

**PAYMENT, CLEARING AND SETTLEMENT
SYSTEMS IN KOREA**

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List of abbreviations

B2B/B2C	Business to Business/Business to Customer
BOK	The Bank of Korea
BOK Act	The Bank of Korea Act
BOK-Wire+	The New Bank of Korea Financial Wire Network System
CCP	Central Counterparty
ATM	Automated Teller Machine
CD	Certificate of Deposit
CLS	Continuous Linked Settlement
CMS	Cash Management Service
CSD	Central Securities Depository
EFT/POS	Electronic Funds Transfer at Point Of Sale
EFT Act	Electronic Financial Transactions Act
FCFTS	Foreign Currency Funds Transfer System
FIC	Financial Investment Company
FSC	Financial Services Commission
FSCM Act	Financial Investment Services and Capital Markets Act
FSS	Financial Supervisory Service
KDIC	Korea Deposit Insurance Corporation
KEB	Korea Exchange Bank
KFCCC	Korea Federation of Community Credit Cooperatives
KFSB	Korea Federation of Savings Banks
KFTC	Korea Financial Telecommunications and Clearings Institute
KOSDAQ	Korea Securities Dealers Automated Quotation
KOSPI	Korea Composite Stock Price Index
KRW	Korean Won
KRX	Korea Exchange
KSD	Korea Securities Depository
LVPS	Large Value Payment System
MBS	Monetary Stabilization Bond
MPC	Monetary Policy Committee
NCUFK	National Credit Union Federation of Korea
RPS	Retail Payment System
RTGS	Real Time Gross Settlement
SIPS	Systemically Important Payment System
SSS	Securities Settlement System

Introduction

The payment systems of Korea consist of one large-value payment system (LVPS) and several retail payment systems (RPSs). BOK-Wire+ is the only large-value payment system in Korea; it is owned and operated by the Bank of Korea (the BOK). There are several retail payment systems, most of them owned and operated by the Korea Financial Telecommunications and Clearings Institute (KFTC). Among them the Electronic Banking System, Check Clearing System, Interbank Remittance System, and the ATM network are the most prominent.

Securities transactions are matched, confirmed, cleared, and settled mainly by the Korea Exchange (KRX) and Korea Securities Depository (KSD). The KRX operates two stock exchanges (the KOSPI and KOSDAQ Markets) and one futures exchange (the Derivatives Market) and is also the central counterparty (CCP) of the securities markets it operates. Exchange traded securities are matched, confirmed and cleared by the KRX, and settled by KSD through its securities settlement systems (SSSs). OTC-traded securities are meanwhile mainly confirmed, cleared and settled by KSD. The final settlement assets vary depending upon the type of securities and the markets on which they are traded. The cash legs of all stock transactions and on-floor corporate bond transactions are settled with commercial bank money; other securities transactions are settled with central bank money.

There have been notable developments in Korean payment and settlement systems. With regard to the LVPS, the BOK began operation of its BOK-Wire+ system in April 2009, adding a hybrid settlement function to the existing RTGS system (named BOK-Wire). This improvement is aimed at reducing participants' liquidity burdens due to the increasing funds transfer volume in line with the rapid increase in financial transactions. There have also been significant changes in the retail payment environment. Especially, securities brokers now are allowed to provide funds transfer services to their non-institutional customers directly through the RPSs. Meanwhile, with the rapid spread of electronic payment instruments such as credit cards and online funds transfers, payment methods are increasingly shifting from paper-based to paperless ones. Also, with the use of mobile banking expanding rapidly, a wider range of payment services are now taking advantage of mobile communication technology.

As in many other countries, based on lessons from the recent global financial crisis discussions on strengthening payment and settlement system safety are taking place actively in Korea. To this end, the BOK and other infrastructure operators have developed a reform plan for upgrading Korean SSSs. Discussions are also going on related to establishment of a CCP and a trade repository for OTC derivatives.

1. Institutional aspects

1.1 The general institutional framework

With respect to the payment and settlement system of Korea, there is a broad range of laws and regulations — governing transactions and the settlement details thereof, issuance and distribution of payment instruments, oversight of payment and settlement systems, legal protection for clearing and settlement agreements, etc.

The Bank of Korea Act (BOK Act), the Financial Investment Services and Capital Markets Act (FSCM Act) and the Electronic Financial Transactions Act (EFT Act), among others, clearly stipulate that the Bank of Korea (BOK) shall play a principal role in overseeing payment and settlement systems.

Contents		Law
Transactions	Commercial transactions	Civil Act, Commercial Act, Standardized Contracts Act
	Securities exchange	Financial Investment Services and Capital Markets Act
	Foreign exchange	Foreign Exchange Transactions Act
Payment instruments	Bills, checks	Bills of Exchange and Promissory Notes Act, Check Act
	Electronic funds transfer and electronic payment methods	Electronic Financial Transactions Act, Digital Signature Act, Framework Act on Electronic Commerce, Act on Consumer Protection in Electronic Transactions
	Electronic bills	Issuance and Distribution of Electronic Bills Act
	Card payments	Specialized Credit Financial Business Act
Oversight function	Oversight of payment and settlement systems	Bank of Korea Act, Electronic Financial Transactions Act, Financial Investment Services and Capital Markets Act
Settlement finality		Debtor Rehabilitation and Bankruptcy Act

1.1.1 Bank of Korea Act

Before the 7th amendment of the BOK Act in September 2003, there was no clear legal basis for BOK operation of its LVPS, nor for its responsibility for risk management, policy development and oversight of the nation's payment and settlement systems overall. This amendment of the Act provided the legal basis for these functions, and as a result the BOK was explicitly vested with the power to formulate and implement policies related to payment and settlement systems, allowing the BOK to more actively pursue advancement of the payment and settlement systems.

Paragraph 1 of Article 81 of the Act stipulates that the BOK may, for the purpose of promoting overall payment and settlement system safety and efficiency, determine the matters necessary concerning

the payment and settlement systems that it operates¹, and other systems settling funds through BOK-Wire+. To be specific, the BOK may determine the rules related to operation and risk management of BOK-Wire+, and also determines oversight rules on payment and settlement system overall.

Paragraphs 2 and 3 of Article 81 prescribe that the BOK may, with respect to the payment and settlement systems operated by institutions other than itself, require that their operators provide information related to payments and settlements, and, if necessary, that their operators or their supervisory bodies take measures to improve system operating rules for the purpose of facilitating payment and settlement system operation. These provisions establish the legal ground for the BOK to collect information, perform assessment, request improvement and monitor any payment and settlement systems. Among others, these include the retail payment systems (RPSs) operated by the Korea Financial Telecommunications and Clearings Institute (KFTC), central counterparty and clearing system operated by the Korea Exchange (KRX) and the securities settlement systems (SSSs) operated by Korea Securities Depository (KSD).

Paragraph 4 of Article 81 authorizes the BOK to require BOK-Wire+ participants to provide any relevant information. This enables the BOK to secure information necessary to enhance payment and settlement system safety and efficiency with respect to non-bank financial institutions such as financial investment companies (FICs)² participating in the system as well as banks.

1.1.2 Other relevant legal texts

In addition to the BOK Act, other laws relate to the payment and settlement systems directly or indirectly. The Civil Act, the Commercial Act and the Standardized Contracts Act regulate business transactions in general. Settlement of securities transactions is governed as well by the FSCM Act, while the Foreign Exchange Transactions Act regulates foreign exchange settlement.

The Bills of Exchange and Promissory Notes Act and the Check Act set out the ways in which these instruments are to be issued, accepted and paid. The Specialized Credit Financial Business Act regulates credit, debit and prepaid cards. In addition, the Electronic Financial Transactions Act (EFT Act), the Framework Act on Electronic Commerce, the Digital Signature Act, and the Issuance and Distribution of Electronic Bills Act have been enacted to regulate electronic transactions.

The FSCM Act and the EFT Act authorize the BOK to oversee FICs and other payment service providers as well. The BOK may require them to submit information; it may also require the Financial Supervisory Service (FSS) to examine institutions, or to conduct joint examination of them with the BOK.

The Debtor Rehabilitation and Bankruptcy Act explicitly ensures settlement finality of transactions processed through major payment systems designated by the Governor of the BOK and SSSs prescribed by the relevant Acts, once instruction transfer, clearing and settlement are completed in accordance with the operating rules of the relevant systems. In anticipation of insolvency or rehabilitation proceedings against any participant in these payment and settlement systems, the Act contains exceptional clauses guaranteeing effectiveness of their transfer instructions or payments regardless of other provisions of the Act. This means that such transactions shall not be subject to cancelation, termination, revocation, and that agreements of such systems on clearing and settlement shall be applicable to them.

1.2 The role of the Bank of Korea

The BOK issues the legal tender and plays a pivotal role in the payment and settlement system of Korea by providing payment services for final settlement to financial institutions through operating the large value payment system (LVPS), extending loans to financial institutions as the lender of last resort, and improving and overseeing the payment and settlement systems.

¹ Currently, the BOK only operates BOK-Wire+.

² An FIC is a company which conducts financial investment business under the FSCM Act.

(a) *Issuance of legal tender*

The BOK has the exclusive authority to issue the legal tender to be used in Korea for all transactions, without limitation. In this regard, the BOK provides new banknotes and coins, withdraws and exchanges old ones and eliminates damaged ones.

(b) *Provision of final settlement service*

The BOK provides final³ settlement service through the current accounts of financial institutions with the BOK. The BOK Act stipulates that institutions that have current accounts with the BOK shall be limited to the government, governmental agencies, financial institutions, and any corporations that the Monetary Policy Committee (MPC) deems necessary to the performance of BOK business.

(c) *Operation of BOK-Wire+*

In 1994, the BOK began operating Korea's LVPS, BOK-Wire, a real-time gross settlement system (RTGS). BOK-Wire enabled financial institutions to connect to their current accounts with the BOK to transfer funds for short-term financial market transactions, securities settlement and foreign exchange settlement. It also provided net settlement of obligations arising from RPS transactions. With the BOK-Wire settlement volume increasing significantly, the BOK launched a plan to upgrade BOK-Wire in May 2005, and BOK-Wire was replaced in April 2009 by BOK-Wire+, which is equipped with a hybrid settlement function to save participants' settlement liquidity by applying a continuous bilateral and multilateral offsetting mechanism. The introduction of BOK-Wire+ has considerably relieved financial institution burdens of preparing large amounts of intraday settlement liquidity.

