

Upgrading Korean payment systems for the information age

Jung-Hyun Kwon

Rapid development in terms both of volume and quality of service has taken place in the Korean payment system since the mid-1980s, when the interbank financial information network was launched. New horizons for its further evolution were opened up by the construction of BOK-Wire, an interbank RTGS system that was brought into operation by The Bank of Korea in December 1994.

Although for some years development efforts were concentrated mostly on the construction of additional payment systems, more recently greater attention has been given to ways of making transfers and settlements faster and more secure.

In today's presentation, the development of Korean payment systems and the role of The Bank of Korea will first be briefly introduced. Next I will explain major policy initiatives already undertaken or in the process of introduction to upgrade the stability and efficiency of the payment systems. The explanation will focus on the background to their implementation and on problems that emerged in the process of their introduction and how these were solved, rather than on a detailed description of the systems themselves.¹

Development of the Korean payment system and the role of the Bank of Korea

Development of the Korean payment system

The improvement of the Korean payment system began with the construction of banks' internal online funds transfer networks in the late 1970s. But the pace of the shift to electronic data transmission in the

¹ Details can be found in the "Red Book" for Korea published by the BIS in March 1997.

payment system gained momentum from the late 1980s, when banks constructed the Interbank CD/ATM network (1988) and the Interbank Funds Transfer System (1989), a domestic interbank electronic settlement system designed to improve the level of customer service and give banks a competitive edge.

The launch of these interbank networks enabled bank customers to deposit and withdraw money at a bank branch anywhere in the country without having to go to their own bank. More notably, it allowed them to make online funds transfers to customers of other banks. This made the whole country a same-day settlement zone.

Also, with the constant increase in the volume of interbank settlements, it became clear that a safe and efficient system for large-value settlements was needed. Work therefore began on development of the central bank's RTGS system. After four years of development, this commenced operation in December 1994.

More recently, networks have been set up linking banks and their major corporate clients, and home banking via computer or telephone has become widespread. Electronic hook-ups between banks and non-bank financial institutions are also progressing apace.

In fact, with the introduction of various electronic payment systems ranging from CD/ATM to phone banking and the launch of BOK-Wire as a primarily large-value interbank settlement system, the overall framework of the Korean payment system is considered reasonably diverse and efficient.

Correspondingly rapid changes are transforming payment and settlement practices in Korea. But Koreans have traditionally had a strong preference for cash and the history of electronic payment instruments is relatively short compared with that in developed countries. The share of paper-based payment instruments such as cash, bills and cheques in the volume of total payments therefore remains quite high.

However, there is a growing shift towards the use of electronic payment and settlement media, particularly the CD/ATM and interbank networks.

The role of The Bank of Korea

In Korea, the large-value payment system is run by The Bank of Korea (BOK), and the bill and cheque clearing system and small-value electronic

funds transfer systems are operated by the Korea Financial Telecommunications and Clearings Institute (KFTC), which was established jointly by the banks. The Governor of BOK serves as chairman of the General Meeting of the KFTC, its supreme policy-making body, and he is thus involved in the operation of retail payment systems by presiding over the decision-making process among member banks.

Also, in August 1995, the Act for the Promotion of Computerisation was passed with the objective of systematically promoting computerisation in various areas of national life. Under its provisions, various subcommittees for the promotion of computerisation were set up for particular sectors. Because of the need for expertise in the financial sector, the Subcommittee for the Promotion of Computerisation in Finance is run by BOK, while other subcommittees are run by government bodies. BOK, through its activities in the subcommittee, has been actively promoting financial information projects such as the introduction of electronic settlement systems, link-ups between the financial information network and non-financial networks and the selection of joint projects to be pursued by financial institutions.

Major policy initiatives to upgrade the stability and the efficiency of the payment systems

The Bank of Korea has pursued a number of policy initiatives to upgrade the stability and efficiency of the nation's payment systems. In September 1997, it incorporated risk control measures into the interbank net settlement systems to manage settlement risk efficiently. It is currently working towards the introduction of cheque truncation and is also preparing security measures to ensure the safety of electronic banking transactions.

