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Current Economic and Financial Movements

Summary

During the second quarter of 2003, the growth rate of the Korean economy slowed down further from the previous quarter, with prices showing stable movements and the current account shifting from the previous quarter's deficit back into surplus. Real gross domestic product (GDP) grew by a mere 1.9 percent in the second quarter year-on-year, which was lower than its 3.7 percent rate in the previous quarter, due to remarkably sluggish private consumption and facilities investment. Real gross national income (GNI) also showed a slight rise of 0.2 percent, owing to worsened trade terms and conditions.

The seasonally-adjusted unemployment rate rose by 0.3 of a percentage point from the previous quarter to 3.4 percent in the second quarter. The number of jobless also increased by about 71,000 from the previous quarter. How-

ever, unemployment before adjusting for seasonal factors dropped from 3.6 percent in the previous quarter to 3.3 percent, owing to a rise in the number of persons seasonally employed.

Both exports and imports (customs clearance basis) saw their growth rates slow down in the second quarter, but maintained a favorable trend. The current account registered a surplus of 2.5 billion dollars in the second quarter, owing to a sharp rise in the surplus on the goods account and a reduced deficit on the service account from the previous quarter.

The year-on-year growth rate of consumer prices stood at slightly above the 3 percent level in the second quarter, showing a stable trend, responding to a fall in the prices of agro-fishery products and petroleum goods, as well as the government's action in lowering special excise tax.

The year-on-year growth rate of pro-

ducer prices saw a similar movement, decelerating from the 3 percent level in the previous quarter to the 1 percent level in the second quarter, owing to a sharp drop in prices of agro-fishery products and industrial goods.

In the financial market, meanwhile, the call rate fluctuated around the 4 percent level as the Bank of Korea lowered its call rate target from 4.25 percent to 4 percent on May 13. The yield on Treasury bonds (3-year maturity) dropped from 4.62 percent at the end of March to 4.16 percent at the end of June, affected by uncertainties over the economic prospects and expectations of further lowering of the call rate target.

The Korea composite stock price index (KOSPI) rose sharply in the second quarter, moving up from 535.70 at the end of March to 669.93 at the end of June, owing to the declaration of the ending of the war in Iraq and expanded net purchase of stocks by foreign investors.

As the Japanese yen showed an underlying appreciation against the U.S. dollar, and the inflow of foreigners' stock investment funds accelerated, the Korean won also showed a strengthening trend against the enfeebled U.S. dollar.

The growth rate of M3 slowed down to 9.6 percent in the second quarter from 12.4 percent in the previous quarter due to the reduced growth of household loans by banks and weak deposit-taking by secondary financial institutions. The

growth rate of M1, for its part, plunged to 5.5 percent in the second quarter from 10.3 percent in the previous quarter, owing to reduced demand for trading currencies in the wake of an economic slowdown and very large-scale repurchases of MMFs at the end of the previous quarter.

Economic Movements

Economic Growth

During the second quarter of 2003, real gross domestic product (GDP) expanded by a mere 1.9 percent year-on-year, down from 3.7 percent in the previous quarter, as private consumption and facilities investment declined despite the relatively favorable pace of construction investment and exports. Meanwhile, the growth rate of real gross national income (GNI), which represents the real purchasing power of income, registered 0.2 percent in the second quarter, an improvement from the negative growth of 1.8 percent in the previous quarter. But it is lower than the real GDP growth rate, which was attributable to an expansion in real trade losses, following the deterioration of the terms of trade from a year earlier.

Final consumption expenditures declined by 1.4 percent year-on-year,

owing to a sharp drop in private consumption that was only partially offset by steady rise in government consumption. Private consumption dropped by 2.2 percent year-on-year, as expenditures for non-durable goods shifted to a decline, those for services were sluggish, and the downward course of expenditures for both durable and non-durable goods accelerated. Meanwhile, government consumption rose by 3.6 percent, a similar rate to 4.0 percent in the previous quarter.

The growth rate of fixed investment slowed from 4.8 percent in the first quarter to 3.5 percent in the second quarter due to the sharp contraction of facilities investment that served to offset a steady rise in construction investment. The growth rate of facilities investment shifted from its positive 1.6 percent in the first quarter to a negative 0.8 percent in the

second quarter, as investment in transportation equipment showed a falling trend and that in machinery shifted to a decline. On the other hand, following on from its 8.1 percent rise in the previous quarter, construction investment showed a high growth rate of 7.2 percent in the second quarter, thanks to expanded investment in infrastructure projects including electricity generation, transmission facilities, harbors and roads, and active investment in non-residential buildings for commercial use.

The year-on-year increase rate of exports of goods and services slowed from 17.2 percent in the first quarter to 10.3 percent in the fourth quarter, but showed steadily rising trend. Exports of goods, led by automobiles, semiconductors and communication equipment, showed a favorable performance, but those of services suffered a setback, owing

[Table 1] Growth Rates by Component of Expenditure^{b)}

	Unit : percent							
	2001		2002 ^{a)}				2003 ^{a)}	
	Year	Year	I	II	III	IV	I	II
G D P	3.1	6.3	6.2	6.6	5.8	6.8	3.7	1.9
G N I	1.4	4.9	7.7	5.6	2.7	4.1	-1.8	0.2
Final consumption expenditure	4.2	6.2	8.4	7.4	5.5	3.8	1.2	-1.4
Private consumption	4.7	6.8	8.9	7.9	6.2	4.3	0.7	-2.2
Government consumption	1.3	2.9	5.3	4.4	1.5	1.0	4.0	3.6
Gross fixed capital formation	-1.8	4.8	6.6	5.4	0.5	6.8	4.8	3.5
Equipment	-9.6	6.8	3.8	7.5	7.8	8.2	1.6	-0.8
Construction	5.3	3.3	9.7	3.8	-4.6	6.0	8.1	7.2
Exports of goods and services	0.7	14.9	2.4	12.8	20.3	24.2	17.2	10.3
Imports of goods and services	-3.0	16.4	6.5	18.8	20.5	20.0	17.9	7.5

Notes : 1) Rates of change compared with the same period of the previous year.

2) p : preliminary

to reduced passenger revenues in the wake of the spread of severe acute respiratory syndrome (SARS).

On the other hand, the growth rate of imports of goods and services shrank sharply from 17.9 percent in the first quarter to 7.5 percent in the second quarter. Imports of goods saw their upward trend blunted due to reduced imports of crude oil and a slowdown in the rate of increase of industrial products. The growth rate of imports of services also slowed, affected by a drop in Koreans' expenditures for overseas travel.

Viewing growth by type of economic activity, the construction industry continued its growth pace, but the growth rates of the manufacturing and service industries slowed down.

Despite the favorable tone in the livestock industry, the agricultural, forestry and fishery posted negative year-on-year growth of 1.4 percent, owing to poor performance in the cultivation, forestry and fishery sectors.

Despite the sluggishness of civil engineering works, the construction industry enjoyed a high growth rate of 8.0 percent, following the previous quarter's 8.8 percent, owing to brisk construction activities for both residential and non-residential buildings.

In the meantime, the manufacturing industry posted a growth rate of 2.2 percent, which was lower than the 5.2 percent of the previous quarter. By sector,

the decreasing pace of the textile, clothing, footwear, leather & fur, printing & publication sectors became more pronounced, whereas the increased pace of the industrial machines, electric & electronics, transportation equipment, and non-metal mining sectors slowed down, giving rise to a sluggish overall business performance.

The service sector posted a slight year-on-year rise of 0.7 percent, down from the previous quarter's 2.0 percent. The wholesale & retail trade, restaurant and hotel sector showed negative growth of 4.5 percent, affected by sluggish transactions of industrial goods in the wake of reduced consumption and poor performance in the restaurant and hotel sector. The community, social and personal service sector also saw its growth rate decline by 0.4 percent from a year earlier.

Despite the steady growth in the communication sector due to the rising use of mobile phones, the transport, storage, and communication industry grew by a mere 1.8 percent, as the transport sector suffered a setback, owing to the slower growth in shipment volumes and weak air transportation revenues following the spread of SARS.

The finance, insurance, real estate and business service sector posted 4.1 percent growth, higher than the previous quarter's 1.5 percent, encouraged by the favorable business performance of the financial and insurance business.

[Table 2] Growth Rates by Sector of Economic Activity¹⁾

	Unit : percent							
	2001		2002 ^p				2003 ^p	
	Year	Year	I	II	III	IV	I	II
Agriculture, Forestry & Fishing	1.9	-4.1	0.7	-3.7	-2.2	-6.3	4.8	-1.4
Manufacturing	2.1	6.3	4.2	6.6	5.5	8.8	5.2	2.2
Electricity, Gas & Water	5.1	13.2	13.7	13.1	11.7	14.0	7.7	5.9
Construction	5.6	3.2	8.6	3.1	-3.8	6.3	8.8	8.0
Services	3.9	8.8	8.1	9.2	9.5	8.6	2.0	0.7
(Wholesale and retail trade, restaurants and hotels)	4.0	5.6	4.1	4.9	6.3	6.8	-1.4	-4.5
(Transport, storage and communication)	10.5	7.4	9.4	8.2	6.7	5.5	2.8	1.8
(Finance, insurance, real estate and business services)	3.0	10.6	11.2	11.3	11.8	8.3	1.5	4.1
(Community, social and personal services)	4.5	11.4	12.2	13.8	11.6	8.0	3.9	-0.4
Government & Private Non-Profit Services	0.9	1.1	0.7	0.6	1.4	1.5	1.3	1.9

Notes : 1) Rates of change compared with the same period of the previous year.

2) p : preliminary

Employment and Wages

The seasonally-adjusted unemployment rate rose by 0.3 of a percentage point from 3.1 percent in the first quarter to 3.4 percent in the second quarter, and the number of jobless reached about 776,000, an increase of 71,000 from the previous quarter. However, the unemployment rate before seasonal adjustment dropped from 3.6 percent in the previous quarter to 3.3 percent. This was mainly attributable to such seasonal factors as inactive job-seeking activities by university students and a rise in seasonal employment in the construction and agro-fishery sectors. In the meantime, the jobless rate (seasonally-adjusted basis) rose from the second quarter to 3.6 per-

cent in July, continuing its rising trend.

Nominal wages rose by 8.3 percent year-on-year during the second quarter, marking a reduced growth rate. This was attributable to the lower rate of increase of regular wages and the sharp slowdown in the growth of special wages which had led the upsurge of wages in the previous quarter. By industry, there was a slowdown in the rates of wage increases in most industries, including manufacturing, construction, and the business, personal, community service sectors.

[Table 3] Employment Trends

Unit : thousand persons, percent

	Year	2002				2003		
		I	II	III	IV	I	II	Jul.
<Seasonally Adjusted>								
Labor Force	-	22,890	22,845	22,842	22,924	22,994	22,796	22,925
(Participation Rate)	-	62.2	61.9	61.7	61.8	61.8	61.1	61.4
Unemployment Level	-	725	708	697	699	705	776	819
(Unemployment Rate)	-	3.2	3.1	3.1	3.0	3.1	3.4	3.6
Employment Level	-	22,165	22,138	22,145	22,226	22,290	22,020	22,105
<Not Seasonally Adjusted>								
Labor Force	22,877	22,339	23,112	23,067	22,989	22,439	23,055	23,238
(Participation Rate)	61.9	60.7	62.6	62.3	62.0	60.3	61.8	62.2
Unemployment Level	708	829	689	652	663	806	751	781
(Unemployment Rate)	3.1	3.7	3.0	2.8	2.9	3.6	3.3	3.4
Employment Level	22,169	21,511	22,423	22,416	22,326	21,633	22,303	22,456

[Table 4] Rates of Increase^b of Nominal Wages

Unit : percent

	2001		2002				2003	
	Year	Year	I	II	III	IV	I	II
Nominal wages per worker	5.1	11.2	8.4	11.0	11.2	13.8	12.9	8.3
(Regular Payment)	6.3	12.1	11.9	12.0	11.6	12.7	9.0	8.4
(Overtime Payment)	-1.6	-3.9	-8.2	-2.8	-3.3	-1.4	9.3	6.5
(Special Cash Payment)	3.4	13.4	2.3	12.9	14.7	22.2	28.5	8.4
(Manufacturing)	5.8	11.9	7.3	10.7	11.9	17.3	13.7	7.2
(Construction)	-0.9	10.2	9.9	8.6	9.0	12.9	14.7	9.3
(Wholesale, retail, restaurants, and hotels)	9.7	10.1	11.4	11.2	10.2	7.9	11.2	7.6
(Transport, storage, communications)	1.9	8.4	4.7	8.3	9.2	10.8	15.6	9.6
(Finance, insurance and real estate)	5.1	10.4	8.1	13.3	8.9	11.4	11.5	8.3
(Business, personal, and community services)	1.0	15.2	10.0	11.2	13.8	14.4	10.6	4.9

Note : 1) Compared with the same period of the previous year.

External Transactions

During the second quarter of 2003, exports soared by 14.5 percent over the same period of the previous year to 46.1

billion dollars, showing continued high growth following the previous quarter's 20.7 percent. Broken down by commodity group, exports of semiconductors, computers, and textiles were sluggish, but

those of automobiles, wireless communication equipment, and ships increased sharply. Exports of machinery, iron & steel, and chemical goods maintained a continued growth. By export destination, exports to the United States posted a modest increase rate, whereas those to China rose remarkably, and those to Japan and the EU showed steady expansion.

In July 2003, exports rose by 15.3 percent over the same month of the previous year to chalk up 15.4 billion dollars. By

item, exports of automobiles failed to keep the level registered a year earlier because of strikes at automakers. However, exports of semiconductors, computers, and wireless communication equipment enjoyed a favorable business performance, and those of shipbuilding, iron & steel, and chemical goods posted brisk growth rates. By export destination, exports to the United States declined from the same month of the previous year, but those to China and Southeast Asia saw their growth rate accelerate further.

[Table 5]

Exports by Sector and Destination¹⁾

(Customs-clearance Basis)

Unit : billion US dollars

	Share ²⁾	2002					2003			
		Year	II	Jan.~Jul.	III	IV	I	II	Jul.	Jan.~Jul.
Exports	<100.0>	162.5 (8.0)	40.3 (4.9)	89.3 (-0.6)	41.3 (15.9)	45.3 (24.6)	43.0 (20.7)	46.1 (14.5)	15.4 (15.3)	104.6 (17.1)
IT products	<30.0>	48.8 (20.0)	11.8 (22.8)	26.6 (11.9)	12.3 (34.5)	13.8 (31.7)	12.7 (17.3)	12.9 (9.8)	4.9 (24.3)	30.6 (15.0)
Semiconductors	<10.2>	(16.6)	(9.6)	(-2.9)	(53.6)	(57.7)	(9.7)	(3.4)	(15.1)	(7.8)
Computers	<7.8>	(15.6)	(31.4)	(17.6)	(27.9)	(6.6)	(0.4)	(-0.6)	(19.4)	(2.8)
Wireless communication apparatus	<6.7>	(34.6)	(39.8)	(35.1)	(31.7)	(38.4)	(51.9)	(31.6)	(51.8)	(42.8)
non-IT related products	<70.0>	113.7 (3.5)	28.5 (-1.0)	62.7 (-5.2)	28.9 (9.4)	31.5 (21.8)	30.3 (22.2)	33.1 (16.4)	10.5 (11.5)	74.0 (18.0)
Automobiles	<10.6>	(12.3)	(-2.3)	(4.4)	(7.4)	(33.2)	(24.9)	(48.8)	(-2.7)	(31.2)
Ships	<6.6>	(10.0)	(8.3)	(-11.1)	(45.2)	(37.8)	(17.8)	(27.0)	(37.8)	(24.3)
Machinery	<6.7>	(10.8)	(5.0)	(-0.5)	(24.1)	(29.5)	(24.9)	(16.1)	(14.8)	(19.4)
Iron & steel products	<6.3>	(2.8)	(0.3)	(-6.3)	(9.7)	(22.0)	(34.1)	(20.5)	(28.6)	(27.0)
Chemical products	<7.3>	(9.4)	(6.2)	(1.3)	(12.7)	(29.8)	(29.6)	(19.7)	(22.2)	(24.0)
Textile & Apparel	<9.1>	(-2.3)	(-4.7)	(-7.0)	(-1.2)	(11.8)	(0.4)	(-5.3)	(-3.8)	(-3.0)
US	<20.2>	(5.0)	(4.8)	(0.5)	(4.3)	(18.4)	(3.1)	(3.4)	(-7.7)	(1.7)
Japan	<9.3>	(-8.3)	(-13.5)	(-19.1)	(3.2)	(15.6)	(20.7)	(10.4)	(6.0)	(13.8)
EU	<13.4>	(10.5)	(1.9)	(-2.3)	(15.9)	(39.3)	(24.8)	(15.1)	(11.7)	(18.6)
China	<14.6>	(30.6)	(17.8)	(14.3)	(35.6)	(64.2)	(60.6)	(35.7)	(47.6)	(47.0)
Southeast Asia	<21.7>	(10.8)	(13.1)	(7.5)	(19.6)	(15.3)	(10.5)	(9.1)	(11.7)	(10.0)
Central & South America	<5.5>	(-8.9)	(-7.8)	(-16.2)	(14.5)	(-2.9)	(16.2)	(-9.6)	(-7.7)	(0.9)

Notes : 1) Figures in parentheses refer to rates of increase compared with the same period of the previous year(%).

2) Based on the year 2002.

During the second quarter, imports rose by 12.1 percent year-on-year to stand at 41.7 billion dollars, which was a sharp deceleration from the previous quarter's 30.8 percent.

By item, the growth rate for imports of raw materials slowed, owing to reduced imports of crude oil following the stabilization of international oil prices, and that of imports of capital goods declined, affected by the sluggish imports of machinery and semiconductors. The rate of increase of imports of consumer goods, especially those of automobiles and alcohol, also slowed dramatically.

Imports in July 2003 rose by 14.0 percent over the same month of the previous year to 14.9 billion dollars. By item,

the growth rate of imports of raw materials accelerated due to early introduction of crude oil by companies in preparation for an anticipated hike in taxes on imported oil. However, the growth rate of imports of capital goods slowed, led by those of machinery, and that of consumer products, led by those of electrical home appliances and automobiles, also declined.

The current account posted a surplus of 2.5 billion dollars in the second quarter as the surplus on the goods account (B.O.P. basis) widened remarkably to 5.7 billion dollars from 1.2 billion dollars in the previous quarter, and the deficit on the service account shrank.

Meanwhile, the current account post-

[Table 6] **Imports by Sector and Use¹⁾**
(Customs-clearance Basis) Unit : billion US dollars

	Share ²⁾	2002					2003			
		Year	II	Jan.-Jul.	III	IV	I	II	Jul.	Jan.-Jul.
Imports	<100.0>	152.1 (7.8)	37.2 (7.8)	84.0 (0.4)	38.9 (13.8)	42.3 (23.1)	44.2 (30.8)	41.7 (12.1)	14.9 (14.0)	100.7 (19.9)
Raw materials & Fuels	<48.6>	73.9 (2.7)	18.1 (0.6)	41.3 (-4.9)	18.6 (6.7)	20.2 (20.6)	22.4 (31.5)	20.2 (11.5)	7.4 (20.1)	49.9 (21.0)
Crude oil	<12.6>	(-10.1)	(-14.8)	(-21.1)	(-2.7)	(18.5)	(50.0)	(3.7)	(31.2)	(26.7)
Iron & steel products	<4.1>	(24.6)	(24.6)	(20.0)	(33.2)	(26.6)	(35.5)	(35.8)	(53.0)	(38.3)
Chemical products	<8.1>	(8.8)	(7.4)	(3.2)	(13.0)	(20.8)	(26.8)	(15.3)	(11.4)	(19.3)
Capital goods	<38.1>	58.0 (10.4)	14.2 (13.7)	31.7 (1.6)	15.1 (20.2)	16.4 (26.5)	16.5 (33.6)	16.1 (13.2)	5.6 (8.9)	38.1 (20.5)
Electric & electronics products	<23.7>	(6.4)	(5.9)	(-3.1)	(16.6)	(21.2)	(26.2)	(13.5)	(14.0)	(18.8)
Machinery	<8.2>	(15.8)	(29.2)	(4.8)	(29.2)	(38.7)	(42.5)	(9.1)	(6.7)	(20.7)
Consumer goods	<13.3>	20.3 (21.8)	4.9 (22.3)	11.1 (21.3)	5.2 (24.4)	5.7 (22.2)	5.4 (20.9)	5.5 (11.0)	1.8 (7.0)	12.7 (14.3)
For domestic use	<59.6>	(12.7)	(13.0)	(5.8)	(17.1)	(27.7)	(29.2)	(12.7)	(8.8)	(18.8)
For export use	<40.4>	(1.3)	(1.2)	(-6.7)	(9.5)	(16.7)	(33.3)	(11.1)	(21.8)	(21.6)

Notes : 1) Figures in parentheses refer to rates of increase compared with the same period of the previous year(%).
2) Based on the year 2002.

