

Payment and Settlement Trends in 2016

I. Overview

Payments and settlements are divided into retail payments and settlements, which individuals and companies use as means of making payments, and large-value payments and settlements, which are funds transfers between financial institutions.

In 2016, the amount of payments and settlements made using payment instruments other than cash continued its upward trend from last year, with a daily average of KRW 376.1 trillion (+10.7% in 2015 → +8.1% in 2016). Retail payments and settlements, including payment cards and funds transfers, amounted to KRW 76.3 trillion, an increase of 1.1% year-on-year (YOY), and large-value payments and settlements through BOK-Wire+ amounted to KRW 299.8 trillion, an increase of 10.1% YOY.

<Table 1> Payments and Settlement Value by Non-cash Payment Instruments (Daily Average)

(KRW trillion, YoY %)

	2014	2015	2016	
			Annual	Rate of Increase/Decrease
Large-value settlement	243.9	272.3	299.8	(10.1)
Retail settlement	70.4	75.5	76.3	(1.1)
Payment cards ¹⁾	1.7	1.9	2.1	(11.8)
Bill and check	24.4	22.8	21.6	(-5.3)
Funds transfers ²⁾	44.2	50.8	52.6	(3.5)
Total	314.3	347.8	376.1	(8.1)

Notes : 1) Credit card (excluding cash advance), check card, prepaid card, (IC cash card) and debit card.

2) Includes Giro System, Electronic Banking System, Interbank Funds Transfer System, CD-CMS Network, Local Bank Information Network, etc.

call transactions or securities / foreign exchange transactions between financial institutions, large value funds transfers by general customers, fund transfers between the participants of the retail payment system operated by the Korea Financial Telecommunications & Clears Institute(KFTC), and fund transfers between the BOK and the participants that use its BOK-Wire+ for the receipt and disbursement of treasury funds.

In 2016, the amount of funds transferred through BOK-Wire+ increased by 10.1% YOY to a daily average of KRW 299.8 trillion. This was mainly due to a sharp increase in fund transfers of securities settlements.

<Table 2> Settlement Values via BOK-Wire+ (Daily Average)

(KRW trillion, YoY %)

	2014	2015	2016	
			Annual	Rate of Increase/Decrease
Transfers between participants	230.3	257.4	285.2	(10.8)
(Call transaction funds)	43.9	31.4	27.7	(-11.8)
(Securities settlement funds)	93.5	115.6	143.2	(23.9)
(Foreign exchange settlement funds)	14.9	18.4	19.3	(4.7)
(Customer payments) ¹⁾	35.1	41.5	37.1	(-10.7)
(Net settlement funds) ²⁾	14.2	16.9	16.8	(-0.5)
Transfers between BOK and participants ³⁾	13.6	14.8	14.5	(-1.9)
Total	243.9	272.3	299.8	(10.1)

Notes: 1) Large-value transfers made by companies to recipients via BOK-Wire+, including linked settlement.

2) Value of funds for which final settlements between participants of the retail payment systems, operated by the KFTC, are carried out on a net basis via BOK-Wire+.

3) Includes payments on government and public bond transactions, Treasury fund transfers, and BOK loans.

Source: BOK

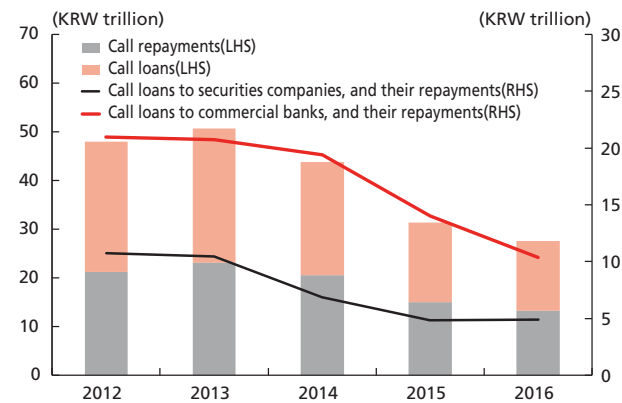
II. Large-value Payment and Settlement Trends

Large-value payments and settlements that are handled by BOK-Wire+ include fund transfers for

Call transaction funds transfers decreased by 11.8% YOY as call transactions of securities companies decreased and RP transactions of commercial banks increased, rather than call transactions, after the

reform of the short-term money market.¹⁾

<Figure 1> Call Transaction Funds Transferred through BOK-Wire+¹⁾ (Daily Average)