Introduction of settlement risk management for interbank net settlement systems

Background to implementation

The launch of BOK-Wire, an RTGS system, in December 1994 has greatly reduced settlement risks in financial transactions. However, for the

interbank net settlement systems in which all the net positions of participants are settled at the designated times through BOK-Wire, no institutional arrangements were readily available to prevent a possible failure of settlement or guarantee the finality of settlement in the event of such a failure.

The mid-1990s have seen buoyant growth in the volume of funds transfers through the interbank net settlement systems, especially the CD/ATM and Interbank Funds Transfer systems. In these systems unsettled net positions occur between banks receiving and sending payment orders because the receiving banks' payments to their customers are made prior to interbank net settlement. A definite need was felt for such uncovered positions to be secured through the management of interbank settlement risk.

Korea maintained, until recently, relatively high reserve requirement ratios and banks' reserve balances far exceeded the value of interbank net settlements. There had been almost no instance of a bank failing to meet its settlement obligations or of a delay in interbank net settlement. However, the average reserve requirement ratio was reduced in three steps from 9.4% in April 1996 to 3.1% in February 1997, greatly lessening the availability of reserve balances as settlement funds. This was largely instrumental in our decision to speed up the introduction of settlement risk management.

Main features of the settlement risk management system

After studying risk management systems for net settlement in a number of advanced countries with regard to their compatibility with the Korean situation, BOK introduced a system of settlement risk management for Korean interbank net settlements.

First, it sought to minimise the possibility of settlement failure and the scale of any such failure by having each bank taking part in the interbank net settlement systems set a cap on its own intraday net debit position generated by customers' transactions through the electronic payment systems.

Secondly, it required participant banks to deposit highly marketable securities with it as collateral according to the level of settlement risk posed for the interbank net settlement systems. In the event of a settlement failure, BOK would sell the collateral or use it as security for a

loan to the defaulting bank, thereby allowing the participant to gather the funds necessary to settle its net obligation. Further, if the collateral put up by a participant in default did not cover the funds necessary to meet its obligations, the remaining banks would share the burden to provide finality for interbank net settlement. In this way, the occurrence of systemic risk arising from successive settlement failures among participants would be prevented.

Problems and the problem-solving process

Although there was a wide diversity of opinions among banks concerning the introduction of a settlement risk management system, BOK succeeded in working out an agreement in lengthy discussions involving all parties.

It was only when we looked at the case for introducing a settlement risk management system, in early 1996, that we realised that the degree of settlement risk had not been widely recognised. Thus, there was substantial opposition both to the need for such a system and to the basic approach towards its introduction, not just within the banking community but also from within the central bank itself.

However, as the reserve requirement ratios had been substantially lowered and reserve money, which is the banks' biggest source of settlement funds, had been reduced to a great extent, a consensus formed as to the necessity of preparing precautionary measures against unexpected settlement failure. Also, the establishment of Korea's Deposit Insurance Corporation in June 1996 to protect the interests of bank customers in the event of a bank's failure helped expand an awareness of the threat of bank settlement failure. These changes greatly helped us in drawing up an agreement on the guidelines for the system's introduction among banks and relevant institutions.

When it came to discussion of its practical implementation, problems arose as to who should operate the system and how to determine the total amount of collateral to be posted.

It was initially proposed that the KFTC, which is a private clearing organisation, should be the operating institution in view of the nature and characteristics of the settlement risk management system.

However, for monetary policy reasons, BOK does not provide intraday overdrafts, and thus its extension of liquidity would have to

depend on emergency loans against previously deposited collateral if the settlement funds of financial institutions were insufficient. We therefore judged it desirable for BOK to operate the overall settlement risk management system directly to ensure its effectiveness. As the net debit caps and the loss-sharing arrangements are also operationally linked to the deposited collateral, their administration is similarly assigned to BOK.

To implement the system, BOK drew up working regulations and entered into an agreement with the participating institutions in the net settlement systems. Also, it incorporated major features of these settlement risk management provisions into the rules of the KFTC, the self-governing body of member participants in the net settlement system.

Meanwhile, the issues raised with respect to banks' collateral burden included which net settlement systems it should cover and what the total value of the necessary collateral should be.