[Table 7] Balance of Payments: Current Account

Unit : billion US dollars

	2002					2003			
	Year	II	Jan.-Jul.	III	IV	I	II	Jul.	Jan.-Jul.
Current account	6.1	1.6	3.3	0.9	2.0	-1.7	2.5	0.4	1.2
Goods	14.2	4.4	8.2	2.8	3.9	1.2	5.7	1.6	8.5
Services	-7.5	-1.6	-3.8	-2.2	-2.1	-2.6	-1.6	-1.1	-5.3
Income	0.5	-0.9	-0.6	0.6	0.7	0.3	-1.0	0.2	-0.5
Current transfers	-1.1	-0.3	-0.5	-0.3	-0.4	-0.7	-0.6	-0.2	-1.5

ed a surplus in July 2003 following on from the previous month, but with its scale reduced to 0.4 billion dollars. This narrowing was attributable to the sharply reduced surplus on the goods account and the persistence of the deficit on the service account, which was attributable to seasonal factors such as a rise in overseas travel during the vacation period.

Prices

Consumer prices, which had risen steeply in the first quarter, dropped in July for the fourth consecutive month due to a fall in the prices of agricultural and petroleum products and the lowering of special excise tax, showing a stable trend. In August, however, consumer prices shifted to an upward trend owing to a steep rise in prices of agricultural, livestock and marine products. Meanwhile, the year-on-year rate of consumer price inflation remained at a stable level of slightly above 3 percent from May onwards.

Viewing the trend of consumer prices by item, prices of agricultural, livestock and marine products showed a steep downward trend during the second quarter due to a sharp drop in prices of vegetables as a result of expanded shipments, which offset the effects of a hike in prices of livestock products. After July, however, consumer prices shifted to an upward trend again owing to poor shipments of vegetables and fruit, affected by seasonal factors such as the prolonged heavy rains.

Prices of industrial products showed a declining trend in the second quarter because of sluggish demand amid an economic slowdown and a fall in prices of petroleum products, affected by a drop in international oil prices and the exchange rate of the won against the dollar. Owing to the lowering of the special excise tax on passenger cars and air conditioners, the prices of industrial products also showed a falling trend in July.

The rate of increase of service prices decelerated significantly from the previ-

ous quarter as public utility charges marked a stable overall trend, despite hikes in housing rents and expenses for eating out.

Meanwhile, the year-on-year increase rate of core inflation, which strips out non-cereal agricultural products and petroleum fractions from the CPI, has held stable at a level of slightly above 3 percent since early this year. The stable pattern of movements of core inflation is attributable to stable industrial product prices thanks to the won's appreciation against the dollar and sluggish demand, which have together served to counteract the relatively steep rises in livestock product prices and charges for personal services.

Producer prices showed a declining trend in the second quarter due to a steep fall in prices of agricultural, forest and marine products and manufacturing industry products. However, they shifted

to an upward trend after July owing to a rise in prices of agricultural, forest and marine products.

Viewing the trend of producer prices by item, those of agricultural, forest and marine products marked a declining trend in the second quarter, affected by a steep fall in prices of vegetables as a result of a bumper crop. But they shifted to a rising trend again after July due to sluggish shipments of agricultural products following frequent torrential rains.

Prices of manufacturing industry products dropped in the second quarter, affected by sluggish demand amid the economic slowdown, falling international oil prices and the won's appreciation against the U.S. dollar. In August, however, those of manufacturing industry products shifted to an upward trend due to higher prices of raw materials, including crude oil and steel.

Service prices showed a moderate

[Table 8]

Rates of Increase of Consumer Prices¹⁾

Unit : percent

	2001		2002				2003			
	Year	Year	I	II	III	IV	I	II	Jul.	Aug.
Consumer Prices	3.2 (4.1)	3.7 (2.7)	1.6 (2.5)	0.8 (2.7)	0.9 (2.6)	0.3 (3.3)	2.4 (4.1)	-0.6 (3.4)	-0.1 (3.2)	0.5 (3.0)
Agricultural, livestock and marine products	9.5	6.9	5.7	0.5	6.0	-5.1	6.6	-5.9	0.1	3.3
Industrial products	0.0	4.1	1.1	1.6	0.2	1.2	1.7	-1.1	-0.5	0.2
Services	4.0	2.8	1.0	0.6	0.4	0.8	1.9	0.7	0.2	0.1
Core inflation ²⁾	3.6 (3.6)	3.1 (3.0)	1.2 (2.9)	0.6 (3.0)	0.5 (2.9)	0.7 (3.1)	1.6 (3.2)	0.5 (3.2)	-0.1 (3.1)	0.2 (3.2)

Notes : 1) Comparison is with the last month of the preceding period. Figures in parentheses refer to rates of increase over the corresponding period of the previous year.

2) The CPI after stripping out prices of petroleum fractions and agricultural products except cereals.

[Table 9] Rates of Increase of Producer Prices¹⁾

Unit : percent

	2001		2002				2003			
	Year	Year	I	II	III	IV	I	II	Jul.	Aug.
Producer Prices	-2.5	2.3	1.2	0.6	0.0	0.4	2.3	-1.6	0.2	0.4
	(-0.5)	(-0.3)	(-2.1)	(-0.5)	(-0.2)	(1.6)	(3.0)	(1.3)	(1.6)	(1.9)
Agricultural, forest and marine products	6.7	4.9	4.7	-0.6	2.6	-1.8	3.9	-4.9	2.6	3.3
Manufacturing industry products	-5.6	2.2	1.5	0.8	-0.4	0.3	2.9	-2.3	0.0	0.3
Electric power, water, and gas supply	4.0	-1.8	-3.7	-0.3	0.6	1.6	2.4	-0.1	-0.5	-0.3
Services	1.4	2.4	1.1	0.4	0.2	0.7	1.0	0.4	0.1	0.2

Note : 1) Comparison is with the last month of the preceding period. Figures in parentheses refer to rates of increase over the corresponding period of the previous year.

upward trend from the second quarter, as expenses for machinery leasing dropped thanks to the won's appreciation against the dollar.

Export prices, which had risen sharply in the first quarter, continued their decreasing trend since early in the second quarter, led by those of semiconductors and mobile phones, as sluggish demand persisted owing to a delay in the recovery of the U.S. economy and the spread of SARS.

Import prices also shifted to a steep fall in the second quarter, as prices of

international raw materials, notably crude oil, showed a weakened tone and prices of capital and consumer goods dropped due to a fall in the exchange rate of the won against the dollar, as well as lackluster demand. In July, however, import prices showed somewhat rising trend, as prices of raw materials, including crude oil and steel, rose even though there was a continuing fall in those of capital and consumer goods.

Housing prices began to rise from February this year, breaking away from their stable trend maintained since the fourth

[Table 10] Rates of Increase of Export and Import Prices¹⁾

Unit : percent

	2001		2002				2003			
	Year	Year	I	II	III	IV	I	II	Jun.	Jul.
Export prices	-11.6	-1.1	7.6	-8.5	0.5	-0.1	4.6	-5.7	-0.1	-0.5
	(-3.8)	(-7.0)	(-8.7)	(-8.6)	(-7.9)	(-2.2)	(-3.9)	(-4.5)	(-0.9)	(0.5)
Import prices	-8.5	2.9	6.3	-4.9	1.7	0.1	6.3	-6.4	0.3	0.0
	(3.5)	(-6.2)	(-8.5)	(-8.5)	(-8.0)	(0.8)	(3.5)	(-1.6)	(1.3)	(3.2)

Note : 1) Comparison is with the last month of the preceding period.

quarter of last year, and their upward pace accelerated during the second quarter. Affected by the government's announcement of the measures to stabilize housing prices, including the expanded ban on the resale of rights to buy new apartments, on May 23, the increase rate of housing prices slowed down temporarily. However, the increasing pace accelerated again from the middle of July, affected by a steep rise in prices of apartments scheduled for reconstruction in Gangnam, southern Seoul, as well as those in Daejeon.

In contrast with housing prices, housing rents had continued the downward trend since the second quarter, affected by a rise in the number of new apartments and the slackness of demand in a season not favored for moving house, but the declining pace narrowed from July, owing to rising seasonal demands.

Meanwhile, land prices maintained a relatively stable trend during the second quarter, as demands were sluggish owing to opaque economic prospects. Due to

expectations of the move of the administrative capital and development of new towns, however, land prices in some regions, including Daejeon and Gimpo, showed a relatively high rising trend.

Financial Developments

Financial Markets

The overnight call rate fluctuated slightly around 4.25 percent, the target for it set by the Bank of Korea, from the beginning of the second quarter. However, as the Bank of Korea on May 13 made a downward adjustment of the call rate target to 4 percent to avoid an overly deep contraction of economic activities, the call rate eased to the same level. Meanwhile, yields on Treasury bonds (three-year maturity) fell to the year's lowest level (3.95 percent on June 18), affected by uncertainties over economic prospects and expectations of additional

[Table 11] Rates of Increase of Real Estate Prices¹⁾

	Unit : percent									
	2001		2002				2003			
	Year	Year	I	II	III	IV	I	II	Jul.	Aug.
Housing prices	9.9	16.4	7.6	2.1	5.2	0.8	1.2	3.3	0.2	0.3
(Apartments in Seoul)	19.3	30.8	15.0	2.3	11.7	-0.5	-0.8	5.4	0.6	1.2
Housing rents	16.4	10.1	7.3	1.6	2.6	-1.6	1.4	-0.7	-0.5	-0.1
(Apartments in Seoul)	23.4	11.4	11.2	1.8	3.9	-5.3	1.3	-2.4	-0.9	-0.2
Land prices	1.3	9.0	1.8	1.3	3.3	2.3	0.4	0.5	-	-

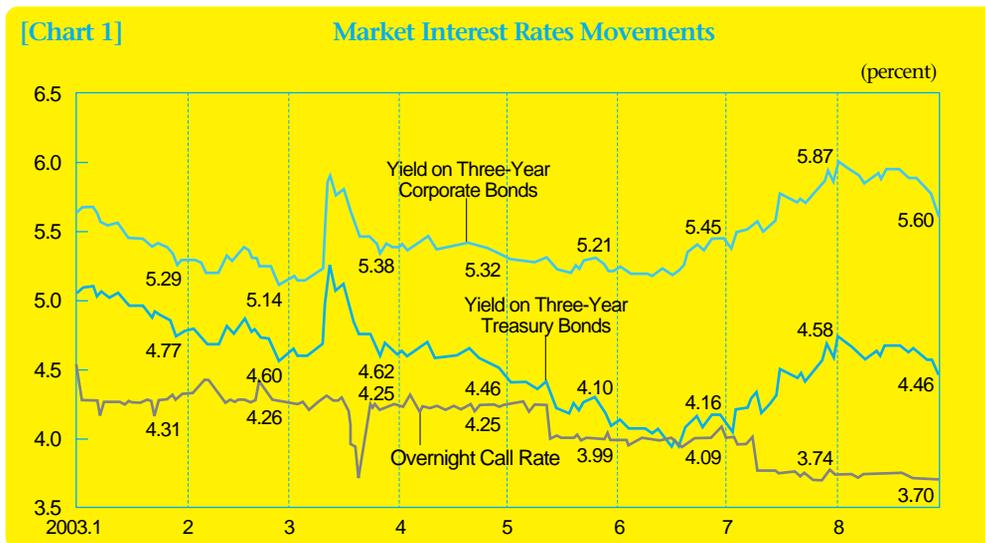
Note : 1) Comparison is with the end of the preceding period.

cuts in the target rate. After late June, however, they shifted to an upward trend, owing to a rise in interest rates on government bonds in major countries, including the United States. Accordingly, yields on Treasury bonds showed an overall decline from 4.62 percent at the end of March to 4.16 percent at the end of June. However, yields on corporate bonds (AA-grade, three-year maturity) showed a downward rigidity due to the continued tendency of avoiding riskier assets. In the latter part of June, however, they rebounded along with yields on Treasury bonds to stand at 5.45 percent at the end of June, marginally higher than their 5.38 percent at the end of the previous quarter.

In the meantime, as the Bank of Korea lowered the call rate target to 3.75 percent again on July 10 to counteract the slowing of the real economy, the

overnight call rate showed a mild range of fluctuations around its target. Yields on Treasury bonds and corporate bonds rose to 4.58 percent and 5.87 percent, respectively, at the end of July, boosted by expectations of a recovery of the domestic economy following growing signs of a recovery in the U.S. economy and the implementation of government pump-priming measures. But yields fell back to 4.46 percent and 5.60 percent, respectively, at the end of August, affected by an atmosphere of caution over their surge within the brief period of time.

With the introduction of second quarter, the Korea Composite Stock Price Index (KOSPI) showed a strong overall upward trend, boosted by the ending of the warfare against Iraq. KOSPI subsequently fluctuated around the 600 level in late April and early May, held back by

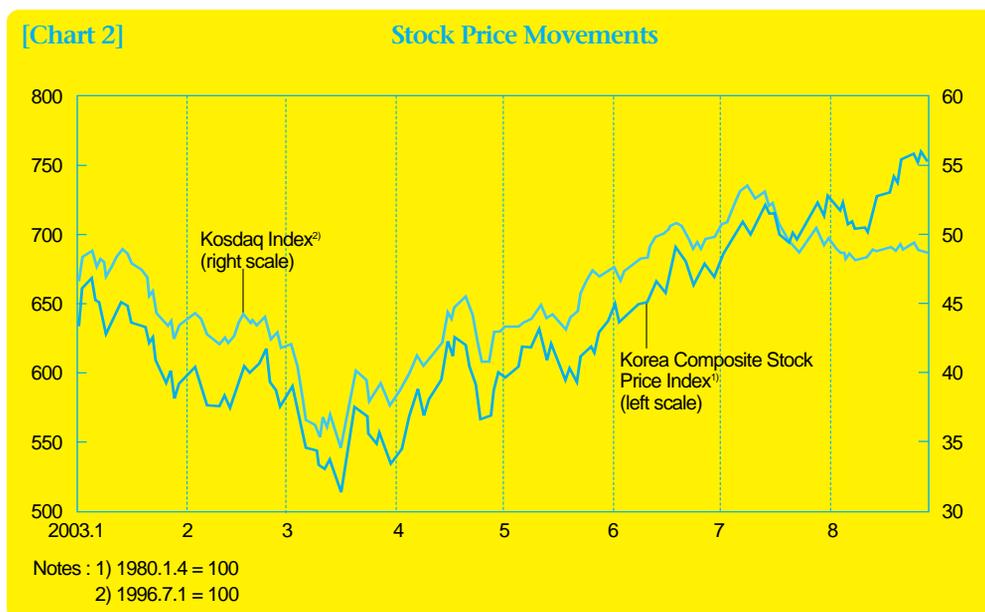


growing fears of an economic slowdown and worries over the North Korean nuclear issue. However, it regained a strong upward trend from the middle of May, due to the soothing of the market's unease provoked by both the SK Global accounting scandal and the troubled status of many credit card companies, as well as foreigners' expanded net stock purchases affected by the bullish U.S. stock market. So the KOSPI rose greatly to 669.93 at the end of June from 535.70 at the end of previous quarter. The KOSDAQ index showed similar movements to those of the KOSPI, rising from 37.77 at the end of March to 49.75 at the end of June.

After July, the KOSPI also continued its upward trend, boosted by foreigners' net buying of stocks, to post its high for the

year of 759.47 at the end of August. For its part, however, the KOSDAQ index dropped slightly from the end of June to stand at the 49.54 at the end of August, as the upward trend of Internet-related issues eased owing to a cautious attitude toward this steep rise within a short time period.

The Korean won fell back for a while against the U.S. dollar after the second quarter due to the expectations of the American economy's recovery and the yen's depreciation following the market intervention by the Japanese foreign exchange authorities. However, as the Japanese yen nevertheless appreciated against the U.S. dollar and the inflow of foreigners' stock investment funds accelerated, the Korean won continued to strengthen against the greenback.



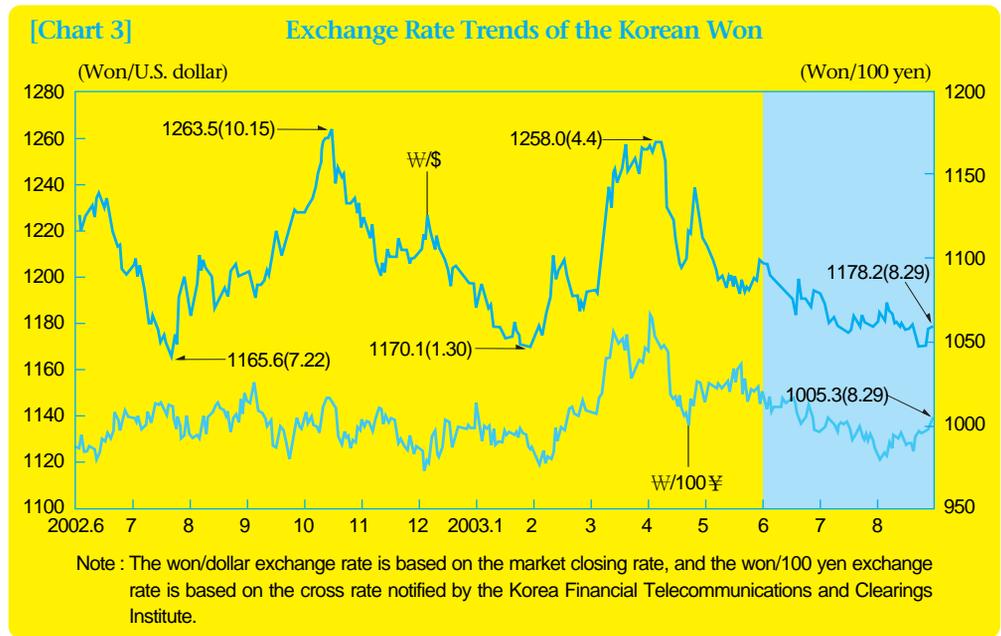
As a result, the won strengthened to trade at 1,169.5 won per dollar in August (Aug. 22), its highest level in 13 months, and it stood at 1,178.2 won against the dollar at the end of August, an appreciation of some 6.5 percent from the end of March.

In the meantime, the Korean won firmed against the Japanese yen to change hands at 979.1 won (per 100 yen Aug. 1), as the appreciation of the won against the dollar far surpassed that of the yen. Thereafter, however, the yen appreciated against the dollar at a speedier pace, leaving the won trading at 1,005.3 won per 100 yen at the end of August, a net appreciation of 3.9 percent from the end of March.

In spite of the settlement of the issue of the massive demand for repurchases of

MMFs, the decrease in the pace of deposit-taking at investment trust companies accelerated as enterprises withdrew corporate deposits temporarily to repay debts before the end of the first half. If we exclude the effects of first-half closing, deposit-taking by investment trust companies may be presumed to have continued its recovering trend since May, centering on MMFs invested in government and public bonds. Deposits at banks also maintained an upward trend due to the growing preference for safer assets, centering on short-term market deposits. However, money-in-trust at banks showed a declining trend, led by Specific Money-In-Trust chiefly designated for investment in CP.