(d) *Provision of liquidity*

The BOK may provide liquidity for banks facing unexpected temporary liquidity shortages, in order to prevent chain defaults and ensure financial stability in Korea. In this regard, the BOK supplies settlement liquidity to banks lacking it, through intraday overdrafts and Liquidity Adjustment Loans⁴, in order to prevent delays in overall settlement caused by temporary liquidity shortages.

The BOK is able to fulfill such a key role not only because of its exclusive right as the central bank to issue the legal tender, but also because it is entitled to promptly intervene in the market in times of crisis as a provider of loans to financial institutions.

(e) *Payment and settlement system oversight*

To contribute to payment and settlement system safety and efficiency, the BOK oversees payment and settlement systems, their operators and participants, and their payment methods in accordance with the BOK Act and the Regulation on Operation and Management of Payment Systems. The BOK classifies the payment and settlement systems subject to its oversight into "systemically important payment and settlement systems (SIPSs)" and "other payment and settlement systems" — on the bases of the monetary values of transactions through the systems and the effects that failures of the systems would have on financial markets overall. The BOK assesses SIPS once every two years and other payment and settlement systems when necessary.

(f) *Research on and improvement of payment and settlement system*

The BOK conducts research on the payment and settlement system. It also builds on the results of such research to improve the payment and settlement system by introducing new systems to further

³ The term 'final' is used here in the sense that transactions paid by BOK banknotes are completed without any clearing or settlement process.

⁴ A Liquidity Adjustment Loan is an overnight standing facility provided by the BOK. The interest rate on a Liquidity Adjustment Loan is 100 basis points above the Base Rate except on the last day of a reserve maintenance period, when it is 50 basis points above the Base Rate.

ensure system safety and efficiency. In addition, the BOK leads the efforts to promote financial informatization⁵ while contributing to the improvement of existing or the introduction of new RPSs.

(g) *Co-operation with other institutions*

After the global financial crisis, the BOK, the Ministry of Strategy and Finance (MoSF), the Financial Services Commission (FSC), the Financial Supervisory Service (FSS) and the Korea Deposit Insurance Corporation (KDIC) agreed to share financial information among themselves to enhance resilience and limit systemic risks. The BOK and the FSS also signed a memorandum of understanding on joint examinations and information sharing. In addition, the BOK participates in international organizations including the Committee on Payment and Settlement Systems (CPSS) at the Bank for International Settlements, and in international cooperative oversight as a member of the CLS Oversight Committee together with the central banks of other countries issuing CLS currencies.

1.3 The role of other private and public sector bodies

1.3.1 Payment and settlement system operators

(a) *Korea Financial Telecommunications and Clearings Institute*

The owner and operator of most of the RPSs, the KFTC is a non-profit organization set up on a joint-ownership basis by member banks. It was established in June 1986 by a merger of the Korea Clearing and Credit Reporting Center with the Korea Giro Center. The KFTC has built interbank shared networks in addition to its check clearing and giro businesses, for the transmission of funds transfer messages between banks. It also provides support for the joint electronic businesses of financial institutions and recently launched an accredited certification⁶ system (yessign).

(b) *Korea Exchange*

The KRX operates the KOSPI, KOSDAQ and Derivatives Markets in accordance with the FSCM Act. The KRX also clears transactions conducted in these markets. In addition it acts as a central counterparty (CCP) by providing services such as matching and confirmation of trades, clearing, assumption of obligations and guarantee of settlements. Only members of the KRX⁷ are allowed to trade securities in the KRX markets. KRX members are responsible for contributing funds to resolve possible settlement failures, for paying transaction charges, and for reporting their financial statuses (e.g. their quarterly balance sheets and income statements) to the KRX.

(c) *Korea Securities Depository*

KSD is the sole Korean central securities depository (CSD) under the FSCM Act. In this function, it provides centralized depository and securities settlement services through book-entry transfers. It also clears for over-the-counter (OTC) traded securities. Financial institutions including banks, FICs, insurance companies, and foreign depository services are allowed to open accounts with KSD, while individuals and other companies can use KSD only indirectly through KSD members.

(d) *Other system operators*

Other systems include CLS (Continuous Linked Settlement), the international foreign exchange (FX) settlement system, operated by CLS Bank; several local banks operating domestic foreign currency

⁵ Financial informatization means that payment instruments, financial transactions and financial information are electronized and standardized by information telecommunication technology.

⁶ An accredited certification service (such as yessign) is one that issues and manages accredited certificates used for confirming the identities of parties in online transactions and for preventing e-document fraud. Accredited certificates are issued by financial institutions, and can be used for Internet banking and credit card payments for online purchases.

⁷ Only financial institutions (mostly FICs) licensed as investment traders or investment brokers under the FSCM Act can be KRX members.

transfer systems; federations of non-bank credit institutions⁸, which operate funds transfer systems among their member credit cooperatives; and BC Card Co., Ltd (BC Card), which operates a credit card settlement system.

CLS eliminates principal risk by providing PVP (payment versus payment) in the settlement of foreign exchange transactions. CLS Bank designated the KRW (Korean Won) as a CLS eligible currency in December 2004, and as a consequence was granted access to a BOK current account as well as to BOK-Wire+. As of the end of 2009, a total of 17 local banks and 11 foreign bank branches in Korea were using the service to settle foreign exchange transactions involving the KRW.

Several commercial banks operate foreign currency funds transfer systems (FCFTSs), which allow for foreign currency transfers between local financial institutions. A bank wishing to transfer foreign currency through the systems must open an account for each currency concerned with one of the settlement banks.

Some federations of non-bank credit institutions⁹ — the Korea Federation of Savings Banks (KFSB), the Korea Federation of Community Credit Cooperatives (KFCCC), and the National Credit Union Federation of Korea (NCUFC) — operate funds transfer systems for their members. Funds transfers among members are completed through their accounts with the federation on a multilateral net settlement basis. Transactions between members and non-members (banks or members of other federations) are meanwhile conducted through RPSs¹⁰ operated by the KFTC. More specifically, since individual members are not allowed to participate in the KFTC's RPSs, their instructions for payments to and from non-members are submitted to the RPSs in the name of the federation, which participates in the RPSs. The KFTC calculates the federation's net settlement obligation, while the federation calculates each member's net settlement obligation and settles it through members' accounts with the federation.

BC Card, a consortium of 11 banks in Korea, provides a BC Card settlement service. When a consumer purchases goods or services with a credit card issued by a BC Card member bank, BC Card carries out multilateral net settlement between the banks of the card holder and the merchant involved.

1.3.2 Providers of payment services

(a) Banks

Banks eligible to carry out funds transfer services under the Banking Act provide a wide range of payment services based upon demand deposits. Banks issue bills and checks, and provide cash deposits and withdrawal services as well as funds transfers through various RPSs operated by the KFTC (e.g. the Giro System or the Electronic Banking System). Foreign currency transfer services are also provided by banks, through the domestic foreign currency transfer systems.

(b) Post Office

The Post Office provides payment services similar to those of banks, in accordance with the Post Office Deposits and Insurance Act. Since 1995 a broad range of services have been provided by the Post Offices through the RPSs operated by the KFTC.

⁸ In this article, savings banks, community credit cooperatives and credit unions are commonly called "non-bank credit institutions". The federations of these institutions are special corporations established under the Mutual Savings Banks Act, the Community Credit Cooperatives Act and the Credit Unions Act. These federations participate in the RPSs on behalf of their member institutions.

⁹ They play roles equivalent to that of a central bank for their member institutions. They receive and manage deposits and reserves, conduct funds settlement between members, provide loans to members, and oversee the businesses of their members.

¹⁰ There are 11 retail payment systems, and the three federations participate in seven of them.

(c) *Federations of non-bank credit institutions*

Federations of non-bank credit institutions are allowed to provide funds transfer services under the applicable special laws. They have participated in the RPSs and been providing funds transfer, cash deposit and cash withdrawal services since 2002, and began issuing their own cashier's checks¹¹ from 2008¹². However, it is required that their net settlements of payments through the RPSs be processed through settlement agent banks, given that these federations do not usually maintain sufficient funds in their accounts with the BOK to meet daily net settlement needs, as they are not required to deposit required reserves at the BOK, and that the BOK cannot provide liquidity to them¹³.

(d) *Financial investment companies*

FICs having investment trading or investment brokerage business licences under the FSCM Act have been providing funds transfer services directly to individual customers since July 2009. They are now able to send and receive their payment instructions through RPSs as RPS participants¹⁴. Meanwhile, to prevent settlement risk from increasing with FICs participating in the RPSs, it is required that their net settlements be processed through settlement agent banks¹⁵, in the same way as those of the non-bank credit institution federations.

(e) *Credit card companies*

Credit card companies issue credit cards based upon the credit statuses and expected future incomes of card applicants; and also provide acquiring and processing services. Credit cards can be used not only for purchasing goods and services, but also for instalment purchases¹⁶ and cash advances. Credit card companies also issue debit cards (based on strategic partnerships with the banks where card holders have their accounts), and prepaid cards.

(f) *Issuers of electronic money and other electronic prepayment instruments*

Issuers of electronic money (e-money) and electronic prepayment instruments¹⁷ provide payment services by issuing certificates having electronically stored monetary values. Issuers of e-money must be approved by the Financial Services Commission (FSC), and issuers of electronic prepayment instruments must register with the FSC¹⁸. As of the end of 2009, there are three kinds of e-money and 13 kinds of electronic prepayment instruments being issued.

(g) *Mobile telecommunication companies*

Mobile telecommunication companies in Korea offer mobile banking services in partnership with banks, providing users access to the internet banking services of financial institutions through mobile devices such as mobile phones. Mobile banking services are delivered by mobile telecommunications companies providing wireless funds transfer platforms, which make internet banking service available

¹¹ Refer to the Section 2.2.1 for more details.

¹² Before 2008, federations of non-bank credit institutions were only able to use cashier's checks issued by banks. The amendment of the related law granted them permission to issue cashier's checks by themselves.

