DRD DISCUSSION PAPER

Report No. DRD208

THE RECENT MACROECONOMIC EVOLUTION OF THE REPUBLIC OF KOREA: AN OVERVIEW

by

Vittorio Corbo
and
Sang Woo Nam

Development Research Department
Economics and Research Staff
World Bank

May 1986
Revised February 1987

THE RECENT MACROECONOMIC EVOLUTION OF THE REPUBLIC OF KOREA: AN OVERVIEW

Vittorio Corbo

and

Sang-Woo Nam

World Bank

The authors are grateful to J. Williamson for comments and to Inbom Choi for research assistance.

The Recent Macroeconomic Evolution of the Republic of Korea: An Overview

Vittorio Corbo
and
Sang-Woo Nam

Abstract

Korea, in its pursuance of an export-oriented growth strategy, was gravely hit by the two oil price shocks in the 1970s, but has overcome the difficulties with fairly successful adjustment policies. This paper reviews the recent macroeconomic evolution of Korea by describing its basic policy regimes, domestic as well as external shocks, and the ensuing policy responses.

We also investigate the impact of external shocks on the Korean economy and evaluate the role of major macro policies by examining the stance of fiscal and monetary policy. The analysis of the impact of external shocks is based on a small model of the current account to be used for counterfactual simulation experiments to evaluate how different the economy would have been without the first and second oil price shocks as well as the favorable turnaround of the external environment since 1983. Fiscal policy is analyzed using the IMF and OECD measures of fiscal impulse, while the analysis of monetary policy is based on the estimation of a rather standard demand for money equation.

We have found that external shocks had profound adverse effects on Korea's current account, growth and inflation, while the favorable external environment since 1983 helped the economy significantly. The real exchange rate was observed to have played a central role in encouraging growth in 1980, the year of the most serious domestic and external shocks, and since 1983 when domestic prices have been stabilized. Finally, we have also found that both fiscal and monetary policies in Korea were utilized in a very discretionary way. Since the late 1970s when a comprehensive stabilization program was launched, they have mainly been used to achieve price stabilization with the resulting real depreciation of the exchange rate, but were modified flexibly enough to mitigate any excessive slowdown in economic growth.

Table of Contents[1]

Tables

Figures

1. Introduction

The purpose of this paper is to provide an overview of the recent evolution of the Korean economy, especially during the last ten years (the most recent of which have been years of adjustment).

The paper is divided into five sections. Section 2 reviews the evolution of the main macroeconomic variables over the last 22 years. In particular we discuss the role of incentives in the evolution of exports and output, and the effects of external shocks. Section 3 provides an accounting decomposition of GNP growth in terms of both demand and supply. In Section 4, which investigates the impact of external shocks on the Korean economy, we build a model of the current account that is first estimated and then simulated for three counterfactual experiments. In the first experiment, we assume that the external environment (terms of trade, LIBOR rate, industrialized countries' growth) of 1973-75 continued to correspond to that of 1971-72. In the second experiment, we assume that the external environment of 1979-82 continued to correspond to that of 1976-78. The final experimemt is based on the assumption that the external environment of 1980-82 continued during 1983-85. In the fifth section we examine Korea's fiscal and monetary policy: fiscal policy is analyzed for the 1971-84 period using the IMF and OECD methodology of fiscal impulses; monetary policy is evaluated for the years 1979-1982 and 1983-1984. Section 6 presents our main conclusions.

2. The Oil Shocks and Economic Development

It is well known that Korea has had one of the most successful records of economic development in the last two decades. What is less well known is that it also experienced substantial macroeconomic imbalances in the late 1970s and early 1980s, manifested in an acceleration of inflation, a

slowdown in export growth, a large increase in the current account deficit and ultimately a sharp drop in GNP.

For the purpose of evaluating Korea's economic development, we can separate the last twenty-five years into three sub-periods: 1963-1972, 1973-1980 and 1981-1985. The first period started with changes in the trade regime that sharply raised relative incentives to export activities and reduced the extreme variance of incentives across import competing activities; this phase ended by the time of the first oil shock. The second period began with the first oil shock and included a period of government promotion of heavy and chemical industries, a strategy that was deemphasized following the crisis of the late 1970s; this period also included the second oil shock and ended with two disastrous years for agriculture. The final period comprises the years of adjustment.

During the first period, Korea achieved stunning successes. As shown in Table 1, real GNP growth averaged 9.5 percent per annum, largely due to an explosion in manufacturing exports (during this period, total exports grew at an annual average rate of 32.4 percent). In this high growth period, annual inflation was slightly above the one digit level, reaching an annual average of 15 percent for the GNP deflator (GNPD) and 9.7 percent for the wholesale price index (WPI).

In the same period, domestic absorption grew at a rate almost a full percentage point above that for GNP and foreign transfers were only minor. The current account deficit averaged 5.0 percent of GNP for the period, although it averaged 8.4 percent of GNP during 1968-71.

After a rationalization of the trade regime that was accompanied by a large real devaluation in the period 1963 to 1965, there was a continuous appreciation up to 1968. From 1968 to 1969 the real exchange rate was almost