Deposit-taking by investment trust companies during the July-August peri-



[Table 12]

Growth of Deposits at Financial Institutions

(Change during the period)

Unit : billion won

	2002			2003					
	II	III	IV	I	II	May	Jun.	Jul.	Aug.
Deposit money banks ¹⁾	11,618	10,389	13,853	8,414	14,624	8,742	2,169	654	6,340
Money-in-trust	-683	-1,882	-171	-2,246	-7,049	-2,561	-1,636	-1,657	-968
Investment trust companies	-3,454	4,966	-216	-8,062	-9,053	1,681	-2,470	7,217	102
Merchant banking corporations ²⁾	-1,095	174	-1,026	2,672	-1,030	-796	-788	-115	-100

Notes : 1) Bank deposits + CDs + RPs + Cover bills

2) Bills Issued + CMA

od continued its recovering trend, led by MMFs, owing to the re-introduction of funds withdrawn at the end of the previous quarter and banks' lowering of their MMDA interest rates. Deposit-taking by banks also rose sharply, led by MMDAs.

The growth rate of M3 slowed from 12.4 percent in the first quarter to 9.6 percent in the second quarter, owing to the slowing of the growth of household loans at banks and lackluster deposit-taking at secondary financial institutions including investment trust companies. The growth rate of M1 also fell from 10.3 percent in the previous quarter to 5.5 percent in the second quarter, reflecting

both a drop in money demand for the transaction purpose due to the economic slowdown and the massive repurchases of MMFs from the end of the previous quarter.

In July, the growth rate of M3 fell further because of a reduced supply of private credit including household loans. However, the M1 growth rate edged up, affected by growing attraction of MMDAs.

Bank Loans and Corporate Finance

The growth of bank lending to enterprises slowed down slightly during the

[Table 13]

Monetary Aggregate Trends¹⁾

(On the basis of average figures)

Unit : percent

	2002			2003					
	II	III	IV	I	II	May	Jun.	Jul.	Aug.
M3	13.7	12.6	13.2	12.4	9.6	9.4	9.1	8.7	-
M1	27.9	20.3	16.1	10.3	5.5	5.2	5.9	6.2	-
M2	12.4	10.9	13.0	13.1	9.1	9.1	7.9	7.0	-
Reserve money	17.0	15.1	10.7	7.7	7.2	5.5	8.6	5.6	6.9

Note : 1) Rates of change compared with the same period of the previous year.

second quarter as enterprises repaid their borrowings in a bid to lower their debt ratios before the first-half closing of accounts and demand for loans was sluggish owing to the slowing economy. But bank lending to small and medium-sized companies continued its upward trend, due to the rising demand for working capital and banks' efforts to expand the corporate lending. The growth rate of bank lending to households accelerated from the previous quarter, owing to a rise in loans for mortgage on apartments and for expenses involved in moving from apartments about to be rebuilt.

Meanwhile, the issuance of CP was lackluster, affected by the investors' tendency to avoid riskier assets. The volume

of the net redemption of CP was large owing to investment trust companies' reluctance to buy CP given the persistence of high corporate credit risk.

In July, corporate lending extended by banks rose sharply, owing to banks' re-lending of loans that companies had paid back before the closing of accounts at the end of the first half of the year and smaller companies' seasonal demand for working capital and the funds for the payment of value added tax. Meanwhile, the net issuance of CP maintained its declining trend due to enterprises' subdued demand for investment funds. The net redemption trend of CP was maintained following card companies' repayment of outstanding CP at maturity.

[Table 14]

Bank Loan and Corporate Funding

(Changes during the period)

Unit : billion won

	2002			2003					
	II	III	IV	I	II	May	Jun.	Jul.	Aug.
Bank Lending ¹⁾ to Enterprises	11,649	8,237	4,870	16,447	10,970	3,841	-122	5,079	1,654
(Large enterprises)	-1,815	-278	-1,242	1,756	-971	-1,080	-2,330	1,063	-220
(Small and medium enterprises)	13,465	8,514	6,113	14,691	11,941	4,921	2,208	4,016	1,874
Bank Lending to Household	17,634	16,012	10,514	4,815	9,077	3,268	2,687	2,301	3,222
Net bond issuance ²⁾	-3,612	-803	-447	-1,038	-1,056	-394	-189	-1,264	-997
Net CP issuance ³⁾	3,435	2,499	251	2,254	-13,256	-4,480	-4,312	-938	-1,000

Notes : 1) Excludes changes to bank accounts in connection with the disposal of bad loans and debt-for-equity swaps, but includes trust accounts and CLO.

2) Excludes under court management, court receivership and workout programs, by financial companies, and by state-run corporations, but includes Primary CBO that was accepted by Korea Development Bank in its prompt underwriting arrangements and that was redeemed prior to maturity.

3) Based on the amount of CP discounted by securities firms, banks' trust accounts, and merchant banking corporations.

Monetary Policy

Adopted by the Monetary Policy Committee

July ~ September 2003

Monetary Policy in July 2003*

Despite the steady growth of exports, the economic slowdown has become more evident because of the contraction of domestic demand. The pace of the economic recovery is also not expected to pick up to any great degree in the latter half of this year, considering both domestic and global economic conditions.

In June, consumer price inflation continued to ease for the third straight month, due to the decline in the prices of agricultural products and petroleum-based products. It is estimated that the current account surplus widened in June in response to the enlarged surplus on the goods account. The overheated housing market cooled in June following a series of the government's resolute measures to stabilize it.

Financial markets as a whole have shown stability. However, fund-raising conditions for low-rated corporations

* Unofficial English translation based on the Korean original that was decided upon by the Monetary Policy Committee on July 10, 2003

remain difficult and there are potentially destabilizing factors present such as liquidity problems of credit card companies and the troubles of SK Global.

Taking the above factors into consideration, the Monetary Policy Committee of the Bank of Korea decided today to lower its target for the overnight call rate from 4.0 percent to 3.75 percent for the intermeeting period. In a related action, the committee also lowered the interest rate on Liquidity Adjustment Loans of the Bank of Korea by 25 basis points to 3.50 percent.

Meanwhile, for sustainable growth and stability of the economy, a more positive role should be played by fiscal policy, and furthermore, a cautious eye should continue to be kept on the stability of real estate market.

Monetary Policy in August 2003*

Despite the continuing sluggishness of domestic demand, the economy appears to be partly improving, mainly due to the steady growth of exports and the increase in industrial production.

In July, consumer price inflation continued to ease for the fourth consecutive month, partly because of the decline in the prices of manufacturing industry

* Unofficial English translation based on the Korean original that was decided upon by the Monetary Policy Committee on August 7, 2003

Monetary Policy in September 2003*

* Unofficial English translation based on the Korean original that was decided upon by the Monetary Policy Committee on September 9, 2003

products directly affected by the reduction of excise taxes. The upward pace of housing prices has also eased. It is estimated that the current account moved back into a balance from last month's large surplus primarily because of the substantial reduction in surplus on the goods account.

Long-term interest rates have risen, causing the term structure to return to a normal, and liquidity conditions are also relatively favorable. Overall, financial markets have shown stability.

Taking these domestic and global economic conditions into consideration, the Monetary Policy Committee of the Bank of Korea decided today to maintain the benchmark overnight call rate at its current level (3.75 percent) for the intermeeting period.

Domestic demand remained sluggish and the increasing rate of industrial production fell sharply. Meanwhile, exports have continued to grow steadily and global economic conditions, especially those in the U.S., have improved gradually.

In August, consumer price inflation shifted to a rise following four months of

decline, as prices of agricultural products rose due to frequent torrential rains. Housing prices also showed a relatively rapid rise, mainly driven by seasonal demand.

The current account surplus is estimated to have widened in August mainly thanks to the enlarged surplus on the goods account.

In the financial markets, the aversion to credit risks appears to have been declining in part, although fund-raising conditions for low-rated corporations have not improved markedly. The liquidity problems of credit card companies have also shown gradual amelioration. As a whole, financial markets have shown stability.

Taking the above financial and economic conditions into consideration, the Monetary Policy Committee of the Bank of Korea decided today to maintain the benchmark overnight call rate at its current level (3.75 percent) for the intermeeting period.

Short and Long-run Exchange Rate Determinants of the Korean Won

Jin-yong Kim*
Sung-taek Kwon**

The Korean won had depreciated gradually against the U.S. dollar since the market average exchange rate system was adopted on March 1990. After the currency crisis in 1997, however, it fluctuated greatly against the dollar rather than appreciated gradually under the free floating exchange rate system and the sustained over-supply of foreign exchange that characterized the domestic foreign exchange market at that time owing to the current account surplus and large inflows of foreign investment funds. And the short-term exchange rate volatility of the Korea won increased sharply in comparison to the pre-crisis period. Considering the difference in the exchange rate movements of the Korean won before and after the currency crisis, this paper examines factors determining short and long-run exchange rate movements of the Korean won during the post-1990 period. The main findings are as follows:

First, domestic and foreign money supply, relative income, interest rate differentials, the capital account balance and the terms of trade are found to be factors affecting the long-run exchange rate movements of the Korean won.

Second, the yen/dollar exchange rate and foreigners' net stock purchase, along with domestic money supply and relative income, which are major long-run exchange rate determinants, affect the short-run exchange rate movements of the

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The opinions expressed in this paper are those of the authors only and do not necessarily reflect those of the Bank of Korea.

Korean won to a great extent and their impact on the exchange rate has increased greatly particularly during the post-crisis period.

Third, the empirical results show that the order flow in the Korean interbank foreign exchange market, which contains private information of market participants, has a considerable impact on the daily exchange rate movements of the Korean won.

Fourth, following the currency crisis, the exchange rate of the Korean won tends to return to its equilibrium level more quickly than during the pre-crisis period when the actual exchange rate deviates from the long-run equilibrium level. This is ascribable to its increased sensitivity to economic fundamental variables such as money supply, relative income and the capital account balance since the currency crisis.

Consequently, in order to sustain the stability of the exchange rate market, the policy authorities should consider the following points.

First, it may well that the actual exchange rate shows misalignment with the long-run equilibrium level because there is a difference between the short and long-run determinants of the exchange rate. In addition, since the 1997 crisis, when the exchange rate deviates from the equilibrium level, it has adjusted itself more promptly to restore the equilibrium level. Noting this, it is desirable that misalignments between the actual exchange rate and the long-run equilibrium should be adjusted by market forces. In case, however, the exchange rate deviates excessively from the equilibrium for a considerable period, it will be necessary to lessen its severe deviations through relevant interest rate policy and foreign exchange supply-demand management measures.

Second, macroeconomic stability is essential to keeping the stability of the exchange rate in that sharp and abrupt exchange rate variations following the currency crisis are also attributable to the large and unexpected changes in macroeconomic variables such as money supply and domestic income.

Third, based on the finding that the exchange rate of the Korean won is also greatly affected in the short run by external factors, including the yen/dollar exchange rate and the foreigners' net stock purchases, not only does the Korean foreign exchange market need to be expanded, in terms of size, to absorb external shocks effectively, but also it should be developed the level of advanced countries on an on-going basis.

Lastly, the order flow in the Korean interbank foreign exchange market is analyzed as being a key determinant of the daily exchange rate movements of the Korean won. In this situation, when the foreign exchange authorities wish to adjust the supply and demand of foreign exchange in order to smooth abrupt and overshooting exchange rate variations, the indirect impact on the exchange rate from the accompanying changes in order flow should be taken into consideration as well as the direct impact.

- I . Introduction
- II . Trends and Characteristics of the Exchange Rate Movements of the Korean Won
- III . Short and Long-run Exchange Rate Determinants of the Korean Won
 - 1. Theory of Exchange Rates and Previous Empirical Studies
 - 2. Empirical Analysis
- IV . Conclusion

I. Introduction

The Korean won had depreciated gradually against the US dollar since the market average exchange rate system was adopted on March 1990. After the currency crisis in 1997, following the introduction of the free floating exchange rate system at the end of 1997 and the further expansion of foreign exchange and capital liberalization in April 1999, however, the Korean won fluctuated widely against the US dollar rather than appreciated gradually, despite the sustained over-supply of foreign exchange in the domestic foreign exchange market owing to the current account surplus and large inflows

of foreign investment funds. In addition, the daily exchange rate volatility of the Korean won increased sharply, compared to the pre-crisis level.

Considering the difference in the exchange rate movements of the Korean won before and after the currency crisis, it is necessary to investigate empirically by what factors the exchange rate of the Korean won is determined. Since factors affecting long-run movements of the exchange rate can differ from those affecting short-run dynamic movements, it seems highly desirable to divide the factors underlying the exchange rate movements of Korean won into the short and long-run factors.

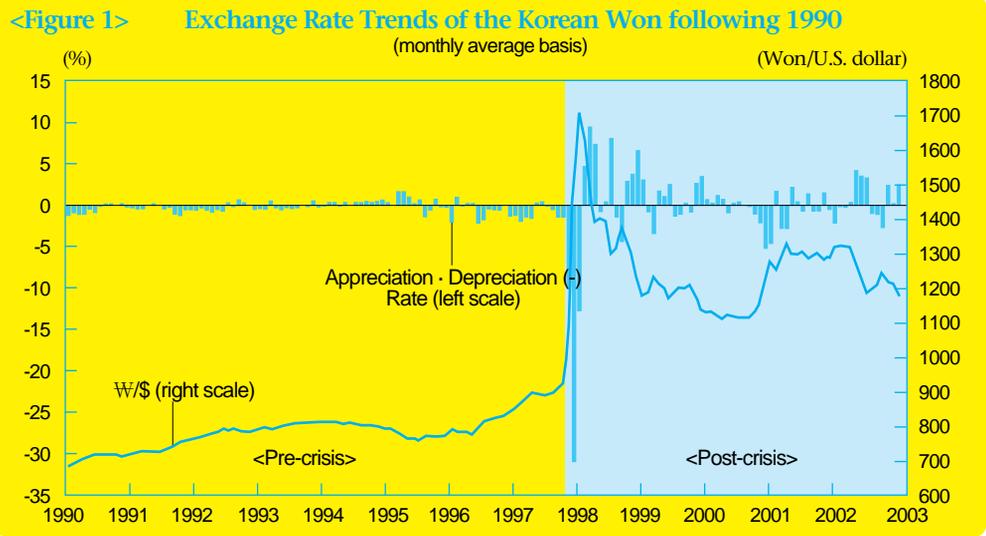
From this perspective, this paper examines individually the short and long-run factors determining the exchange rate movements of the Korean won during the post-1990 period. Section II briefly describes the trends and features of the exchange rate movements of the Korean won since 1990. Section III introduces exchange rate theories and previous empirical studies, and empirically examines the exchange rate determinants of the Korean won since the beginning of the 1990s. For the analysis of the long-run exchange rate determinants of the Korean won we employ a cointegration method on the basis of the monetary approach, which is that of a major school of thought concerning exchange rate theory; and for the analysis of short-run determinants, we employ an error correction model and a micro exchange rate model. Section IV summarizes the main results of this paper and presents a few implications for exchange rate policy.

II . Trends and Characteristics of the Exchange Rate Movements of the Korean Won

The Korean won depreciated gradually against the U.S. dollar from 1990 up until the first half of 1995 (Jan.1990: 683 won per dollar → Jun.1995: 761 won per dollar) before the Korean won fell at a somewhat rapid pace from the second half of 1995 (Jun.1995: 761 won per dollar → Oct.1997: 926 won per dollar).

With the introduction of the free floating exchange rate system¹⁾ following the currency crisis, however, the Korean won showed a different pattern of exchange rate movements: it fluctuated widely against the U.S. dollar. The exchange rate of the Korean won began to rise rapidly in November 1997 and posted 1,702 won per dollar on a monthly average basis in January 1998, its highest level recorded since currency reform before the Korean won regained some of its strength from February 1998 to April 2000 (Jan. 1998: 1,702 won per dollar → Apr. 2000: 1,110 won per dollar). Thereafter it has continued to fluctuate, with the U.S. dollar-Korean Won exchange rate showing a steep upward trend from May 2000 to

1) Korea adopted the market average exchange rate system on March 2, 1990 and allowed the exchange rate to fluctuate within a daily variation range ($\pm 0.2\%$ at the initial stage → $\pm 0.6\%$ (Sep. 1991) → $\pm 0.8\%$ (Sep. 1992) → $\pm 1.0\%$ (Oct. 1993) → $\pm 1.5\%$ (Nov. 1994) → $\pm 2.3\%$ (Dec. 1995) → $\pm 10.0\%$ (Nov. 1997)). Meanwhile, the daily variation limits were abolished on December 16, 1997; and Korea's exchange rate system shifted to a de-facto free floating exchange rate system, in which the exchange rate is determined by the interplay of foreign exchange supply and demand.

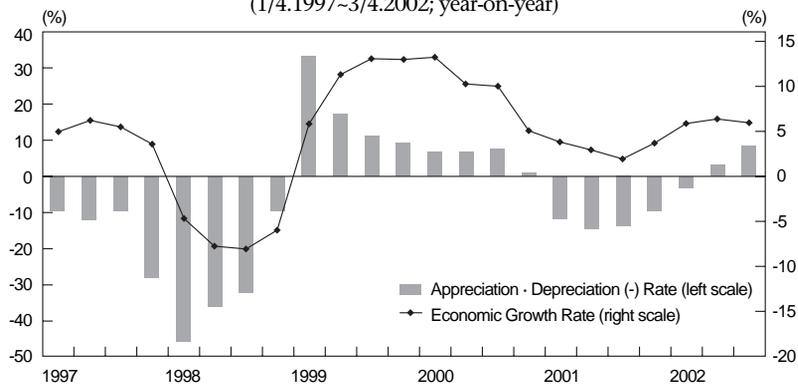


March 2002 and declining sharply from April 2002 until recently (Apr. 2002: 1,318 won per dollar → Jul. 2002: 1,185 won per dollar).

One of the main features of the exchange rate movements of the Korean won following the currency crisis is that the range of variation during major appreciation and depreciation periods widened greatly in comparison to the pre-crisis period. The Korean won's annu-

al average depreciation and appreciation rates during the major periods, excluding the currency crisis period, rose from 4~7.5% preceding the crisis to 16~35% following the crisis. This is attributable to the frequent in-and-out-flows and increased scale of foreign capital under the free floating exchange rate system implemented. Large swings in economic fundamentals, including economic growth rate, also underlay the trends.²⁾

2) **Economic Growth Rate and the Korean won**
(1/4.1997~3/4.2002; year-on-year)



<Table 1> Appreciation · Depreciation(-) Rates of the Won and Yen
(monthly average exchange rate basis)

	Pre-crisis period			Crisis period ²⁾		Post-crisis period		
	1990.1 ~94.1	1994.2 ~95.7	1995.8 ~97.10	1997.11 ~98.1	1998.2 ~98.3	1998.4 ~00.4	2000.5 ~01.4	2002.4 ~7
Won/dollar	-16.7 (-4.1)	7.1 (4.7)	-17.0 (-7.5)	-45.6 (-182.3)	14.3 (85.7)	34.1 (16.4)	-16.2 (-16.2)	11.6 (34.9)
Yen/dollar	28.8 (7.1)	27.8 (18.6)	-27.9 (-12.4)	-6.4 (-25.8)	0.6 (3.6)	22.0 (10.6)	-14.8 (-14.8)	11.2 (33.5)

Notes : 1) Figures in parentheses are annual basis.

2) During crisis period is defined as the period when the exchange rate variation of the Korean won increased sharply above the average level during 1997~1998.

