

**Payment, clearing and  
settlement systems in  
Korea**



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## List of abbreviations

ARS	Automatic Response Service
ATM	automated teller machine
B2B/B2C	business to business / business to customer
BOK	Bank of Korea
BOK Act	Bank of Korea Act
BOK-Wire+	New Bank of Korea Financial Wire Network System
CCP	central counterparty
CD	certificate of deposit
CFIP	Committee on Financial Informatisation Promotion
CLS	Continuous Linked Settlement
CMS	Cash Management Service
CP	commercial paper
CSD	central securities depository
DVP	delivery versus payment
EFT Act	Electronic Financial Transactions Act
EFTPOS	electronic funds transfer at point of sale
FCFTS	foreign currency funds transfer system
FIC	financial investment company
FIFO	first in, first out
FSC	Financial Services Commission
FSCM Act	Financial Investment Services and Capital Markets Act
FSS	Financial Supervisory Service
IC	integrated circuit
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
MoSF	Ministry of Strategy and Finance

*Korea*

MPC	Monetary Policy Committee
MS	magnetic stripe
MSB	monetary stabilisation bond
NCUFK	National Credit Union Federation of Korea
NDF	non-deliverable forward
PVP	payment versus payment
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). The LVPS is BOK-Wire+, which is owned and operated by the Bank of Korea (BOK). Most of the RPSs are owned and operated by the Korea Financial Telecommunications and Clearings Institute (KFTC), the most prominent being the Electronic Banking System, the Cheque Clearing System, the Interbank Remittance System and the ATM Network.

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). Over-the-counter (OTC) securities are meanwhile confirmed, cleared and settled mainly by KSD. The final settlement assets vary depending on 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.

Several notable developments in Korean payment and settlement systems have taken place in recent years. 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 real-time gross settlement (RTGS) system, BOK-Wire. This improvement was aimed at reducing participants' liquidity burdens stemming from the rising funds transfer volumes associated with the rapid increase in the number of financial transactions. Significant changes have also been made to the retail payment environment. In particular, securities brokers are now 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 taking advantage of mobile communication technology.

As in many other countries, active discussions on strengthening payment and settlement system safety are taking place in Korea. These draw on lessons from the recent global financial crisis. To this end, the BOK and other infrastructure operators have developed a reform plan for upgrading Korean SSSs. The establishment of a CCP and a trade repository for OTC derivatives is also under discussion.

## 1. Institutional aspects

### 1.1 The general institutional framework

With respect to the payment and settlement system of Korea, a broad range of laws and regulations govern transactions and the settlement details thereof, issuance and distribution of payment instruments, oversight of payment and settlement systems, 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.

Table 1

**Laws relating to the Korean payment and settlement system**

Contents		Law
Transactions	Commercial transactions	Civil Act, Commercial Act, Standardised Contracts Act
	Securities exchange	Financial Investment Services and Capital Markets Act
	Foreign exchange	Foreign Exchange Transactions Act
Payment instruments	Bills, cheques	Bills of Exchange and Promissory Notes Act, Cheque 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	Specialised 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 seventh 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 the advancement of those 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 necessary matters concerning the payment and settlement systems that it operates,<sup>1</sup> and other systems settling funds through BOK-Wire+. To be specific, the BOK may determine the rules related to the operation and risk management of BOK-Wire+, and it also determines oversight rules on payment and settlement systems 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

<sup>1</sup> Currently, the BOK only operates BOK-Wire+.

improvement and monitor any payment and settlement systems. These include the retail payment systems (RPSs) operated by the Korea Financial Telecommunications and Clearings Institute (KFTC), the 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 authorises the BOK to require BOK-Wire+ participants to provide any relevant information. This enables the BOK to secure the information necessary to enhance payment and settlement system safety and efficiency with respect to non-bank financial institutions such as financial investment companies (FICs)<sup>2</sup> 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 Standardised Contracts Act regulate business transactions in general. Settlement of securities transactions is also governed by the FSCM Act, while the Foreign Exchange Transactions Act regulates foreign exchange settlement.

The Bills of Exchange and Promissory Notes Act and the Cheque Act set out the ways in which these instruments are to be issued, accepted and paid. The Specialised Credit Financial Business Act regulates credit, debit and prepaid cards. Electronic transactions are also regulated by 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.

