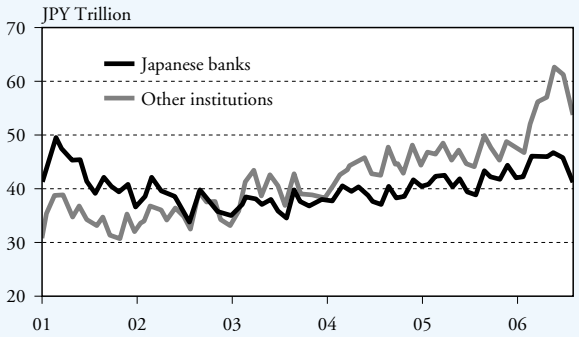
Together, the total amount of liquidity, which exceeded JPY 50 trillion at its peak, declined to about JPY 30 trillion with the reduction of overnight balances after the end of QMEP.

Chart 4: Turnover Ratio



Source: Bank of Japan

Chart 5: Daily Average Value by Institution Type



Note: Japanese Banks include city, regional, and trust banks. Other Institutions are mainly foreign banks and securities companies.
Source: Bank of Japan.

(3) Increase in Turnover Ratio

During the course of the day, participants receive incoming payments from other participants, including delivery and repayment of call money loans. Incoming payments do not affect the total amount of liquidity in the system. But from the perspective of each participant, incoming payments are also an important source of funding.

In this paper, the turnover ratio of the system's liquidity is calculated as the ratio of the total value settled to the total amount of the system's liquidity. Higher turnover ratio indicates participants' higher reliance on incoming payments.

Unlike overnight balances and intraday overdrafts which can be used by participants at any time during the day, incoming payments can only be used after the receipt from others. The timing of receiving those payments is uncertain and they may not be available at the time when they are needed (see BOX2 for a description of reliance on incoming payments). Such timing friction affecting availability of liquidity in an RTGS system is likely to be intensified as the turnover ratio becomes higher, increasing the importance of intraday management of liquidity and payment flows.

Chart 4 shows the turnover ratio of the total amount of liquidity and the turnover ratio of overnight balances (without intraday overdrafts). After the end of QMEP, the timing friction in the system intensified to some extent due to the increase in the value settled and the decrease in the amount of overnight balances. The turnover ratio of overnight balances has risen sharply to almost the same level as that in fall 2001. The turnover ratio of the total amount of liquidity has also risen to the same level as that at end-2001, though intraday overdrafts have contributed in easing some of the timing friction in the system.

(4) Change in Shares of the Value Settled

As shown in Chart 5, the daily value settled by institutions other than Japanese banks (mainly foreign banks and securities companies) has increased significantly in the past several months. This increase is partly attributable to a growth in funding needs of foreign banks. Foreign banks are widening the range of counterparties, and some are providing funding to their affiliate securities companies. In addition, the shift in their funding activities away from foreign exchange swaps (which usually settle in CLS or FXYCS[3]) to call money loans (which settle in BOJ-NET) have also contributed to the increase. Meanwhile, securities companies are actively conducting repo transactions with trust and city banks for funding purposes.

In 2001, soon after the conversion to RTGS, the total value settled by Japanese banks exceeded that of other institutions by more than JPY 10 trillion. However, recently, the total value settled by other institutions has increased rapidly, where the total value settled by Japanese banks showed only a moderate increase. The total value of payments made by other

[BOX2] BOJ-NET Payment Network

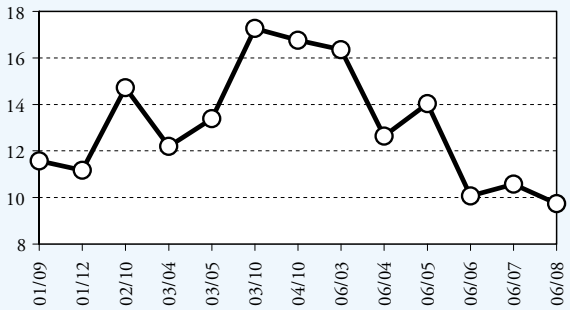
In an RTGS system, when a participant delays a payment, another participant expecting to receive that payment may also delay its payments. This can result in transmission of liquidity shocks and increase the amount of intraday settlement exposures in the system. A situation where multiple participants hold back their payments until they receive payments from others is called "gridlock."

The impact of a delay by one participant on others' payments can vary according to the structure of the payment network.

(1) Payment Market Concentration

Chart A shows the degree of concentration of interbank transfers in BOJ-NET using the Herfindahl-Hirschman Index (HHI). Higher HHI indicates higher degree of concentration.

Chart A: Ratio of HHI to Benchmark



Notes:
1. HHI is calculated by squaring the share of each participant and then summing the resulting numbers. Benchmark is calculated as 1/Number of Participants.
2. The figures before the end of QMEP are for the 1st day of the monetary policy meeting (a day before the Bank decided to increase the target range for outstanding balances at BOJ accounts), and those after the end of QMEP are for the 1st day of the monetary policy meeting.