¹³ Under the BOK Act, the BOK can lend money to these federations only during times of severe monetary and credit contraction.

¹⁴ Before Feb. 2009, when the FSCM Act came into force, FICs were able to provide funds transfer services only indirectly, through banks.

¹⁵ Refer to Section 3.3.5 (d) for more detailed explanation.

¹⁶ In Korea, when consumers purchase goods or services using credit cards, they may sometimes choose between two options: general purchase and instalment purchase. When they choose to make a general purchase, they must pay the charge for their purchase at once on the following due date. When choosing the instalment option, however, they may pay for the goods and/or services purchased at regular intervals, usually three to 12 months.

¹⁷ The ETF Act classifies electronic prepayment methods into e-money and other electronic prepayment instruments, in accordance with their convertibility to cash and their range of usage. See Section 2.2.4 for a more detailed explanation.

¹⁸ Refer to the Section 2.2.4 for more details.

via mobile phones. The rest of the funds transfer process is conducted by the banks in the same way as for internet banking services. In order to use mobile banking services users must apply for internet banking services, since the services are provided through the Electronic Banking System operated by the KFTC.

Mobile telecommunication companies also provide mobile-payment services. A customer having a mobile phone equipped with a special chip is able to make purchases (usually for public transportations) via the phone, and the charge is made to the mobile phone bill.

1.3.3 Other related authorities and commissions

(a) Financial Services Commission

The FSC serves as a policy-making body for matters pertaining to supervision of the financial industry as a whole for the purpose of protecting the integration of Korea's financial markets by promoting a sound credit system and fair business practices. The FSC drafts and amends financial laws and regulations; it also issues regulatory licenses to financial institutions. Related with payment and settlement systems, the FSC regulates system operators including the KRX, KSD, the federations of non-bank credit institutions, and most providers of payment services including banks, financial investment companies, non-bank credit institutions, etc.

(b) Financial Supervisory Service

The FSS acts as the executive supervisor for the FSC, and principally carries out examination of financial and other related institutions along with enforcement and other oversight activities as directed or charged by the FSC. The financial institutions including banks, non-bank credit institutions, financial investment companies, credit card companies, etc., and the other related institutions including the KRX and KSD are supervised by the FSC.

(c) Committee on Financial Informatization Promotion

The Committee on Financial Informatization Promotion (CFIP) is a private consultative group aimed at financial informatization, comprised of the BOK, banks, the KFTC, the KDIC, the Korea Securities Computer Corporation, the Korea Credit Guarantee Fund, etc. The CFIP deliberates on matters related to the selection of mutual business projects, the standardization of work involved in financial informatization and the safety countermeasures of the Financial Information Networks. It has been leading the establishment of financial networks such as the ATM network, the Interbank Remittance System, the Electronic Banking System, etc. Recently, the CFIP is working on building international networks for ATM systems, on replacing magnetic stripe (MS) cards with integrated circuit (IC) cards, and on preparing mobile banking systems for smart phone use.

2. Payment media used by non-banks

2.1 Cash payments

The BOK currently issues banknotes, in accordance with Article 47 of the BOK Act, in four denominations — KRW 1,000, KRW 5,000, KRW 10,000 and KRW 50,000 — and coins in six denominations — KRW 1, KRW 5, KRW 10, KRW 50, KRW 100 and KRW 500¹⁹. Most of the currency issued consists of banknotes. As of the end of 2009, banknotes of KRW 10,000 and higher values accounted for 88.9% of the total notes in circulation, with the KRW 50,000 notes accounting for 26.6%. Even though cash is still used widely in Korea, its proportion has been declining with the wide spread of credit cards since the 1990s.

¹⁹ The KRW/USD exchange rate was 1164.50 at the end of 2009.

2.2 Non-cash payments

2.2.1 Checks and bills

Checks and bills were formerly the most popular non-cash payment instruments used mainly by companies. With the development and wide spread of electronic payment instruments such as online funds transfer and payment cards, however, the share of checks and bills in total payments has been declining since 2000.

Bills are usually used as a credit facility or payment instrument between companies. Most are promissory notes, which are certificates through which the issuer, as a debtor, promises to pay a certain amount of money to the note recipient. Promissory notes are used mainly in business transactions or financing loans between financial companies. Even though bills of exchange are also used in Korea, their total volume and value are negligible.

The checks currently in use in Korea consist of cashier's checks and current account checks (corporate checks). A cashier's check is drawn by a bank on itself: the bank secures settlement money for the check and deposits it into a separate account before issuance. In addition to blank checks, there are three types of preset-value – KRW 100,000, KRW 500,000 and KRW 1,000,000 – cashier's checks used in Korea, among which the KRW 100,000 denomination is the most popular (account holders with ATM cards²⁰, or credit/debit cards with ATM card functions, can deposit cashier's checks through ATMs, and even withdraw funds in the form of cashier's checks). However, their share in total payments is decreasing now with the recent expansion of electronic payments and the beginning of KRW 50,000 note issuance from June 2009.

A current account holder with a bank may issue current account checks. Current account checks, drawn on the credit statuses of their issuers, are used mainly by companies having good credit to pay for business transactions, taxes, use of public utilities, etc. Even though individuals are also able to issue current account checks, they rarely do so in Korea.

	2006	2007	2008	2009
Bills	5,431	8,059	9,931	8,172
Checks	15,355	16,018	17,263	16,846

2.2.2 Funds transfers

A funds transfer enables a payer to transfer funds to a payee's account without any exchange of cash or check. Funds transfers in Korea include credit transfers and debit transfers, in which funds are transferred on the payment orders of the payer and the payee, respectively.

(a) Credit transfers

Credit transfers are available through BOK-Wire+ and various retail payment systems. Large-value funds transfers between financial institutions are made through BOK-Wire+, while most small-value funds are transferred mainly through retail payment systems including the GIRO System, Interbank Remittance System, ATM Network, CMS (Cash Management Service) System, Electronic Banking System, etc.

Companies or public corporations making large volume payments can use the giro direct deposit service or the CMS credit transfer service. These services enable payers to transfer funds using giro

²⁰ Also called bank cards or cash cards.

direct deposits to recipient accounts with any banks across the country via a single bank account. Meanwhile, credit transfers for general-purpose payments (carried out irregularly between individuals) are executed through the Interbank Remittance System, the Electronic Banking System, and the ATM Network.

The interbank remittance service enables a bank customer, no matter if he/she has a bank account or not, to remit funds from any branch teller window to a recipient account regardless of its bank affiliation. The recipient can withdraw the money immediately after the payer has sent it using this service²¹. The funds transfers between banks arising in the process are settled through BOK-Wire+ on the next business day. Service hours are the normal bank teller window operation hours, from 09:00 through 16:00. The maximum one-time transfer limit is KRW 100 million.

Senders can also use internet or mobile banking services provided through the Electronic Banking System to initiate credit transfers. Internet banking service hours range from 00:05 to 23:55, and the one-time and daily transfer limits are KRW 100 million and KRW 500 million respectively for individual customers, and KRW 1 billion and KRW 5 billion for corporate customers. Mobile banking services, giving customers the ability to access their bank accounts with mobile devices via wireless Internet have been provided since 1999. Recently, with the number of smart-phone users increasing rapidly, the use of mobile banking is growing significantly.

Credit transfer can also be initiated from ATM terminals. When the system was first introduced, funds transfers were allowed only within the same bank. Funds transfers to other banks through ATMs then became available in 1994, and customers were allowed to access their own accounts through the ATMs of other banks in 1996. The service hours of ATM terminals range from 00:05 to 23:55, 365 days a year. For safety, banks may set withdrawal and transfer limits for individual customers, up to the maximum values determined by the FSC.

Internet Giro System, which is a kind of electronic bill presentment and payment (EBPP) system, is also provided as a way of credit transfer since March 2000. Multiple billing institutions deliver bill details to the KFTC and the KFTC notifies the payers of the details via the Internet. The bills can also be paid via the Internet by the payers. By using this service billing institutions can substantially save printing and mailing cost, and payers can also save time by making payments via the Internet without visiting bank branches or ATMs.

(b) *Debit transfers*

The giro direct debit service and CMS debit transfer service are used mainly automatically transfer funds from a payer's bank account to a payee institution's account in accordance with advanced agreement between the payer, the payee and the financial institutions involved, without further instruction or action by the payer.

		Table Funds transfer figures, by type of transfer (daily averages); thousand transactions; KRW billion				
		2005	2006	2007	2008	2009
Credit Transfer	Volume	5,370	5,781	6,470	7,175	7,396
	Value	135,406	146,468	170,068	196,701	207,910
Debit Transfer	Volume	9,977	11,062	12,251	12,696	12,664
	Value	135,785	146,918	170,603	197,263	208,446

²¹ There is typically no automatic notification of the recipient. The recipient will have to check his bank account balance personally.

2.2.3 Payment cards

(a) Credit Cards

Credit cards, first introduced in Korea in 1969, are used most widely in small to medium value transactions. In the early days, credit cards were allowed only for use in purchases of goods and services. An ATM card function was then added in 1986, and the services offered have increased since then including cash advances, revolving credit and deferred payment-type public transportation cards. Recently, mobile credit card services (allowing users to store their credit card information on IC chips installed in their mobile phones) enable users to make contactless payments via mobile phone. Credit cards are the most widely used card-type payment instrument in Korea.

In Korea, there are 11 domestic credit card brands currently issued, by both banks and specialized credit card companies. In addition to them, five foreign brands are also accepted. Cardholders do not pay fees on credit card transactions except their annual membership fees, while merchants accepting credit cards must pay merchant discount fees. The average merchant discount fee was 2.2% at the end of 2009. Since the Korean credit card payment system is a three-party card payment system, there is no interchange fee.

	2005	2006	2007	2008	2009
Volume	7,311	8,574	9,514	11,363	13,370
Value	988	1,016	1,106	1,250	1,278

(b) Debit Cards

Second in popularity behind credit cards are debit cards. Debit cards were in the past used mainly by people who were ineligible for credit cards, since they were not cheaper²² and even provided less bonus rewards than credit cards. Recently, however, an increasing number of people are using debit cards, mainly because many Koreans have begun to think using debit cards (instead of credit cards) helps prevent unnecessary purchases and impulse consumption, since debit card usage is restricted by the amount of money in a card holder's account.