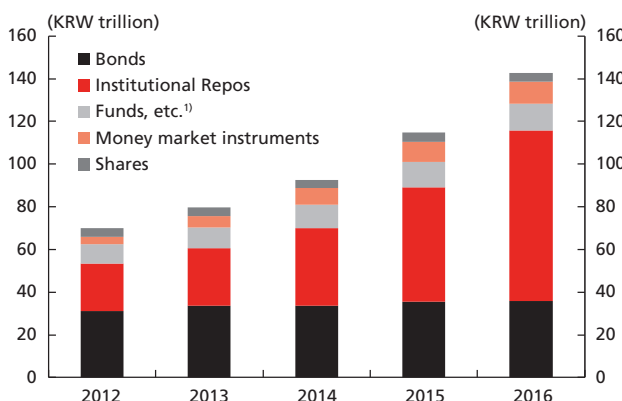


Note: 1) Amount of payments made using call transactions through the BOK-Wire+ Settlement system

Source: BOK

Securities settlement fund transfers increased by 23.9% YOY with the increase in Inter-Institution Repos, money market instruments, and funds transactions among institutions. In particular, the increase in Inter-Institution Repos led to an increase in total securities settlement funds—mainly due to the increased use of RP by securities companies with limited participation in the call market—and the expansion of RP transactions by banks as financing and management tools.

<Figure 2> Securities Settlement Fund Transferred through BOK-Wire+ (Daily Average)

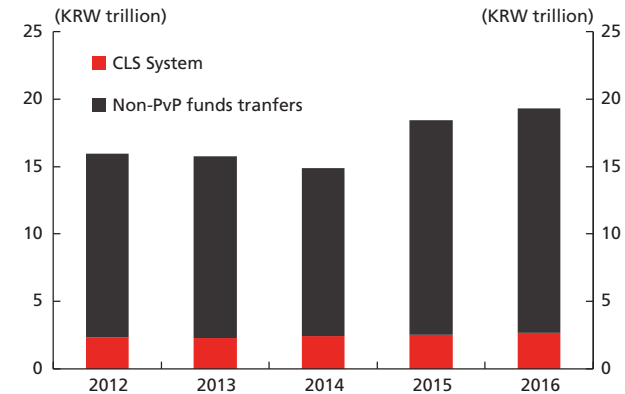


Notes: 1) Collective investment securities under the Financial Investment Services and Capital Markets Act

Source: BOK

Foreign exchange fund transfers²⁾ slightly increased by 4.7% YOY, with increases in both the fund transfers using the CLS system (+5.6%) and Non-PvP funds transfers through the interbank exchange transaction system (+4.6%).

<Figure 3> Foreign Exchange Fund Transferred through BOK-Wire+¹⁾ (Daily Average)

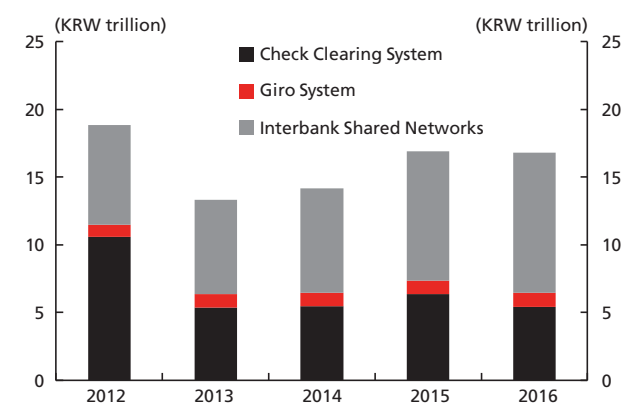


Note: 1) Funds transferred via the CLS system are indicated on a net basis while funds via Non-PvP funds transfers are indicated on a gross basis.

Source: BOK

Despite the increase in fund transfers using the Interbank shared networks (+8.2%), the total amount of net settlement fund transfers among the participants that use BOK-Wire+ decreased by 0.5% YOY as a result of a decrease in the use of the check clearing system (-14.5%).