The FSCM Act and the EFT Act authorise the BOK to oversee FICs and other payment service providers. 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 cancellation, termination or 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 the operation of 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.

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<sup>2</sup> 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 final<sup>3</sup> 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 reduced the amount of intraday settlement liquidity that financial institutions need to prepare.

(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 this regard, the BOK supplies settlement liquidity to banks lacking it, through intraday overdrafts and liquidity adjustment loans,<sup>4</sup> in order to prevent delays in overall settlement caused by temporary liquidity shortages.

The BOK is able to fulfil this key role not only because of its exclusive right as the central bank to issue 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" (SIPs) and "other payment and settlement systems" – according to the monetary values of transactions conducted through the systems and the effect that system failures would have on financial markets overall. The BOK assesses SIPs once every two years and other payment and settlement systems when necessary.

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<sup>3</sup> The term "final" is used here in the sense that transactions paid using BOK banknotes are completed without any clearing or settlement process.

<sup>4</sup> 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.

*(f) Research on and improvement of the 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 ensure system safety and efficiency. In addition, the BOK leads the efforts to promote financial informatisation<sup>5</sup> while contributing to the improvement of existing RPSs or the introduction of new ones.

*(g) Cooperation 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 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 organisations 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 organisation 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 Centre with the Korea Giro Centre. The KFTC has built interbank shared networks in addition to its cheque 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 certification<sup>6</sup> 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 KRX<sup>7</sup> 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 status (eg their quarterly balance sheets and income statements) to the KRX.

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<sup>5</sup> Financial informatisation refers to the fact that payment instruments, financial transactions and financial information are electronically automated and standardised by information telecommunication technology.

<sup>6</sup> 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.

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

(c) *Korea Securities Depository*

KSD is the sole Korean central securities depository (CSD) under the FSCM Act. In this role, it provides centralised depository and securities settlement services through book-entry transfers. It also clears OTC 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 transfer systems; federations of non-bank credit institutions,<sup>8</sup> 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 Korean won (KRW) 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 institutions<sup>9</sup> – 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 RPSs operated by the KFTC.<sup>10</sup> 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 that participates in the relevant RPS. 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 the 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 cardholder and the merchant involved.

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<sup>8</sup> 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.

<sup>9</sup> These 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.

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

### 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 cheques, and provide cash deposits and withdrawal services as well as funds transfers through various RPSs operated by the KFTC (eg 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 Office through the RPSs operated by the KFTC.

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

Federations of non-bank credit institutions are permitted to provide funds transfer services under the applicable special laws. Having participated in the RPSs and provided funds transfer, cash deposit and cash withdrawal services since 2002, they started issuing their own cashier's cheques<sup>11</sup> in 2008.<sup>12</sup> However, they are required to process their net settlement of RPS payments through settlement agent banks, given that the BOK cannot provide liquidity to them and 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 mandatory reserves at the BOK.<sup>13</sup>

#### (d) Financial investment companies

FICs with investment trading or investment brokerage business licences under the FSCM Act have provided 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 participants.<sup>14</sup> Meanwhile, to prevent settlement risk from increasing in line with the number of FICs participating in the RPSs, they are required to process their net settlements through settlement agent banks,<sup>15</sup> 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 status and expected future income 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 purchases<sup>16</sup>

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<sup>11</sup> See Section 2.2.1 for more details.

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

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

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

<sup>15</sup> See Section 3.3.5 (d) for a more detailed explanation.

<sup>16</sup> 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

and cash advances. Credit card companies also issue debit cards (based on strategic partnerships with the banks where cardholders 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 instruments<sup>17</sup> provide payment services by issuing certificates with 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 FSC.<sup>18</sup> As of the end of 2009, three kinds of e-money and 13 kinds of electronic prepayment instrument exist.

(g) *Mobile telecommunications companies*

Mobile telecommunications companies in Korea offer mobile banking services in partnership with banks, providing users with 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 that provide wireless funds transfer platforms which make internet banking services available 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 telecommunications 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 transport) 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 policymaking 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 licences to financial institutions. Regarding 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 other related institutions including the KRX and KSD are supervised by the FSC.

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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.

<sup>17</sup> 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.

<sup>18</sup> See Section 2.2.4 for more details.