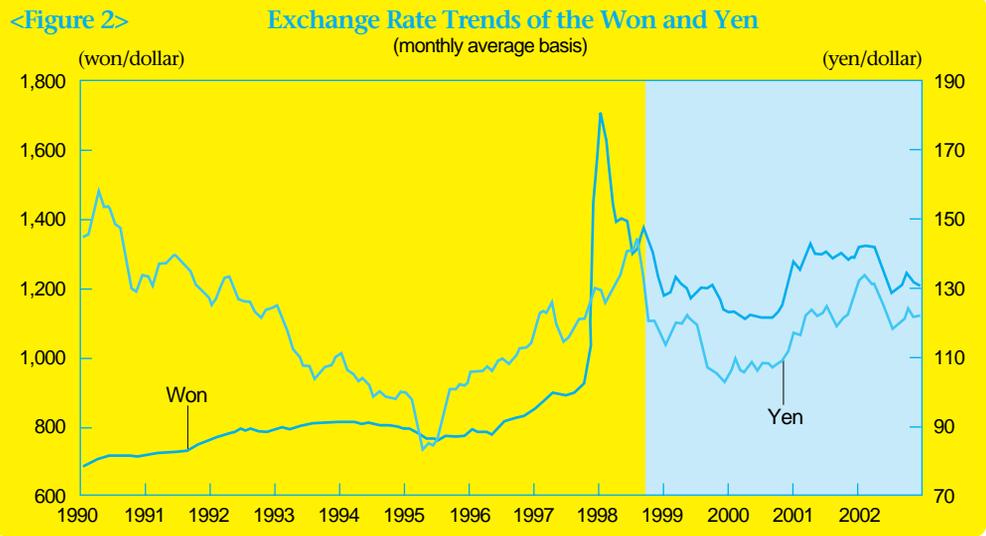
Second, the synchronized movements of the Korean won with those of the Japanese yen against the U.S dollar (hereafter, won-yen synchronization) has deepened following the crisis. Before the crisis, won-yen synchronization appeared only during periods of the yen's depreciation – the Korean won's exchange value fell by 17.0% against the U.S. dollar during Aug. 1995~Oct. 1997 when the yen depreciated by 27.9%. Following the currency crisis, however, the won-yen synchronization has been evident not only during periods of the yen's depreciation (May. 2000~Apr. 2001: the yen depreciated against the US dollar by 14.8% and the Korean won fell against the greenback by 16.2%) but also during periods of its appreciation (Apr. 1998~Apr. 2000: the yen appreciated against the greenback by 22.0% and the won by

34.1%). Recently, the rate of appreciation of the Korean won against the dollar became to resemble that of the yen (Apr. 2002~Jul. 2002: the yen appreciated by 11.2% and the won by 11.6%).

The basic motivation underlying the won-yen synchronization is the expectation that the Korean won will show the similar movements to those of the yen in the foreign exchange market, as the degree of export competition between Korea and Japan increases.³⁾

It is also affected by the increased influence of foreign factors and market sentiment on the exchange rate of the Korean won in the wake of the implementation of the free floating exchange rate system and the easing of regulations on capital and foreign exchange. For instance, if the yen appreciates against the US dollar, Korean exports become

3) The degree of export competitiveness is an indicator to measure the extent of overlap between the exports of two countries in the global market. As this indicator nears 100, it indicates that the degree of export competitiveness is higher. The degree of export competitiveness between Korea and Japan stood at 65.9 in 2002, up from 1998's 58.9 (Kwon, 2002).



more competitive and they rise; thus, the market participants' expectations of an expansion of foreign currency supply results in the Korean won's appreciation.

Third, the short-term exchange rate volatility of the Korean won, which had remained low until the mid-1990s, increased sharply following November 1997. Comparing the volatility in the

post-crisis period, excluding the immediate aftermath period (Nov. 1997~Mar. 1998), with that of the pre-crisis period, interday volatility expanded from 0.11% to 0.38%, and intraday volatility from 0.17% to 0.63%. The conditional standard deviation of the daily exchange rate variation of the Korean won also increased from 0.16% to 0.52%. This

<Table 2> Exchange Rate Volatility of the Korean Won
(period average basis)

unit : %

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	1990~1997	1998~2002
Inter-day variation ¹⁾	0.07	0.10	0.08	0.07	0.08	0.17	0.15	0.94 (0.17)	0.99 (0.70)	0.29	0.28	0.37	0.30	0.21 (0.11)	0.45 (0.38)
Intraday variation ²⁾	0.11	0.13	0.11	0.11	0.12	0.24	0.25	1.19 (0.30)	1.64 (1.22)	0.57	0.46	0.52	0.50	0.29 (0.17)	0.75 (0.63)
Conditional standard deviation ³⁾	0.11	0.14	0.12	0.12	0.13	0.25	0.23	0.89 (0.21)	1.70 (1.04)	0.41	0.38	0.49	0.41	0.25 (0.16)	0.69 (0.52)

Notes: 1) (Interday variation range / the closing price of the previous day) × 100
 2) (Intraday variation range / the basic exchange rate) × 100
 3) The conditional standard deviation of daily exchange rate variation of the Korean won is estimated based on the GARCH-M(1,1) model.
 4) Figures in parentheses exclude the period in the immediate aftermath of the crisis (Nov. 1997~Mar. 1998).

expansion of the short-term volatility is attributable to the abolition of the daily variation limits for the won/dollar rate that resulted in the de-facto adoption of a free floating regime at the end of 1997, and to the increased sensitivity of the won/dollar rate to external factors, like the yen/dollar rate and in-and-out-flows of foreign stock investment.

III . Short and Long-run Exchange Rate Determinants of the Korean Won

1. Theory of Exchange Rates and the Previous Empirical Studies

A. Theory of Exchange Rates

In general, exchange rates are known to be determined not only by macroeconomic variables, including money supply, national income and interest rates, but also by various other factors, such as foreign exchange supply-demand conditions and expectations of market participants. The traditional theory of exchange rates, which views exchange rates as being determined mainly by macroeconomic variables, may be divided into the flow approach and the asset market approach. Recently the microstructure approach has emerged, which uses microstructure variables in the foreign

exchange market, such as order flow and other variables containing exchange-rate related private information, in order to explain exchange rate movements.

1) Flow approach

In the flow approach to exchange rate determination, the exchange rate of a currency is determined by foreign exchange supply-demand conditions, which reflect mainly changes in the current account position such as exports and imports. In other words, this approach views balance of payments(BOP) and the exchange market to be so closely related that a BOP deficit is a reflection of excess demand for the foreign currency while a surplus reflects excess supply.

For example, if the exports of a country increase, the supply of foreign currency increases and consequently the exchange rate falls – the domestic currency appreciates; and if imports increase due to increased domestic income, demand for foreign currency increases, and thus the exchange rate rises – the domestic currency depreciates. Notably, the Mundell-Fleming model which posits free capital flows between countries, takes the view that exchange rates are determined not only by the current account balance but also by the overall international balance of payments(current account balance + capital account balance). According to this model, therefore, a rise in the domestic interest rate leads to

capital inflows and increase in foreign currency supply; and the exchange rate falls – the domestic currency appreciates as a result (Mundell 1963, Fleming 1962).

2) Asset market approach

According to the flow approach, if the current account of a country is out of equilibrium under a free floating exchange rate system, the exchange rate is supposed to change and external equilibrium restored. Even after major advanced countries adopted the floating exchange rate system following the demise of the Bretton Woods system in 1973, however, imbalances on the current accounts of these countries persisted for long period. Against this backdrop, the asset market approach was introduced. The asset market approach, which views the exchange rate as being determined by asset market equilibrium, is divided into the monetary approach and the portfolio balance approach.

(A) Monetary approach

The monetary approach states that exchange rates are determined by money market equilibrium in accordance with the relative supply and demand for the money concerned.⁴⁾ This approach is

subdivided into the flexible-price monetary approach and the sticky-price monetary approach.

The flexible-price monetary approach, which was developed by Frenkel (1976), Bilson (1978) and Mussa (1976, 1979), assumes that purchasing power parity (PPP) holds both in the short run and in the long run as well because prices are flexible. And exchange rates are determined by factors affecting the money market equilibrium, such as domestic and foreign money supply, income and interest rates. For instance, an increase in the domestic money supply leads to a rise in domestic prices and the exchange value of the domestic money will fall in PPP terms – the exchange rate will rise. Also, if national income increases, domestic money demand will grow; and with the decline in domestic prices, the exchange value of domestic money will rise – the exchange rate will fall. However, if domestic interest rates rise, domestic money demand will decrease, and prices rise, as a result, the exchange value of domestic money decreases.⁵⁾

Dornbush (1976) argues that PPP holds only in the long run because prices are sticky in the short run and goods markets adjust more slowly to monetary shocks

4) The Monetary approach basically posits purchasing power parity (PPP), stable money demand function and perfect substitution between domestic and foreign bonds. If these bonds are perfect substitutes, exchange rate variation does not affect investors' portfolios because yields on domestic and foreign bonds, taken into account exchange rate variations, are the same.

5) Since purchasing power parity ($s=p/p^*$) holds, if domestic prices (p) drop, exchange rates also fall where foreign prices (p^*) are constant. Conversely, if domestic prices (p) rise, exchange rates decline.

than financial markets. In the foreign exchange market, however, exchange rates adjust promptly, reflecting the expectations of market participants. As a result exchange rates tend to overshoot their long-run equilibrium levels.⁶⁾ This approach is the same as the flexible price monetary approach in that if money supply in a country increase, the exchange rate rises, and if the national income increases, the exchange rate falls. However the former differs from the latter in that the interest rate has a negative(-) relationship with the exchange rate. In other words, a rise in domestic interest rates induces capital inflows and thus leads to domestic currency appreciation.

Meanwhile, Frankel(1979) takes issues with the fact that the flexible price monetary approach is based on the assumption that the PPP holds even in the short run, and that the sticky-price monetary approach does not take inflation expectations into account. He then develops a generalized monetary approach, which considers the stickiness of prices in the short run and the differences in inflation expectations between countries.⁷⁾ Accord-

ing to this approach, if inflation continues in a country, due to inflation expectations of economic agents, money demand reduces and the currency's value goes down.⁸⁾

(B) Portfolio balance approach

Branson(1979), Frankel(1983) et al. view that exchange rates are determined in the process of portfolio adjustment among money and domestic and foreign bonds in an optimal way, following the changes in expected rate of return on bonds, and supply and demand shifts for those assets. This is because domestic and foreign bonds are not perfect substitutes, and expected rate of returns on domestic and foreign bonds, if exchange rate variations considered, will be different. This approach tells us that if domestic interest rates rise, demand for domestic bonds increases while demand for foreign bonds reduces; and the exchange rate declines as a result. In addition, if the supply of domestic bonds increases, demand for foreign bonds expands relatively,⁹⁾ and thus the exchange rate rises. If the supply of foreign bonds increases,

6) In the long run ,however, as PPP holds, exchange rates regain their long-run equilibrium levels in a gradual manner.

7) The model, set out by Frankel, is also called the real interest differential model, in that nominal interest rates and inflationary expectations are considered.

8) In <Table 3>, long-term interest rates differential, rather than that in inflationary expectations between two countries, is included in the Frankel model, taking into account the fact that inflationary expectations are reflected in long-term interest rates.

9) In case the supply of domestic bonds increases, investors expand their holdings of foreign bonds, while disposing of domestic bonds, in order to hold constant the shares of holdings of domestic and foreign bonds. Meanwhile, if the supply of foreign bonds increases, they dispose of foreign bonds and increase their holdings of domestic bonds.

<Table 3> Macroeconomic Theory of Exchange Rate Determination

Type	Major content	Representative models	Researchers
Flow approach	Determined by supply and demand for foreign currency	$s = \beta_1 (y - y^*) + \beta_2 (p - p^*) + \beta_3 (i - i^*)$ Where, $\beta_1 > 0, \beta_2 > 0, \beta_3 < 0$	Mundell(1963) Fleming(1963)
Asset market approach	Determined by supply and demand for financial asset stock		
Monetary approach	Assumes perfect substitution of bonds among countries	Bilson model: flexible-price model $s = (m - m^*) + \beta_1 (y - y^*) + \beta_2 (i - i^*)$ Where, $\beta_1 < 0, \beta_2 > 0$	Frenkel(1976) Bilson(1978) Mussa(1979)
	Assumes stable money demand function	Overshooting model: sticky-price model $s = (m - m^*) + \beta_1 (y - y^*) + \beta_2 (i - i^*)$ Where, $\beta_1 < 0, \beta_2 < 0$	Dornbush (1976)
		Frankel model: real interest differential model $s = (m - m^*) + \beta_1 (y - y^*) + \beta_2 (i - i^*) + \beta_3 (i - i^*)$ Where, $\beta_1 < 0, \beta_2 < 0, \beta_3 > 0$	Frankel(1979)
Portfolio balance approach	Assumes imperfect substitution of bonds	$s = \beta_1 (i - i^* - \Delta s^*) + \beta_2 (b - b^*)$ Where, $\beta_1 < 0, \beta_2 > 0, b$: bonds	Branson(1979) Frankel(1983)

Note: s is exchange rate; y income; p prices; m money supply; i short term interest rate; i long term interest rate; s* expected exchange rate; b bond; * relevant variable of foreign country; Δ difference. All the variables excluding interest rate are natural logs.

in the meantime, demand for domestic bonds increases in a relative sense; and consequently, the exchange rate falls.

3) Microstructure approach

Unlike the macroeconomic exchange rate theory, explained above, the microstructure approach uses microstructure variables in foreign exchange markets, including order flows¹⁰⁾ and bid-ask spreads to explain exchange rate movements. Notably, Lyons(2001) presents a hybrid

model using order flow, a microstructure variable, as an explanatory variable for exchange rates as well as macroeconomic variables like interest rates.

$$s_t = f(i, m, z) + g(X, Z)$$

Where,

s: exchange rates; i: interest rates; m: money supply;

z: other monetary fundamentals; X: order flow;

10) Order flow refers to signed trading volume, indicating whether foreign trading begin from the buyer side(+) or the seller side(-). O'hara(1995) asserts that microstructure variables in the foreign exchange market, including order flow and bid-ask spread, play a pivotal role in exchange rate determination.

and Z : other microstructure variables

According to Lyons, macroeconomic exchange rate theories such as the asset market approach assumes that there is no information asymmetry between the foreign exchange market participants. In fact, market participants make use of dispersed private information as well as share the same public information. For this reason, Lyons maintains that the macroeconomic exchange rate model provides poor explanatory power as to exchange rate variation, and that order flow, which conveys private information about exchange rates, is a major determinant of exchange rates.

B. Previous Empirical Studies

According to Messe and Rogoff(1983) and Frankel and Rose(1996), up until the 1980s, traditional macroeconomic exchange rate models had low explanatory power as to exchange rate variation. Their forecasting power could not outperform a simple no-change forecast's, based on a random walk hypothesis.

Meanwhile, as advanced time series analysis methods such as cointegration

tests¹¹⁾ became available in the 1990s, there has been a wealth of studies on the monetary approach using the error correction model(ECM)¹²⁾ based on the monetary approach. These studies show that macroeconomic variables, including money supply, interest rates and income, offer a relatively good explanation of the short and long-run movements of exchange rates; and that the monetary ECM's forecasting ability is somewhat superior to that of a simple random walk model. MacDonald and Taylor(1994) use a cointegration test to estimate the long-run equilibrium relationship between exchange rates and money supply, interest rates and production. The estimation result is that the signs of variables are consistent with the monetary approach, and that its forecasts outperform that of the random walk model. Johnston and Sun(1997) present a similar result showing that in major advanced countries there exists a long-run equilibrium relationship between exchange rates and macroeconomic variables, and that the monetary ECM has generally superior forecasting ability to that of the random walk model.¹³⁾ In the analysis of Chinn

11) This is a technique for estimating long-run equilibrium relationships among nonstationary time series. In general, macroeconomic variables including exchange rates, interest rates, income and money supply, have features of non-stationary time series. Whether these variables have long-run equilibrium relationships is revealed by cointegration tests.

12) The error correction model is a model that combines an error correction term, representing the misalignment between exchange rates and long-run equilibrium exchange rates, with a dynamic equation comprised of differenced variables, if a cointegrating vector exists between exchange rates(dependent variable) and macroeconomic variables(explanatory variables). It is used for explaining short-run dynamic movements of exchange rates.

13) Recently, Mark and Sul(2001) estimate a monetary exchange rate model through a cointegration test,

and Meese(1995), in addition, it is found that there exists a long-run relationship between exchange rates and macroeconomic variables, such as money supply, production, interest rates and the trade balance, and that the model's forecasts are more accurate than that of random walk model's.¹⁴⁾ Rapach and Wohar(2001) estimate a long-run equilibrium relationship between exchange rates and production and money supply by using panel data over the period of 1880~1995 for 14 advanced countries. They present the result that in 8 countries among 14, there exists a long-run equilibrium relationship, and that if exchange rates deviate from the long-run equilibrium level, it takes considerable time to return to the intrinsic equilibrium level.¹⁵⁾

Meanwhile, Evans and Lyons(2002) add order flow, a microstructure variable, as an explanatory variable to a macroeconomic model and analyze the daily mark/dollar and yen/dollar exchange rates during May~August 1996. The result shows that order flow provides high explanatory and forecasting power as to short-term exchange rate variation. Lyons(2001), additionally, maintains that

order flow can explain not only short-term exchange rate variation but also long-term(over 5 years) variation.

Empirical studies on the factors determining the exchange rate movements of the Korean won have been mostly conducted on the pre-crisis period. Seo(2001) implements a cointegration test using the monetary exchange rate model for the period of April 1990~October 1997. He asserts that there exists a cointegrating vector between the exchange rate and the money supply and industrial production of Korea and the U.S., and forecasts of the model outperforms that of the random walk model. In addition, Park and Jang(1999) empirically analyze the relationship between the daily exchange rate variation of Korean won and the order flow of foreign exchange banks over the period of March 26~July 16 1999, based on the micro approach to exchange rate determination, and show that order flow is a proximate determinant of the daily exchange rate variation in the Korean foreign exchange market.

using data obtained from 18 countries, and prove that there exists a long-run equilibrium relationship between the exchange rates of 14 countries and monetary fundamentals including money supply and income, and that the model produces better predictions than the random walk model.

14) However, if the forecasting period is less than one year, the monetary VECM exhibits lower forecasting power in comparison to that of the random walk model.

15) According to Rapach and Wohar(2001), it is estimated that if actual exchange rates deviate from the long-run equilibrium level, the misalignment scale narrows only by 6~20% in one year. Frankel and Rose(1996) also point out the misalignment between actual exchange rates and long-run equilibrium exchange rates.

2. Empirical Analysis

As explained above, we analyze empirically the short and long-run exchange rate determinants of the Korean won on the basis of the monetary approach, on which empirical analyses of exchange rate models have usually been conducted since the mid-1990s. In addition, we analyze the factors affecting the daily exchange rate movements of the Korean won using a micro exchange rate model, which is evaluated as offering a good explanatory power in regard to the short term movements of exchange rates.

A. Long-run Exchange Rate Determinants of the Korean Won

In order to shed light on the long-run exchange rate determinants of the Korean won, we analyze the long-run equilibrium relationship¹⁶⁾ between the exchange rate and macroeconomic variables such as money supply, income and interest rates, through a cointegration test. As

analytical models, we use a simple model¹⁷⁾, which only includes money supply and income of Korea and the U.S., Bilson's flexible-price monetary model (Bilson, 1978), and Frankel's real interest differential model (Frankel, 1979). Taking into account Korea's smaller economic scale and higher external dependency, compared with major advanced countries, and the increased impact of the capital account position on the won/dollar exchange rate after the currency crisis, we use a hybrid model¹⁸⁾, which includes the capital account position and the terms of trade as additional explanatory variables in the simple model.

<simple model>

$$s = \alpha + \beta_1 m + \beta_2 m^* + \beta_3 (y - y^*) + \varepsilon_t^{19)}$$

<Bilson model>

$$s = \alpha + \beta_1 m + \beta_2 m^* + \beta_3 (y - y^*) + \beta_4 (i - i^*) + \varepsilon_t$$

<Frankel model>

$$s = \alpha + \beta_1 m + \beta_2 m^* + \beta_3 (y - y^*) + \beta_4 (i - i^*) + \beta_5 (\tilde{i}_L - \tilde{i}_L^*) + \varepsilon_t$$

16) If there exists a cointegrating vector, representing a long-run relationship between exchange rate and macroeconomic variables, these variables can be considered as long-run determinants of exchange rate, in that they have stable, long-run relationship with exchange rate; and exchange rate estimated by the cointegrating vector can be viewed as long-run equilibrium level, in that they represent long-run exchange rate level reflecting macroeconomic conditions.

17) This is done considering the fact that there have been ample empirical studies that take only money supply and income as explanatory variables of exchange rates, excluding interest rate differentials between countries. For instance, Mark(1995), Berkowitz and Killan(2000) posit that long-run equilibrium exchange rates(\bar{s}) are determined by the money supply and income of two countries($\bar{s} = [m - m^*] - \alpha[y - y^*]$).

18) Edwards(1994) considers that in the case of a small open economy, exchange rates are considered by the capital account position and the terms of trade.

19) In each model, domestic and foreign money supply are estimated separately in order to increase the explanatory power of model, as shown in Seo(2000). In the Frankel model, the actual inflation rate or long-term interest rates can be used as a proxy variable of inflation expectations. In this paper, we use long-term interest rates, based on the Fisher hypothesis.