Table 1

Annual Macro Indicators, 1963-1985

Year	Exports 1/	GNP	GDP	Absorption	GNP Deflator	WPI	Consolidated Public Sector Deficit	Current Account Deficit	Terms of Trade	Real Effective Exchange Rate 2/
	Percentage Changes						Percent of GNP		Indexes: 1980 = 100	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1963	n.a.	9.1	n.a.	n.a.	29.3	19.4	n.a.	-5.3	111.3	75.3
1964	23.5	9.6	9.7	1.7	30.0	33.9	n.a.	-0.9	112.5	93.5
1965	35.9	5.8	5.7	6.1	6.3	10.3	n.a.	0.3	114.3	107.4
1966	42.4	12.7	12.2	14.6	14.2	8.6	n.a.	-2.8	127.7	103.7
1967	32.6	6.6	5.9	9.4	15.8	6.2	n.a.	-4.5	132.2	97.7
1968	39.5	11.3	11.3	14.5	15.9	8.1	n.a.	-8.4	137.7	93.0
1969	36.1	13.8	13.8	16.5	14.6	6.9	n.a.	-8.3	132.6	93.6
1970	19.6	7.6	8.8	6.5	15.7	9.4	n.a.	-7.8	133.8	96.4
1971	20.9	8.8	9.2	10.3	13.4	8.6	1.0	-9.0	132.7	103.6
1972	36.6	5.7	5.9	1.5	16.4	13.8	4.6	-3.5	132.1	112.6
1973	55.3	14.1	14.4	12.7	13.4	6.9	1.6	-2.3	125.4	127.1
1974	-2.8	7.7	7.9	12.9	29.5	42.1	4.0	-10.9	102.1	107.7
1975	15.9	6.9	7.5	4.4	25.8	26.5	4.6	-9.0	92.1	110.3
1976	41.6	14.1	12.7	10.1	20.5	12.2	2.9	-1.1	105.1	101.8
1977	22.6	12.7	10.8	11.5	15.8	9.0	2.6	0.0	112.4	101.8
1978	19.9	9.7	10.1	14.1	21.9	11.6	2.5	-2.1	117.8	104.4
1979	-3.8	6.5	7.3	11.5	21.1	18.8	1.4	-6.7	115.3	97.1
1980	9.7	-5.2	-2.9	-8.0	25.6	38.9	3.2	-8.7	100.0	100.0
1981	17.3	6.2	6.9	2.9	15.9	20.4	4.6	-6.9	97.9	96.1
1982	6.2	5.6	5.5	4.5	7.1	4.7	4.3	-3.7	102.2	95.4
1983	13.8	9.5	9.5	8.5	3.0	0.2	1.6	-2.1	103.1	101.3
1984	7.9	7.6	7.9	7.2	4.0	0.7	1.4	-1.7	105.3	104.1
1985 3/	2.3	5.1	5.2	3.8	3.6	0.9	n.a.	-1.1	105.9	110.6
Period Average 4/										
1963-72	32.4	9.5	9.5	10.3	15.0	9.7	n.a.	-5.0	126.7	97.7
1973-80	16.7	8.7	8.6	9.0	21.8	18.7	2.9	-5.1	108.8	106.3
1981-85	9.7	7.8	7.8	6.9	4.5	1.7	3.0	-3.1	102.9	101.5

1/ Total exports of goods and non-factor services.

2/ The real effective exchange rate is defined as foreign prices in domestic currency divided by domestic prices with trade weights.

3/ Data for 1985 are based on new system of national accounts.

4/ Average growth rates for columns (1) through (6) are based on compound rates (i.e., $Y_t = Y_o(1+g)^t$, where g is the growth rate and Y is the observed value of the variables. We obtain g by regressing $\ln Y_t = b_1 + b_2 t$, where $g = e^{b_2} - 1$).

Sources: Bank of Korea and Economic Planning Board, except for column (10) whis is KDI estimates.

constant but then there was a continuous real depreciation up to 1972. The real exchange rate depreciated 49.5 percent between 1963 and 1972, but by early 1972 was back to its 1965 value. The real depreciation of the early years was associated with a substantial improvement in the current account and high export growth. 1/ In contrast, the real appreciation of the 1966 to 1969 period in spite of the improvement in the terms of trade, was associated with a sharp deterioration in the current account. Export and output growth also slowed down in the early 1970s. In spite of short term movements, however, the real exchange rate clearly remained relatively stable in the 1965-1972 period.

The good performance of exports during this period can be attributed to several factors. First, the large real devaluation of the 1963-64 period and the accompanying export promotion policies sharply realigned incentives in favor of export oriented activities (Westphal 1978, Nam 1985). Second, the improvement in export incentives came at a time of substantial expansion in world trade. Indeed, in the period 1963-72 the value of world trade grew at an average annual rate of 11.6 percent. The third reason for Korea's good export performance is the very small base value of commodity exports, which amounted to only 55 million dollar in 1962.

During the 1973-1980 period, Korea adjusted its development strategy. Several factors influenced the decision to encourage import substitution activities in investment goods and raw materials. First, following a nearly one-third reduction in the number of U.S. troops stationed in Korea in the early 1970s, the government decided to promote the defense industry out of

---

1/ It has been claimed that in the initial years of the export promotion drive there was a deliberate effort to keep the real exchange rate above its equilibrium level as an export promotion device (Krueger 1986).

concern for national security. Second, a concern about a future loss of comparative advantage in light manufacturing exports resulted in the Korean authorities encouraging what was thought by them as the industries of the future. As a result the Korean authorities embarked in an enormous investment effort in the heavy and chemical industries, with the aim of strengthening the country's industrial structure and developing a domestic defense industry. Large scale investment projects in these industries were encouraged through special tax incentives, preferential credit allocation, and negative real interest rates in a system dominated by widespread credit rationing. Furthermore, the recessionary effect of the sharp drop in terms of trade following the first oil shock (the terms of trade deteriorated by 30.3 percent between 1972 and 1975) was neutralized by the large expansion in investment in heavy and chemical industry; at the same time, an expansionary monetary policy resulted in a sharp increase in total real absorption and a large foreign-debt-financed current account deficit that reached 10.9 percent of GNP in 1974 (as shown in table 1, column 8; this is the highest value for the last 22 years).

The sharp rise in grain import prices after the first oil shock also lent support to proponents of self-sufficiency in major food grains. Thus, during 1975-78, the government extended its price support program for rice. The resulting deficits in the government-run Grain Management Fund and the Fertilizer Account were jointly responsible for 37% of the total growth of the money supply during 1976-78.

Expansionary aggregate demand policies and heavy foreign borrowing made it possible for Korea to achieve an average annual rate of growth of GNP of 8.7 percent in the 1973-1980 period. Meanwhile, however, external debt grew at an average annual rate of 28.8 percent. Furthermore, the expansionary

monetary policy of these years -- involving an average annual rate of growth of M2 of 29.3 percent -- resulted in a high average annual rate of inflation (of 21.8 percent for the GNP deflator and 18.7 percent for the WPI) in spite of the controls for many wage goods. Indeed, for many wage goods the growth in wage income plus remittances from the Middle East resulted in excess demand that was controlled with price controls and the black market flourished. Finally, the labor market was very tight; the unemployment rate fell almost continuously during the period, reaching 3.2 percent in 1978 and then increasing slightly to 3.8 percent in 1979 and 5.2 percent in 1980, the year of the deep recession.

The fixed nominal exchange rate from 1974 to 1979, together with expansionary demand policies that resulted in domestic inflation being higher than international inflation, led to a 23.6 percent appreciation in the real effective exchange rate between 1973 and 1979 1/ (Table 1, Column 10). The rate of growth in output per unit of input slowed considerably, from 4.9 percentage points during the 1963-1972 period to only 1.6 percentage points for the period 1972-82 (Kim and Park, 1985, page 64). Meanwhile, after initially rapid export expansion in the early years of export led growth, the rate of increase slowed to 16.7 percent per year; the export growth rate was actually negative in 1974 and 1979. Increase in wages and lack of access to bank credit was hitting hard the profitability of labor intensive exports. As a consequence of an overheated labor market, real wages in manufacturing and export activities grew by 110.2 and 105.2 percent respectively between the 1974-75 period and 1979 (Table 2 columns 2 and 4). Not surprisingly Korea was

---

1/ Most probably the real appreciation was even higher as price controls were quite extensive by 1979 with important premiums in black markets.