(c) *Committee on Financial Informatisation Promotion*

The Committee on Financial Informatisation Promotion (CFIP) is a private consultative group that focuses on financial informatisation. It comprises the BOK, the 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 cooperative business projects, the standardisation of work involved in financial informatisation and security for financial information networks. It led the establishment of such financial networks as the ATM Network, the Interbank Remittance System and the Electronic Banking System. Recently, the CFIP has worked 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 smartphone use.

## 2. Payment media used by non-banks

### 2.1 Cash payments

In accordance with Article 47 of the BOK Act, the BOK currently issues banknotes 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 500.<sup>19</sup> 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 widely used in Korea, its share in total payments has been on the decline since the 1990s, owing to the rapid take-up of credit cards.

### 2.2 Non-cash payments

#### 2.2.1 Cheques and bills

Cheques and bills were formerly the most popular non-cash payment instruments, used mainly by companies. With the development and take-up of electronic payment instruments such as online funds transfer and payment cards, however, the share of cheques and bills in total payments has been on the decline since 2000.

Bills are usually used as a credit facility or payment instrument between companies. Most are promissory notes, which are certificates by 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 cheques currently in use in Korea consist of cashier's cheques and current account cheques (corporate cheques). A cashier's cheque is drawn by a bank on itself: the bank secures settlement money for the cheque and deposits it into a separate account before issuance. In addition to blank cheques, there are three types of preset-value – KRW 100,000, KRW 500,000 and KRW 1,000,000 – cashier's cheques used in Korea, of which the KRW 100,000 denomination is the most popular (account holders with ATM cards,<sup>20</sup> or credit/debit cards with ATM card functions, can deposit cashier's cheques through

<sup>19</sup> The KRW/USD exchange rate was 1,164.50 at the end of 2009.

<sup>20</sup> Also called bank cards or cash cards.

ATMs, and even withdraw funds in the form of cashier's cheques). However, their share in total payments is now falling, owing to the recent expansion of electronic payments and the issuance of KRW 50,000 notes from June 2009.

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

Table 2  
**Cheque and bill clearing figures**  
Daily averages, in billions of KRW

	2006	2007	2008	2009
Bills	5,431	8,059	9,931	8,172
Cheques	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 cheque. 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 and Electronic Banking System.

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 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 allows bank customers, whether or not they have bank accounts, to remit funds from any branch teller window to any recipient account regardless of its bank affiliation. The recipient can withdraw the money immediately after the payer has sent it using this service.<sup>21</sup> 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 to 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 extend from 00:05 to

<sup>21</sup> There is typically no automatic notification of recipients, who must check their bank account balances.

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, allowing customers to access their bank accounts with mobile devices via wireless internet, have been provided since 1999. Recently, with the sharp increase in the number of smartphone users, mobile banking has gained ground rapidly.

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 extend 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.

The Internet Giro System, which is a type of electronic bill presentment and payment system, has been in operation since March 2000 and can be used to initiate credit transfers. Multiple billing institutions deliver bill details to the KFTC, which notifies the payers of the details via the internet. Bills can also be paid via the internet. By using this service, billing institutions can make substantial savings in printing and mailing costs, and payers can also save time by making payments via the internet without the need to visit bank branches or ATMs.

(b) *Debit transfers*

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

Table 3

**Funds transfer figures, by type of transfer**

Daily averages, in thousands of transactions and billions of KRW

		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

**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 purchases of goods and services. An ATM card function was added in 1986. The range of services offered to credit card holders has increased ever since, and now includes cash advances, revolving credit and deferred payment-type public transport cards. Recently, mobile credit card services (allowing users to store their credit card information on IC chips installed in their

mobile phones) have started to allow users to make contactless payments via mobile phone. Credit cards are the most widely used card-type payment instrument in Korea.

In Korea, 11 domestic credit card brands are currently issued, by banks and specialised credit card companies.<sup>22</sup> In addition, five foreign brands are also accepted. Cardholders pay no fees on credit card transactions, their annual membership fees excepted, 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.

Table 4

### Credit card payment volumes and values

Daily averages, in thousands of transactions and billions of KRW

	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 no cheaper<sup>23</sup> and provided fewer bonus rewards than credit cards. Recently, however, an increasing number of people have been using debit cards, mainly because many Koreans have begun to think that 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 cardholder's account.