There are two kinds of debit cards currently used in Korea – pin-based and signature-based – with signature-based cards predominant. Signature-based debit cards are issued by credit card companies. Since the service is provided through the credit card networks, card holders can use them in any places where the same brands of credit cards are accepted. Meanwhile, only local banks issue pin-based debit cards, and purchases made with them are processed through the EFT/POS²³ Network provided by the KFTC. Pin-based debit cards are not widely used in Korea due to the shortage of sellers accepting them and the limited service hours of the network (08:00 to 23:00).

²² There are no transaction fees charged to either credit or debit card users.

²³ Electronic Funds Transfer at Point Of Sale

Table Debit card payment values and volumes (daily averages) thousand transactions; KRW billion					
	2005	2006	2007	2008	2009
Volume	545	908	1,405	2,033	2,877
Value	22	34	52	73	100

(c) *Prepaid Cards*

Introduced in September 1994, prepaid cards are not widely seen in Korea. They are used mainly at gas stations, department stores, convenience stores, etc. The issuance of prepaid cards is currently very low, as they are not well promoted and there are few accepting merchants. Credit card companies have recently begun issuing prepaid gift cards, which allow users only to purchase goods or services up to the prepaid amounts.

Table Prepaid card payment values and volumes (daily averages) thousand transactions, KRW billion					
	2005	2006	2007	2008	2009
Volume	30	42	53	57	82
Value	1.4	2.0	2.5	2.8	3.5

2.2.4 *Other payment media*

Other media used in Korea include electronic money²⁴ (e-money), electronic prepayment instruments, electronic bills, etc.

Banks, non-bank credit institutions and credit card companies may issue e-money without approval of the FSC, while other institutions need approval to do so. There are three types of e-money currently issued in Korea, and they are all used mainly for public transportation.²⁵

Meanwhile, other electronic prepayment methods, similar to e-money but with convertibility into cash and range of usage far below those of e-money, are classified as “electronic prepayment instruments” in Korea²⁶. Banks, non-bank credit institutions and credit card companies may issue electronic prepayment instruments without registering with the FSC, while other issuers may do so only after such registration. There are two types of electronic prepayment instrument: the IC card-type and the network-type. The IC card-type electronic prepayment instrument is used mainly to pay for public transportation, and the network-type²⁷ for payment for goods and services purchased online.

²⁴ The EFT Act defines e-money as a certificate or the information on such a certificate with transferable monetary values stored and issued in electronic form.

²⁵ The three types of e-money are not interoperable. As a result, public transportation service providers accept only the e-money with which they affiliate.

²⁶ In accordance with the EFT Act, e-money can be exchanged into cash anytime regardless of the balance, but exchanging electronic prepayment instruments into cash may take some time, and the exchanged cash may be smaller than the face value. E-money must in addition be able to be used in at least five business fields, but for electronic prepayment instruments two business fields are enough.

²⁷ Network-type electronic prepayment instruments store monetary values in network databases which are accessed on-line for transaction approvals.

Table
E-money and electronic prepaid instrument payment values and volumes
(daily averages)
thousand transactions; KRW billion

		2005	2006	2007	2008	2009
E-money	Volume	422	438	352	298	289
	Value	0.33	0.31	0.29	0.25	0.25
Electronic Prepaid Instruments	Volume	N.A	N.A	N.A	9,860	12,071
	Value	N.A	N.A	N.A	11.3	15.0

Electronic bills are simply promissory notes prepared in electronic form. The information on a bill (as to its issuer, recipient, amount, etc.) is stored electronically, and its issuance, receipt, endorsement and repayment are carried out online. Corporations subject to outside audits²⁸ have been required to use only electronic bills since November 2009.

2.3 Recent developments

Recently, developments in information and communication technology (ICT) have facilitated the use of paperless payment methods in Korea. Paper-based (excluding cash) payments accounted for 43.0% of retail payments in 2009, compared to 48.0% in 2005, while the portion of paperless payments accordingly increased from 52.0% to 57.0%.

The use of ICT in banking has made rapid progress. The UbiTouch service, a kind of electronic banking service launched in September 2008, has enabled customers to use any ATM providing the UbiTouch service, regardless of bank affiliation, by a mobile phone with a USIM chip containing account information.

Demand for smart phone banking service has also been increasing recently. In order to meet this demand, several banks are building systems for smart phone banking services -- either individually or jointly. Especially, the BOK is leading a joint smart phone banking system project in which the KFTC and 13 commercial banks participate. As a result, customers are now able to make funds transfers and to check their account balances.

3. Interbank funds transfer systems

3.1 General overview

Interbank funds transfer systems in Korea consist of one large-value payment system (LVPS), and several retail payments systems (RPSs) and foreign currency funds transfer systems (FCFTSs).

BOK-Wire a LVPS owned and operated by the BOK, was introduced in December 1994. Through this system, the BOK provided a funds transfer service via participants' current accounts with the BOK. In November 1999, the BOK began also providing a delivery versus payment (DVP) service for securities settlement, and in December 2004, CLS was granted access to a current account with the BOK as well as to BOK-Wire, in order to enable PVP service for FX settlement involving KRW. In its early days, BOK-Wire processed funds transfers based solely on its real-time gross settlement (RTGS)

²⁸ In accordance with the Act on External Audit of Stock Companies, a corporation having assets totalling more than KRW 10 billion, or listed on the Korea Exchange, must be audited by an external auditor.

mechanism. However, as the BOK-Wire settlement volume surged, the liquidity burdens on participants increased. In May 2005, the BOK therefore launched a four-year project to develop a new system (BOK-Wire+), which would not only use the pre-existing RTGS mechanism but also apply a hybrid settlement mechanism²⁹. BOK-Wire+ has operated stably since its launch in April 2009.

Most retail payment systems in Korea are operated by the KFTC. They provide a wide range of services, including funds transfers between individual customers and large-volume corporate funds transfers.

Several major local banks operate the FCFTSs. By using FCFTSs, financial institutions are able to make foreign currency funds transfers in real-time, which is not always possible via overseas correspondent banks. FCFTSs also help their participants manage their liquidity by providing them intraday credit.

3.2 Large-value payment system

3.2.1 Institutional Framework

The MPC is the ultimate decision-making body of the BOK on its monetary policy. It decides on basic matters concerning operation and management of the payment and settlement system. The BOK then sets the detailed standards applying to all participants, including the rights and responsibilities of the BOK, in line with the basic principles for BOK-Wire+ operation.

3.2.2 Participation

In order to use BOK-Wire+, institutions must maintain current accounts with the BOK³⁰ while also fully satisfying the following several requirements: satisfactory financial soundness, adequate numbers of staff dedicated to BOK-Wire+ operations, and sufficient expected volumes of us³¹. Such requirements are determined by the governor of the BOK, based upon principles provided by the MPC. The BOK annually checks whether member institutions meet these requirements, and those failing to do so are requested to take corrective measures, to withdraw from membership or to terminate the relevant contracts.

The number of BOK-Wire member institutions rose steadily in the past, from 115 in 1994 to 158 in 1997. After the Asian financial crisis in the late 1990s, however, the number dropped, due mainly to active financial sector restructuring, and as of the end of 2009 it was 129 (53 banks and 76 non-banks).

3.2.3 Types of transactions

Funds transfer services provided through BOK-Wire+ include general funds transfers³², interbank short-term lending/borrowing, third-party funds transfers, the cash legs of DVP settlement, the KRW legs of CLS settlement and RPS net settlements. BOK-Wire+ is also used for the implementation of BOK monetary policy operations as well as for issuance and redemption of government and other public bonds.

3.2.3.1 Main business

General funds transfers between participants' accounts at the BOK are the most important service carried out by BOK-Wire+. The supply and repayment of short-term interbank lending/borrowing across participants' BOK accounts, in order to adjust temporary liquidity excesses or shortages, are

²⁹ A hybrid settlement system is a payment system which combines the characteristics of an RTGS system and a netting system, by adding bilateral and multilateral offsetting features to the RTGS system.

³⁰ BOK rules allow banks (local and foreign), insurance companies, securities dealers and brokers, government agencies, and CLS Bank to open current accounts with the BOK.

³¹ Currently, minimum 6 staff and 50 transactions per month

³² The transfer of funds between accounts not connected to any underlying transactions such as securities or foreign exchange.

made through the BOK-Wire+. Third-party funds transfer allows an individual or a business to make a large-value funds transfer through a BOK-Wire+ participant in a prompt and safe manner. The DVP service conducted through BOK-Wire+ ensures that a buyer's payment for securities is made at the time of delivery through KSD (security delivery and payment are simultaneous). Through BOK-Wire+, participants are able to settle the KRW legs of their foreign exchange transactions using the PVP service provided by CLS Bank, which eliminates the principal risk of foreign exchange transactions. BOK-Wire+ also provides settlement services for transactions netted in the RPSs. Such payments include transfers between the current accounts of participants concerned at designated times. BOK-Wire+ is a pivotal monetary policy transmission channel as well, as market participants secure intraday overdrafts from or engage in repurchase transactions with the BOK.

3.2.3.2 Ancillary business

As the bank for the Korean government, the BOK collects treasury funds (taxes, fines, etc.) received by financial institutions through BOK-Wire+ and carries out public and government bond-related activities, including issuances and registrations of rights of pledge, transfers of title, redemptions at maturity, and repurchases before maturity. BOK-Wire+ is also used by the BOK to receive applications for loans, and to grant loans.

3.2.4 Operation of the system and settlement procedures

The online operating hours of BOK-Wire+ are 9:00-17:30 from Monday to Friday. The BOK may extend these hours temporarily if deemed necessary due to error in the BOK-Wire+ system, to delays or concentrations of fund settlement, or to any other unavoidable reasons.

3.2.4.1 Settlement system, by transaction

The BOK-Wire+ settlement procedures are sub-classified into those using the RTGS system and those using the hybrid system with its bilateral and multilateral offsetting features added to the RTGS system. Participants hold two types of accounts with the BOK – current accounts and deposit accounts for settlement. The former are used for transactions carried out through the RTGS system, and the latter for those through the hybrid system.