<Figure 4> Net Settlement Fund Transferred through BOK-Wire+ (Daily Average)



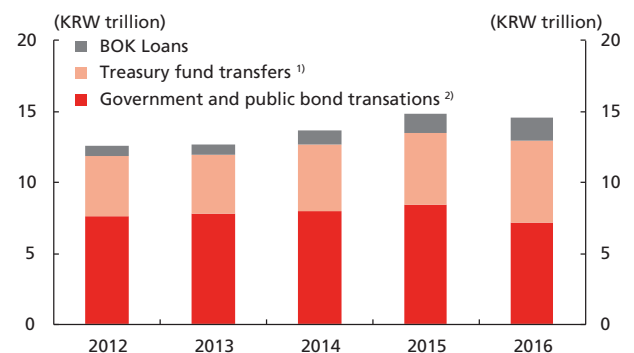
Source: BOK

1) According to the "Money Market Reform Plan," promoted by the government and the BOK in order to mitigate the money market's overreliance on the call market, the call money cap imposed on securities companies gradually decreased in 2014 from 25% of the equity capital to 5%. From March 2015, all securities investment companies except for primary dealers of treasury bonds and securities companies subject to the BOK's open market operation were excluded from participating in the call market.

2) In the case of settlements of foreign exchange transactions, the transfer of won-denominated funds is handled through BOK-Wire+. In particular, the CLS system links the computer systems of the CLS banks and central banks to handle the payment of sold currency and the receipt of bought currency without any delay between countries.

Meanwhile, the daily average value of funds transfers between the BOK and BOK-Wire+ participants, government and public bonds transactions, treasury funds transfers, and loans of the BOK, reached KRW 14.5 trillion, decreasing by 1.9% YOY.

<Figure 5> Fund Transfers between BOK and Participating Organizations (Daily Average)



Notes: 1) Includes transactions of participating organizations through the Treasury Network

2) Issuance and repayment of treasury bonds and monetary stabilization bonds, repurchase agreement transactions, interest payments, etc.

Source: BOK

III. Retail Payment and Settlement Trends

1. Payment Cards

In 2016, value of transactions made via payment cards recorded a daily average of KRW 2.1 trillion, representing a 11.8% YOY increase.

Transactions by credit cards increased by 10.9% YOY due to the spread of personal credit cards use in airlines³⁾ (+16.2%), distributors⁴⁾ (+12.7%), medical institutions⁵⁾ (+10.0%), and public transportations (+9.3%) sectors.

Check cards maintained a high growth rate (+15.2%) following on from the previous year (+17.9%) due to tax benefits⁶⁾ that are higher than

credit cards and to incidental services similar to credit cards.

<Table 3> Payment Card Use¹⁾ (Daily Average)

(KRW billion, YoY %)

	2014	2015	2016	
			Annual	Rate of Increase/Decrease
Credit cards ²⁾³⁾	1,416	1,512	1,677	(10.9)
Mobile cards ⁴⁾	16	30	46	(51.7)
Check cards ³⁾	312	368	424	(15.2)
Pre-paid cards ⁵⁾	2.7	2.3	2.2	(-3.5)
Others ⁶⁾	0.3	0.6	0.9	(59.3)
Total	1,730	1,883	2,104	(11.8)

Notes: 1) Based on amounts settled, excluding transactions that were cancelled after being approved

2) Excluding cash advances

3) Including overseas use

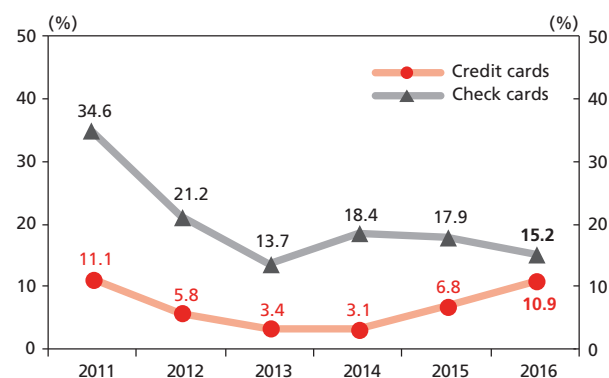
4) Payment card information is stored on mobile devices or networks, and such devices are used to make payments.

5) Pre-paid cards issued by credit card companies and banks running credit card businesses.