Table 5

### Debit card payment volumes and values

Daily averages, in thousands of transactions and billions of KRW

	2005	2006	2007	2008	2009
Volume	545	908	1,405	2,033	2,877
Value	22	34	52	73	100

Two kinds of debit card are 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, cardholders can use them anywhere the relevant brands of credit card are accepted. Meanwhile, only local banks issue PIN-based debit cards, and purchases made with them are processed through

<sup>22</sup> Korean banks and specialised credit card companies issue credit cards that carry the logo of foreign card companies as well as their own. When such credit cards are used in Korea, they are treated as Korean-brand credit cards. However, when used abroad, they are treated as foreign-brand credit cards.

<sup>23</sup> No transaction fees are charged to either credit or debit card users.

the EFTPOS<sup>24</sup> 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 restricted service hours of the network (08:00 to 23:00).

(c) *Prepaid cards*

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

Table 6

**Prepaid card payment volumes and values**

Daily averages, in thousands of transactions and billions of KRW

	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 money<sup>25</sup> (e-money), electronic prepayment instruments and electronic bills.

Banks, non-bank credit institutions and credit card companies may issue e-money without the approval of the FSC, while other institutions need approval to do so. Three types of e-money are currently issued in Korea, all used mainly for public transport.<sup>26</sup>

Meanwhile, other electronic prepayment methods, similar to e-money but with convertibility into cash and a range of usage far below those of e-money, are classified as “electronic prepayment instruments” in Korea.<sup>27</sup> 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 transport, and the network-type<sup>28</sup> for payment for goods and services purchased online.

<sup>24</sup> Electronic funds transfer at point of sale.

<sup>25</sup> 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.

<sup>26</sup> The three types of e-money are not interoperable. As a result, public transport service providers accept only the e-money with which they are affiliated.

<sup>27</sup> In accordance with the EFT Act, e-money can be exchanged into cash at any time regardless of the balance, but exchanging electronic prepayment instruments into cash may take some time, and the cash exchanged into may be a smaller amount than the face value. E-money must, in addition, be usable in at least five business fields, but for electronic prepayment instruments two business fields will suffice.

<sup>28</sup> Network-type electronic prepayment instruments store monetary values in network databases which are accessed online for transaction approvals.

Table 7

**E-money and electronic prepaid instrument  
payment volumes and values**

Daily averages, in thousands of transactions and billions of KRW

		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 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 audits<sup>29</sup> have been required to use electronic bills exclusively 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% of retail payments in 2009, compared with 48% in 2005, while the portion of paperless payments accordingly increased from 52% to 57%.

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

Demand for smartphone banking services has also increased recently. In order to meet this demand, several banks are building systems for smartphone banking services – either individually or jointly. In particular, the BOK is leading a joint smartphone banking system project in which the KFTC and 13 commercial banks are participating. 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 payment systems (RPSs) and foreign currency funds transfer systems (FCFTSs).

BOK-Wire, the 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

<sup>29</sup> 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 KRX, must be audited by an external auditor.

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) 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 mechanism.<sup>30</sup> BOK-Wire+ has operated stably since its launch in April 2009.

Most retail payment systems in Korea are operated by the Korea Financial Telecommunications and Clearings Institute (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 with intraday credit.

## **3.2 Large-value payment system**

### **3.2.1 Institutional framework**

The Monetary Policy Committee (MPC) is the BOK's ultimate decision-making body on its monetary policy. It decides on basic matters concerning the 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 BOK<sup>31</sup> while also fully satisfying the following requirements: financial soundness, adequate numbers of staff dedicated to BOK-Wire+ operations, and sufficient expected usage volumes.<sup>32</sup> Such requirements are determined by the Governor of the BOK, based on principles laid down 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, withdraw from membership or 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).

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<sup>30</sup> 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.

<sup>31</sup> 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.

<sup>32</sup> Currently, a minimum of six staff and 50 transactions per month.

### **3.2.3 Types of transactions**

Funds transfer services provided through BOK-Wire+ include general funds transfers,<sup>33</sup> 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 the 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 done through BOK-Wire+. Third-party funds transfer allows an individual or a business to make a large-value funds transfer through a BOK-Wire+ participant promptly and safely. 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 the participants concerned at designated times. BOK-Wire+ is also a pivotal monetary policy transmission channel, 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, delays or concentrations of funds settlement, or any other unavoidable circumstances.