Source: Author's calculation.

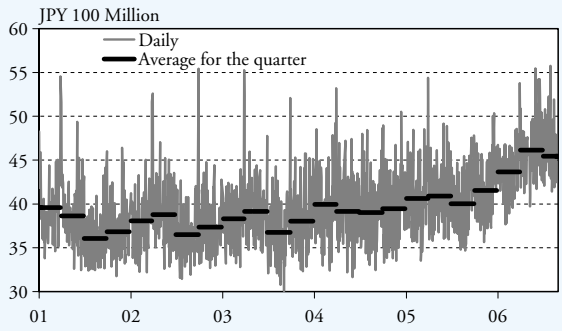
Under QMEP, HHIs were on an upward trend, indicating that interbank activities were increasingly concentrated on a smaller number of participants. Some participants were not actively conducting call money transactions because of excess supply of funds in the money market. After the end of the policy, HHIs have shown a downward tendency. This suggests that, as demand for liquidity grew, financial institutions newly granted and expanded credit lines to each other, leading to a diversification of lenders and borrowers in the money market.[4] In such a less concentrated network, settlement delay by a participant, especially those with large settlement value, could have a "widespread" impact unless other participants take appropriate measures to complete their own transactions.

(2) Average Value per Transfer

The impact of settlement delay will likely be larger as the value per transfer becomes larger. As shown in Chart B, the value per BOJ-NET funds transfer has been increasing, mainly owing to increase in the value of interbank transfers.

For JGS transactions, market guidelines set the upper limit on the size of transactions at JPY 5 billion. As a result, no major change has been observed in the average value of payments made by participants with relatively high shares of JGS-related funds transfers (e.g., securities companies).

Chart B: Average Value per Transfer



Source: Bank of Japan.

There is no such guideline for call money transactions, and participants in the call money market tend to carry out transactions in larger value to improve efficiency of their funding operations. As a result, the average value of interbank transfer is increasing along with the increase in call money transactions. This suggests that the system is becoming more vulnerable to liquidity shocks, which can be caused by an operational failure of a participant.

institutions has exceeded that by Japanese banks by more than JPY 10 trillion. This suggests that those institutions require larger amount of liquidity during the day than before. Some of those institutions therefore have kept excess overnight balances at BOJ accounts even after the end of QMEP.

Duration of Intraday Exposures

In an RTGS system, smooth flow of payments is achieved on the condition that each participant prepares sufficient funds at an appropriate timing and makes payments immediately with those funds. In BOJ-NET, after the conversion to RTGS, funds transfers have been completed one after another starting with the system's opening time (9:00). Large percentages of the day's funds transfers have been completed by around 10:00, which is relatively early compared with RTGS systems in other countries.

There are two factors supporting such a smooth flow of payments in the system.

The first factor is the well-observed market guidelines regarding trading and settlement timing of certain types of transactions. For example, for call money transactions, there are rules called Repayment-First Rule and One-Hour Rule. The Repayment-First Rule encourages a borrower to return call loans immediately after 9:00 and no later than 10:00. The One-Hour Rule encourages a lender of call loans to release the funds within one hour after a contract is made. For JGS transactions, market guidelines encourage each participant to complete settlement of all transactions by noon. The guidelines help address uncertainties associated with incoming payments and facilitate smooth flow of payments in BOJ-NET.[5]

The second factor is the excess supply of BOJ account balances under QMEP, and a large amount of collateral held by participants for utilizing intraday overdrafts.

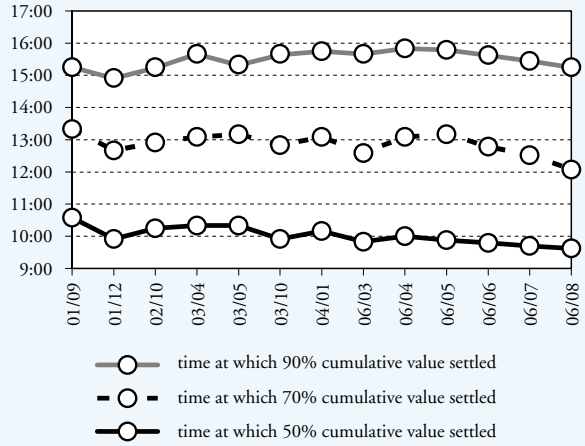
Chart 6 shows the duration of intraday exposures in BOJ-NET by transfer type.

After the end of QMEP, even under potentially growing timing friction, smooth flow of payments continues to be achieved for interbank transfers, supported by the availability of large amount of liquidity (see Chart 6 (1)). Participants continue to observe the above market guidelines for call money transactions to avoid reputation costs incurred by delaying settlement. As shown in the chart, 50% of cumulative value is settled within an hour from the system's opening time, and 70% by 13:00.