Table 2

Relative Prices and Financial Variables

	1965-73	1974-75	1976-78	1979	1980-81	1982-85
I. Relative Prices (Index, 1980 = 100)						
Real Wages, deflated by						
Export Prices	39.1	52.0	82.6	106.7	101.9	126.2
Manufacturing Prices	41.5	54.8	86.6	115.2	100.8	130.0
CPI	39.9	57.5	82.1	104.9	99.5	118.7
Real Effective Exchange Rate	102.2	109.1	100.4	95.2	97.4	101.7
External Terms of Trade	129.8	97.1	111.8	115.3	99.0	104.1
II. Financial Variables: (%)						
Interest Rate a/						
- Banking	11.5	-13.5	4.7	-4.0	-3.6	8.3
- Curb Market	37.9	6.1	26.3	15.2	11.4	24.9
Public Sector Deficit/GNP	2.4 b/	4.3	2.7	1.4	3.9	2.2
M_2 c/	46.4	26.5	35.1	26.8	26.6	18.5
Bank Credit c/	43.0	42.5	30.7	35.7	35.8	18.0

Sources: Bank of Korea and Ministry of Finance.

a/ Real rates, computed as $\frac{i - \pi}{1 + \pi}$ where π is the annual average of the WPI inflation.
b/ Average of 1971-73.
c/ Percentage rates of changes.

rapidly losing its competitiveness in labor intensive activities in comparison with unit labor costs in other NICs. One of the bright features of this period was the large increase in the export of construction services to the Middle East. However, this activity was encouraged by heavy government subsidies out of concern for the deteriorating external accounts. In spite of the real exchange rate appreciation and expansionary domestic policies, the current account deficit as a share of GNP fell from 9.0 percent in 1975 to 1.1 percent in 1976 and practically to zero in 1977, before increasing to 2.1 percent in 1978, to 6.7 percent in 1979 and 8.7 percent in 1980.

The end of the seventies found Korea at a crossroads. Widespread price control and subsidized credit allocation schemes were encouraging rent-seeking activities. Expansion had slowed considerably in the export sector, which had previously been the main engine of growth. The massive investment in heavy and chemical industry had resulted in wasteful excess capacity. The second oil shock was threatening to produce a further deterioration in the terms of trade, and the increase in international interest rates was calling into question the high borrowing growth strategy of the late seventies. To make matters worse, three consecutive bad harvests resulted in a drop in real agricultural GNP in both 1978 and 1980; the drop in 1980 was an especially severe 21.7 percent. The unemployment rate reached 5.2 percent in 1980, the highest level for the last ten years and comparable to that of the 1965-73 period.

During the late 1970s, the acceleration of inflation and the combination of credit rationing and negative real interest rates resulted in a feverish demand for real estate and other real assets, which in turn led to a real estate boom. It became increasingly profitable for business firms to borrow as much as possible from banks at negative real interest rates to

invest in real assets. This in turn led to an increasingly fragile corporate financial structure. The government attempted to curb inflation through price controls but this predictably produced supply shortages, black markets, and deteriorating product quality. Not surprisingly, in the late 1970s the Korean public became increasingly concerned about the efficiency of widespread government control in an increasingly complex and highly open economy (Park 1985b).

To correct this situation, a comprehensive stabilization program that included economic liberalization actions was adopted in the spring of 1979. The program called for the deferral of large investment projects, a 5% cut in nominal current expenditures, and a monetary policy that called for positive real interest rate and tight control of monetary expansion to support the stabilization effort. 1/ The second oil shock, and the dismissal of the risky alternative of financing a large current account deficit made the stabilization effort much more urgent. Finally, in early 1980 a large devaluation followed by a managed float and supportive restrictions on aggregate demand were introduced to improve the real exchange rate and to correct one of the basic macro imbalances.

The third period, 1981-1984 is made up of the years of adjustment. The adjustment process started with the 1979 stabilization plan outlined above; it was followed by the devaluation of early 1980 and reforms in credit allocation that reduced discrimination against small and medium enterprises in terms of access to credit (Cho and Cole 1986). Supply side policies included a price stabilization program for daily necessities (which included the

---

1/ For an analysis of the recent Korea's inflation experience see Corbo and Nam (1986).

expansion of agricultural production complexes), improvements in inventory practices, and a streamlining of commodity distribution services.[1/]

In 1980 and 1981, both monetary and fiscal policies were designed to reduce inflation and to improve export competitiveness. The process of recovery took much longer than expected, however, owing to the external shocks (see Section 4 below) arising from a slowdown in economic activity in OECD countries, the increase in international interest rates and the second oil shock. The stance of fiscal and monetary policy was somewhat relaxed in response to an unduly slow recovery. Initiatives taken during this period included greater financial support for public construction works, for small and medium-sized firms, for residential construction (especially for low-income families), and for exports of heavy industrial products on a deferred payment basis. The tax system was also actively utilized, with the introduction of temporary investment tax credits, reductions in personal and corporate income taxes, and selective use of capital gains and special excise taxes.

The above results seem to indicate either that fiscal management in Korea did not suffer from serious institutional rigidities or that budget preparations were based on fairly accurate projections of the macroeconomic profile for the coming fiscal year. In the absence of evidence for the superior forecasting abilities of the Korean authorities, credit should be given to the former inference. Indeed, as the above description of the government's economic policies suggests, Korean fiscal management has been very flexible. Even after the budget has been drawn up, the government,

---

1/ For another evaluation at the adjustment programs of these years see Aghevli and Marquez-Ruarte (1985).

depending on economic circumstances, has implemented across the board or selective budget cuts, maintained flexible excise tax rates, allowed special tax reductions, prepared a supplementary budget, and borrowed for speedy spending. Thus, fiscal lags were not substantial.

After 1982 monetary expansion slowed substantially, M2 growth remained at a high 26.6 percent level during 1980-81 reached 28.1 percent in 1982, but fell rapidly thereafter. The fiscal contraction of 1979 was also relaxed in 1980. But it was only in 1981 that fiscal operations expanded substantially, producing a public sector deficit of 4.6% of GNP. On the other hand, exchange rate management remained relatively rigid during 1981-82, so as to minimize inflationary pressure from rising import costs. After a 35 percent nominal depreciation of the won vis-a-vis the U.S. dollar during 1980, the exchange rate appreciated 4-5% in real terms during the following two years.