Funds transfers involving BOK loans, government and public bond transactions, CLS settlement, and RPS net settlement are handled through the RTGS system, while those related to general funds transfers, short-term interbank lending/borrowing, and DVP settlements are dealt with through the hybrid system.

Settlement system (Settlement account)	Applicable transactions	Settlement mechanism
RTGS system (Current account)	CLS funds transfers Designated time net settlements Issuances and redemptions of government and public bonds BOK loans Funds transfers between participants after 17:30 to repay intraday overdrafts ¹⁾	RTGS
Hybrid system (Deposit account for settlement)	General funds transfers (including third-party funds transfers) Short-term interbank lending/borrowing DVP transactions (including BOK repo transactions)	RTGS, bilateral and multilateral offsetting

Note: 1) Funds transfers between participants for repayment of intraday overdrafts are allowed until 17:50.

3.2.4.2 Types of payment instruction

The payment instructions of BOK-Wire+ are divided into “Urgent payment instructions” and “Normal payment instructions”. Urgent payment instructions are settled immediately on a one-to-one and gross basis, provided there is a sufficient balance to cover settlement. This type of instruction is used in cases where payment must be made immediately or there is little possibility of simultaneous offsetting. If the balance is insufficient for covering the relevant transaction, the system holds the payment instruction in a queue until the necessary funds are deposited or other conditions necessary for bilateral or multilateral settlement are satisfied.

Should a payment not need to be made urgently, a participant can save liquidity by classifying the payment as a normal payment instruction. In this case settlement is not processed immediately, even if the funds in the relevant account are sufficient. Rather, payment is made on a simultaneous bilateral settlement basis³³ at a time when the instruction of the relevant counterparty is input into the system, or by multilateral settlement which occurs every 30 minutes. **Moreover, at 17:05, all normal payments are switched into urgent payment.**

3.2.4.3 Bilateral and multilateral settlement

When a new payment order is input to the BOK-Wire+ hybrid system, the system retrieves the order of the counterparty from its queue file and attempts to carry out simultaneous bilateral settlement. In the case of simultaneous bilateral settlement, urgent payment instructions are in principle processed ahead of normal payment instructions. However, normal payment instructions of a participant to which liquidity flows as a result of a simultaneous settlement can be processed prior to urgent payment instructions. If there is a lack of funds or the net payment limit is exceeded as a result of simultaneous bilateral settlement of a normal payment instruction, it is not processed but saved in a queue file. For such files, simultaneous multilateral settlement is attempted every 30 minutes, while payment instructions satisfying the settlement condition requirements, related for example to deposit balances, net payment limits, etc., are processed simultaneously.

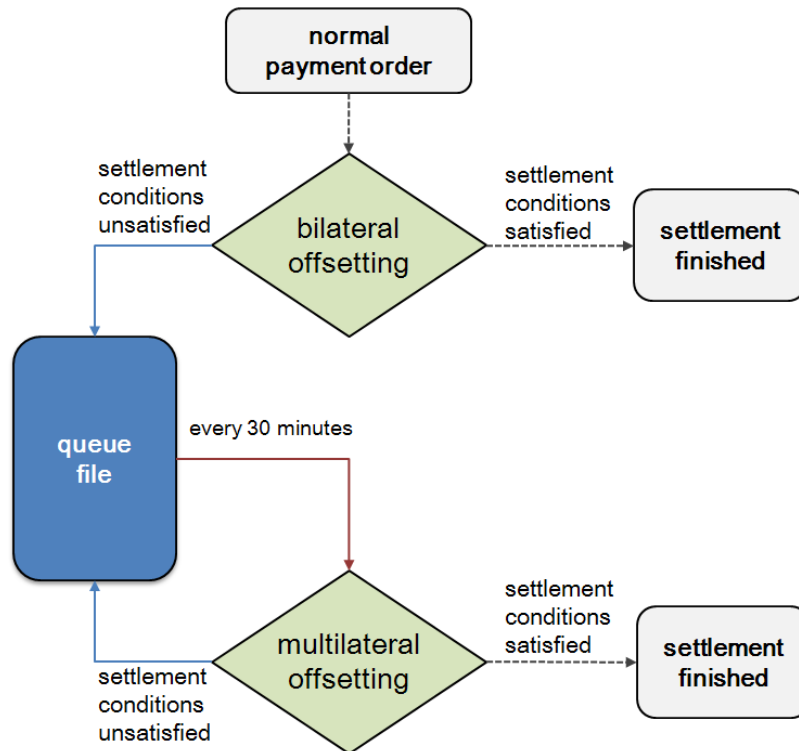
3.2.4.4 Queuing arrangement

The methods of payment order processing in the RTGS and the hybrid systems of BOK-Wire+ differ. To heighten funds transfer efficiency, the RTGS system processes payment orders in accordance with a by-pass FIFO³⁴ rule. Under this rule, the system attempts to process the first transfer in a queue, but when this cannot be done due to a lack of funds, the next transfer is instead settled. The hybrid system on the other hand allows participants to adjust their own payment orders' positions in the queue in accordance with settlement conditions, or to change the types of their payment orders in the queue. Under this system, participants can change normal into urgent payment orders and vice versa.

³³ Technically simultaneous bilateral settlement is not netting. In legal terms settlement is gross (ie the individual obligations are not replaced by a net obligation) but it has the economic effect of netting payments because the gross payments are made simultaneously.

³⁴ First In, First Out (FIFO)

Chart
Bilateral and multilateral settlement mechanism



3.2.4.5 *Designated-time transaction system*

The large-value funds transfer transactions that financial institutions apply for through BOK-Wire+ during the day are in principle processed upon receipt, in accordance with pre-set procedures. However, netted RPS settlements, redemptions of short-term loans with specified maturities, and receipts of treasury funds from financial institutions are all processed at specific designated times during the day.

Type		Time	Account
Net settlement of RPS ¹⁾		11 : 00	Current account
Receipt of treasury funds		14 : 00	
Repayment of short-term loans	Half-day loans (mornings)	14 : 05	Deposit account for settlement
	Half-day loans (afternoons)	16 : 05	
	Overnight or longer-term loans	11 : 05	

Note: 1) Net settlement of clearing transactions through clearing houses outside of Seoul is carried out at 14:00.

3.2.5 Risk management

To reduce the credit risk involved in settlement, the BOK adopted the RTGS system when launching BOK-Wire. The related laws and regulations were also amended so as to prevent settlement finality from being impaired and to mitigate any legal risks. The Debtor Rehabilitation and Bankruptcy Act, which came into effect from April 2006, stipulates that bankruptcy procedures shall not affect transactions which are completed through BOK-Wire, thereby ensuring the finality of BOK-Wire settlement.

To facilitate smooth settlement among participants and reduce liquidity risk, the BOK extends intraday overdrafts to participant banks temporarily falling short of settlement funds. Overdrafts are provided only to financial institutions subject to the BOK's minimum reserve requirement, and interest (3-year treasury yield – overnight interbank rate) is charged on overdrafts in amounts exceeding 25% of the equity capitals of the recipient institutions.

With the launch of BOK-Wire+ in April 2009, the intraday liquidity needs of participants were significantly reduced, and liquidity risk in consequence declined. The new function of BOK-Wire+ has enabled participants to complete intraday settlement with lower liquidity, mitigating settlement delays and gridlock as well as the accompanying system risks.

3.2.6 Pricing

When using BOK-Wire+, participants pay fees determined by the BOK. Fees include a monthly fixed fee and per-usage fees that can vary in accordance with when the payment order is entered. To encourage participants to enter their information early, the BOK applies discount rates to transactions entered before 16:00 and higher rates to those entered between 16:00 and 17:30.

		Before 16:00	16:00~17:30	After 17:30 ¹⁾
Fixed fee (monthly)		100,000		
Fee per transaction	Standard funds transfer	150	500	4,000
	Cancelled transaction	800	800	4,000

Note: 1) applicable to transactions made in extended hours

3.2.7 Major on-going and future projects

The BOK has implemented a tiered participation model for BOK-Wire+ since June 2010. Through tiering arrangements, indirect participants in BOK-Wire+ can send and receive large value payments as well as monitor their transactions through direct participants. To make this scheme more effective, the BOK plans to tighten the BOK-Wire+ membership requirements and conduct an annual review of each participant's membership eligibility. Institutions failing to meet the requirements will be recommended to use the services through direct participants.

3.3 Retail payment systems

3.3.1 Institutional framework

Most retail payment systems in Korea are owned and operated by the KFTC³⁵. The KFTC is a non-profit organization set up on a joint-ownership basis by member banks³⁶. The decision-making bodies

³⁵ The details of each system are laid out in Section 3.3.4

of the KFTC consist of the General Meeting, the Board of Directors, and the Committee. The General Meeting is the supreme decision-making body, and consists of member banks. The Board of Directors, comprising nine directors, enacts and revises the rules and regulations necessary for operating each RPS and makes decisions on the function and operation of the Committee. The Committee, composed mainly of participants selected as directors, decides on the details of business procedures, including operational rules and detailed guidelines, for the businesses involved in each RPS.

3.3.2 Participation

A payment service provider can participate in the RPSs of the KFTC in two ways. First, it can become either a general or an associate member of the KFTC, and then participate in any KFTC-operated business. The other method is to become a special participant in one or more specific businesses. Special participants, however, do not have the right to vote in the General Meeting. The BOK and financial institutions under the Banking Act may become general members, associate members or special participants, while other institutions running financial or finance-related businesses are required to obtain approval of the General Meeting to become special participants. Special participants include the Post Office, the federations of non-bank credit institutions, foreign banks, FICs, etc.

Approvals for participation in the RPSs operated by the KFTC, as well as expulsions from them, are determined at the General Meeting, which is the supreme decision-making body of the KFTC. At the end of 2009, there were 11 general members, 10 associate members and 43 special participants taking part in the RPSs.

3.3.3 Types of transactions

The KFTC operates 11 RPSs, providing a wide range of payment services:

- Check Clearing System
- Giro System
- CMS Systems
- Interbank Remittance System
- Bankline System³⁷ (a regional bank shared network)
- ATM Network³⁸
- Electronic Banking System³⁹.
- K-Cash Network
- EFT/POS System
- B2B E-commerce Payment System
- B2C E-commerce Payment System

Check clearing services are provided through the Check Clearing System. The Giro and CMS Systems enable companies and public corporations to make large-volume funds transfers. Individual and corporate customers make funds transfers through the Interbank Remittance System, the Bankline System (a regional bank shared network), the ATM Network and the Electronic Banking System. The K-Cash Network is used for settlement of e-money transactions, and the EFT/POS System for settlement of debit card payments. The B2B and B2C E-commerce Payment Systems support online transactions between buyers and sellers.