#### *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.

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<sup>33</sup> The transfer of funds between accounts not connected to any underlying transactions such as securities or foreign exchange.

Table 8  
Settlement systems and applicable transactions

Settlement system (settlement account)	Applicable transactions	Settlement mechanism
RTGS system (current account)	<ul style="list-style-type: none"> <li>• CLS funds transfers</li> <li>• Designated-time net settlements</li> <li>• Issuances and redemptions of government and public bonds</li> <li>• BOK loans</li> <li>• Funds transfers between participants after 17:30 to repay intraday overdrafts<sup>1</sup></li> </ul>	RTGS
Hybrid system (deposit account for settlement)	<ul style="list-style-type: none"> <li>• General funds transfers (including third-party funds transfers)</li> <li>• Short-term interbank lending/borrowing</li> <li>• DVP transactions (including BOK repo transactions)</li> </ul>	RTGS, bilateral and multilateral offsetting

<sup>1</sup> Funds transfers between participants for repayment of intraday overdrafts are allowed until 17:50.

#### 3.2.4.2 Types of payment instructions

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 scope for simultaneous offsetting. If the balance does not suffice to cover 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 basis<sup>34</sup> at a time when the instruction of the relevant counterparty is input into the system, or by multilateral settlement, which occurs every 30 minutes. At 17:05, all normal payments are switched into urgent payments.

#### 3.2.4.3 Bilateral and multilateral settlement

When a new payment order is input into 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, the

<sup>34</sup> 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.

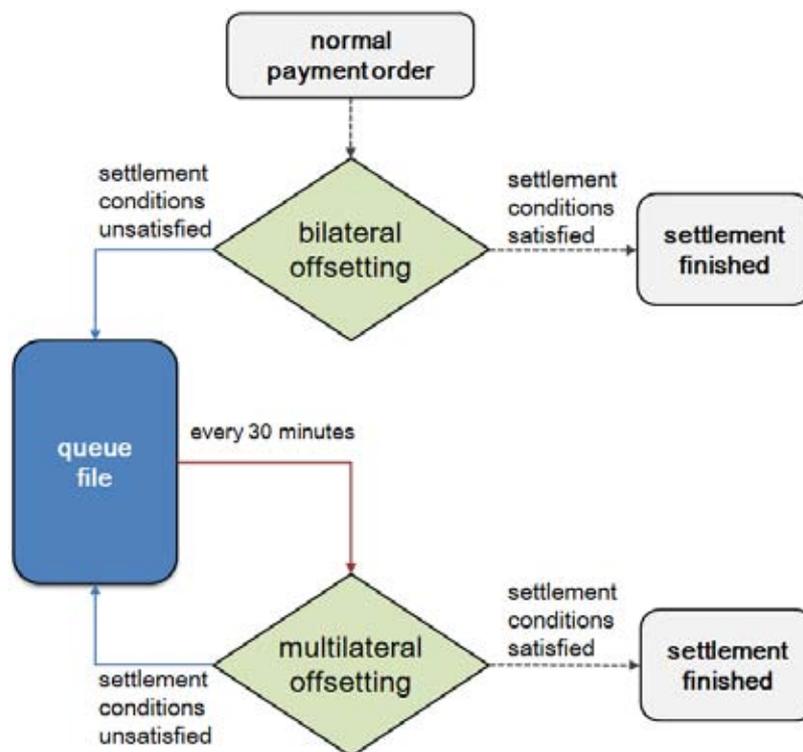
normal payment instructions of a participant to which liquidity flows as a result of a simultaneous settlement can be processed prior to urgent payment instructions. If there is a lack of funds or the net payment limit is exceeded as a result of simultaneous bilateral settlement of a normal payment instruction, the payment order 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 and net payment limits, are processed simultaneously.

3.2.4.4 Queuing arrangement

Payment order processing methods differ in the RTGS and the hybrid systems of BOK-Wire+. To heighten funds transfer efficiency, the RTGS system processes payment orders in accordance with a bypass FIFO<sup>35</sup> 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.

Chart 1

**Bilateral and multilateral settlement mechanism**



<sup>35</sup> First in, first out.