Since 1981, Korea's stabilization efforts have relied heavily on an incomes policy, in the belief that reliance on demand management alone requires too much time and an excessively large sacrifice of income growth for the sake of price stability. The rate of announced salary increases for public servants has usually served as an informal wage guideline for the private sector. Continuous downward adjustments of interest rates in parallel with the slowdown in inflation and small changes in government purchase prices for rice also constituted an integral part of the incomes policy. While the effectiveness of these policies might be debatable and some side effects were obvious, they clearly signalled an unwavering government commitment to price stabilization.

The combination of these policy responses with falling unit import prices resulted in a sharp decline in the inflation rate from 26% in 1980 to

only 7% in 1982, in terms of the GNP deflator. Despite relatively good export performance (attributable to the large exchange rate depreciation in 1980), real GNP in 1981 experienced only a modest recovery of 6.2% after a drop of 5.2 percent in 1980. With the slowdown in export growth, performance for 1982 was also disappointing in spite of strong residential and public construction activities.

On the other hand, thanks to favorable external terms of trade, together with active overseas construction in the Middle East, the annual current account deficit fell from a $5 billion level during 1979-81 to $2.7 billion in 1982. Nevertheless, as the international financial market grew increasingly unstable with more frequent loan reschedulings, Korea, which had emerged as the fourth largest borrower among developing countries, decided to give higher priority to improving the balance of payments and reducing external debt.

In step with the economic recovery from 1982 onward, the focus of macro policies shifted toward consolidating price stability and eliminating the current account deficit as soon as possible. Both fiscal and monetary policy remained very restrictive. On the zero-base budgeting principle, the general account budget was designed to produce a sizable surplus, in order to finance deficits in some of the government-run funds. Consequently, the consolidated public sector deficit was reduced from 4.3% in 1982 to 1.6% and 1.4% of GNP in 1983 and 1984 respectively. The expansion of money supply (M2) also slowed to 19.5% in 1983 and 11-12% during 1984-85 -- fairly restrictive levels in view of the declining velocity of money due to decelerating actual and anticipated inflation. Bank interest rates were adjusted slightly upward to make them relatively attractive for depositors compared to non-bank rates. On the other hand, in line with renewed concern about the external

balance, exchange rate management was flexible enough to allow the real effective rate to depreciate by about 9% during 1983-84.

The economy regained strong growth momentum in 1983 with a GNP growth rate of 9.5%, which was maintained through the first half of 1984. Private consumption and construction led the recovery, but rising exports have been the major source of growth since the second half of 1983. Export growth began to falter again late in 1984, in line with the noticeable slowdown in the U.S. economy and rising protectionist barriers against Korean exports. Housing and other private construction activity was also sluggish, reducing GNP growth for 1985 to 5.1% (compared to 7.6% in the previous year).

In response to disappointing growth performance and a deteriorating labor market situation, a number of stimulatory measures were taken in 1985. They included a further depreciation of the Korean won (by about 6% on a year-average basis), relaxation of monetary policy mainly to encourage investment in the export sector, a new investment tax credit, and a stimulatory supplementary budget. The available evidence suggests that the economy started to pick up by late 1985.

As export growth recovered during 1983-84, the current account deficit fell steadily to the $1.5 billion level. In 1985, in the face of growing protectionism abroad, declining revenues from overseas construction, and stronger pressure to liberalize imports, the current account deficit narrowed further to $0.9 billion, mainly due to a fall in imports of almost $1.0 billion. Also noteworthy were the government's efforts to improve the maturity structure of external debt. As short-term borrowing was discouraged its share of total foreign debt declined steadily to 23% at the end of 1985, from 33.5% three years earlier.

The other side of this improvement in the external balance is the increase in the domestic savings ratio to 28.4% of GNP in 1985 from 22.4% in 1982. A sectoral savings analysis suggests that high income growth, price stability, a lower corporate tax burden, and a slowdown in government consumption growth were the major factors behind enhanced domestic saving.

Finally, despite full-fledged economic recovery, inflation in terms of the GNP deflator remained at a low 3-4%. Moderate fiscal and monetary policies, stable import unit prices, a good harvest, and an incomes policy that continued to keep major factor costs in line with the decelerating inflation rate, all seem to have contributed to price stability. Corbo and Nam (1986) argue that the main factors accounting for the slowdown in inflation after it peaked in 1980 have been the slowdown in the rate of growth of the dollar prices of imported inputs, and the tight fiscal and monetary policy of 1984-85 (which produced an improvement in the real effective exchange rate with only a moderate nominal devaluation).

One point that emerges clearly from this section is the role of exchange rate policy. Overall, the real effective exchange rate of the Korean won has been maintained fairly constant since the mid-1960s. As Korea's inflation was generally much higher than that of its major trading partners, this meant steady depreciation of the nominal exchange rate, although with some deviations. Following a 100% nominal devaluation of the Korean won vis-a-vis the US dollar, triggered by a foreign exchange crisis in 1964, the nominal exchange rate adjustment fell short of the difference in inflation rates. The result was a 13% appreciation of the real effective exchange rate during 1968-69 from the 1965 level. During 1970-72, the nominal depreciation of the Korean was somewhat accelerated and, the value of the US dollar fell against other major currencies during 1972-73. These developments led to a

substantial depreciation of Korea's real effective exchange rate during 1970-73. However, high domestic inflation under the fixed exchange rate regime following the first oil price shock quickly eliminated most of the real effective depreciation, in spite of two major nominal devaluation of the Korean won in late 1974 and early 1980.

Some additional real effective appreciation of the won took place during the first phase of the stabilization program in 1981-82, indicating that exchange rate management was somewhat biased toward curbing inflation. Since 1983, when the deceleration of inflation was quite evident, exchange rate management has been free of a stabilization bias and was actually tilted toward stimulating exports and growth.

3. Sources of Economic Growth

A demand decomposition of the sources of growth (Table 3), shows that the external sector contributed 0.6 percentage point to GNP growth in 1971-73, a big turnaround from the -1.4 percentage points achieved in 1961-70. A large and sustained expansion in exports made possible a large and sustained expansion in output by providing much-needed imports.

The impact of the worldwide recession after the first oil price shock on Korean exports of goods and non-factor services was so severe that their contribution to GNP growth dropped from 5.4 percentage points during 1971-73 to 1.4 percentage points during 1974-75. However, Korea managed to maintain a relatively high rate of GNP growth -- 7.3 percent -- in 1974-75, when many non-oil producing countries registered negative growth. The change in the relative price of energy products and countercyclical aggregate demand policies seem to have been the main contributing factors.