³⁶ All local banks are either general or associate members of the KFTC. The BOK is one of the general members.

³⁷ The Bankline System connects the computer network systems of regional banks through the KFTC, to enable regional bank customers' use of banking services in all regional bank branches.

³⁸ The ATM network is the name of the Korean ATM network.

³⁹ The Electronic Banking System is an expanded and revised version of the ARS system launched in 1984. It serves as an intermediary for electronic banking services such as ARS, telebanking, internet banking and mobile banking.

Meanwhile, there are several credit card payment systems operated by credit card companies as well, for settling credit card transactions.

3.3.4 Operation of the system and settlement procedures

As customers request funds transfers by means of a range of payment instruments during the day, the KFTC calculates participants' total intraday transactions in each system and determines their multilateral net settlement obligations. It notifies the BOK and participants of the results at pre-arranged times. The BOK then completes settlement by conducting funds transfers across BOK-Wire+ participants' accounts with the BOK at the proper designated net settlement times. The details of the settlement procedures in several major RPSs are as follows:

(a) Check Clearing System

Both electronic and physical exchanges of checks and bills are currently available in Korea. As of the end of 2010, however, the exchange of checks will be carried out only through truncation⁴⁰. With this method, banks receiving checks (the payees' banks) reproduce the images and text information of the checks and send them to the KFTC. Based upon the information received, the KFTC determines participants' balances with each bank and requests net settlements by the BOK at 11:00 on day T+1.

In the case where there is an insufficient balance in a payer's account for cashing the check and bills (or a bill), the payer's bank should notify the payee's bank of this by no later than 14:00 on day T+1. The payee of such a check is then not allowed to withdraw the funds until the issuer deposits sufficient money. When there is no such notification, funds are credited to the payee's account after 14:20 on day T+1. If the issuer of the check for which notification is given fails to deposit the relevant amount in his account by the end of business hours on day T+1, the check is classified as dishonored and re-settled through the following day's check clearing process.

(b) Giro System

The settlement procedures for the Giro System differ depending upon whether the giro bill concerned is paper-based or paperless. In the case of traditional paper-based credit transfers, the giro bills paid by customers are delivered to the KFTC on day T. After processing the bills, the KFTC sends the payment details to the payees' banks and the payees (T+1). Settlement obligations are calculated on a multilateral basis and the KFTC notifies the BOK of them before 10:00 on day T+2. Settlement will take place at 11:00 on day T+2.

In the case of the electronic giro service, the settlement procedures vary in accordance with the service type. An institution receiving funds through direct debit notifies the KFTC (T-1) of the preauthorized debit details. The KFTC sends the information to the payer's bank on the same day, and the payer's bank withdraws the relevant funds from the payer's account on the day following (T) and then notifies the KFTC (T+1). Net settlement obligations are calculated and sent to the BOK on day T+3, and the payee's bank credits the relevant funds to the deposit account of the payee on that day.

Companies using direct deposit services provide the related information including recipient account numbers and amounts to the KFTC at least two days before the due date (T-2). After classifying and grouping all notices in accordance with the payees' banks, the KFTC sends credit details to the payees' banks on day T-1, and the payees' banks credit the relevant amounts to the payees' accounts on the following day (T). Net settlement obligations are calculated on a multilateral basis and notification is made to the BOK for final settlement on day T.

(c) Interbank Remittance System

A funds transfer instruction submitted by a payer at a bank teller window is sent to the KFTC, which in turn transmits the instruction to the payee's bank through the Interbank Remittance System. Upon receiving the instruction, the payee's bank credits the amount to the payee's account. The KFTC then

⁴⁰ Electronic information exchange

calculates the net settlement obligations on the following business day and requests net settlement by the BOK.

(d) *ATM network*

In the cases where a customer withdraws cash through the ATM terminal of another bank, the details of the withdrawal are sent to the bank with which the customer holds his/her account (customer's bank). Upon receiving the information, the customer's bank verifies the payment request and sends a payment approval message to the bank to which the ATM belongs. The customer can then immediately withdraw cash through the ATM. KFTC calculates the interbank net obligations which are then settled through the BOK on the following business day. Meanwhile, in-house transactions (ATM withdrawals at branches of a customer's home bank) are not related to the ATM network; they are processed within the bank.

When a customer requests a credit transfer via an ATM terminal, the KFTC and the payee's bank are notified of the details through the ATM network, and the relevant funds are immediately credited to the payee's account with the bank. The KFTC calculates the net settlement obligations and sends the information to the BOK on the following day to settle net interbank obligations.

(e) *Electronic Banking System*

In the case where a customer requests transfer of funds through internet banking, mobile banking or telephone banking services, the details thereof are sent through the Electronic Banking System to the KFTC and the beneficiary's bank. The relevant funds are then immediately credited to the beneficiary, and the interbank net obligations are settled through the BOK on the following business day.

(f) *CMS*

An institution receiving an insurance premium or a credit card payment using the CMS debit transfer service requests the relevant withdrawal from the payer's bank one day before the due date, through the KFTC. The payer's bank then debits the relevant funds from the payer's account on the due date, and interbank net settlement is carried out through the accounts of the banks concerned with the BOK on a multilateral net basis on the next business day. The payee's bank credits the relevant funds to the institution's account on the business day following the due date. Transfer arrangements for pension or salary payments through CMS credit transfer follow similar procedures.

(g) *Credit Card Settlement Systems*⁴¹

When a customer purchases goods or services using a credit card issued by any of the 11 BC Card member banks, the details are sent to the bank that issued the card. If the issuing bank approves the transaction, the goods or services are provided to the customer. The merchant then sends the sales slip to its bank, which will collect the payment from the issuing bank through the clearing system and pay the merchant. The issuing bank then sends a bill to the customer through BC Card.

In the case where a customer purchases goods or services using a credit card issued by a non-bank credit card company, the details are sent to that company and the goods or services are provided to the customer upon company approval of the transaction. After the transaction, the merchant submits the sales slip to the credit card company, which pays the merchant through its bank and sends a bill to the customer.

3.3.5 Risk management

Funds transferred through some RPSs are immediately credited to the payees' accounts, and the related interbank net obligations are settled at the designated settlement times on the following business day (T+3) through BOK-Wire+. If there were no proper settlement risk management

⁴¹ Transactions with signature-based debit cards, which are the predominant kind of debit cards in Korea, are settled through the credit card settlement system described in this section. Pin-based debit cards the other less popular debit card kind is processed and settled through the ETF/POS Network.

frameworks in place, therefore, a participant's possible settlement failure could cause materialization of systemic risk. For this reason, the BOK implemented risk management arrangements for the net settlement systems in September 1997, to ensure the completion of net settlement even in the event of settlement failures of some participants. The arrangements include net debit caps, collateral requirements, and loss-sharing arrangements among participants. With FICs now able to provide funds transfer services through the RPSs, the BOK has also developed a "net settlement agent arrangement" to prevent any resulting increase in settlement risk.

(a) *Net debit caps*

A net debit cap is a ceiling set on the allowed amount of unsettled net obligation of a participant, in order to mitigate settlement risk. If a participant's unsettled net obligation exceeds its cap during a business day, it is not allowed to send additional payment instructions. RPSs in which net debit caps are applied include the ATM network, the Interbank Remittance System, and the Electronic Banking System, where customers' accounts are credited as soon as payment instructions are submitted, even before settlement of the funds through BOK-Wire+ has taken place. Each participant can, at its own discretion, determine its net debit cap. To prevent participants from setting their caps too high, the BOK uses its cap as the basis for calculating a participant's required collateral amount.

(b) *Collateral requirements*

Every RPS participant is required to provide securities as collateral against its possible settlement failure. In the event of a participant's default, the BOK can sell the participant's collateral securities or use them as collateral against BOK lending facilities to complete settlement.

Securities eligible as collateral are limited to Korean government bonds, government-guaranteed bonds and monetary stabilization bonds⁴². For transactions subject to net debit caps, the collateral requirement is equivalent to 30% of the cap, and for other transactions it is 30% of the daily average net payment amount cleared during the immediately preceding six-month period. The BOK assesses the market values of the collateral securities provided by participants on a daily basis, and requires participants to provide additional collateral if necessary to maintain collateral value.

(c) *Loss-sharing arrangements*

If a defaulting participant's collateral is insufficient for covering a settlement shortfall that it experiences, all other participants must share in making up the uncovered position in order to finalize interbank net settlement. The allotment of participants' shares in this process is calculated based upon the amounts of their collaterals. Once settlement through loss-sharing among participants has been completed, the defaulting participant must repay the other participants in accordance with their loss-share contributions, including interest determined in advance.

(d) *Net settlement agent arrangements*

FICs and the federations of non-bank credit institutions could pose relatively higher settlement risks than banks, given that they are not required to provide reserves to the BOK and therefore do not have sufficient funds in their BOK current accounts. To mitigate systemic risk, the BOK therefore allows them to carry out net settlement only indirectly, through agent banks. According to the contract between an FIC and its agent bank, the bank guarantees the FIC's obligation even when the FIC fails to make the relevant payment. Potential settlement risks caused by FICs are in this way limited to the agent banks.

⁴² Monetary Stabilization Bonds (MSBs) are issued by the BOK. They originated as a major tool of monetary policy during the period when the volume of government and public bonds essential for open market operations remained insufficient. They are issued in different maturities ranging from 14 days to two years, among which the two-year maturity constitutes the majority.

3.3.6 Pricing

Each institution participating in the RPSs is required to pay a one-off membership fee as well as annual fees to the KFTC. The membership fee is determined based upon the amount each institution has invested to build the system, while the annual fees aim at fully covering the maintenance and operational expenses arising from system use. These fees are applied based on the individual RPS in which each participant takes part.

Each financial institution determines, at its own discretion, the fees applicable to its customers using retail payment services. Customer fees vary depending on the financial institution and the type of transaction concerned.