### 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 preset 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.

Table 9  
Designated-time transactions

Type		Time	Account
Net settlement of RPS <sup>1</sup>		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	

<sup>1</sup> Net settlement of clearing transactions through clearing houses outside 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 that are temporarily short of settlement funds. Overdrafts are provided only to financial institutions subject to the BOK's minimum reserve requirement, and interest (three-year treasury yield less overnight interbank rate) is charged on overdrafts in amounts exceeding 25% of the equity capital of 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 systemic 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 according to 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.

Table 10  
**BOK-Wire+ service fee schedule**  
 In KRW

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

<sup>1</sup> Applicable to transactions made in extended hours.

### 3.2.7 Major ongoing and future projects

The BOK implemented a tiered participation model for BOK-Wire+ in 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 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 KFTC.<sup>36</sup> The KFTC is a non-profit organisation set up on a joint ownership basis by member banks.<sup>37</sup> The decision-making bodies 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

<sup>36</sup> The details of each system are laid out in Section 3.3.4.

<sup>37</sup> All local banks are either general or associate members of the KFTC. The BOK is one of the general members.

Meeting to become special participants. Special participants include the Post Office, the federations of non-bank credit institutions, foreign banks and FICs.

Approvals for participation in the RPSs operated by the KFTC, as well as expulsions, are determined at the General Meeting. At the end of 2009, 11 general members, 10 associate members and 43 special participants participated in the RPSs.

### **3.3.3 Types of transactions**

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

- Cheque Clearing System
- Giro System
- CMS Systems
- Interbank Remittance System
- Bankline System<sup>38</sup>
- ATM Network<sup>39</sup>
- Electronic Banking System<sup>40</sup>
- K-Cash Network
- EFTPOS System
- B2B E-commerce Payment System
- B2C E-commerce Payment System

Cheque clearing services are provided through the Cheque 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 EFTPOS System for settlement of debit card payments. The B2B and B2C E-commerce Payment Systems support online transactions between buyers and sellers.

Meanwhile, the credit card companies operate several credit card payment systems 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 prearranged times. The BOK then completes settlement by conducting funds transfers across BOK-Wire+ participants' accounts with the BOK at the proper designated

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<sup>38</sup> The Bankline System connects the computer network systems of regional banks through the KFTC, to allow regional bank customers to access banking services through all regional bank branches.

<sup>39</sup> The ATM Network is the name of the Korean ATM network.

<sup>40</sup> The Electronic Banking System is an expanded and revised version of the Automatic Response Service (ARS) system launched in 1984. It serves as an intermediary for electronic banking services such as ARS, telebanking, internet banking and mobile banking.

net settlement times. The details of the settlement procedures in several major RPSs are as follows:

(a) *Cheque Clearing System*

Both electronic and physical exchanges of cheques and bills are currently available in Korea. As of the end of 2010, however, the exchange of cheques has been carried out only through truncation.<sup>41</sup> With this method, banks receiving cheques (the payees' banks) reproduce the images and text information of the cheques and send them to the KFTC. Based upon the information received, the KFTC determines participants' balances with each bank and requests net settlement by the BOK at 11:00 on day T+1.

Where there is an insufficient balance in a payer's account for cashing the cheque or bill, the payer's bank notifies the payee's bank no later than 14:00 on day T+1. The payee of such a cheque 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 cheque 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 cheque is classified as dishonoured and re-settled through the following day's cheque clearing process.

(b) *Giro System*

The settlement procedures for the Giro System differ depending on 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 them to the BOK before 10:00 on day T+2. Settlement takes place at 11:00 on day T+2.

In the case of the electronic giro service, settlement procedures vary according to the service type. An institution receiving funds through direct debit notifies the KFTC (T-1) of the preauthorised 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 following day (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 calculates the net settlement obligations on the following business day and requests net settlement by the BOK.

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<sup>41</sup> Electronic information exchange.

*(d) ATM Network*

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). On 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. The 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 routed through 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*

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<sup>42</sup>*

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.

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.

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<sup>42</sup> Transactions with signature-based debit cards, which are the predominant type of debit card in Korea, are settled through the credit card settlement system described in this section. Those with PIN-based cards, the less popular type of debit card, are processed and settled through the EFTPOS Network.