Table 3

Sources of Growth by Demand Sector
(% contribution)

	1961-70	1971-73	1974-75	1976-78	1979-82	1983-84
Private Consumption	5.5	5.7	4.6	5.6	2.5	3.9
Government Consumption	0.7	0.5	0.8	1.1	0.3	0.4
Fixed Investment	3.3	2.3	2.3	7.1	0.5	3.5
Private Construction	(1.3)	(1.2)	(1.0)	(2.9)	(0.5)	(1.5)
Government Construction	(0.6)	(-0.0)	(0.4)	(0.6)	(0.2)	(0.6)
Producer's Durable Equipment	(1.3)	(1.2)	(0.9)	(3.5)	(-0.3)	(1.4)
Inventory Change	0.4	0.2	1.5	-0.9	-0.6	-0.5
External Trade (Net)	-1.4	0.6	-1.4	-0.8	0.6	0.2
Exports	(2.1)	(5.4)	(1.4)	(7.0)	(2.4)	(4.1)
Imports	(-3.6)	(-4.5)	(-2.3)	(-8.8)	(-0.8)	(-3.5)
Net Factor Income	(0.0)	(-0.3)	(-0.5)	(0.9)	(-1.0)	(-0.4)
GNP Growth	8.4	9.5	7.3	12.2	3.2	8.5

Note: The sectoral contributions were obtained by allocating the compound GNP growth rate to each sector in proportion to the accumulated changes in its value added. Because of statistical discrepancies and rounding errors, the sectoral contributions do not exactly add up to the total.

Source: Author's estimates based on primary data from Bank of Korea.

During the 1976-78 period, the economy was characterized by an overheated investment boom and rapid expansion of both exports and imports. With increased bank credit at subsidized interest rates as well as a large inflow of foreign capital, all facilitated by the government's efforts to promote the heavy and chemical industries, fixed investment expanded at an annual rate of 27.0 percent, contributing 7.1 percentage points (58 percent) to a GNP growth of 12.2 percent. A substantial portion of this investment was made with imported capital goods. Thus, despite fairly rapid export growth and overseas construction in the Middle East, on a demand accounting basis the external sector was a net negative contributor to GNP growth during this period. Given that total consumption did not increase markedly to match GNP growth, the domestic savings ratio rose from 19.1 percent in 1975 to 28.5 percent of GNP in 1978.

By 1978, the appreciation of the real exchange rate (17.9 percent between 1973 and 1978) that had developed as a consequence of the expansionary demand policies of 1974-78 was having negative effects on export growth. Then came the second oil price shock. As a result of both factors, the real growth of exports of goods and non-factor services slowed from an annual rate of 27.7 percent during 1976-78 to 7.1 percent during 1979-82 -- and this despite the large depreciation in the exchange rate since early 1980. A more dramatic development was the weakness of investment and import demand: fixed investment and imports of goods and non-factor services rose at annual average rates of only 1.5 percent and 2.1 percent, respectively, during 1979-82, and investment in producers' durable equipment actually declined. Because of the low growth of imports, the external sector made a positive contribution to real GNP, in spite of the sharp deterioration in the balance of factor income that resulted from high international interest rates. Fiscal policy at this

time was generally restrictive, in line with the government's strong anti-inflationary efforts, and contributed to the weak demand. As consumption adjusted slowly and partially to the low growth in incomes, the domestic savings ratio dropped considerably to a level of 20 percent during 1980-82.

The real devaluation of the early eighties and the post-1982 recovery of the world economy, particularly that of the United States, pulled Korea back to more normal growth rates after 1982. Its exports were constrained, however, by growing protectionism in the industrialized world against exports from newly industrializing countries such as Korea, and by the weakening incentives for exporters. Thanks to declining international interest rates, however, the deterioration in the factor income balance slowed, so that the external sector was ultimately a small net contributor to GNP growth during 1983-84. The contribution of private fixed investment and fiscal expenditures held at more or less normal levels, but consumption was slow to adjust to rising incomes, a phenomenon that could have been linked to a downward adjustment in consumer expectations about future income growth. The result was that the domestic savings ratio rose to 27.3% in 1984.

The supply side trend was toward increasing contribution from the manufacturing sector and declining shares in agriculture and services (Table 4). The agricultural sector also suffered from sporadic crop failures, and a spell of cool weather in the summer of 1980 reduced agricultural value added by more than 20 percent. In that year, the agriculture, forestry and fishing sector was responsible for 73 percent of the -5.2 percent growth in GNP.

Despite fluctuations in the expansion of mining and manufacturing sectors, mainly reflecting export performance, their relative contributions to GNP growth increased steadily from 27 percent in 1961-70 to 36 percent in

Table 4

Sources of Growth by Industry
(% contribution)

	1961-70	1971-73	1974-75	1976-78	1979-82	1983-84
Agriculture, Forestry & Fishing	1.6	1.1	1.5	0.1	0.3	0.5
Other Industries	6.8	8.4	5.8	12.0	2.8	8.0
Mining and Manufacturing	2.3	3.4	2.9	4.9	1.4	3.8
Construction, Electricity, Gas and Water	0.8	0.8	0.6	1.7	0.5	1.1
Services	3.7	4.2	2.3	5.5	1.0	3.1
(Wholesale and Retail Trade Restaurants and Hotels)	(1.6)	(2.5)	(1.2)	(1.9)	(0.5)	(1.9)
GNP Growth	8.4	9.5	7.3	12.2	3.2	8.5

Note: The sectoral contributions were obtained by allocating the compound GNP growth rate to each sector in proportion to the accumulated change in its value added.

Source: Author's estimates, primary data from Bank of Korea.

1971-73, 40 percent in 1974-78 and 44-45 percent in 1979-84. As Korea's export structure moved toward heavy industry and chemical products, this subsector's share in manufacturing value added at current market prices rose from 37 percent in 1971-73 to over 52 percent in 1983-84.

Following the expansionary demand policies of the second half of the seventies, there was a boom in land values and construction. Reflecting the rapid expansion in housing construction during 1976-78, the construction sector's contribution to GNP growth rose substantially during this period, although it returned to a normal level thereafter. The services sector showed some procyclical movement, and its relative contribution to growth declined when the economy was weak. The most rapidly growing service areas during 1976-78 included financing, insurance, transport and communications; the leaders in 1983-84 were wholesale and retail trade, financing, and insurance.