3.3.7 Major on-going and future projects

Truncation of promissory notes and current account checks exchanged through the Seoul Clearing House began in October 2009, and for clearing houses in cities neighboring Seoul in December 2009. Nationwide deployment of truncation for promissory notes and current account checks was completed in November 2010.

Meanwhile, with a view toward establishments of cross-border ATM network arrangements, discussions are taking place with central banks of countries with which Korea has active relationships. Once cross-border linkages of nations' ATM networks are established, customers may more conveniently withdraw cash abroad at lower fees⁴³. Banks are expected to make more revenue from overseas cash withdrawal services and to face reduced the settlement liquidity burdens through net settlement of obligations. Various risk management arrangements involving cross-border ATM network use will be implemented as well in order to control risks involved with cross-border ATM network.

3.4 Foreign currency settlement systems

3.4.1 CLS System

3.4.1.1 Overview

Since 2004, when the KRW was designated a CLS eligible currency, the CLS system has been providing PVP settlement services for foreign exchange transactions including the KRW through direct links between BOK-Wire+ and other major RTGS systems around the world. At the end of 2009, 14 local banks and 11 foreign bank branches in Korea were settling foreign exchange transactions through the CLS system as third parties, using the services of three major local banks that are direct CLS settlement members.

3.4.1.2 Types of transactions

Conventional foreign exchange transactions, such as spot exchange, forward exchange and swaps, are settled through the CLS system at present. Since December 2007, NDF (non-deliverable forward) settlement has been made through the system as well.

3.4.1.3 Settlement procedures

CLS Settlement member banks and third parties in Korea follow the same procedures used worldwide to settle their transactions, while CLS Bank uses its current account with the BOK to receive or discharge KRW funds. The settlement and funding period for Asia-Pacific currencies, including KRW, is between 07:00 and 10:00 CET, which is from 14:00 to 17:00 Korean standard time.

⁴³ Currently foreign cardholders in Korea and Korean cardholders abroad can withdraw cash only with cards in alliance with global ATM card companies (eg. VISA, MasterCard). By means of establishing cross-border ATM networks, cash can be withdrawn with cards not in alliance with global ATM card companies as lower service charges.

3.4.1.4 Operation of the system

To facilitate safe and efficient KRW funds transfers between CLS Bank and its settlement member banks, CLS Bank has been granted direct access to BOK-Wire+, as the only institution allowed to access remotely from overseas. Because BOK-Wire+ does not use SWIFT (the standard communication network for CLS), the BOK has established the 'CLS Link System', which converts SWIFT messages to/from CLS Bank into the proprietary message format of BOK-Wire+.

3.4.1.5 Oversight of the system

The CLS system is subject to BOK oversight, as it is designated a systemically important payment and settlement system. In addition to the BOK's own monitoring and assessment of the system on a regular basis, the BOK also participates in the CLS Oversight Committee for cooperative system oversight together with the other central banks of the 17 CLS eligible currencies under the head oversight of the Federal Reserve Bank of New York⁴⁴.

3.4.2 Domestic foreign currency funds transfer systems

3.4.2.1 Overview

Financial institutions in Korea, including local banks and foreign bank branches, process foreign currency funds transfers related to small-value FX transactions or to purchases of goods and services through FCFTSs operated by some major local banks (KEB, Kookmin Bank, Shinhan Bank, etc).

Due to time differences between Korea and some other regions, difficulties can arise when executing a foreign currency funds transfer via an overseas correspondent bank within the same business day. In contrast, the FCFTSs of domestic settlement banks can transfer foreign currency funds in real-time. A large number of banks have opened foreign currency current accounts in FCFTSs. The FCFTSs also enable financial institutions to process payments, even when their account balances are insufficient, using intraday foreign currency credit provided by the settlement banks. Such credit can then be repaid to the settlement banks through their overseas correspondent banks overnight. As a result of settling through FCFTSs, financial institutions can reduce their needs for liquidity as well as the fees imposed for execution of funds transfers through overseas correspondent banks.

3.4.2.2 Types of transactions

FCFTSs typically provide real-time funds transfer services in as many as 20 currencies including the USD, the EUR and the JPY. No specific restrictions are applied to the types of transactions accepted in a system, but it is usually used to process retail foreign exchange or current transactions in relatively small values.

3.4.2.3 Operation of the system and settlement procedures

Settlement banks operate FCFTSs typically during their business hours from 09:00 to 17:00. Instead of using a correspondent bank in the respective currency region, the sending bank requests that the settlement bank operating an FCFTS settle the funds transfer and notifies the receiving bank. The settlement bank processes the foreign currency funds transfer by debiting and crediting the sending and receiving banks' foreign currency accounts with the settlement bank.

If the sending bank's foreign currency balance is insufficient to cover the funds transfer, the settlement bank may provide an intraday credit facility within a certain limit. The bank furnished with such credit must assign its correspondent bank to transfer the same amount within the same business day to the settlement bank's correspondent bank. If the repayment is delayed, penalty interest at a rate agreed in advance between the settlement and the customer bank may be imposed.

⁴⁴ CLS cooperative oversight is governed by the Protocol for the Cooperative Oversight Arrangement of CLS which is downloadable from the website of the US Federal Reserve,

3.4.2.4 Risk management

Settlement banks that operate FCFTSs are exposed to risks associated with intraday credit provision. For some currencies, settlement banks are unable to confirm until the following business day whether intraday credit provided to the sending banks has been repaid to their correspondent bank accounts overseas. Settlement banks are hence exposed to both credit and liquidity risks during this time.

In order to mitigate these risks, settlement banks set varying limits on intraday credit for participants, based upon their credit ratings, transaction frequencies and asset volumes.

The BOK has designated major FCFTSs as subject to its oversight, requiring that each settlement bank provide it with statistics on a periodic basis and notify it of any major changes made in system rules. Along with this, the BOK carries out monitoring and evaluation of the systems and encourages settlement banks to implement prudent risk management.

3.4.2.5 Pricing

In general, there is no fee imposed for account opening, maintenance or transfer services between local banks. However, participants need to pay fees when making overseas transfers.

4. Systems for post-trade processing, clearing and securities settlement

4.1 General overview

The securities settlement systems (SSSs) in Korea are operated by KSD, and the clearing systems are operated by the KRX. The KRX also operates the KOSPI, KOSDAQ and Derivatives Markets. Both stocks and bonds are traded in the KOSPI Market while only stocks are traded in the KOSDAQ Market. In the Derivatives Market, options and futures based on various underlying assets including stocks, stock indices, interest rates, currencies and commodities such as gold and lean hogs are traded.

The KRX, acting as a CCP, plays the role of clearing house for transactions conducted in the markets it operates. KSD is a central securities depository and provides book-entry transfers and a centralized depository. It also conducts settlement for securities traded on the floors, and both clearing⁴⁵ and settlement for those traded OTC. The cash legs of securities transactions are settled through the accounts held either with the BOK or with commercial banks depending upon the type of transactions.

Chart Summary of securities trading, clearing and settlement systems in Korea

⁴⁵ KSD provides trade confirmation services, but it is not regarded as a CCP for OTC transactions since it doesn't assume its members' settlement obligations.

Market	Securities	Clearing	Settlement		
			Securities	DVP	Funds
KOSPI / KOSDAQ / Derivatives markets	GBs ¹⁾ , Repos	KRX	KSD	DVP3	BOK
	Stocks, Bonds ²⁾				Commercial Banks
	Options, Futures				
OTC markets	Stocks ³⁾	KSD	KSD	DVP3	BOK
	Bonds, CDs, CP			DVP1	
	Repos				

Notes: 1) Government bonds
 2) General bonds including corporate and small-value government bonds
 3) Settlement between KRX members (brokers) and non-member institutional investors. See 2nd paragraph of Section 4.4.4 for more detailed explanation.

4.2 Confirmation system and trade repository

4.2.1 Institutional framework

Under the FSCM Act, the KRX provides confirmation of transactions made in the KRX markets, while trade confirmation for OTC transactions is conducted by KSD. Information on securities traded through the KRX markets is gathered and stored by the KRX, and on those traded OTC stored by KSD. However, there is no trade repository for OTC-traded derivatives in Korea.

4.2.2 Participation

In accordance with KRX membership regulation, only financial institutions (mostly FICs and some banks) which have obtained investment trading business or investment brokerage business licenses under the FSCM Act can be members. As of end-2009 85 financial institutions had obtained KRX membership.

Participants using KSD's settlement system for their OTC transactions, in accordance with KSD's Regulation on Settlement Service for Securities, include banks, FICs, insurance companies, asset management companies, pension funds, etc. At the end of 2009, the numbers of KSD members were 240 for bond transactions, 82 for repo transactions, and 157 for stock transactions.

4.2.3 Types of transactions

The KRX conducts trade confirmation for stocks, bonds and derivatives listed on the KRX markets. Stock, bond and repo transactions conducted OTC are confirmed by KSD.

4.2.4 Operation of the system

When buy and sell orders for KRX-listed securities are placed on day T, they are matched automatically by the KRX matching system, and the KRX corrects errors in transactions and confirms them before 15:00 on day T+1.

Meanwhile, when a buyer and a seller enter into an agreement to trade bonds OTC, they provide notification of the trade details to KSD. KSD then confirms the information and notifies the buyer and seller of final settlement details.

4.2.5 Pricing

The KRX does not charge fees for its confirmation service in particular. Instead it does charge for the whole range of services it provides, which includes trade matching, confirmation and clearing. More details on the KRX fee policy are provided in Section 4.3.7. Similarly, KSD does not charge any fees for its confirmation service.

4.3 Central counterparty and clearing system

4.3.1 Institutional framework

The KRX acts as a CCP for the trades conducted in the markets it operates. As the CCP, the KRX assumes obligations, performs multilateral trade netting, and confirms settlement of funds and securities in accordance with the FSCM Act. The KRX also guarantees settlement of transactions conducted in the markets it operates, consequently reducing counterparty risk.

The KRX is a corporation owned by 43 shareholder companies, mainly FICs. The FSC is in charge of supervising KRX businesses. The KRX is required to obtain FSC approvals for establishing or amending its membership and operational rules. The KRX's clearing systems are subject to BOK payment and settlement system oversight.