### 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 frameworks in place, therefore, a participant's settlement failure could represent a source 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 permitted amount of a participant's unsettled net obligation, 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 a participant's cap as the basis for calculating its 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 stabilisation bonds.<sup>43</sup> 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 does not suffice to cover a settlement shortfall, all other participants must collectively make up the uncovered position in order to finalise the interbank net settlement. The allocation of participants' shares in this process is calculated according to the amount of their collateral. Once settlement through loss-sharing among participants has been completed, the defaulting participant must repay the other participants in accordance with their loss-sharing contributions, including interest determined in advance.

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<sup>43</sup> Monetary stabilisation 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 required 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.

(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.

### **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 ongoing and future projects**

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

Meanwhile, with a view to establishing cross-border ATM network arrangements, discussions are taking place with central banks of countries with which Korea has active relationships. Cross-border linkages between ATM networks will allow customers to withdraw cash abroad more conveniently and at lower cost.<sup>44</sup> Banks can expect higher revenues from overseas cash withdrawal services combined with lower settlement liquidity burdens thanks to net settlement of obligations. Various arrangements are envisaged to mitigate the specific risks of cross-border ATM networks.

## **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 provided 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.

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<sup>44</sup> Currently, foreign cardholders in Korea and Korean cardholders abroad can withdraw cash only with cards that are affiliated to the global ATM card companies (eg VISA, MasterCard). With the establishment of cross-border ATM networks, cash can be withdrawn with cards not affiliated to the global ATM card companies and at lower service charges.

### 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, non-deliverable forward (NDF) settlement has also been done through the system.

### 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.

### 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 it 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 York.<sup>45</sup>

## 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).<sup>46</sup>

Due to international time differences, 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 allow 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 overnight to the settlement banks through their overseas correspondent banks. By settling through FCFTSs, financial institutions can reduce their need for liquidity and avoid the fees imposed for execution of funds transfers through overseas correspondent banks.

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<sup>45</sup> CLS cooperative oversight is governed by the Protocol for the Cooperative Oversight Arrangement of CLS, which can be downloaded from the website of the US Federal Reserve.

<sup>46</sup> These systems settle only the transactions of customers with accounts at the same bank.

### 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, which 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 notify 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.

### 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. The BOK also monitors and evaluates the systems and encourages settlement banks to implement prudent risk management.

### 3.4.2.5 *Pricing*

In general, local banks do not impose fees for account opening, maintenance or transfer services between themselves. 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 centralised depository. It also conducts settlement for floor-traded securities, as well as clearing<sup>47</sup> and settlement for those traded over the counter. The cash legs of securities transactions are settled through the accounts held either with the BOK or with commercial banks depending on the type of transaction.

Chart 2

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

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

<sup>1</sup> Government bonds. <sup>2</sup> General bonds, including corporate and small-value government bonds. <sup>3</sup> Settlement between KRX members (brokers) and non-member institutional investors. See second paragraph of Section 4.4.4 for 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; KSD stores information on securities traded over the counter. However, there is no trade repository for OTC derivatives in Korea.

### 4.2.2 Participation

In accordance with KRX membership regulations, only financial institutions (mostly FICs and some banks) which have obtained investment trading business or investment brokerage

<sup>47</sup> KSD provides trade confirmation services, but it is not regarded as a CCP for OTC transactions since it does not assume its members' settlement obligations.

business licences 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 and pension funds. At the end of 2009, KSD had 240 members 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 over the counter 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 over the counter, 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 charges no specific fees for its confirmation service. Instead it charges for the whole range of services it provides, which include 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 specific 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 responsible for 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 stabilisation bonds and KDIC (Korea Deposit Insurance Corporation) bonds are traded.

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

Table 11  
**Summary of securities trading, clearing and settlement through KRX**

Securities traded	KOSPI Market			KOSDAQ Market	Derivatives Market
	Stocks	Government bonds	General bonds	Stocks	Options, futures
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 <sup>1</sup>	T	T+2	T+1
DVP type	DVP3	DVP3	DVP3	DVP3	DVP3
Number of members <sup>2</sup>	61	85	85	61	63

<sup>1</sup> Day T for repo transactions. <sup>2</sup> 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 KSD are notified of the relevant details.