Further insights into Korea's economic performance can be obtained from a recent study by Kim and Park (1985) of the sources of growth in the economy. Using Denison's approach, Kim and Park find that for the whole 1963-82 period, the largest contribution to growth, accounting for a little over 1/3 of the growth rate, was made by the growth in labor input (excluding education) followed by capital accumulation and scale economies. On the other hand, advances in knowledge contributed 18.3 percent of the standardized growth rate. When the authors divided their period of study into two sub-periods (1963-1972 and 1973-1982), they found that total labor input (excluding education) was the major contributor to growth in both cases. They also found that the technological improvements residual, which made the second highest contribution to growth in the first period, made the lowest contribution in the second one. On the other hand, the contribution of

capital accumulation increased from 13.9 percent of the standardized rate of growth to 26.2 percent in 1973-1982.

Kim and Park attribute the slowdown in technical progress and the higher contribution of capital largely to (a) completion of the gains from the opening-up of the sixties and (b) the change in development strategy with the second import substitution effort of the second half of the seventies. In particular, they suggest that the capital intensive import substituting projects of the seventies did not conform with Korea's comparative advantage (op cit, pp.173-174).

4. Effects of the External Shocks on the Korean Economy: A Model of the Current Account 1/

During the decade from 1973 to 1982, the Korean economy was hit hard by the unfavorable international economic environment. For a relatively small open economy that is dependent heavily on exports for growth and on imports for raw materials and capital goods, the impact of the two oil price shocks and the ensuing worldwide recession was very profound.

Table 5 shows the magnitude of the impact of the external shocks. The first of them produced a worldwide recession; the GDP of the industrialized countries, whose growth had averaged more than 5 percent a year during 1971-73, stagnated during 1974-75. In addition, the short-term Eurodollar rate jumped from around 6% in 1971-72 to an average of 10.2 percent in 1973-74. In Korea, as the unit value of imports rose 113 percent during 1973-75, the external terms of trade deteriorated by 30 percent.

1/ For an alternative model of the sources of Korean external debt see Park (1985a). For a more detailed analysis of external sector policies in recent Korea's adjustment, see Dornbusch and Park (1986).

Table 5

Major Changes in Korea's External Environment, 1971-85

(%)

	Korea's Terms of Trade (1980 = 100)	International Interest Rate (Three-month Eurodollar)	GDP Growth of OECD Countries	Share of Exports to Middle East
Before the First Shock				
1971	132.7	6.58	3.5	0.8
1972	132.1	5.37	5.2	3.3
After the First Shock				
1973	125.4	9.42	5.5	1.3
1974	102.1	10.90	0.2	2.6
1975	92.1	6.95	-0.8	6.2
Before the Second Shock				
1976	105.1	5.57	5.2	9.1
1977	112.4	6.05	3.9	10.8
1978	117.8	8.85	4.0	9.0
After the Second Shock				
1979	115.3	12.09	3.0	7.7
1980	100.0	14.19	0.6	8.8
1981	97.9	16.87	1.5	8.1
1982	102.2	13.29	-0.2	7.9
Post 1982				
1983	103.1	9.72	3.0	9.9
1984	105.3	10.94	5.0	5.4
1985	105.9	8.40	3.0	4.8

Sources: Bank of Korea; and IMF, International Financial Statistics.

The second oil price shock was every bit as traumatic. During 1979-81, the terms of trade worsened by 28 percent. The industrialized countries adopted more restrictive monetary policies after the second shock than they had after the first shock, with the result that international interest rates rose dramatically. For example, the short-term Eurodollar rate more than doubled from an average of 6.8 percent during 1976-78 to an average of 14.1 percent during 1979-82. During 1980-82, average annual GDP growth in the industrialized countries was only 0.6 percent, a significant drop from the 4.0 percent average of 1976-79. Only in 1983 did they started to recover from the recession.

The one positive consequence of the oil price shocks was the rapid growth of imports in the oil-exporting countries and the active participation of Korean construction companies in ambitious development projects in the Middle East. Consequently, Korean exports of construction-related and other products to that region expanded very rapidly; its share in total exports jumped from 2.0 percent in 1971-74 to 10.8 percent in 1977. After the second oil price shock, however, there was no further increase in this components of Korea's exports.

The impact of the two shocks on the Korean economy was obvious, the external current account deficit jumped from an annual average of $340 million during 1972-73 to almost $2.0 billion during 1974-75. The weakening of the balance of payments position was even more dramatic after the second oil price shock: the current account balance, which had recorded a small surplus in 1977 and a deficit of $1.1 billion in 1978, registered an annual average deficit of $4.7 billion during 1979-81.

For a more accurate evaluation of the full impact on Korea of the external shocks, we would need a disaggregated econometric model of the whole economy. In the remainder of this section, however, we are concerned mainly with the impact of these shocks on the current account balance in terms of trade and service flows: we can therefore make do with a small model that only evaluates the effect of the external shocks on the balance of payments. The model is presented in the Appendix.

The model was used to determine what would have happened to the balance of payments if there had been no external shocks. The external situation in the absence of the oil price shocks is defined here as follows:

- Terms of trade: the unit value of imports during 1973-75 (1980-82) was such that the terms of trade were the same as the average during 1971-72 (1976-79).

- The short-term Eurodollar rate during 1973-75 (1979-82) was the same as the average rate during 1971-72 (1976-78).

- The annual GDP growth rate of the industrialized countries during 1974-75 (1980-82) was the same as their average growth rate during 1971-73 (1976-79).

- The export share to the Middle East from 1975 on was maintained at the 1974 level. (During the second oil price shock period, this share did not increase. Thus, this impact was excluded in the analysis of the second shock.)

The next step was to run three dynamic simulations with three alternative sets of data relating to the external conditions: a base simulation with the actual data, and two counterfactual simulations for no first or second oil price shock, respectively, with the external conditions as specified above. The counterfactual simulation results were then compared with the base simulation to evaluate the impact of the external shocks on (a) commodity exports and imports, (b) the current account, (c) external debt, and (d) real gross domestic product.

Table 6 summarizes the results. It shows that, without the first oil price shock, the current account could have been $2.6 billion (12.4 percent of GNP) better in 1975 than the actual deficit of $1.9 billion. In that same year, net external debt could have been about $4.5 billion less than the actual outstanding amount of $7.0 billion. The analysis indicates that the shock reduced nominal commodity exports by $2.3 billion while keeping imports almost unchanged in 1975. Finally, real GDP was 4.4 percent lower in 1975 due to the shock.