6) IC cash cards, debit cards

Source: Credit card companies and banks running credit card businesses, securities companies, and the KFTC

<Figure 6> Growth Rate of Daily Average Transaction of Credit Cards and Check Cards¹⁾



Note: 1) YoY

Source: Credit card companies and banks running credit card businesses, securities companies

3) The number of domestic and overseas air travelers increased (+16.2% in 2016) due to the growth of low-cost airlines and the suspension of fuel surcharges on international flights. (Source: Ministry of Land, Infrastructure and Transport)

4) Distributors include department stores, supermarkets, discount stores, convenience stores, duty free shops, home shopping and Internet shopping.

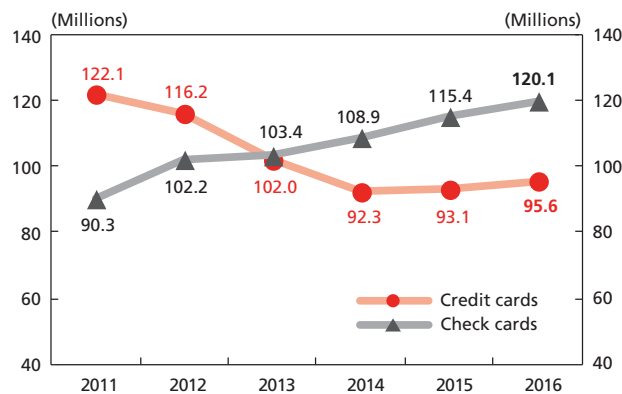
Distributors' sales increased (+8.5% in 2016) due to government support for high-efficiency home appliances incentives (from July 1 to September 30 in 2016) and the Korea Sales Festa (from September 29 to October 9 in 2016). (Source: Ministry of Trade, Industry and Energy)

5) Overall medical expenses, including those covered by patients, increased (+11.4% in 2016) due to strengthened health insurance coverage, such as the lowering of the age limit for implant treatment covered by health insurance (from 70 years old to 65 years old). (Source: National Health Insurance Service, Health Insurance Review & Assessment Service)

6) The income deduction rate is 30% for check cards and 15% for credit cards.

As of the end of 2016, the number of issued check cards was 120.07 million (+4.1% YOY), exceeding the number of issued credit cards (95.64 million, +2.7% YOY). Compared with the end of 2013, when the numbers of issued check cards and credit cards were similar, the number of issued check cards increased by 16.1% while that of credit cards decreased by 6.3%.

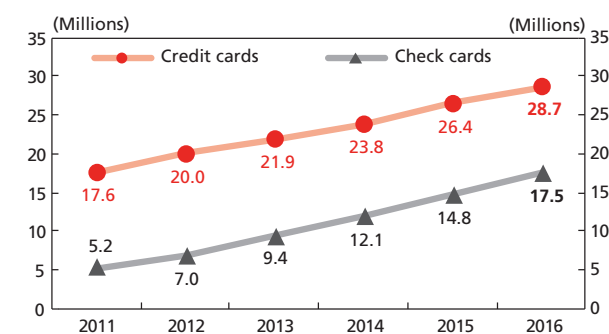
<Figure 7> Number of Issued Credit Cards and Check Cards (Yearend)



Source: Credit card companies and banks running credit card businesses, securities companies

In 2016, the average number of daily transactions for credit cards and check cards increased by 8.4% and 18.0% to 28.65 million and 17.47 million, respectively.

<Figure 8> Number of Transactions for Credit Cards and Check Cards¹⁾



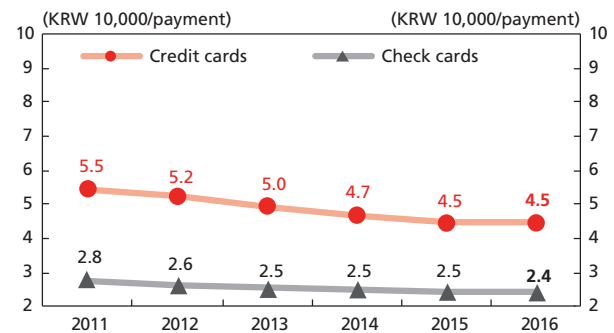
Note: 1) For residents only, including overseas spending

Source: Credit card companies and banks running credit card businesses, securities companies

The average amount of individual transactions with credit cards (personal goods and services purchases) and check cards remained small due

to their widespread usage in convenience stores, supermarkets, and public transportations. In 2016, the average amount of individual transactions by check card decreased by 3.5% to 24,342 won, while that by credit card slightly increased to 44,564 won (+0.1%).