#### **4.3.5 Risk management**

To mitigate settlement risk for the Korean CCP, various risk management tools are employed. If a participant defaults on its obligations, the KRX requires members to pay margins (defaulter's pay). KRX members must also contribute to a joint compensation fund which makes good 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 assets including settlement reserve

In addition, only institutions satisfying certain requirements<sup>48</sup> 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 CSDs.

#### **4.3.7 Pricing**

The KRX charges three kinds of fee 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 on a per-transaction basis. Fee policy is decided by the KRX Board of Directors.

#### **4.3.8 Major ongoing and future projects**

Since 2008, the financial supervisory authorities, the BOK and major market participants have jointly discussed how to enhance the efficiency and safety of OTC derivatives market activities in Korea. In the light of market growth and the lessons learnt from the recent global financial crisis, the decision has been taken to build new infrastructure for the OTC derivatives market, including a CCP and a trade repository. While the details are still being discussed by a task force established in February 2010, the instruments most likely to be subject to CCP clearing are interest rate swaps, credit default swaps and currency swaps. 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 a centralised depository for securities, and securities settlement by book-entry transfer for floor-traded and OTC securities transactions. The KRX is its major shareholder, and its depositors, which are banks and FICs, comprise the other shareholders. The FSC is responsible for its supervision, and KSD requires FSC approval for changes in its articles of incorporation and 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 over the counter are settled through KSD's settlement systems. Derivatives transactions are meanwhile settled by the KRX, either via cash settlement or physical delivery.

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<sup>48</sup> The requirements include appropriate financial soundness, IT infrastructure and human resources.

#### 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. 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. 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 simultaneously transfer the securities and funds to the members to complete settlement (DVP3 scheme).<sup>49</sup>

Where institutional investors such as asset management companies entrust conduct of securities transactions to KRX members, such trades are accompanied by large-value securities deliveries and funds transfers between KRX members and its institutional clients. Therefore a settlement procedure exists 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 on 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 complete their delivery of the securities and payment of the funds, KSD initiates simultaneous settlement of the securities and funds under the DVP3 scheme.

Payment for derivatives transactions conducted between the KRX and its members is 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 warehouse<sup>50</sup> under a DVP3 mechanism.

For bond, certificate of deposit (CD) and commercial paper (CP) transactions made over the counter, the trading parties must 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 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 over the counter. 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.

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<sup>49</sup> For a description of different DVP models, see CPSS, *Delivery versus payment in securities settlement systems*, Basel, September 1992.

<sup>50</sup> KSD is the designated warehouse at present.

Table 12

**Summary of clearing and settlement through KSD**

<b>Securities</b>	<b>Bonds</b>	<b>CDs, CP</b>	<b>Repos</b>	<b>Stocks<sup>1</sup></b>
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 <sup>2</sup>	240	240	82	157

<sup>1</sup> Stocks traded between KRX members and institutional investors. <sup>2</sup> End of 2009.

**4.4.5 Risk management**

KSD employs several risk management tools. First, 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 (ie 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 backup operating centre. It also limits its membership to institutions satisfying certain requirements, related to eg financial soundness, human resources and IT infrastructure. Lastly, KSD is subject to supervision by 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 over the counter in Korea. In addition, KSD's settlement systems are linked with two international CSDs, 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 currently provides 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 and approved by the FSC. Fees consist of a settlement service fee and a deposit service fee. The settlement service fee is calculated as a percentage of each transaction value, plus KRW 500 per transaction. The deposit service fee is charged in proportion to the value of the securities deposited.

**4.4.8 Major ongoing 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 that end, the BOK and clearing and settlement system operators developed in November 2009 a reform plan 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 repos,<sup>51</sup> to reduce the liquidity burdens on financial institutions caused by the changes in settlement procedures. Details of the reform will be set out and put into effect from the second half of 2011.

#### **4.5 Use of the securities infrastructure by the BOK**

The BOK uses the securities infrastructure in conducting its monetary policy operations. It carries out open market operations as and when necessary to influence 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 the issuance of monetary stabilisation bonds, and through securities transactions (outright sales and purchases or repo agreements). The corresponding depository services are provided by KSD.

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<sup>51</sup> Under this scheme, the KRX and its FIC members can use the government bonds and monetary stabilisation bonds they purchase as collateral against which they can obtain intraday liquidity funds from the BOK for settling the transaction.