<hybrid model>

$$s = \alpha + \beta_1 m + \beta_2 m^* + \beta_3 (y - y^*) + \beta_4 ka + \beta_5 tot + \varepsilon_t$$

For empirical analysis, monthly data during the period 1990~2001 are used; and for income variables, the industrial production index is used as a proxy. In that money demand is mainly for trading purposes in the monetary approach, we use M1 statistics as in the previous studies.²⁰⁾ Yields on CDs(3 months; i , i^*) are used as short-term interest rates; and yields on Korean national housing bonds(5 years; i_i) and on U.S. Treasury bonds(5 years; i_i^*) as long-term interest rates. The ratio(%) of the capital account

balance to nominal GDP and the net barter terms of trade index(= unit value index of exports/unit value index of imports) are used as the capital account balance(ka) and the terms of trade(tot) respectively. As for money supply and the industrial production index which show seasonal variations, seasonally adjusted series are used, while all variables apart from interest rates and the capital account balance are transformed into natural logs.

The results for unit root test reveal that all variables have unit roots, which means all series are non-stationary. In this situation, we conduct the Johansen cointegration test to see if long-run

<Table 4> Estimation Results of Cointegrating Vector

	simple model		Bilson model		Frankel model	hybrid model	
	Entire period	Pre-crisis period	Entire period	Pre-crisis period	Entire period	Entire period	Pre-crisis period
Constant terms	3.00	4.05	-2.20	3.51	1.47	13.0	15.3
Domestic money supply(m)	0.77 (13.81)	0.49 (7.41)	1.25 (16.43)	0.51 (8.69)	0.73 (7.24)	0.31 (2.86)	0.09 (0.67)
U.S. money supply(m*)	-0.74 (-5.87)	-0.42 (-3.68)	-0.83 (-4.73)	-0.39 (-4.42)	-0.03 (-0.11)	-0.77 (-3.02)	-0.65 (-2.79)
Relative income (y-y*)	-1.00 (-5.48)	-0.36 (-2.20)	-2.12 (-9.22)	-0.48 (-3.23)	-1.37 (-4.40)	-0.68 (-3.44)	0.52 (1.26)
Interest rate differential(i-i*)	-	-	0.02 (4.65)	0.005 (1.47)	-0.05 (3.76)	-	-
Long-term interest rate differential(i _i -i _i *)	-	-	-	-	0.06 (2.48)	-	-
Terms of trade (tot)	-	-	-	-	-	-2.03 (-5.09)	-4.20 (-6.20)
Capital account (ka)	-	-	-	-	-	-0.92 (-3.31)	-0.97 (-2.95)

Note: Figures in parentheses represent t-value.

20) We use new M1 for Korea, which is similar to the U.S.'s M1.

equilibrium relationships, i.e. cointegrating vectors, exist between the exchange rate and macroeconomic variables such as money supply, income and interest rates.²¹⁾

According to the test results, one cointegrating vector exists between the exchange rate of the Korean won and the monetary fundamental variables during both the entire period and the pre-crisis period in every model (i.e. the simple model, the Bilson model and the hybrid model) except for the Frankel model in which it exists for the entire period, but not the sub period.

Looking into the long-run equilibrium equation between the exchange rate and money supply and relative income, as estimated by the simple model, the explanatory variables are all statistically significant and the signs of the estimated coefficients are consistent with theory. In particular, the coefficients of domestic and foreign money supply and relative income are 0.5, -0.4 and -0.4, respectively in the pre-crisis period, while, in the entire period, they become 0.8, -0.7 and -1 respectively, with their absolute value nearing 1, thus they are better matched to the monetary approach.²²⁾

In the Bilson model, the domestic and foreign interest rate differential is esti-

mated to have a positive(+) relationship with the exchange rate, thus a domestic interest rate rise is likely to serve as a factor raising the exchange rate through the decline in money demand in the long run. In particular, the coefficients for the entire period are found to be larger than those during the pre-crisis period. This is mainly because the domestic interest rate rise also had a negative impact on domestic stock prices and triggered outflows of foreign stock investment funds following the currency crisis. During the entire period, in addition, the coefficients of the domestic and foreign money supply stand at 1.30 and -0.8, respectively, closer to the absolute value of one, as compared to the pre-crisis period (0.5 and -0.4).

Also in the case of the Frankel model, almost all variables are statistically significant and correctly signed with theory, and the coefficients of the domestic money supply and the relative income are 0.7 and -1.4, respectively, showing similarity to those of the Bilson model. As for the interest rate, it is analyzed that the short-term interest rate differential ($i-i^*$) has a negative(-) relationship with the exchange rate in the long run, while the long-term interest rate differential ($i_l-i_l^*$), reflecting expected inflation, has a

21) Refer to <Appendix 1> for further details of unit root tests and cointegration tests.

22) According to the monetary approach to exchange rate determination, the coefficient of domestic and foreign money supply should be unity(1) in theory. The coefficient of domestic and foreign relative income is close to unity, as shown in previous empirical analyses including Taylor and Peel(2000).

positive(+) relationship with the exchange rate in the long run. This coincides with Frankel's theoretical hypothesis and the results of empirical analyses.²³⁾

As for the hybrid model, all variables are correctly signed in the entire period; the coefficients of the domestic and foreign money supply(0.3 and -0.8), and the relative income(-0.7) exhibit larger absolute values in comparison to those of the pre-crisis period(0.1, -0.65 and -0.5, respectively). The capital account balance and the terms of trade are estimated to have statistically significant negative(-) correlations with the exchange rate of the Korean won during the entire period and pre-crisis periods.

Considering the results of the above cointegration tests, it can be concluded that not only money supply, relative income, the domestic and foreign interest rate differential but also the capital account position and the terms of trade are major factors underlying the long-run exchange rate movements of the Korean won. Taking the entire period, in particular, all estimated coefficients comply better with theory, in comparison to those of the pre-crisis period, and show higher statistical significance. This is attributable

to the closer relationship between the exchange rate and macroeconomic variables following the currency crisis.

B. Short-run Exchange Rate Determinants of the Korean Won

1) Error correction model

Factors explaining short-run dynamic movements of the exchange rate can be analyzed by a dynamic equation comprised of lagged difference terms of variables, including the exchange rate(dependent variable) and macro-economic variables(explanatory variable). If a cointegrating vector exists between the exchange rate and explanatory variables, however, it is generally analyzed by an error correction model, which includes not only a dynamic equation but also an error correction term(ω_{t-1})²⁴⁾, estimated by an cointegrating vector. Accordingly, in order to examine the factors determining the short-run exchange rate movements of the Korean won, we specify a vector error correction model with the error correction term as an explanatory variable, as follows:

23) According to Frankel(1979), exchange rates have a negative(-) relationship with the nominal interest differential, and a positive(+) relationship with the inflationary expectation differential(=long-term interest differential; $i_t - i_t^*$), and coefficients of inflation expectation differential are analyzed as being larger than those of the nominal interest differential.

24) The error correction term(ω_{t-1}) is defined as the difference between the actual exchange rate(s_{t-1}) and the long-run equilibrium exchange rate(f_{t-1}), which is determined by the estimated cointegrating relationship. In the simple model, for example, ω_{t-1} can be described as follows: $\omega_{t-1} = s_{t-1} - f_{t-1} = s_{t-1} - [\alpha + \beta_1 \cdot m_{t-1} + \beta_2 \cdot m_{t-1}^* + \beta_3 \cdot (y-y^*)_{t-1}]$

<Error correction model I>

$$\Delta S_t = \mu + \alpha \omega_{t-1} + \sum_{i=1}^p \beta_i \Delta S_{t-i} + \sum_{i=1}^p \gamma_i \Delta f_{t-i} + \sum_{i=1}^p \delta_i z_{t-i} + \varepsilon_t$$

where,

S : won/dollar exchange rate

μ : constant term

ω : error correction term

f : vector comprised of domestic and foreign money supply(m, m^*), relative income($y - y^*$), short-term interest rate differential($i - i^*$) and long-term interest rate differential($i_L - i_L^*$)

z : other short-run determinants of the exchange rate, including the first order difference term of the yen/dollar exchange rate(Δyen) and foreign investors' net stock purchase (fstock)

ε : disturbance term

Δ : first order difference

The yen/dollar exchange rate and foreign investors' net stock purchase are added as explanatory variables because won-yen synchronization has deepened since the currency crisis. It also takes into account previous studies(Park, 1999) showing that since the full-scale opening

of the capital market as exemplified by elimination of the ceiling on foreign investors' stock investment in May 1998, the exchange rate of the Korean won reacts more sensitively to foreign investors' stock investment position.²⁵⁾

For actual analysis, the ratio of foreigners' net stock purchase amount to their total trading amount([purchase amount - selling amount] / total amount of trading) is used as foreign investors' net stock purchase. Meanwhile, the lags of explanatory variables excluding the yen/dollar exchange rate are set by the general-to-specific method. Thus the explanatory variables, including their lag variables, with no significance are omitted from the vector error correction model.²⁶⁾

According to the estimation results (<Table 5>), the error correction term(ω_{t-1}), excluding the Bilson model in the pre-crisis period, has a negative(-) relationship with the exchange rate variations of the Korean won, and is statistically significant in every model. In particular, the coefficients of the error correction terms for the entire period are -0.06, -0.09 and -0.10, larger than those in the

25) In choosing explanatory variables of the vector error correction model, U.S. money supply and Korea's terms of trade are excluded due to their low significance. The foreign investors' net stock purchase, rather than the capital account balance, is taken as explanatory variable because it is a proximate cause of the capital account variation and increases significance of estimated coefficients and explanatory power of the model. Since the data for foreign investors' net domestic stock purchase is available from 1992, the periods of the analysis are adjusted to Jan. 1992-Dec. 2001(entire period) and Jan. 1992-Oct. 1997(pre-crisis period).

26) In the case of the yen/dollar exchange rate, only the current term is included in the above model, taking into account the insignificance of the yen/dollar lag term and the deepening of won-yen synchronization.

<Table 5> Estimation Result of the Error Correction Model I

	Entire period				Pre-crisis period		
	simple	Bilson	Frankel	hybrid	simple	Bilson	hybrid
Constant term(μ)	0.00 (0.72)	-0.00 (-0.26)	0.00 (0.09)	0.01 (1.40)	0.00 (0.21)	0.00 (0.12)	0.00 (1.07)
Error correction term(ω_{t-1})	-0.06 [†] (-1.73)	-0.09** (-2.63)	-0.07* (-2.58)	-0.10** (-3.78)	-0.03 (-1.58)	-0.03 [†] (-1.68)	-0.02** (-3.47)
Domestic money supply(Δm_{t-3})	0.45** (3.25)	0.55** (4.20)	0.28 [†] (1.90)	0.37** (2.73)	0.07 (1.54)	0.07 (1.47)	0.06* (2.12)
Relative income($\Delta(y-y^*)_{t-1}$)	-0.31* (-2.55)	-0.22 [†] (-1.69)	-0.28* (-2.25)	-0.24* (-2.03)	-0.04 (-1.20)	-0.04 (-1.28)	-0.02 (-1.00)
Short-term interest rate differential($\Delta(i-i^*)_{t-1}$)	-	-0.003 (-0.90)	-0.01** (-3.15)	-	-	0.001 (1.30)	-
Long-term interest rate differential($\Delta(i-l-i^*)_{t-1}$)	-	-	0.01* (2.17)	-	-	-	-
Yen/dollar exchange rate(Δyen)	0.31** (3.07)	0.31** (3.14)	0.32** (3.02)	0.33** (3.42)	0.10** (3.50)	0.10** (3.56)	0.08** (3.92)
Foreign investors' net stock purchase($fstock_{t-1}$)	-0.02 [†] (-1.97)	-0.02 [†] (-1.64)	-0.02 [†] (-1.73)	-0.03** (-2.69)	0.00 (0.78)	0.00 (1.13)	0.00 (0.48)
lag variable(Δs_{t-1})	0.62** (7.93)	0.64** (7.82)	0.33** (3.21)	0.50** (6.16)	0.34** (3.38)	0.30** (2.90)	0.23* (2.48)
R ²	0.49	0.52	0.50	0.54	0.46	0.47	0.40
Q-stastics ²⁾ (p-value)	0.05 (0.82)	0.26 (0.61)	2.60 (0.11)	0.08 (0.77)	0.15 (0.70)	0.01 (0.90)	0.00 (0.95)

Notes: 1) **, * and † represent significance at the 1%, 5% and 10% levels respectively.

2) Ljung-Box's Q statistics.

pre-crisis period(-0.03, -0.04 and -0.02) in terms of absolute value. This means that the exchange rate, if deviating from an equilibrium level, tends to return to it more quickly than in the pre-crisis period as the exchange rate reacts sensitively to macroeconomic variables after the currency crisis. For instance, according to the simple model, if the exchange rate deviates from the equilibrium level, approximately 6% of the deviations is adjusted in the next month whereas only 3% was adjusted before the currency crisis.

As for the domestic money supply and

relative income, the signs of the coefficients are consistent with the theoretical expectations in all the models, in particular, the coefficient value and statistical significance of the variables increase during the entire period, in comparison to those during the pre-crisis period. So these variables are deemed to have an impact not only on the long-run but also on the short-run exchange rate movements of the Korean won.

In the case of the interest rate differentials, in the Frankel model, the variables are all statistically significant and the signs of the estimated coefficients

coincide with theory (the short-term interest rate differential: - and the long-term interest rate differential: +). Meanwhile, the short-term interest rate differential in the Bilson model has no statistical significance during the entire period, and the coefficient during the pre-crisis period (positive: +) has a different sign from that during the entire period (negative: -).²⁷⁾

For the yen/dollar exchange rate, the estimated coefficients stand at 0.31~0.33 during the entire period, an increase from the pre-crisis period's 0.08~0.10, owing to the deepening of the won-yen synchronization following the currency crisis. In the case of foreign investors' net stock purchase, the coefficients are not significant during the pre-crisis period while having a statistically significant negative(-) relationship during the entire period. These results are attributable to the fact that before the currency crisis, the correlation between the foreign investors' net stock investment and the exchange rate was very weak, due to the ceiling on foreign investors' domestic stock purchase and their low share of the domestic stock market; but since the crisis, the impact of foreign investors' stock investment on the exchange rate has grown thanks to the elimination of the

ceiling and the expansion of their market share.

In conclusion, money supply and relative income have a significant impact not only on the long-run movements but also on the short-run dynamic movements of the exchange rate of Korean won from the early 1990s to the end of 2001. The yen/dollar exchange rate and foreign investors' net stock purchase are also major short-run determinants of the exchange rate variation, and their impact on it increased following the 1997 crisis.

Meanwhile, we add the trading volume of the foreign exchange market, one of the microstructure variables, as an explanatory variable and estimate ECM again over the entire period. The estimation results are as follows:

<Error correction model II>

$$\Delta S_t = \mu + \alpha \omega_{t-1} + \sum_{i=1}^p \beta_i \Delta S_{t-i} + \sum_{i=1}^p \gamma_i \Delta f_{t-i} + \sum_{i=1}^p \delta_i Z_{t-i} + \sum_{i=1}^p \theta_i \text{trade}_{t-i} + \varepsilon_t$$

where,

trade : volume of foreign currency trade (spot), and the other terms are the same to those of <Error correction model I>

27) The negative(-) relationship of the exchange rate with the short-term interest rate differential during the entire period stems from the opening of the domestic bond market following the currency crisis. However, it has no statistical significance because inflows of foreign capital have been brisker for the stock market than bond market.

<Table 6>

Estimation Result of Error Correction Model II

	Entire period			
	simple	Bilson	Frankel	hybrid
Constant term(μ)	0.15** (3.30)	0.09** (2.14)	0.19** (3.93)	0.08* (1.82)
Error correction term(ω_{t-1})	-0.10** (-2.94)	-0.09** (-2.69)	-0.08** (-2.93)	-0.10** (-3.48)
Domestic money supply(Δm_{t-3})	0.41** (3.02)	0.56** (4.31)	0.40** (2.94)	0.38** (2.88)
Relative income($\Delta(y-y^*)_{t-1}$)	-0.24* (-2.04)	-0.19 (-1.49)	-0.28* (-2.33)	-0.23* (-1.95)
Short-term interest rate differential ($\Delta(i-i^*)_{t-1}$)	-	-0.002 (-0.68)	-0.01* (-2.18)	-
Long-term interest rate differential ($\Delta(i_L-i^*_L)_{t-1}$)	-	-	0.01* (2.31)	-
Yen/dollar exchange rate(Δyen)	0.38** (3.75)	0.37** (3.64)	0.49** (4.69)	0.37** (3.78)
Foreign investors' net stock purchase (fstock $_{t-1}$)	-0.05** (-3.61)	-0.04** (-2.64)	-0.06** (-4.37)	-0.04** (-3.17)
Volume of foreign currency trade (trade $_t$)	-0.02** (-3.25)	-0.01* (-2.17)	-0.03** (-3.88)	-0.01† (-1.70)
lag variable(Δs_{t-1})	0.59** (7.81)	0.62** (7.65)	0.45** (5.15)	0.50** (6.20)
R ²	0.54	0.54	0.51	0.55
Q-stastics ²⁾ (p-value)	0.09 (0.76)	0.39 (0.53)	0.64 (0.42)	0.25 (0.62)

Notes: 1) **, * and † represent significance at the 1%, 5% and 10% levels respectively.

2) Represents Ljung -Box's Q statistics.

Although there is little change in the estimated coefficients of the existing explanatory variables including the error correction term, money supply, relative income and the yen/dollar exchange rate in all models, explanatory power increases to a certain degree.²⁸⁾ In addition, the trading volume is statistically significant in all models apart from the Bilson model. In this light, trading volume has an explanatory power in regard to a part

of the exchange rate variation of the Korean won, that is unexplained by macroeconomic variables. The estimation results reveal that the trading volume has a negative(-) relationship with the exchange rate. This is deemed to stem from the fact that an increase of the trading volume is mostly led by an over supply condition of the foreign exchange market thanks to the continued current account and capital account surpluses

28) In case the volume of foreign currency trading is added as an explanatory variable, R² increases to 0.52, 0.54, 0.51 and 0.55 in simple, Bilson, Frankel and hybrid models, respectively, from 0.49, 0.52, 0.50 and 0.54.

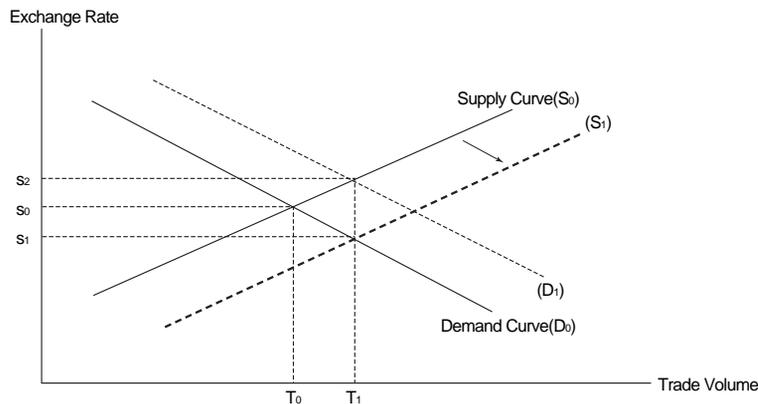
following the currency crisis.²⁹⁾

2) Microstructure approach

In the foreign exchange market where informational asymmetry is existent, private information of the market participants can greatly affect exchange rate variation. Nevertheless, the macroeconomic exchange rate models estimated above use only public information such as macroeconomic variables to explain exchange rate variation. Taking this into account, we analyze to what extent order flow in the Korean interbank market³⁰⁾, which is known to be a proximate cause of exchange rate variation in the micro approach, can explain the daily exchange rate variation of the Korean won.

Order flow represents the signed transaction volume, which contains information about whether the actual transaction is initiated by the seller or the buyer (Lyons, 2001). It is significant because it reflects private information³¹⁾ on future exchange rate variation. In other words, various traders, including foreign exchange banks, fund managers, corporations and individuals, participate in the foreign exchange market; and their orders contain diverse private information, such as market participants' prospects for exchange rates and major macroeconomic variables, central bank intervention and so forth. Since foreign exchange banks, which act as dealers in the foreign exchange market, are espe-

29) As shown in the graph below, if foreign currency supply increases ($S_0 \rightarrow S_1$), the exchange rate falls ($S_0 \rightarrow S_1$), and the volume of foreign currency trading in the foreign exchange market has a negative (-) relationship with the exchange rate. Conversely, if foreign currency demand increases ($D_0 \rightarrow D_1$), the exchange rate rises ($S_0 \rightarrow S_2$), and the trading volume has a positive (+) relationship with the exchange rate.