At first different opinions were expressed about whether it was necessary to include bills and cheques, because they cause no credit risk to banks as payments to customers are only made after the interbank net settlement has been finalised. However, in Korea the scale of cheque clearing is so large that a settlement failure by any one bank could cause liquidity and systemic risk problems. Thus we decided to include cheque clearing in the risk management system.

In addition, to keep banks' collateral burden as light as possible in the early stages of introduction without detracting from the effectiveness of the system, BOK set the value of the total collateral necessary at Won 1.8 trillion (approximately US\$ 19 billion). This amount is equivalent to the maximum net debit position of the largest bank, and the level was determined in the belief that, even in the event of a settlement failure by the largest bank, net settlement could be finalised by sharing out the shortfall in settlement funds among other participating banks.

The collateral requirement for each individual bank is equivalent to 10% of its net debit cap plus 30% of the daily average value of its net obligations in other net settlement systems such as cheque clearing where net debit caps are not imposed. It represents merely 6-7% of the value of government bonds and BOK Monetary Stabilisation Bonds currently held by the banks and, therefore, does not hamper their normal banking operations. Looking ahead, BOK plans gradually to increase the collateral ratio while keeping it within a range that does not unduly restrict banks' freedom in the management of their funds. The eventual aim is to induce

individual banks to manage the settlement risks arising from their operations on their own initiative.

In the case of net settlement systems in major developed countries, shortages of settlement funds in the event of a settlement failure by a bank are covered through the disposal of collateral. In Korea they are covered not only by the disposal of collateral but also by BOK's emergency loan facility, whereby banks can borrow the needed funds against their collateral held by BOK. This arrangement was reached in the belief that if just the disposal of collateral were available, other banks would be exposed to liquidity risk as it might take quite a long time for the bank in default to acquire the necessary funds, hence delaying net settlement.

Promotion of the introduction of cheque truncation

Background to introduction

In Korea, as cashier's cheques and bills are widely used in general consumer and business transactions and bank branches handle the collection of charges for various public utilities and other recurring payments such as newspaper subscriptions and tuition fees, the receiving and processing of various payment documents (bills, cheques and giro documents) makes up a large part of a bank branch's everyday business.

However, the majority of the associated documentation tasks are carried out manually and the transmission of the collected slips usually requires physical delivery. This has been a factor hindering an improvement of productivity by bank branches.

Thus, there is an urgent need for a system of cheque truncation to be introduced so as to allow business to be handled solely by information flows through electronic communication channels without the need for the delivery of documents. This can be achieved by standardising the documents and mechanising the data processing.

Main features of the system

We plan to transform physical-delivery-based clearing into electronic-information-based clearing for the handling of all payment documents, including bills and cheques.

According to the plan, the first step is to complete cheque truncation by the second half of 1998 for cashier's cheques and electricity and telephone OCR documents, which have been already standardised. The remaining payment documents whose format is not yet standardised will be included as circumstances permit.

Problems and the problem-solving process

BOK took the initiative and is playing a key role in the introduction of the system. The Subcommittee for the Promotion of Computerisation in Finance, over which it presides, selected the introduction of cheque truncation as one of the key projects for financial computerisation in November 1996.

Because the introduction of cheque truncation must be carried out jointly by all banks and receivers of funds, lengthy discussions with all the parties involved were required to set out the schedule for its introduction and avoid potential conflicts of interest.

During the discussion process, some banks were very cool towards the project because of the high investment costs they would have to shoulder for the setting-up of the system. Also, the KFTC, which acts as a communication relay centre, feared a loss of its organisational status through the reduction of its operations caused by the system's introduction and sought to postpone the project.

Furthermore, tax-collecting agencies held widely differing views on the standardisation of payment documents as regards the detail and scope of the information that should be included on them, and no satisfactory consensus was reached, either among the tax-collecting agencies themselves or between tax-collecting agencies and the banks. Since the Government had selected truncation as a national computerisation project, it thereupon organised a working group on the standardisation of payment documents and became actively involved in reconciling the different opinions. This led to agreement that the information to be entered on the slips should be reduced to the bare minimum, that tax-receiving agencies unable to acquire the information they needed from the slips should construct their own database systems to obtain the information, and that the standardised format of OCR giro documents should be given wide publicity as the national standard.