The impact of the second oil price shock turned out to be a little more serious than the first one. Without the second shock, Korea's current account balance could have been as much as $10.2 billion (14.7 percent of GNP) better in 1982, so that the actual deficit of $2.7 billion would have been a sizable surplus. Korea could also have limited its net debt outstanding to about $7 billion in 1982, given that the shock may have led to a growing external indebtedness of more than $21 billion (the actual net debt outstanding was $28.3 billion in 1982). The negative impact of the second shock on nominal commodity exports was equivalent to 60 percent of the actual amounts in 1982, while the favorable impact on nominal imports was 21 percent

Table 6

Impact of the Oil Price Shocks on the External Balance and Real GDP
(in billion U.S. dollars)

	Commodity Exports		Commodity Imports		Current Account Balance			Net External Debt		Real GDP (1980 constant trillion won)	
	Actual	Impact	Actual	Impact	Actual	Impact	(% of GNP)	Actual	Impact	Actual	Impact
First Oil Price Shock											
1973	3.28	-	3.85	0.13	-0.30	-0.16	(1.2)	3.02	0.16	22.75	0.11
1974	4.52	-1.20	6.45	0.40	-2.02	-1.75	(9.5)	5.02	1.91	24.55	-0.55
1975	5.00	-2.33	6.67	-0.03	-1.89	-2.60	(12.4)	7.03	4.51	26.41	-1.16
Second Oil Price Shock											
1979	14.71	-	19.10	-	-4.15	-0.15	(0.2)	14.0	0.15	38.98	-
1980	17.21	-3.13	21.60	0.46	-5.32	-4.29	(7.1)	19.6	4.44	37.91	-1.18
1981	20.67	-6.66	24.30	-1.55	-4.65	-6.75	(10.2)	24.5	11.19	40.72	-2.52
1982	20.88	-12.49	23.47	-4.99	-2.65	-10.17	(14.7)	28.3	21.36	43.04	-6.22

Notes: - Negligible

of the actual amount. 1/ The effect of the second shock on Korea's real GDP, estimated to be 14.5 percent in 1982, was much more severe than that of the first shock.

Decomposition of the impact of the oil price shocks into four separate effects (Table 7) indicates that: (a) the slowdown in exports attributable to the recession in the industrialized countries and (b) the terms of trade effects accounted for 49 percent and 57 percent respectively of the total cumulative impact of the first oil shock on the current account during 1973-75, and were responsible for an increase in Korea's net external debt of $2.2 billion and $2.6 billion respectively by the end of 1975. The negative interest rate effect and the positive Middle East construction effect were relatively insignificant during the first oil shock period. (Individual effects do not exactly sum up to the total, due to the compounding of various effects in the total).

On the other hand, the recession in the industrialized countries dominated the total impact of the second oil price shock, being responsible for 68 percent of the cumulated effect, or a $14.5 billion increase in net external debt during 1979-82. The terms of trade effect and interest rate effect, respectively, accounted for 21 percent and 13 percent of the impact, contributing to net external debt by $4.5 billion and $2.9 billion, respectively, during 1979-82. During the initial period of both shocks, the

---

1/ Balassa (1985) estimated similar effects of the external shocks on the balance of payments in newly industrializing economies. For the effect of the worldwide recession on exports, he used the 1963-73 trend value of exports by major commodity and assumed constant market shares. His results show that the negative effect of the first oil price shock on South Korea's balance of payments was 16.1 percent of GNP in 1975 (without the interest rate effect), and that of the second shock was 20.9 percent of GNP (including the interest rate effect) in 1981.

Table 7

Decomposition of the Effects of the Oil Price Shocks
(Billion US dollars)

Effect	Commodity Exports				Commodity Imports				Current Balance				Net External Debt			
First Oil Price Shock																
		1973	1974	1975		1973	1974	1975		1973	1974	1975		1973	1974	1975
Terms of Trade		-	-	-		0.13	0.88	1.02		-0.13	-0.93	-1.14		0.13	1.05	2.20
Interest Rate		-	-	-		-	-	-		-0.03	-0.09	-0.10		0.03	0.11	0.21
OECD Recession		-	-1.20	-3.40		-	-0.55	-1.64		-	-0.68	-1.88		-	0.68	2.56
Middle East Construction a/		-	-	0.63		-	-	0.35		-	-	0.29		-	-	-0.30
Total		-	-1.20	-2.33		0.13	0.40	-0.03		-0.16	-1.75	-2.60		0.16	1.91	4.51
Second Oil Price Shock																
	1979	1980	1981	1982	1979	1980	1981	1982	1979	1980	1981	1982	1979	1980	1981	1982
Terms of Trade	-	-	-	-	-	1.70	1.29	0.45	-	-1.81	-1.65	-1.00	-	1.81	3.46	4.46
Interest Rate	-	-	-	-	-	-	-	-	-0.15	-0.50	-0.96	-1.25	0.15	0.65	1.61	2.85
OECD Recession	-	-3.13	-6.66	-12.49	-	-1.35	-2.98	-5.50	-	-1.90	-4.23	-8.40	-	1.90	6.13	14.53
Total	-	-3.13	-6.66	-12.49	-	0.45	-1.53	-4.95	-0.15	-4.26	-6.71	-10.13	0.15	4.40	11.12	21.25

a/ The simulation result also shows that the positive contribution of Middle East construction to the current account was $780 million (2.7 percent of GNP) and $1,010 million (2.7 percent of GNP) in 1976 and 1977, respectively.

terms of trade effect proved to be fairly important, while the effect of recession in the industrialized countries dominated in the later state of the shocks.

International comparisons show that Korea was one of the LDCs that were hardest hit by the external shocks (Balassa, 1985; Sachs, 1985). On this basis Korea's successful adjustment looks even more impressive.

In this connection, one might want to evalute, to what extent, the favorable international environment after 1982 contributed to the improvement in the Korean balance of payments. Thus, an additional counterfactual simulation was run with the same external conditions since 1983 as those during the second oil price shock. More specifically, the external situation during 1983-85 was assumed as follows:

- The unit value of imports was such that the terms of trade did not change from the average during 1980-82.

- The short-term Eurodollar rate was the same as the average rate during 1979-82.

- The annual GDP growth rate of the OECD countries was the same as their average growth rate during 1980-82.

- The share of exports to the Middle East during 1984-85 was the same as the average share during 1979-83.