30) In general, the foreign exchange market is divided into two parts: the customer market where trading is made between customers (corporations and individuals) and foreign exchange banks, and the interbank market where trading takes place between foreign exchange banks. Since foreign currency trading are effectively made mainly between banks, a micro approach has been developed, centering on the analysis of the interbank market.

31) Information available in the foreign exchange market is divided into two parts: public information, including macroeconomic variables, and private or dispersed information, which is held by various market participants. For example, rumors are private information while news is public information.

cially better placed than other participants to observe and analyze the order flow of customers and other dealers in a comprehensive manner, their valuable private information obtained through interbank transactions is reflected in their orders.

To analyze the impact of order flow on the daily exchange rate variations of the Korean won, we estimate the following exchange rate models based on the microstructure approach, and drawing on Evans and Lyons(2002), Lyons(2001), Park and Jang(1999).

<Model I>

$$\Delta s_t = \alpha + \beta_1 \text{Order}_t + \varepsilon_t$$

<Model II>

$$\Delta s_t = \alpha + \beta_1 \text{Order}_t + \beta_2 \Delta \text{yen}_t + \beta_3 \text{fstock}_t + \varepsilon_t$$

<Model III>

$$\Delta s_t = \alpha + \beta_1 \text{Order}_t + \beta_2 \Delta \text{yen}_t + \beta_3 \text{fstock}_t + \beta_4 (i_t - i_t^*) + \varepsilon_t$$

Where,

s_t : won/dollar exchange rate, Order_t : order flow,

yen_t : yen/dollar exchange rate, fstock_t : foreign investors' net stock purchase,

$i_t - i_t^*$: interest rate differentials(= CD

rate - U.S. CD rate),

Δ represents first order difference;

and all the variables excluding interest rates are natural logs.

<Model I> consists only of order flow; <Model II> and <Model III> are hybrid models, which take both order flow(private information) and macroeconomic variables(public information) as explanatory variables. As well Evans and Lyons(2002), the nominal interest rate differential is used as public information in the model. In addition, we choose foreign investors' net stock purchase and the yen/dollar exchange rate as explanatory variables, noting that their growing influence on the exchange rate of the Korean won. For the empirical analysis, order flow(Order_t) is constructed from the actual transaction data in the interbank foreign exchange market, gathered at two-minute intervals from September 1, 2001 to September 30, 2002(see <Appendix 2>).³²⁾

Using the daily data, we estimate the above three models by the ordinary least squares(OLS) method. The empirical result shows that order flow has explanatory power in regard to the daily exchange rate variations of the Korean won.

According to the result, order flow in

32) Order_t represents the signed trade volume with values between -1 and 1. If it is larger than 0, exchange rates are expected to rise, showing that excessive demand exists. In contrast, if it is smaller than 0, exchange rates will decline, meaning that there is excessive supply.

<Table 7> Exchange Rate Model Estimation Using Order Flow

	Model I	Model II	Model III
Order flow(Order)	0.019** (8.71)	0.016** (7.86)	0.016** (7.74)
Yen/dollar(Δ/yent)	0.214** (6.95)	0.214** (6.94)	
Foreign investors' net stock purchase (fstock)		-0.002* (-2.04)	-0.002** (-2.03)
interest rate differential(i-i*)			-0.0001 (0.908)
R ²	0.22	0.36	0.36
D.W	1.92	2.26	2.26

Note: ** and * represent significance at the 1% and 5% levels.

all models is correctly signed(+) and statistically very significant. In the case of <Model I> in which order flow alone is used as an explanatory variable, it explains 22% of the daily exchange rate variations of the Korean won during September 1, 2001~September 30, 2002; and in <Model II>, in which the yen/dollar exchange rate added as an explanatory variable, it explains 36% of the daily exchange rate variation. In general, the explanatory power of order flow in regard to the exchange rate variation is greater in advanced countries with developed foreign exchange markets. This figure(36%) for <Model II> is relatively high, considering the explanatory power(42%)

of the micro exchange rate model for the Japanese yen, which includes public information like interest rate differentials(Evans and Lyons, 2002). It is noteworthy that when the yen/dollar exchange rate, foreign investors' net stock purchase and the nominal interest rate differential are added, the coefficient of order flow does not change greatly. This, we think, is because order flow explains that part of exchange rate variation not explained by public information.³³⁾ In this regard, order flow is deemed to be a key determinant of the daily exchange rate variation of the Korean won. Besides this, owing to the deepening of won-yen synchronization, it is

33) Order flow here includes not only private information but also some of the public information about macroeconomic variables. However, even when items of publicly available information(interest rates, yen/dollar exchange rate and foreign investors' net stock purchase) are used as control variables in the model above, order flow is analyzed to be still statistically significant. In this situation, there is a good chance that order flow is reflecting mostly private information that differs from public information. Accordingly, to increase the explanatory power of the exchange rate model, monthly and quarterly models that include both major macroeconomic variables(GDP, money supply and so on) and order flow need to be developed. This will be possible after the data for order flow has been accumulated at least for five years.

analyzed that the yen/dollar has a great impact on the daily exchange rate variations of the Korean won and that foreign investors' net stock purchase does on it at the 5% significant level. Nominal interest rate differential, however, does not have influence on the daily exchange rate variations, which is different from the result by Evans and Lyons(2002). The reason is that in advanced countries, capital flows mainly through bond market whereas, in Korea, mostly through stock market. Besides, the linkage between foreign exchange market and money market of Korea is much weaker compared with that of advanced countries, in that there still exists a gap between nominal interest rate differentials and swap rates.

IV. Conclusion

This paper has examined factors determining the exchange rate movements of the Korean won during the post-1990 period, dividing them into short and long-run determinants. The long-run determinants are analyzed using the long-run equilibrium relationship between the exchange rate and macroeconomic variables through a cointegration test based on the monetary approach, and the short-run determinants using a error correction and a micro exchange rate model. The major

findings are as follows:

The domestic and foreign money supply, relative income, the domestic and foreign interest rate differentials, the capital account balance and the terms of trade have exerted an impact on long-run exchange rate movements of the Korean won since 1990. Each estimated coefficient during the entire period(including the currency crisis period) coincides better with theory and has greater statistical significance, in comparison to the pre-crisis period.

Along with money supply and relative income, the yen/dollar exchange rate and foreign investors' net stock purchase are found to have significant impact on the short-run exchange rate variation of the Korean won. For the entire period, in particular, estimated coefficients of these variables are larger and more statistically significant than those for the pre-crisis period. In this regard, it is considered that the impact of these variables on the short-run exchange rate variation of the Korean won increased following the currency crisis. In addition, the coefficients of the error correction terms, which represent the misalignment between the actual exchange rate and the long-run equilibrium level, are larger for the entire period than those in the pre-crisis period. This means that, following the currency crisis, if the actual exchange rate deviates from the equilibrium level, it takes a shorter time for the rate to return to the level. If

the trading volume of foreign exchange is added as an explanatory variable of the ECM, the statistical significance of the estimated coefficients and the explanatory power of all models increase. In this sense, trading volume, a microstructure variable in the foreign exchange market, explains some part of the exchange rate variation that cannot be explained by macro economic variables.

The empirical analysis of the impact of order flow in the interbank foreign exchange market on the daily exchange rate variation of the Korean won reveals that it explains 22% of the daily exchange rate variation during the period of September 1, 2001~September 30, 2002, and 36% when the yen/dollar exchange rate is added as an explanatory variable. These levels are relatively high considering that micro exchange rate models have explanatory power of 42% in advanced countries with developed foreign exchange markets.

Viewing the above findings, in order to sustain the stability of foreign exchange market, it is reasonable that the policy authorities should consider the following.

First, it may well be that the actual exchange rate shows a misalignment with the long-run equilibrium level because there is a difference between the short and long-run determinants of the exchange rate. In addition, since the 1997 crisis, when the exchange rate devi-

ates from the equilibrium, an adjustment has taken place more promptly to restore the equilibrium. Noting this, it is desirable that misalignment between the actual exchange rate and the long-run equilibrium should be adjusted by market forces. However, should the exchange rate deviate excessively from the equilibrium for considerable periods, it would be necessary to lessen the severity of its deviation through relevant interest rate policy and foreign exchange supply-demand management measures.

Second, macroeconomic stability is essential to maintaining exchange rate stability in that sharp and abrupt exchange rate variations since the currency crisis are also attributable to large and unexpected changes in macroeconomic variables such as money supply and domestic income.

Third, in view of the result that the exchange rate of the Korean won is also greatly affected in the short term by external factors, including the yen/dollar exchange rate and foreigners' net stock purchase, not only does the Korean foreign exchange market need to be widened and deepened to absorb external shocks effectively, but it should also be developed to be on a par with the foreign exchange market of advanced countries on an on-going basis. In this respect, the foreign exchange market can be deepened through more active transactions involving futures, swaps and deriva-

tives such as monetary futures and options since the volume of spot exchange transactions, which are linked with external transactions such as exports and imports, has a limit to its expansion.

Lastly, order flow in the interbank foreign exchange market is analyzed to be a key determinant of daily exchange rate movements of the Korean won. In this

situation, when the foreign exchange authorities wish to adjust the supply and demand of foreign currency in order to smooth abrupt and excessive exchange rate fluctuations, consideration should be given to the indirect impact on the exchange rate by the accompanying changes in order flow as well as the direct impact.

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The unit root test for exchange rate, money supply, income and interest rates shows that all variables are nonstationary time series, having unit roots, and that first differenced variables do not have unit roots at the 1% significance level.

Unit Root Test Result for Variables

	Level		1st difference	
	ADF ¹⁾	Significance probability	ADF	Significance probability
Won/dollar exchange rates(s)	-1.257	0.648	-8.816	0.000
Relative money supply (m-m*)	-2.587	0.287	-9.140	0.000
– Domestic monetary aggregates(m)	-2.549	0.305	-8.979	0.000
– U.S. monetary aggregates(m*)	-2.039	0.575	-4.513	0.002
Relative income(y-y*)	-1.528	0.816	-16.628	0.000
interest rate differential(i-i*)	-2.162	0.221	-9.402	0.000
Long-term interest rate differential(i _l -i _l *)	-1.881	0.341	-9.339	0.000

Notes: 1) Augmented Dicky-Fuller test statistics.

2) Appropriate time lag for unit root test is based on the Akaike Information Criterion(AIC).

In order to see if a cointegrating relationship exists between the exchange rate of the Korean won(won/dollar) and fundamental monetary variables including money supply, income and interest rates, we also conduct cointegration tests for a simple model(<Model I>), Bilson model(<Model II>), Frankel model(<Model III>) and a hybrid model with the capital account balance and the terms of trade as explanatory variables(<Model IV>), both for the pre-crisis period(Jan. 1990~Oct. 1997) and for the entire period(Jan. 1990~Dec. 2001). The results show evidence of a cointegrating relationship at a signifi-

Cointegration Test Results

(Trace statistics)

	Entire period (Jan. 1990~Dec. 2001)				Pre-crisis period (Jan. 1990~Oct. 1997)			
	Model I	Model II	Model III	Model IV	Model I	Model II	Model III	Model IV
	Time lag=2	2	1	2	2	3	1	3
H0 : r=0	81.2**	88.1**	132.2**	150.2**	57.2**	85.9**	38.8	116.8**
H0 : r=1	21.9	51.9*	85.7**	83.7*	24.2	54.1*	33.4	71.0*
H0 : r=2	7.5	20.3	44.9	39.7	8.7	28.9	19.3	42.9
H0 : r=3	0.26	8.0	19.3	15.2	0.0	13.9	13.3	21.2

Notes : 1) Based on the Johansen method, the time lag is chosen by the AIC; but where it is probable that this time lag is excessive, the time lag is selected by the Schwarz criterion(SBC).

2) ** and * represent significance at the 1% and 5% levels respectively.

cance level of 1% in the basic, Bilson and hybrid model during both the pre-crisis and entire periods. The Frankel model finds two cointegrating relationships at a significance level of 1% only for the entire period.

<Appendix 2> Calculation Process of Order Flow

We gathered actual transaction data of foreign exchange banks during September 2001~September 2002, and obtained a proxy for order flows through the following methods, drawing on Lyons(2001), Park and Jang(1999).

$$Order_t = \sum (B_t - S_t) / \sum (B_t + S_t)$$

Where, if $P_t^b > P_{t-1}^b$, $B_t = 1$; otherwise, $B_t = 0$

If $P_t^s > P_{t-1}^s$, $S_t = 1$; otherwise, $S_t = 0$

P_t^b : bid price, P_t^s : ask price, B_t : buyer-initiated order, S_t : seller-initiated order

First, using the interbank trading data with a frequency of two minutes, we assign unity(1) to buyer-initiated order(B_t) if the bid price(P_t^b) becomes higher than at the previous time, and unity(1) to seller-initiated order(S_t) if the ask price(P_t^s) becomes lower. The buyer and seller-initiated orders(B_t and S_t) at two-minute intervals that are obtained by this method are summed for each business day; then daily order flow($Order_t$) is computed in accordance with the above equation. Meanwhile, if B_t is unity, it means that trade is begun by buyers at this point, and that foreign exchange dealers quote a higher bid price for dollars than at the previous point, in order to secure additional dollars. Thus, it can be interpreted as showing that private information related to dollar strength is included. If S_t is unity, it means that trade is initiated by sellers; and this can be interpreted as showing that private information related to dollar weakness is included.

Here, order flow($Order_t$), computed by the summing up of buyer- initiated(B_t) and seller-initiated orders(S_t) stands between -1 and 1. If order flow($Order_t$) is larger than zero(0), this means that there are more buyer-initiated orders(B_t) than seller-initiated orders(S_t); thus, there exists excessive demand for dollars in the interbank foreign exchange market as foreign exchange dealers expect exchange rate to rise. On the other hand, if order flow($Order_t$) is smaller than zero, there is excessive supply of dollars. In consequence, order flow($Order_t$) will have a positive(+) correlation with the exchange rate.

Payment and Settlement Trends in the First Half of 2003

I. Overview

During the first half of 2003, the average daily volume of settlements through financial institutions' retail payment systems stood at 20.5 million in volume, for a total value of 34.1 trillion won. This represented an increase of 1.2 percent in volume and 0.9 percent in value from the same period of the previous year.

The rise in settlement volume and value, which occurred despite a drop of 11.3 percent in volume and 8.1 percent in value in the clearings of checks and bills, was mainly attributable to a steady increase in electronic-based settlements, including those made via the interbank shared networks and Electronic Bank Giro, which rose by 4.9 percent in terms of volume and 14.7 percent in terms of value, compared to the same period of the previous year.

Accordingly, the share of electronic-based settlements in the total retail pay-

ment systems registered 75.3 percent in volume terms and 44.7 percent in value terms, up 2.7 percentage points and 5.4 percentage points, respectively, from the same period of the previous year.

Looking at the share of various instruments within retail payment systems as a whole in terms of volume, there was an increase in that of credit cards and Bank Giro compared with the same period of the previous year, whereas that of bills and checks dropped. In terms of value, the share of the interbank shared networks expanded sharply, but that of checks and bills and credit cards decreased.

In particular, the share of credit cards increased in volume, but decreased in value. This was attributable to an increase in the purchase of commodities and services, which accounts for a large portion of credit card use, and a reduction in the use of cash advance services following an imposition of gradually reduced ceiling

[Table 1] Retail Payments and Settlements in the First Half of 2003
(daily average) Unit : thousand, billion won, %

	First Half of 2002		First Half of 2003		Change	
	Volume	Value	Volume	Value	Volume	Value
Paper-based	5,548.0 (27.4)	20,530.6 (60.7)	5,063.3 (24.7)	18,887.2 (55.3)	-8.7	-8.0
Checks&bills	3,849.4 (19.0)	20,314.7 (60.0)	3,413.6 (16.7)	18,665.4 (54.7)	-11.3	-8.1
Bank Giro	1,698.6 (8.4)	215.9 (0.6)	1,649.6 (8.1)	221.8 (0.6)	-2.9	2.7
Electronic-based	14,673.4 (72.6)	13,303.0 (39.3)	15,396.6 (75.3)	15,258.8 (44.7)	4.9	14.7
Interbank Shared Networks	6,097.5 (30.2)	11,117.9 (32.9)	6,221.6 (30.4)	13,239.2 (38.8)	2.0	19.1
Electronic Bank Giro	1,191.0 (5.9)	142.0 (0.4)	1,503.2 (7.3)	180.0 (0.5)	26.2	26.8
Credit cards	7,384.9 (36.5)	2,043.0 (6.0)	7,671.8 (37.5)	1,839.6 (5.4)	3.9	-10.0
Total	20,221.5 (100.0)	33,833.6 (100.0)	20,459.8 (100.0)	34,146.0 (100.0)	1.2	0.9

Note : 1) Figures in parentheses refer to the portion.

on the use of this service.

In the meantime, the average daily volume of fund transfers and settlements between financial institutions through the Bank of Korea Financial Wire Network (BOK-Wire), a large-value fund transfer system, was 6,673 for an average value of 86.7 trillion won, representing an increase of 25.6 percent in volume and 8.6 percent in value, from the same period of the previous year. The sharp rise in settlement was largely ascribable to a steep hike in real-time gross settlements, which account for the majority of the large-value fund settlements center-

ing on Delivery Versus Payment (DVP) transactions involving securities and transfer of general funds for settlement of stock transactions due to a large-scale increase of trading volume in bond market.¹⁾

As a result, the share of the large-value fund transfer system to the overall payment and settlements in the first half of 2003 stood at a mere 0.03 percent in volume, but reached 71.7 percent in value.

1) The average daily trading volume in the bond market in the first half of 2003 amounted to 10.4 trillion won, an increase of 44.4 percent from the 7.2 trillion won recorded during the same period of the previous year.

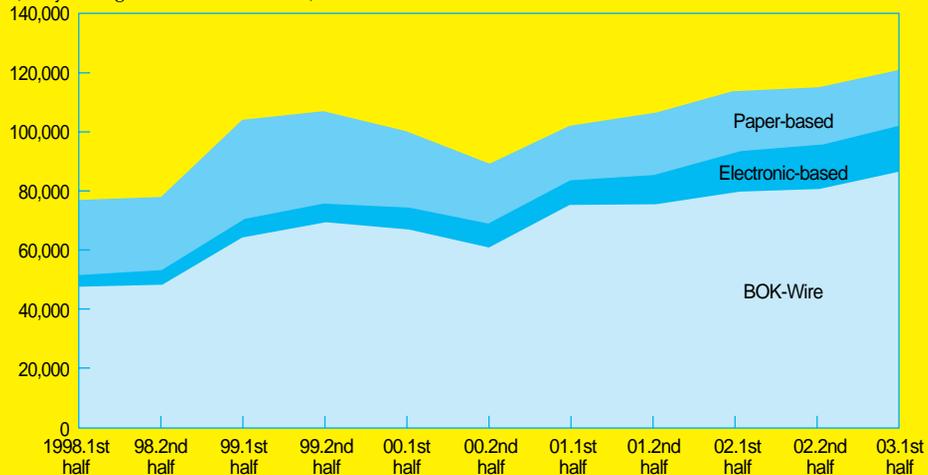
[Table 2] Settlements through BOK-Wire in the First Half of 2003
(daily average)

Unit : number, billion won, %

First half of 2002		First half of 2003		Change	
Volume	Value	Volume	Value	Volume	Value
5,314.4	79,847.6	6,672.7	86,712.6	25.6	8.6

[Chart 1] Trends of Payment and Settlement Figures

(Daily average value in billion won)



II . Payment and Settlement Trends by Payment Media

1. Checks and bills

During the first half of 2003, average daily clearings of checks and bills recorded 3.4 million by volume and 18.7 trillion won by value. These figures represented decreases of 11.3 percent and 8.1 percent, respectively, from the same period of the previous year.