By explaining the need for the system and the benefits to be gained

from its introduction, BOK persuaded the relevant institutions to play an active role in the project. It set up a working group consisting of banks, the KFTC and large-volume funds recipients, and produced a detailed implementation plan for cheque truncation after reconciling conflicting opinions so as to produce an adequate consensus.

An important problem that had arisen in the discussions on the system's introduction was that of cost-sharing among the institutions involved.

Agreement was finally reached that the banks should share the costs of constructing the information relay centre and that individual banks should bear the costs of purchasing the necessary equipment and developing the related programs.

However, each bank will be allowed to opt for reader/sorter machines, scanners or PCs as its data-processing method in order to minimise its costs. Also, the online networks of individual financial institutions and the existing financial information network will be utilised to the fullest extent possible in constructing the communication network necessary for the exchange of information.

Another problem is that it is questionable whether payment orders in electronic form are legally enforceable under the Bills and Cheques Act of Korea as it now stands, since it stipulates that cheque holders should present the physical cheques. Also, it would be difficult to make paying banks responsible, as they are at present, for the payment of forged cheques because there is no way for paying banks to inspect the physical cheques where cheque truncation is used.

To address these problems, having taken legal advice and observed foreign precedents, BOK plans to insert the following provisions into the interbank agreement. As banks both pay and issue cashier's cheques, once paying banks reconcile the electronic information received from collecting banks with the details of their own issue records and confirm that both sets of information match, payment orders are to be acknowledged as effective. In addition, as cashier's cheques will be first examined for forgeries by the collecting bank, employing sophisticated anti-counterfeiting devices, the collecting bank will be responsible for payments made on forged cheques. However, for those payment documents such as current account cheques and promissory notes that are to be included in the second stage of cheque truncation, amendment of the relevant legislation will be necessary to make such payment orders

in electronic form legally enforceable because their issuers are not banks but private individuals and an interbank agreement would not be legally binding on them.

Enforcement of security measures

As factors detrimental to the security of the financial information network, such as unauthorised access and failure of computer and communication networks, have substantially increased with the expanded provision of electronic banking services in Korea, there is a growing need to set up comprehensive guidelines for security measures both to ensure the safety of electronic banking transactions and to cope with emergencies such as system failure and natural disasters.

In this context BOK undertook a comprehensive survey in June 1996 on the security status of domestic banks' financial information networks. From this it emerged that the level of security for the financial information networks in most cases fell far short of that in major advanced countries: most banks did not have security guidelines for their financial information network and also were not equipped with standby communication facilities or an electronic backup system. This was because the financial information networks had been constructed within a relatively short time-span and most banks did not pay great attention to their security level.

Accordingly, in February 1997 BOK established a set of security guidelines for financial information networks. These include guidelines for security measures and contingency plans. The guidelines for security measures include the management of information concerning financial transactions, the administration of computer network resources and specialists, and the operation of electronic systems and their installations and equipment to protect financial information networks from unauthorised access, breakdown and accidents under normal circumstances. The guidelines for contingency plans include the actions and procedures that should be contained in individual contingency plans so as to allow a swift restoration of business in an emergency.

However, because the implementation of security measures imposes heavy costs on banks and their benefits do not make themselves felt in the short term, top management had little interest in putting them in

place. Also, because of the great differences in the size of individual banks, the uniform application of the BOK guidelines to all banks was problematic.

Thus, banks are now to draw up and put into effect on a voluntary basis their own detailed implementation plans tailored to their particular conditions but based on the guidelines for security measures put forward by BOK. We hope to encourage enthusiasm for, and a willingness to invest in, security measures on the part of senior management through a biennial comparative appraisal of individual banks' progress in implementing their plans, the results of which will be reported back both to top management and to the Office of Bank Supervision.

In September this year, BOK also investigated the state of banks' readiness with respect to the "year 2000 problem" and found that some of them did not realise its seriousness. Thus, it drew up a target timetable under which all banks should complete the necessary system changes by the end of 1998 and linkage tests with other institutions by June 1999.