There is currently no CCP for OTC securities transactions in Korea.

4.3.2 Participants

See Section 4.2.2

4.3.3 Types of transactions

The KRX is the CCP of the KRX markets including the KOSPI, KOSDAQ and Derivatives Markets. The KOSPI Market is divided into the stock and the bond markets, and the bond market is subdivided into two segments. In the first segment -- the general bond market -- corporate, and small-value government and public bonds are traded. In the second segment -- the government bond market -- government bonds, Monetary Stabilization Bonds and KDIC (Korea Deposit Insurance Corporation) bonds are traded.

Only stocks are traded in KOSDAQ Market, while various options and futures are traded in the Derivatives Market.

Table
Summary of securities trading, clearing and settlement through KRX

	KOSPI Market			KOSDAQ Market	Derivatives Market
	stocks	government bonds	general bonds	stocks	options, futures
Securities traded					
Clearing agent	KRX	KRX	KRX	KRX	KRX
Settlement (funds)	Banks	BOK	Banks	Banks	Banks
Settlement (securities)	KSD	KSD	KSD	KSD	—
Settlement day	T+2	T+1 ¹⁾	T	T+2	T+1
DVP type	DVP3	DVP3	DVP3	DVP3	DVP3
Number of members ²⁾	61	85	85	61	63

Notes : 1) Day T for repo transactions 2) End of 2009

4.3.4 Operation of the system

As the CCP for securities transactions made through the KRX markets, the KRX assumes the obligations of its members. By means of multilateral netting, it determines the volume of securities and the amount of funds to be submitted by each member. KRX' members as well as the KSD are notified of the relevant details.

4.3.5 Risk Management

To minimize the settlement risk for the Korean CCP, various risk management tools are employed. In case a participant should default on its obligations, the KRX requires members to pay margins (defaulter's pay). KRX members also have to contribute to a joint compensation fund which makes up for any losses not covered by the defaulters (survivor's pay). The KRX uses a part of its assets -- its settlement reserve -- to guarantee securities transactions between its members. The order in which these resources are used is as follows:

1. The margin funds from the defaulting participant
2. The defaulting participant's contribution to the compensation fund
3. The remainder of the compensation fund
4. KRX's line of credit and other asset including settlement reserve

On top of this, only institutions satisfying certain requirements⁴⁶ are eligible to be members and carry out securities transactions in the KRX markets.

4.3.6 Links to other systems

For securities settlement, the KRX links its clearing systems with KSD's settlement system for securities settlement. There is currently no link with foreign CCPs or CDSs.

4.3.7 Pricing

The KRX charges three kinds of fees for its services: a Trading fee, a Clearing and Settlement fee, and an Access fee. Trading and Settlement fees are charged to KRX members in proportion to their transaction values, while Connection fees are charged per transactions. Fee policy is decided by the KRX Board of Directors.

4.3.8 Major on-going and future projects

Since 2008, there has been a discussion among the financial supervisory authorities, the BOK and major market participants on enhancing the efficiency and safety of OTC derivative market activities in Korea. Considering the growing market, and the lessons learnt from the recent global financial crisis, the group has decided to build new infrastructures for the OTC derivatives market, including a CCP and a trade repository. While the details are still being discussed, in a task force established in February 2010, interest rate (IRS), credit default (CDS) and currency swaps (CRS) are most likely to be subject to CCP clearing. The FSC plans to complete the legislative process by the end of 2012.

4.4 Securities settlement system

4.4.1 Institutional framework

KSD is the only Korean CSD. It is constituted as a special corporation under the FSCM Act. In accordance with the Act, KSD provides centralized deposit of securities, and securities settlement by book-entry transfer for securities transactions on the floors and OTC. The KRX is its major shareholder, and its depositors such as banks and FICs comprise the other shareholders. The FSC is in charge of its supervision, and KSD requires FSC approval for changes in its articles of incorporation and

⁴⁶ The requirements include appropriate financial soundness, IT infrastructure, human resources, etc.

business rules. In accordance with the BOK Act, the BOK oversees the settlement systems operated by KSD.

4.4.2 Participants

See Section 4.2.2

4.4.3 Types of transactions

All securities, except for derivatives, traded on-floor or OTC are settled through KSD's settlement systems. Derivatives transactions are meanwhile settled by the KRX, either via cash settlement or physical delivery.

4.4.4 Operation of the system

Settlement procedures differ depending on the securities concerned. For stocks and bonds traded on the KRX markets, the KRX notifies its members and KSD of the settlement details. The members are required to transfer funds or deliver securities to KSD's securities settlement account or funds settlement account by no later than 16:00 on the settlement date. The settlement dates are day T+2 for stocks, T+1 for government bonds and T for general bonds. Only when both counterparties to a transaction have delivered their obligations (securities or funds) to the accounts of KSD will KSD transfer the securities and funds to the members simultaneously to complete settlement (DVP3 scheme).

Meanwhile, in case where institutional investors such as asset management companies entrust conduct of a securities transactions to KRX members, such trades are accompanied by large-value security deliveries and funds transfers between KRX members and its institutional clients. Therefore there exist a settlement procedure for settlement between KRX members and its institutional clients. When a KRX member enters into a transaction agreement through the KRX markets according to the entrustment, the member notifies KSD of the details. KSD then determines the settlement details based upon bilateral net settlement and notifies the trading parties (the KRX member and clients) of the settlement information. Based upon this information, on T+2 the parties deliver the securities to their accounts with KSD and transfer the funds to KSD's account with the BOK during BOK-Wire+ business hours (currently 09:00~17:30). Once both parties delivery of the securities and payment of the funds are completed, KSD initiates simultaneous settlement of the securities and funds under the DVP3 scheme.

Payments for derivatives transactions conducted between the KRX and its members are carried out no later than 16:00 on day T+1, through the accounts held with commercial banks. In the case of physical delivery for gold futures, however, payment is made at 12:00 on day T+3 through the designated warehouse⁴⁷ under a DVP3 mechanism.

For bonds, certificates of deposit (CD) and commercial paper (CP) transactions made OTC, the trading parties must then deliver the securities or make payment to the KSD settlement accounts during BOK-Wire+ business hours on the settlement date, in accordance with the notified details. Settlement occurs on day T+1 for bonds and day T for CDs or CP. As soon as the trading parties have delivered their securities and funds to their securities accounts with KSD and KSD's account with the BOK, KSD simultaneously settles the securities and funds -- through the parties' securities accounts at KSD and funds accounts held with the BOK (DVP1 scheme).

OTC-traded repo transactions are settled through the Institutional Repo Settlement System operated by KSD. The settlement procedures for transactions in and redemptions of repos are almost the same as those for bonds traded OTC. The differences are that settlement of repos takes place on the trade date (T), and daily calculation of collateral and margin requirements is performed in order to maintain collateral value during the contract period.

⁴⁷ KSD is the designated warehouse at present.

Table
Summary of clearing and settlement through KSD

Securities	Bonds	CDs, CP	Repos	Stocks ¹⁾
Clearing	KSD	KSD	KSD	KSD
Settlement (funds)	BOK	BOK	BOK	BOK
Settlement (securities)	KSD	KSD	KSD	KSD
Settlement day	T+1	T	T	T+2
DVP type	DVP1	DVP1	DVP1	DVP3
Number of members ²⁾	240	240	82	157

Notes : 1) Stocks traded between KRX members and institutional investors

2) End of 2009

4.4.5 Risk Management

KSD employs several risk management tools. First and foremost, by implementation of a DVP mechanism linking KSD's SSSs with BOK-Wire+, principal risk arising from the settlement of securities transactions is substantially eliminated. Also, as final settlement of securities occurs no later than T+2, for example T+2 for stocks and T or T+1 for bonds, the volume of trade outstanding is limited and aggregate market exposure mitigated. To reduce operational risk, KSD has a recovery plan and runs a back-up operating center. It also limits its membership to institutions satisfying certain requirements, related for example to financial soundness, human resources, and IT infrastructure. Lastly, KSD is subject to supervision of the FSS and the FSC, and its SSSs are overseen by the BOK.

4.4.6 Links to other systems

KSD links its settlement systems with the KRX and the BOK, for the settlement of the securities leg and the funds leg of securities transactions conducted on-floor or OTC in Korea. In addition, KSD's settlement systems are linked with two international CDSs, Euroclear and Clearstream, and two global custodians, Citibank and State Street Bank. Through these links, KSD provides depository and settlement services for foreign securities. KSD is currently providing such services for securities listed on 34 foreign securities markets.

4.4.7 Pricing

Fees for settlement services provided by KSD are determined by KSD's Board of Directors, with approval of the FSC. Fees consist of a settlement service and a deposit service fee. The settlement service fee is calculated as a percentage of each transaction value, plus 500 KRW per transaction. The deposit service fee is charged in proportion to the value of the securities deposited.

4.4.8 Major on-going and future projects

The BOK, KRX and KSD are working to enhance the SSSs in several ways, including prevention of settlement delays or gridlocks caused by clashes between the different settlement processes in the KRX and the OTC markets.

To this end, the BOK and clearing and settlement system operators developed a reform plan in November 2009, for upgrading the SSSs. While full details of the reform are not yet determined some aspects include changing the settlement procedures for government bonds and repo transactions in the KRX markets from DVP3 to DVP1, for earlier settlement, and introducing a new scheme for

intraday BOK liquidity provision using self-collateral repos⁴⁸, to reduce the liquidity burdens of financial institutions caused by the changes in settlement procedures. Details of the reform will be laid out and put into effect from 2nd half of 2011.

4.5 Use of securities infrastructure by the Bank of Korea

The BOK uses the securities infrastructure in conduct of its monetary policy operations. It carries out open market operations as and when necessary to affect the level of reserves in the banking system and to manage the overnight interbank lending/borrowing rate. These operations are conducted in two ways: through issuance of Monetary Stabilization Bonds (MSBs), and through securities transactions (outright sales and purchases or repo agreements). The corresponding depository services are provided by KSD.

⁴⁸ Under this scheme, the KRX and its FIC members can use the government bonds and Monetary Stabilization Bonds they are purchasing as collateral with which to obtain intraday liquidity funds from the BOK for settling the transaction.