<Figure 9> Average Amount of Individual Transaction by Credit Cards and Check Cards¹⁾²⁾



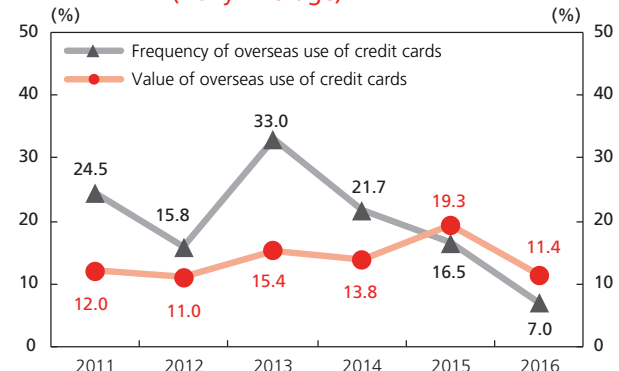
Notes: 1) For residents only, including overseas spending

2) Amount paid for personal general and installment purchase by credit cards

Source: Credit card companies and banks running credit card businesses, securities companies

In 2016, overseas credit card use by residents maintained an upward trend in US dollar term,⁷⁾ but the upward trend slowed in KRW term compared with the previous year due to a slowdown⁸⁾ in the depreciation of KRW (+19.3% in 2015 → +11.4% in 2016).

<Figure 10> Growth Rate of Number and Amount of Overseas Transactions of Credit Card (Daily Average)¹⁾



Notes: 1) In KRW, year-on-year

Source: Credit card companies and banks running credit card businesses, securities companies

7) The growth rate of overseas spending by credit card was 8.5% in both 2015 and 2016.

8) The KRW/USD average exchange rate rose by 7.4% YOY to 1,131.5 won in 2015 and by 2.6% to 1,160.4 won in 2016.

2. Bills and Checks

In 2016, payments settled through bills and checks recorded a daily average of KRW 21.6 trillion, representing a decrease of 5.3% YOY.

<Table 4> Payment and Settlement via Bills and Checks (Daily Average)

(KRW billion, YoY %)

	2014	2015	2016	
			Annual	Rate of Increase/Decrease
Cashier's check	2,514	2,497	2,107	(-15.6)
Preset value	313	267	220	(-17.4)
(KRW 100,000 denomination)	94	73	56	(-23.0)
(KRW 1,000,000 denomination)	216	192	163	(-15.2)
Non-preset value	2,202	2,230	1,886	(-15.4)
Promissory notes and others	19,398	17,975	17,154	(-4.6)
(Promissory notes)	5,283	3,281	2,792	(-14.9)
(Current account checks)	13,469	13,470	13,031	(-3.3)
(Electronic bills) ¹⁾	495	1,093	1,211	(10.8)
Others ²⁾	2,501	2,347	2,343	(-0.2)
Total	24,414	22,818	21,604	(-5.3)

Notes: 1) Excludes electronic bills provided as security for Intermediated Lending Support Facility provided by the Bank of Korea

2) Includes postal money orders, notifications of call funds settlements, and receipts of securities principal and interest payments

Source: KFTC

The value of cashiers' checks cleared, both with preset values, such as KRW 100,000 and KRW 1,000,000, and non-preset values, dropped significantly, recording a decrease of 15.6% YOY, due to the diversification of payment instruments, prevalent use of cards, and increased use of KRW 50,000-denominated banknotes⁹⁾.

The settlement value of promissory notes and others decreased by 4.6% YOY as securities companies reduced the issuance of call promissory notes following reductions in call borrowings.

3. Funds Transfers

In 2016, the upward trend of the value of retail payments by fund transfers through electronic

banking networks slowed to a daily average of KRW 52.6 trillion (+14.9% in 2015 → +3.5% in 2016).

<Table 5> Value of Settlements Made via Fund Transfers¹⁾ (Daily Average)

(KRW trillion, YoY %)

	2014	2015	2016	
			Annual	Rate of Increase/Decrease
Electronic Banking System	37.8	43.9	45.6	(3.8)
(Internet banking) ²⁾	18.4	20.3	21.0	(3.7)
(Firm banking) ²⁾	15.6	19.3	19.8	(2.8)
(Mobile banking) ²⁾	0.2	0.3	0.3	(36.9)
Funds Transfer System	4.2	4.7	4.8	(2.4)
Giro System	1.0	1.0	1.0	(-0.5)
Others ³⁾	1.1	1.2	1.2	(1.6)
Total	44.2	50.8	52.6	(3.5)

Notes: 1) Excluding BOK-Wire+

2) Based on amounts transferred to other banks

3) CMS Network, CD Network, Local Bank Information Network, etc.