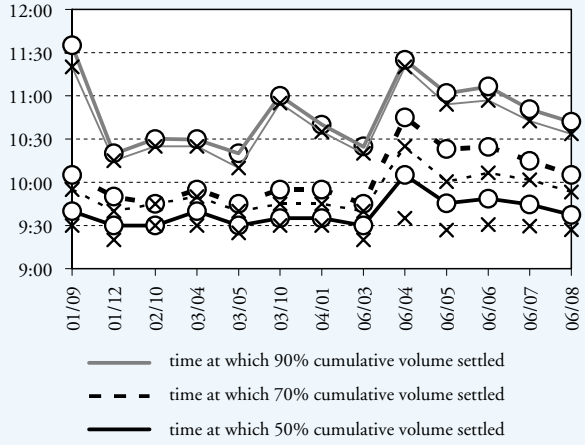
The lower graph shows the settlement times for DVP for JGSs. Shortly after the end of QMEP, some delays in the system's early operating hours were observed, which tended to negatively affect settlements later in the day. In April 2006, 50% of cumulative volume was settled by 10:00, 70% by 10:30, and 90% by 11:00. This indicates that the duration of exposures has become longer, pushing back each completion phase by 30 minutes. In addition, at the time of completion of 50% and 70% cumulative volume, time lags were observed between requests for JGS transfers (lines with x-marks) and those for funds transfers (lines with o-marks). These delays are largely attributable to the surge in the volume of JGS transactions. Since a substantial portion of JGS transactions continues to be settled by noon and some improvements have been observed, there does not seem to be a serious problem at this point that could hinder smooth flow of payments. Nevertheless, risk management and processing capacity need to be strengthened to prepare for future increase in the volume of JGS transactions.

Chart 6: Duration of Settlement Exposures

(1) Interbank Transfers



(2) DVP for JGSs



Note: The figures before the end of QMEP are for the 1st day of the monetary policy meeting (a day before the Bank decided to increase the target range for outstanding balances at BOJ accounts), and those after the end of QMEP are monthly daily average.
Source: Bank of Japan

Concluding Remarks

Payment activities in BOJ-NET have been coping well with the changing financial environment after the end of QMEP. Each participant continues to appropriately control their intraday payment flows, and smooth flow of payments continues to be achieved in the system. However, as the functioning of financial markets further recovers in the future, there would likely be further increases in settlement value, liquidity costs, risk management costs, and processing volume, which could lead to a gradual increase in the timing friction specific to RTGS systems.

The impact of intensifying timing friction on a participant would vary depending on the amount of assets that the participant holds that are accepted as collateral. For example, participants with sufficient amount of eligible collateral will be able to access intraday overdrafts that will help them overcome the timing friction.

On the other hand, participants without sufficient collateral would become more dependent on incoming payments as a source of liquidity. To maintain smooth flow of payments in accordance with market guidelines, those participants need to secure sufficient and timely funding, and prepare for the concentration of payment flows early in the day. This is especially important in the process of increased reliance on incoming payments.

Looking forward, arrangements for efficiently recycling funds in the market needs to be further developed and utilized to address expected changes in trading and payment activities.[6] For example, participants are encouraged to utilize nettings and open-end transactions to reduce the settlement value of call loans on a bilateral basis, as recommended in the market guidelines. Further recovery of the financial markets would also boost liquidity in the market. In addition, changes in settlement method could be effective, including the introduction of new liquidity-saving features into BOJ-NET.[7]

[1] A settlement is "final" when it is irrevocable and unconditional. Settlement exposure is the amount of settlement obligations at risk. It is indicated as the product of its *size* and *duration*. The amount of settlement risk grows as the amount of exposure increases.

[2] Simultaneous processing of DVP and collateralization (SPDC) allows the receiver of JGSs to pledge the incoming securities as collateral for intraday overdrafts, while using the overdrafts to pay for those incoming securities. Similarly, the deliverer of JGSs is able to withdraw the securities pledged with the Bank for delivery to the receiver, while using the funds received to repay the overdrafts.

[3] CLS and FXYCS stand for the Continuous linked settlements and the Foreign Exchange Yen Clearing System respectively.

[4] For a discussion of long-term changes in the structure of the network in the call money market, refer to "Financial System Report," released by the Financial System and Bank Examination Department, the Bank of Japan in 2006.

[5] Market guidelines regarding trading and settlement of call money transactions were developed by the Study Group for Activation of Short-term Money Markets, and those for JGS transactions were developed by the Japan Securities Dealers Association.

[6] For details, refer to "Changes Observed in Money Markets after the Conclusion of the Quantitative Easing Policy," Financial Markets Report-Supplement, released by the Financial Markets Department, the Bank of Japan in 2006.

[7] Under the neXt-Generation RTGS (RTGS-XG) project, BOJ-NET will (1) introduce new liquidity-saving features, and (2) incorporate large-value payments that are currently handled by two private-sector DNS systems (FXYCS and the Zengin System). For details on RTGS-XG, refer to "Japan's Next-Generation RTGS," released by the Payment and Settlement Systems Department, the Bank of Japan in 2006.

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