Viewing the clearing volume of checks

and bills by type, the use of non-preset-value cashier's checks and household checks decreased sharply amid a drop in the volume of overall clearings. Clearings of 100,000-denominated cashier's checks, which accounted for 83.0 percent of the overall clearings of checks and bills, fell by 10.1 percent, affected by the expanded use of Internet banking.

Meanwhile, viewing the clearing value of checks and bills by type, the use of cashier's checks and promissory notes declined, but that of current account checks, certificates of deposits, and other

[Table 3] Clearing Figures for Checks and Bills in the First Half of 2003

(daily average)

Unit : thousand, billion won, %

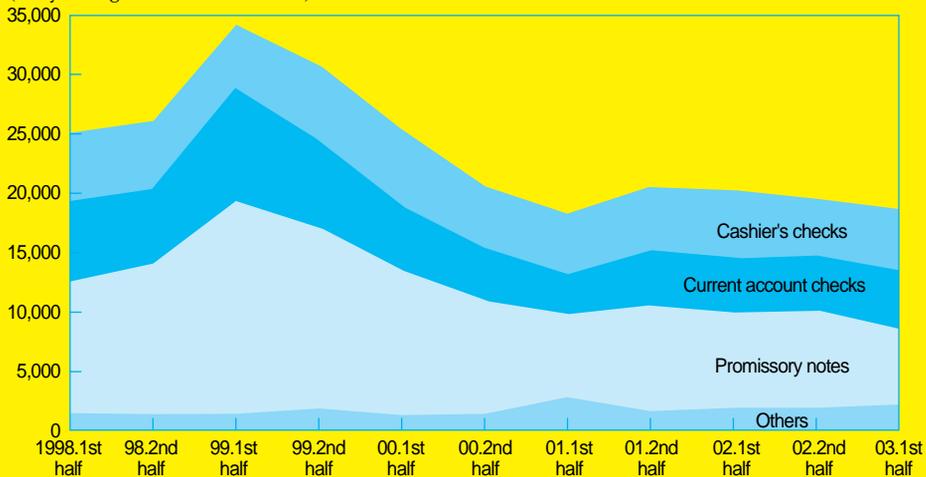
	First Half of 2002		First Half of 2003		Change	
	Volume	Value	Volume	Value	Volume	Value
Promissory notes	25.4 (0.7)	8,020.8 (39.5)	22.7 (0.7)	6,333.0 (33.9)	-10.6	-21.0
Current account checks	11.5 (0.3)	4,584.7 (22.6)	10.0 (0.3)	5,001.3 (26.8)	-13.0	9.1
Cashier's checks	3,785.9 (98.4)	5,827.0 (28.7)	3,358.1 (98.4)	5,109.6 (27.4)	-11.3	-12.3
Non-preset value	131.4 (3.4)	5,029.3 (24.8)	100.7 (2.9)	4,416.8 (23.7)	-23.4	-12.2
Preset value	3,654.5 (94.9)	797.7 (3.9)	3,257.4 (95.4)	692.8 (3.7)	-10.9	-13.1
<100,000 won denomination>	3,151.2 (81.9)	315.1 (1.6)	2,833.7 (83.0)	283.4 (1.5)	-10.1	-10.1
Household checks	13.0 (0.3)	43.5 (0.2)	10.8 (0.3)	39.9 (0.2)	-16.9	-8.1
Others ¹⁾	13.6 (0.4)	1,838.9 (9.1)	12.0 (0.4)	2,181.6 (11.7)	-11.8	18.6
Total	3,849.4 (100.0)	20,314.7 (100.0)	3,413.6 (100.0)	18,665.4 (100.0)	-11.3	-8.1

Notes : 1) Receipts of call money repayments, Certificates of Deposit(CD), etc.

2) Figures in parentheses refer to shares in total.

[Chart 2] Checks and Bills Clearing Trends

(Daily average value in billion won)



certificates increased. In particular, the use of promissory notes dropped by 21.0 percent from the same period of the previous year, as the use of bill substitution schemes²⁾ offering various tax incentives increased continuously.

2. Bank Giro

During the first half of 2003, the average daily transactions through the Bank Giro System registered 3.2 million by vol-

ume terms and 401.8 billion won by value terms, exhibiting rises of 9.1 percent and 12.3 percent, respectively, over the same period of the previous year. This was attributable to a sharp rise in the use of electronic Giro, including automatic transfers, despite the lackluster trend in the use of paper-based Giro. Although the use of electronic Giro increased at a rapid pace, the share of paper-based Giro still accounts for over 50 percent of overall Giro use.

[Table 4] Trends in the Share of Electronic Giro Use

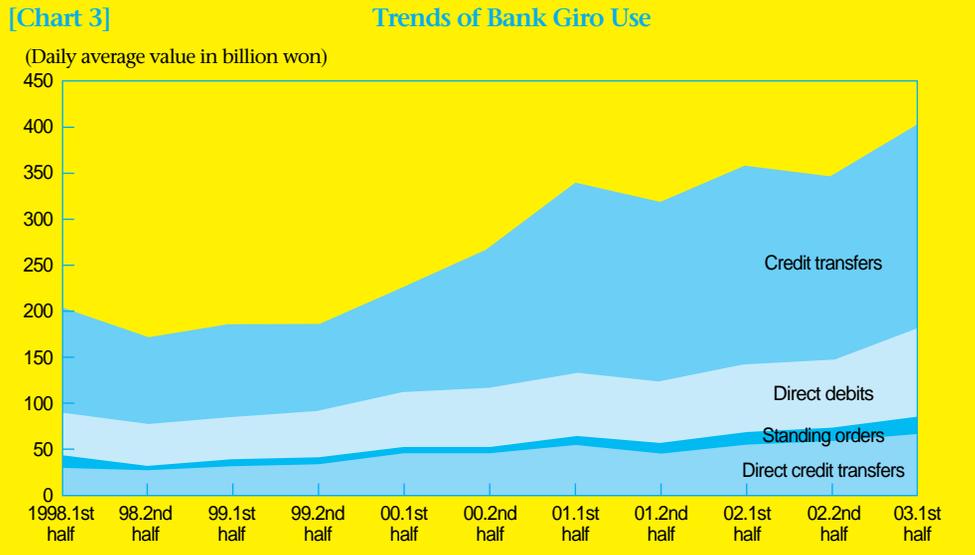
Unit : %			
	2002		First half of 2003
	First half	Second half	
Volume	41.2	43.7	47.7
Value	39.7	42.2	44.8

[Table 5] Payments through Bank Giro in the First Half of 2003

		(daily average)		Unit : thousand, billion won, %			
		First Half of 2002		First Half of 2003		Change	
		Volume	Value	Volume	Value	Volume	Value
Paper-based	Credit transfers	1,698.6 (58.8)	215.9 (60.3)	1,649.6 (52.3)	221.8 (55.2)	-2.9	2.7
	Direct debits	1,088.3 (37.7)	74.0 (20.7)	1,368.4 (43.4)	95.9 (23.9)	25.7	29.6
Electronic-based	Standing orders	56.6 (2.0)	12.8 (3.6)	70.9 (2.2)	16.8 (4.2)	25.3	31.3
	Direct credit transfers	46.2 (1.6)	55.2 (15.4)	64.0 (2.0)	67.3 (16.7)	38.5	21.9
Total		2,889.6 (100.0)	357.9 (100.0)	3,152.8 (100.0)	401.8 (100.0)	9.1	12.3

Note : 1) Figures in parentheses refer to shares in total.

2) Corporate procurement loans, electronic-type loans with accounts receivable as collateral, purchase-exclusive cards, etc.



3. Interbank Shared Networks

During the first half of 2003, the average daily figures for payments through the interbank shared networks registered 6.2 million in volume terms and 13.2 trillion won in value terms, representing increases of 2.0 percent and 19.1 percent, respectively, over the same period of the previous year. This was attributable to a sharp rise in the use of the Electronic Banking Network, including Internet banking, offsetting both a reduction in fund transfers through the Interbank Fund Transfer (IFT) System in the wake of the implementation of the five-day work-week system in the banking industry and a decrease in the use of the Cash Dispenser and Automated Teller Machine

(CD/ATM) Network following the lowering ceilings on credit card advances.

By settlement system type, the use of the Electronic Banking Network rose by 39.7 percent in terms of volume and 53.5 percent in terms of value from the same period of the previous year, affected by the rapid spread of Internet banking.³⁾

On the other hand, the use of the IFT System dropped by 17.6 percent in volume terms and 22.6 percent in value terms from the same period of the previous year. The use of the CD/ATM Network also decreased by 12.1 percent in volume and 12.0 percent in value, respectively, reflecting the reduced ceilings on the use of credit cards and cash advance services.

3) As of the end of June 2003, the number of registered customers for Internet banking stood at 20.0 million, up 38.3 percent from the end of June 2002.

[Table 6] Payments through Interbank Shared Networks in the First Half of 2003

(daily average)

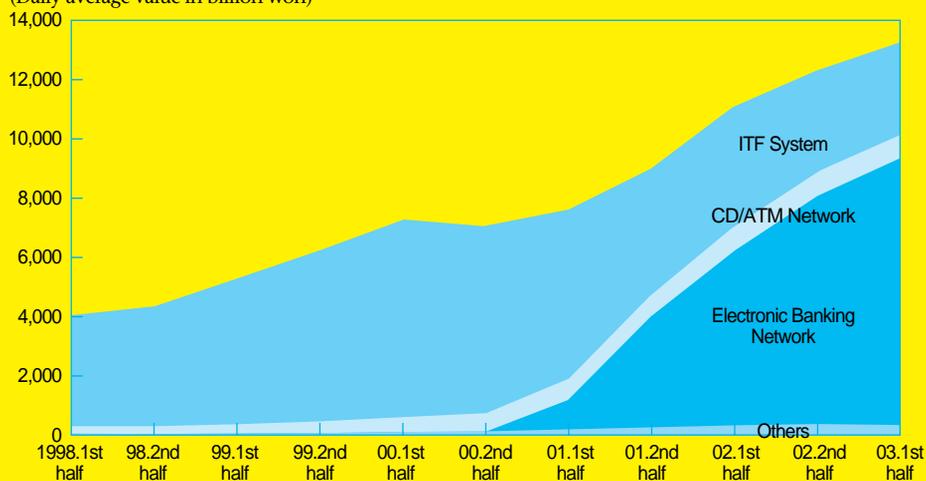
Unit : thousand, billion won, %

	First Half of 2002		First Half of 2003		Change	
	Volume	Value	Volume	Value	Volume	Value
Electronic Banking Network	1,215.3 (19.9)	5,885.3 (52.9)	1,697.4 (27.3)	9,033.1 (68.2)	39.7	53.5
IFT System	1,127.8 (18.5)	4,028.0 (36.2)	928.8 (14.9)	3,119.4 (23.6)	-17.6	-22.6
CD/ATM Network	1,817.7 (29.8)	850.9 (7.7)	1,598.3 (25.7)	749.2 (5.7)	-12.1	-12.0
CMS System	1,928.1 (31.6)	337.3 (3.0)	1,992.1 (32.0)	324.9 (2.5)	3.3	-3.7
Bank Line	4.2 (0.1)	16.2 (0.1)	1.7 (0.0)	12.4 (0.1)	-59.5	-23.5
EFTPOS System	4.5 (0.1)	0.3 (0.0)	3.3 (0.1)	0.2 (0.0)	-26.7	-33.3
Total	6,097.5 (100.0)	11,117.9 (100.0)	6,221.6 (100.0)	13,239.2 (100.0)	2.0	19.1

Note : 1) Figures in parentheses refer to shares in total.

[Chart 4] Trends in the Use of Interbank Shared Networks

(Daily average value in billion won)



4. Credit Cards

During the first half of 2003, the use of credit cards increased by 3.9 percent in volume terms, owing to a steady rise in

the use of credit cards for purchases of goods and services, which accounted for most of the total credit card use in volume terms. However, the use of credit cards decreased by 10.0 percent in value

terms, as their use for cash withdrawals from CD/ATM System fell sharply, affected by soaring credit delinquencies⁴⁾ related to credit cards and reduced ceilings on credit card use.

Accordingly, the use of credit cards per case decreased by 14.3 percent from 280,000 won in the first half of 2002, to 240,000 in the same period of 2003.

Of these totals, average daily transactions for purchases of goods and services continued its upward trend, rising by 13.3 percent in volume terms and 7.2 percent in value terms over the same period of the previous year. The share of

credit card use for purchases of goods and services also expanded to 84.0 percent of total credit card use in volume terms and 47.7 percent in value terms.

However, the use of credit cards for cash advance services dropped by 27.7 percent in volume terms and 21.4 percent in value terms over the same period of the previous year, due to the gradually lowered ceilings on the use of the cash advance services.

As a result, the share of cash advance services in total credit card use fell by 7.0 percentage points (23.0% → 16.0%) in volume terms and 7.6 percentage points

[Table 7] Payments Involving Credit Cards in the First Half of 2003
(daily average)

Unit : thousand, billion won, %

	First Half of 2002		First Half of 2003		Change	
	Volume	Value	Volume	Value	Volume	Value
Purchases	5,683.6	819.1	6,441.1	877.8	13.3	7.2
	(77.0)	(40.1)	(84.0)	(47.7)		
Bank-affiliated	3,522.7	442.4	3,831.4	482.1	8.8	9.0
Non-Bank-affiliated	2,160.9	376.8	2,609.7	395.7	20.8	5.0
Cash Advances	1,701.2	1,223.9	1,230.7	961.8	-27.7	-21.4
	(23.0)	(59.9)	(16.0)	(52.3)		
Bank-affiliated	1,045.0	656.3	779.3	539.5	-25.4	-17.8
Non-Bank-affiliated	656.3	567.6	451.4	422.3	-31.2	-25.6
Total	7,384.9	2,043.0	7,671.8	1,839.6	3.9	-10.0
	(100.0)	(100.0)	(100.0)	(100.0)		
Bank-affiliated	4,567.7	1,098.6	4,610.7	1,021.6	0.9	-7.0
	(61.9)	(53.8)	(60.1)	(55.5)		
Non-Bank-affiliated	2,817.2	944.4	3,061.1	818.0	8.7	-13.4
	(38.1)	(46.2)	(39.9)	(44.5)		
Dependence on cash advance services(%)	23.0	59.9	16.0	52.3	-7.0%p	-7.6%p
Bank-affiliated	22.9	59.7	16.9	52.8	-6.0%p	-6.9%p
Non-Bank-affiliated	23.3	60.1	14.7	51.6	-8.6%p	-8.5%p

Note : 1) Figures in parentheses refer to shares in total.

4) 1.1 million at the end of June 2002 → 1.5 million at the end of December 2002 → 2.0 million at the end of June 2003 (Source: Korea Federation of Banks)

(59.9% → 52.3%) in value terms over the same period of the previous year. However, in terms of value, its share still hovered above 50 percent.

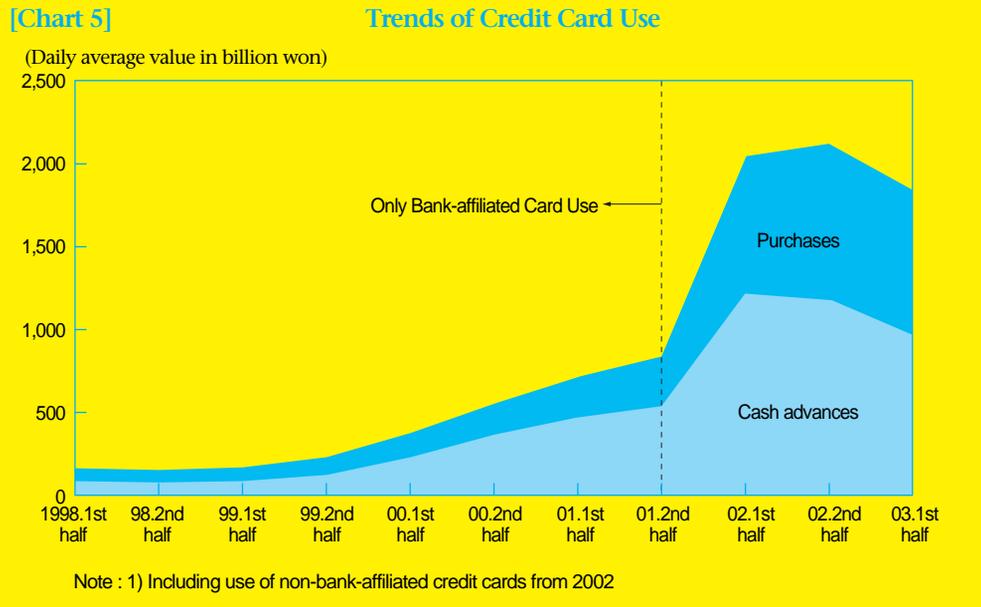
Comparing credit card use between bank-affiliated cards and non-bank-affiliated ones, the growth rate of non-bank-affiliated cards (8.7 percent) was higher than that of bank-affiliated cards (0.9 percent) in terms of volume. In terms of value, however, the rate of decrease non-bank-affiliated cards (-13.4 percent) was larger than that of bank-affiliated cards (-7.0 percent). Meanwhile, the degree of dependence on cash advance services for non-bank-affiliated credit cards fell by 8.5

percentage points in value terms, showing a greater drop than bank-affiliated cards (-6.9 percentage points).

As of the end of June 2003, the total number of credit cards issued stood at 101.1 million⁵⁾, a decrease of 2.3 percent from the end of June 2002, as card companies retired unused cards among those already issued, but the number of merchants accepting cards expanded by 16.9 percent over the end of June 2002 to 16.7 million.⁶⁾

5. The Bank of Korea Financial Wire Network (BOK-Wire)

During the first half of 2003, the BOK-



5) Bank-affiliated cards: 55.7 million, non-bank-affiliated cards: 45.5 million

6) With 8.55 million shops accepting bank-affiliated credit cards and 8.16 million shops accepting non-bank-affiliated credit cards

Wire handled a daily average of 6,673 transactions by volume for a value 86.7 trillion won, representing an increase of

25.6 percent in terms of volume and 8.6 percent in terms of value over the same period of the previous year.

[Table 8] Settlements through BOK-Wire in the First Half of 2003

(daily average)

Unit : number, billion won, %

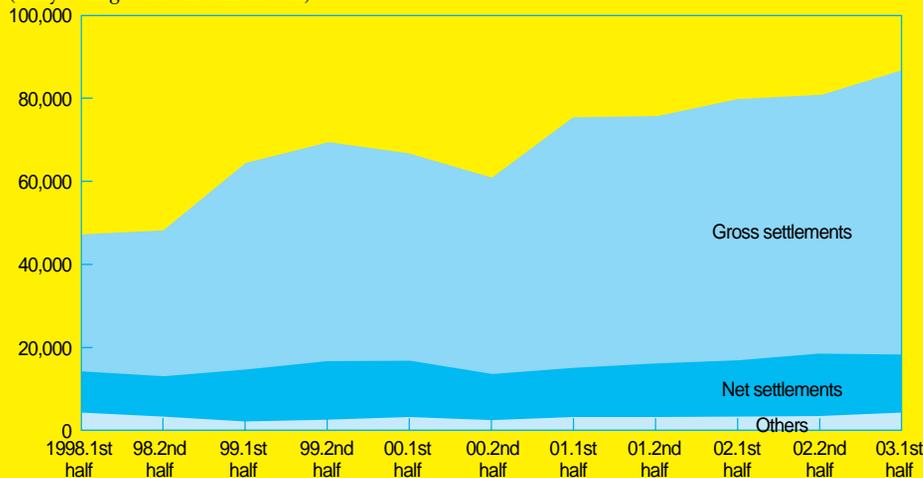
	First Half of 2002		First Half of 2003		Change	
	Volume	Value	Volume	Value	Volume	Value
Gross settlements	3,772.0 (71.0)	63,098.3 (79.0)	4,368.2 (65.5)	68,526.4 (79.0)	15.8	8.6
General transfers	3,425.7 (64.5)	51,089.3 (64.0)	3,840.7 (57.6)	56,045.4 (64.6)	12.1	9.7
Call transaction system	181.6 (3.4)	10,933.4 (13.7)	193.1 (2.9)	10,293.6 (11.9)	6.3	-5.9
DVP	164.7 (3.1)	1,075.6 (1.3)	334.4 (5.0)	2,187.4 (2.5)	103.0	103.4
Net settlements	787.0 (14.8)	13,533.1 (16.9)	676.5 (10.1)	14,157.7 (16.3)	-14.0	4.6
Others ¹⁾	755.4 (14.2)	3,216.2 (4.0)	1,628.1 (24.4)	4,028.5 (4.6)	115.5	25.3
Total	5,314.4 (100.0)	79,847.6 (100.0)	6,672.7 (100.0)	86,712.6 (100.0)	25.6	8.6
Foreign currency fund transfers (million dollars)	8.4	88.7	9.7	124.3	15.5	40.1

Notes : 1) Revenues and expenditures of national funds, BOK loans, transactions of state and public bonds, etc.