Source: KFTC

IV. Measures taken for Improving Payment and Settlement Systems

The BOK established and began operating, as of March 3, 2016, a system that directly links BOK-Wire+ with KFTC's Electronic Banking System, allowing large-value funds transfers in excess of KRW 1 billion by companies and others to be made in real time. With this system, the BOK aims to enhance the convenience with which customers can transfer funds and reduce the settlement risk¹⁰⁾ of financial institutions participating in the Electronic Banking System.

In 2016, the BOK carried out oversight of payment-and-settlement systems that includes assessing and recommending improvements to systemically important payment and settlement

9) The balance of 50,000 won bills (end of period) increased to KRW 52.0 trillion in 2014, KRW 64.3 trillion in 2015, and KRW 75.8 trillion in 2016.

10) While the Electronic Banking System processes fund transfers between customers in real-time, the settlements between financial institutions are settled on a net basis (the difference between payments and receivables) the next business day through BOK-Wire+. Therefore, a recipient's bank that pays the recipient in advance is exposed to the credit risk of failing to collect funds from a payee's bank.

systems, designating a payment and settlement system as systemically important, and conducting joint examinations of banks and securities companies with the Financial Supervisory Service.

and address the areas requiring improvement that were identified during the inspections.

The BOK assessed BOK-Wire+ and retail payment systems¹¹⁾ operated by the KFTC against international standards—namely, the PFMI (Principles for Financial Market Infrastructures)¹²⁾ and the Guidance on Cyber Resilience.¹³⁾ Although BOK-Wire+ was assessed to be meeting most of the PFMI, it still needed to improve operational risk management. The retail payment system operated by the KFTC also satisfied most of the PFMI, but it needed to make improvements to both the cyber resilience management system and the risk management by the board of directors.

In addition, considering the rapidly growing potential risk factors¹⁴⁾ present in the institutional RP settlement system, the BOK designated the institutional RP settlement system as a systemically important payment and settlement system in June 2016.¹⁵⁾

Finally, the BOK conducted joint examinations of two domestic banks and three financial investment companies with the Financial Supervisory Service. It examined whether the banks and financial investment companies had complied with the settlement guideline for BOK-Wire+ participants and relevant funds transfer related regulations and inspected their management of settlement risk, the operational status of their liquidity management and business continuity plans, and their systems for reporting any IT failures to the BOK. It also advised them to close the loopholes

11) Three systems—the Check Clearing System, the Interbank Fund Transfers System, and the Electronic Banking System—are designated as systemically important payment and settlement systems among the retail payment systems operated by the KFTC.

12) The BIS Committee on Payments and Market Infrastructure (CPMI) and the International Organization of Securities Commissions (IOSCO) established and announced the new international standards in the payment and settlement area in April 2012. Three major international standards were integrated for payments and settlements, as there was a need to modify the international standards regarding the expansion of the infrastructure of Over The Counter derivatives and the operation of financial market infrastructure after the global financial crisis.

13) In light of the increase of cyber threats, the CPMI and IOSCO prepared “Guidance on Cyber Resilience for Financial Market Infrastructures” in June 2016 and recommended the establishment of a professional cyber resilience management system that identified the characteristics of cyber risks. Unlike existing IT operation risks, cyber risks are likely to cause extensive damage, such as through malware code spreading rapidly to infect backup data and cause widespread virus infections.

14) Payments for RP transactions between institutions are usually handled through BOK-Wire+ in the late afternoon. With the possibility of payment congestion through BOK-Wire+ after 4 o'clock in the afternoon, since the amount of RP transactions between institutions expanded due to the regulation of call loans for securities companies, the possibility of BOK-Wire+ settlement risk had to be considered.

15) Following Article 81 of the BOK Act, the BOK monitored payment and settlement systems and classified payment and settlement systems to be monitored as important payment and settlement systems depending on the settlement amounts and ripple effects. Regular evaluations are conducted every second year for important payment and settlement systems.