2) Figures in parentheses refer to shares in total.

[Chart 6] Trends of BOK-Wire Use

(Daily average value in billion won)



Real-time gross settlements, which account for the majority of transactions through BOK-Wire, increased by 15.8 percent in volume terms and 8.6 percent in value terms over the same period of the previous year. This was mainly attributable to a sharp rise in bond transactions, including settlements through the Delivery Versus Payment (DVP) System for securities trading and transfers of general funds for settlement for securities trading.

In the meantime, net settlements between financial institutions through BOK-Wire decreased by 14.0 percent in volume terms due to the integration of the computer systems of merged banks,⁷⁾ but increased by 4.6 percent in value terms over the same period of the previous year.

The rise in net settlements in terms of value was ascribable to an increase in the use of interbank shared networks, including Electronic Banking Networks, in the wake of the implementation of the five-day workweek system in the banking industry.

III . Improvements in Payment and Settlement Systems

During the first half of 2003, the Bank of Korea carried out payment and settlement business with a focus on satisfying international standards of the payment and settlement systems, improving paper-based and electronic retail payment systems, and reducing foreign exchange-related settlement risks, in order to enhance the safety and effectiveness of the payment and settlement systems.

First, the Bank of Korea improved relevant systems to help bring some of payment and settlement systems in Korea up to par with international levels. As part of its Financial Sector Assessment Program (FSAP) for 2002, the IMF, along with the World Bank, undertook an appraisal as to whether or not the domestic payment and settlement systems meet international standards. It also issued "Report on the Observance of Standards and Codes (ROSC)" in March 2003, which recommends that the Bank of Korea's rights and responsibilities for the payment and settlement systems be clearly stipulated in the Bank of Korea Act, and that steps be taken to reduce the settlement volume of the bill clearing system.

7) Kookmin Bank and the former Housing and Commercial Bank of Korea unified their computer systems on Oct. 7, 2002, and Hana Bank and the former Seoul Bank consolidated their computer systems on May 12, 2003.

Based on the ROSC, the Bank of Korea mapped out a plan to improve the call fund settlement system,⁸⁾ which called for the replacement of the existing call fund-collecting formula and by a new protocol, with the aim of an automatic redemption on the maturity date through BOK-Wire call transaction system without call bills or receipts for the repayment of call loans. This changeover was implemented in July 2003. Under the existing call fund-collecting formula, financial institutions withdraw call loans by submitting call bills issued by call money institutions (fund borrowing institutions) in the case of call transactions between banks and non-bank financial institutions, or between non-bank financial institutions, or receipts for the repayment of call loans issued by call loan institutions (fund supplying institutions) to clearings.

Also, the Bank of Korea instructed the Korea Financial Telecommunications & Clearings Institute (KFTC) in April 2003

to carry out a self-appraisal as to whether major retail payment systems operated by the KFTC faithfully observed core principles set by the Bank for International Settlements (BIS), and to publish the results.

At the same time, the Bank of Korea pushed ahead with a measure to improve the paper-based settlement system, for bills, checks and Giro. To effectively operate the domestic letters of credit (L/C) bill system and reduce banks' burden on the businesses related to the exchange of domestic L/C bills, the Bank of Korea changed the method of requesting payment for the won-denominated domestic L/C bills from the existing receipts exchanging formula⁹⁾, to an information exchange formula.

Along with this, "A Receipt of Giro public utility charges services using the CD/ATM system¹⁰⁾", which was launched in December 2002 in order to help banks reduce their business burden related the receipt of paper-based Giro at bank win-

8) Under the improved step, all institutions participating in BOK-Wire are entitled to utilize the BOK-Wire call transaction system, whose use had been limited to banks in the past. Call money institutions, which do not participate in the BOK-Wire, are entitled to use the call electronic bonds, whose use is being pursued by the KFTC, when repaying call funds. It also helped institutions related to the issuance of call bills reduce their business burden and the risks related to the carriage of huge amounts of bills.

9) In the case of won-denominated domestic L/C bills at present, if a seller submits L/Cs (issued by the purchaser's trading bank), receipts verifying transactions, and bill of exchange (issuer: seller, undertaker: purchaser's trading bank) to his or her trading bank, the bank is to present it to the purchaser's trading bank within 3 days after the settlement date. Meanwhile, the seller's trading bank is to issue the receipts for the settlements of the domestic L/C bills and receive due amount of the bill through its clearing provided there is no notice about default until the next business day after the presentation date.

10) This refers to the service where a payer pays Giro public utility charges with a Giro paper slip bearing an electronic payment number through debit cards using the CD/ATM machine. The hours available for payments are from 9:30am to 5:00pm on a bank business days at present. In the future, banks plan to extend them according to their particular situation. The commission that using institutions must pay in regard to this service is set at 140 won per case, lower than the Giro commission for receipt at the bank window (normally 170 won per case) in order to stimulate usage of this service.

dows and enhance customer convenience, from April 2003 was implemented for 13 institutions including four receiving public utility charges; namely national pension, health insurance premium, electricity charges, and Korea Telecom bills.

In the meantime, the Bank of Korea sought improvement of the electronic retail payment system as part of the projects undertaken by the Sectional Committee on Financial Informationalization Promotion. In a joint business project with financial institutions, the Bank of Korea has been increasing the number of K-Cash users centering on the transportation and e-commerce fields. To prevent forgery and illegal cash withdrawal incidents occurring due to the insecurity and vulnerability of Magnetic Stripe Cash Cards, the Bank of Korea is also pushing for a shift to Integrated Circuit Cards.

In order to reduce social problems caused by excessive use of credit cards,

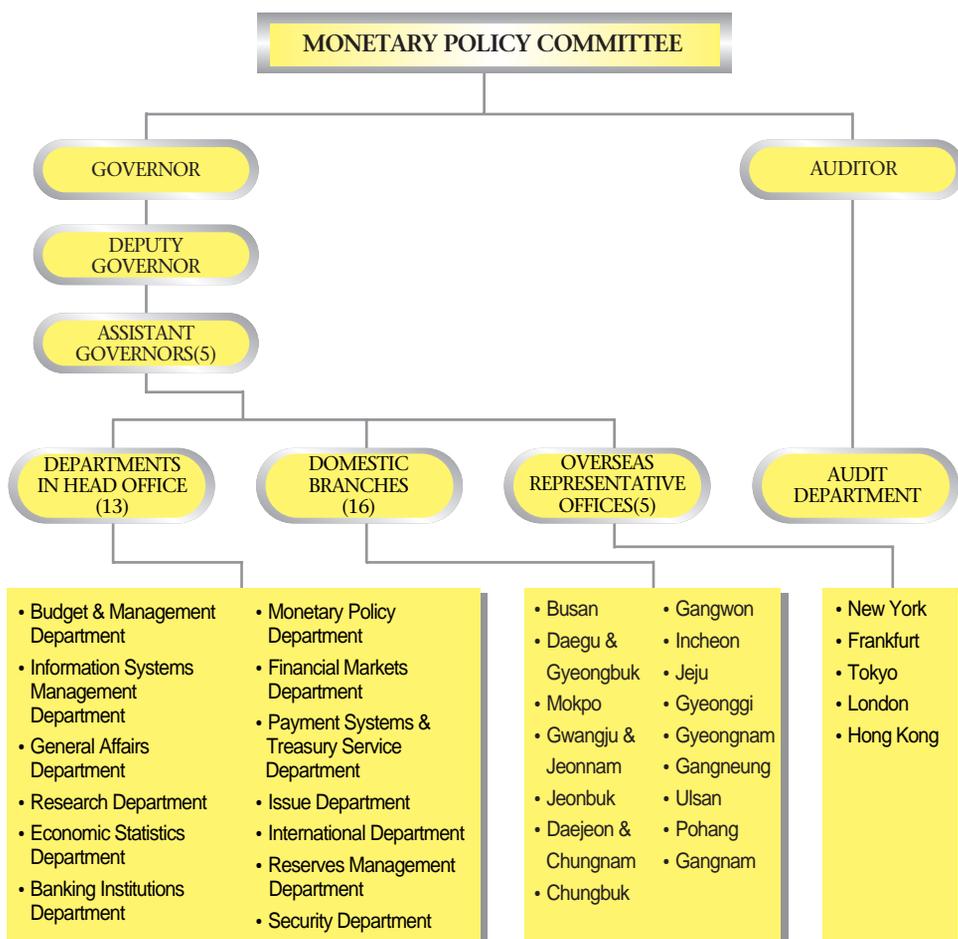
the Bank of Korea is also pushing ahead with measures to grant tax incentives to users of debit cards and attract more shops and banks dealing with debit cards as a means to expand the use of debit cards.

Finally, the Bank of Korea requested the Continuous Linked Settlement Bank (CLS Bank), which was established to reduce foreign exchange settlements risk through Payment-Versus-Payment (PVP) of all foreign exchange transactions in the world, to designate the Korean won as one of its settlement currencies and carried out the necessary procedures. To this end, the Bank of Korea put a “plan to construct CLS joint networks” before the Bank Sectional Committee on Financial Informationalization Promotion in June 2003 and on receiving its approval, requested the CLS Bank to designate the Korean won as one of its settlement currency.

Organization of the Bank of Korea

(As of September 2003)

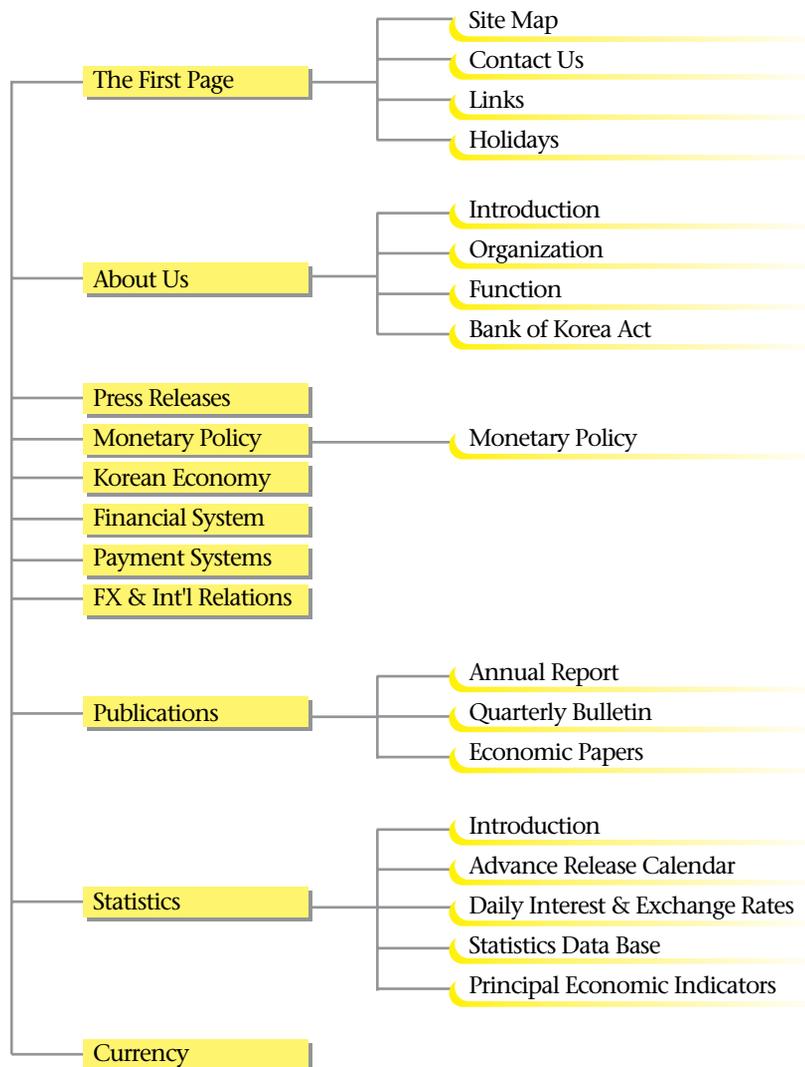
Monetary Policy Committee Seung Park, Chairman Won-Tai Kim Hoon Namkoong Byung-II Kim Tae-Dong Kim Woon-Youl Choi Kun-Kyong Lee	Governor Seung Park Deputy Governor Seong-Tae Lee Assistant Governor Chang-Ho Choi Jae-Ouk Lee Kyuyung Chung Shang-Heon Lee Bang-Woo Jung	Auditor Sang-Yong Lee
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The Bank of Korea's Internet Web Site

1. Press releases and selected data from statistical series - National Accounts, etc - are posted on the Bank of Korea's Web Site (<http://www.bok.or.kr>)

2. Internet Web Site Menus are set out below :



List of Publications

● Periodical

Title	Frequency	Language	Dissemination Type*
Annual Report	Annually	English	P, O
Quarterly Bulletin	Quarterly	English	P, O
Monthly Bulletin	Monthly	Korean	P, O
Working Paper	Occasionally	Korean	P
Economic Analysis	Quarterly	Korean	P, O
Economic Papers	Semiannually	English	P, O
Finance and Economics Working Paper	Occasionally	Korean	P
Financial System Review	Semiannually	Korean	P, O

* Notes : P : printed publication, O : available on-line at the Bank of Korea's web site

● Statistics

Title	Contents	Frequency	Dissemination Type*
Monthly Statistical Bulletin	Major national economic statistics covering money and banking, prices, balance of payments, foreign trade, industry, employment, national accounts, etc.	Monthly	P, B
Economic Statistics Yearbook	Statistics included in the Monthly Statistical Bulletin and others	Annually	P, B
Principal Economic Indicators	Principal indicators and the statistics included in the Monthly Statistical Bulletin	Semimonthly	B
Money & Banking Statistics	Statistics on monetary aggregates(M1, M2, M3, etc.), the principal accounts of CBs & SBs and other financial institutions, capital market trends, principal interest rates, etc.	Monthly	P, B

Title	Contents	Frequency	Dissemination Type*
Regional Financial Statistics	Statistics on the issuance and withdrawal of banknotes and coin by BOK's branches, the deposits and loans of BOK, CBs & SBs, other financial institutions by province, etc.	Monthly	P
Balance of Payments	Current account, capital account, financial accounts, exports & imports by type of goods, indexes of foreign trade and terms of trade, etc.	Monthly	P, B
Price Statistics Summary	Brief review of price movements, statistical compilation procedures and statistics on the producer price index for 949 commodities, and export and import price indexes for 220 and 223 goods.	Every 5 years	P
Monthly Prices	Brief analysis of price movements and statistics on producer price index, export price index, import price index and prices of major world trade commodities, etc.	Monthly	P, B
Input-Output Tables	Outline of compilation method, inter-industrial structure of the Korean economy, transactions tables, input coefficients matrices, production inducements coefficients matrices, supporting tables	Every 5 years	C
National Accounts	Principal indicators of national accounts, consolidated accounts for the nation, income accounts by institutional sector, capital finance account by institutional sector, supporting tables	Annually	P, B, C
Gross Domestic Product	Gross domestic product by kind of economic activity, expenditure on gross domestic product	Quarterly	P, B

Title	Contents	Frequency	Dissemination Type*
Financial Statement Analysis	Summary of survey results, description of survey methods, explanation of company accounts and financial analysis ratios, statistics of estimated balance sheets, income statements, statistics of cost of goods manufactured, funds flow statements and financial ratios, series of major countries' financial analysis ratios, etc.	Annually	P, B
Flow of Funds	Financial surpluses and deficits by economic sector, fund raising and investment by non-financial sectors, the financial sector's sources and uses of funds, accumulation of financial assets	Quarterly	P, B

* Notes : P : printed publication,
 B : on-line database system (BOKIS, accessible via the Bank of Korea's Web Site),
 C : CD-ROM

List of Bank of Korea Working Papers*

Serial No.	Title
2003-1	An Analysis of the Competitive Relationships between the Semiconductor Industries of Korea, Japan and Taiwan
2003-2	Medium and Long-term Tasks Facing the Korean Economy
2003-3	Background of China's Rapid Growth and Its Sustainability
2003-4	Inter-Korean Economic Cooperation Policy Tasks in Developing Korea into a Transportation Hub of Northeast Asia
2003-5	Financial Holding Companies in Korea

* Published in Korean only.

Titles of Articles Appearing in Monthly Bulletin*

July ~ September 2003

● July 2003

- ☒ Analysis of Effects of Monetary Policy by Industry
- ☒ The Recent Trends of the World Economy and its Outlook

● August 2003

- ☒ Microstructure Approach to the Exchange Rate Determinants of the Korean Won
- ☒ Payment and Settlement Trends in the First Half of 2003

● September 2003

- ☒ The Bond Market's Discipline of Credit Card Companies
- ☒ The Balance of Payments in the First Half of 2003

* Published in Korean only.

Titles of Articles Appearing in Quarterly Bulletin*

March 2000 ~ June 2003

● March 2000

- ☒ Current Economic and Financial Movements
- ☒ The Inflation Target for 2000
- ☒ Financial Sector Restructuring in 1999
- ☒ Payment and Settlement Trends in 1999

● June 2000

- ☒ Governor's Speech on the 50th Anniversary of the Bank of Korea's Foundation
- ☒ Current Economic and Financial Movements
- ☒ Flow of Funds in 1999
- ☒ Financial Statement Analysis for 1999

● September 2000

- ☒ Current Economic and Financial Movements
- ☒ The Relationship between Business Survey Results and the Growth Rate of GDP

● December 2000

- ☒ Current Economic and Financial Movements
- ☒ Monetary Policy in a World of Increased Capital Flows
- ☒ Flow of Funds in the First Half of 2000

* Entitled 「Quarterly Economic Review」 until March 2000.

● March 2001

- ☒ Current Economic and Financial Movements
- ☒ The Inflation Target and Monetary Policy for 2001
- ☒ Financial Sector Restructuring in 2000
- ☒ Payment and Settlement Trends in 2000

● June 2001

- ☒ Governor's Speech on the 51st Anniversary of the Bank of Korea's Foundation
- ☒ Current Economic and Financial Movements
- ☒ Flow of Funds in 2000
- ☒ Financial Statement Analysis for 2000

● September 2001

- ☒ Current Economic and Financial Movements
- ☒ The Structure and the Interindustry Effects of the Korean Economy Based on the Input-Output tables of 1998
- ☒ Payment and Settlement Trends in the First Half of 2001

● December 2001

- ☒ Current Economic and Financial Movements
- ☒ Flow of Funds in the First Half of 2001
- ☒ Financial Statement Analysis for the First Half of 2001

● March 2002

- ☒ Current Economic and Financial Movements
- ☒ The Inflation Target and Monetary Policy for 2002
- ☒ Financial Sector Restructuring in 2001
- ☒ Payment and Settlement Trends in 2001

● June 2002

- ☒ Governor's Speech on the 52nd Anniversary of the BOK's Foundation
- ☒ Current Economic and Financial Movements
- ☒ The Redefined Monetary Aggregates
- ☒ Flow of Funds in 2001
- ☒ Financial Statement Analysis for 2001

● September 2002

- ☒ Current Economic and Financial Movements
- ☒ Payment and Settlement Trends in the First Half of 2002

● December 2002

- ☒ Current Economic and Financial Movements
- ☒ Flow of Funds in the First Half of 2002
- ☒ Financial Statement Analysis for the First Half of 2002

● March 2003

- ☒ Current Economic and Financial Movements
- ☒ The Inflation Target and Monetary Policy for 2003
- ☒ Financial Sector Restructuring in 2002
- ☒ Payment and Settlement Trends in 2002

● June 2003

- ☒ Address upon the 53rd Anniversary of the Foundation of the Bank of Korea
- ☒ Current Economic and Financial Movements
- ☒ Summary of Financial Stability Report
- ☒ Flow of Funds in 2002
- ☒ Financial Statement Analysis for 2002