The simulation results are presented in Table 8. They show that, under the conditions stated above, the current account deficit in 1985 could

Table 8

Effects of the Favorable External Environment since 1983
(billion US dollars)

	Actual	Total Impact 1/	Terms of Trade	Interest Rate	OECD Growth	Middle East Construction
Commodity Exports						
1983	23.20	2.49	-	-	2.49	-
1984	26.34	5.59	-	-	7.40	-2.49
1985	26.44	7.27	-	-	9.29	-3.11
Commodity Imports						
1983	24.97	.52	-.53	-	1.03	-
1984	27.37	1.83	-.67	-	3.24	-.90
1985	26.46	2.99	-.56	-	4.53	-1.28
Current Account Balance						
1983	-1.61	2.44 (3.2) 2/	.56	.34	1.54	-
1984	-1.37	4.96 (6.0)	.76	.69	4.55	-1.68
1985	-.89	6.36 (7.7)	.73	.95	5.67	-2.11
Net External Debt						
1983	30.9	-2.44	-.56	-.34	-1.54	-
1984	32.9	-7.39	-1.33	-1.03	-6.10	1.68
1985	35.5	-13.75	-2.06	-1.98	-11.77	3.79
Real GDP (1980 constant trillion won)						
1983	46.73	1.27	-.18	-	1.44	-
1984	50.45	2.93	-.48	-	4.40	-1.39
1985	53.04	4.41	-.64	-	6.37	-2.01

Notes: 1/ The total impact does not exactly break into the individual impacts, due to the compounding of various effects in the total.

2/ Numbers in parentheses are percent of GNP.

have been as large as $7.2 billion compared with the actual deficit of $0.9 billion, making the net external debt almost $14 billion larger than the actual level of $35.5 billion at the end of 1985. At the same time, changes in the external environment since 1983 were estimated to have contributed 8.3 percent to the 1985 GDP. The analysis clearly shows that the external conditions indeed played a critical role in improving the balance of payments and growth performances of the Korean economy since 1983.

However, the simulation results also indicate that the favorable effects of the external situation during 1983-85 was not quite as large as the negative effects of the second oil price shock in terms of the cumulative current balance or real GDP growth rate. The fact that Korea had a very small current account deficit in 1985 suggests that a sizable surplus could have been obtained by 1985 in the absence of the second oil shock.

5. The Role of Fiscal and Monetary Policy

In this section, we evaluate the role of fiscal and monetary policy in the last decade.

The Fiscal Impulse of the Public Sector

In order to evaluate Korea's fiscal policy, we measured fiscal impulse. Fiscal impulse is actually a crude indicator of change in the fiscal stance rather than a measure of the economic effects of the budget. 1/ As such, it suffers from the so-called balanced budget multiplier problem and

---

1/ For a recent evaluation of economic measures of fiscal stance, see Buiter (1985). The IMF and OECD measures of fiscal stance are discussed in Heller et al. (1986).

adjusts only for the deviation in output from its potential level; it ignores other effects from inflation, interest rates, etc.

The estimates of fiscal impulse presented in Table 9 indicate that the IMF and OECD measures were almost the same, except for 1980, when GNP dropped more than 5 percent. Although the use of alternative potential GNP estimates produces somewhat larger differences in fiscal impulse, the dynamic trajectory differences are relatively minor.

A comparison between the change in the actual deficit and the estimated fiscal impulse shows that the cyclical factor (cyclically neutral balance) could swing rather substantially. In the exceptional case of 1980, when the actual deficit increased by 1.7 percent of GNP, the cyclically neutral deficit rose by 2.1 percent of GNP for IMF measure A; the implication is that the fiscal impulse was rather contractionary.

The extent to which fiscal management was countercyclical may be evaluated by examining the changes in fiscal impulse over the business cycle. In fact, with notable exceptions in 1979-81, a rather close inverse relation between the change in the GNP growth rate and fiscal impulse could be confirmed for the 1971-84 sample period. The exceptions can easily be explained by the stabilization efforts, which delayed (until 1981) a fiscal reaction to the sluggish economy of 1979-80. As already described above, with the adoption of a comprehensive stabilization program in 1979, Korea's fiscal management was restrictive until the first half of 1980. In 1981, even though the economy recovered from the substantial negative growth of the previous year, it was still in deep recession, and the fiscal stance shifted toward strong expansion.

Table 9

Fiscal Impulse (Public Sector) a/

(%)

	Real GNP Growth	Actual Deficit (% of GNP)	(Change)	Fiscal Impulse b/ IMF Measure (A)	IMF Measure (B)	OECD Measure (A)	OECD Measure (B)
1971	8.8	2.3	1.4	0.7	1.3	0.7	1.3
1972	5.7	4.6	2.4	1.6	1.7	1.6	1.7
1973	14.1	1.6	-3.0	-2.2	-2.2	-2.2	-2.3
1974	7.7	4.0	2.4	2.1	2.1	2.1	2.1
1975	6.9	4.6	0.6	0.4	0.2	0.4	0.2
1976	14.1	2.9	-1.8	-1.0	-1.2	-1.0	-1.3
1977	12.7	2.6	-0.2	0.1	-0.1	0.1	-0.1
1978	9.7	2.5	-0.1	-0.1	-0.0	-0.1	-0.0
1979	6.5	1.4	-1.1	-1.6	-1.1	-1.7	-1.1
1980	-5.2	3.2	1.7	-0.4	-0.1	-0.8	-0.4
1981	6.2	4.6	1.5	1.7	1.6	1.6	1.5
1982	5.6	4.3	-0.3	-0.3	-0.5	-0.4	-0.6
1983	9.5	1.6	-2.7	-1.9	-2.1	-1.8	-2.0
1984	7.6	1.4	-0.2	0.2	0.1	0.3	0.1

a/ The public sector includes the central government (general account, 12 special accounts and 21 funds) and five public enterprise accounts (grain management, monopoly, railways, communications and supply), together with two related funds (grain management and supply).

b/ Fiscal impulse Measure A uses potential GNP (Y^P) obtained from a regression equation, while Measure B uses peak-through interpolated Y^P (see Appendix).

On the other hand, it is also clear (from Figure 1) that the fiscal impulse for a given change in the GNP growth rate was generally stronger before the stabilization program was launched in 1979 (particularly in 1971, 1972, and 1974). After the stabilization program, the fiscal impulse became particularly restrictive in 1983, just as it had been in the 1979-80 period. The accumulated fiscal impulse during 1971-78 was 1.6 percent of GNP, in contrast to the -2.3 percent of GNP during 1979-84.

Finally, given that the fiscal impulse estimate is far from a good measure of the fiscal contribution to economic growth, it is interesting to look at the movements of real government expenditures in relation to the general economic trends (although the revenue side is totally left out of this analysis). As Figure 2 shows, while the trends for the growth rates of government expenditures and GNP were similar over the growth cycle, the year-to-year direction of their change was opposite except in a few cases.

Thus we conclude that fiscal policy played a central role in both the expansion of the second half of the seventies and the macro-adjustment effort of the eighties.

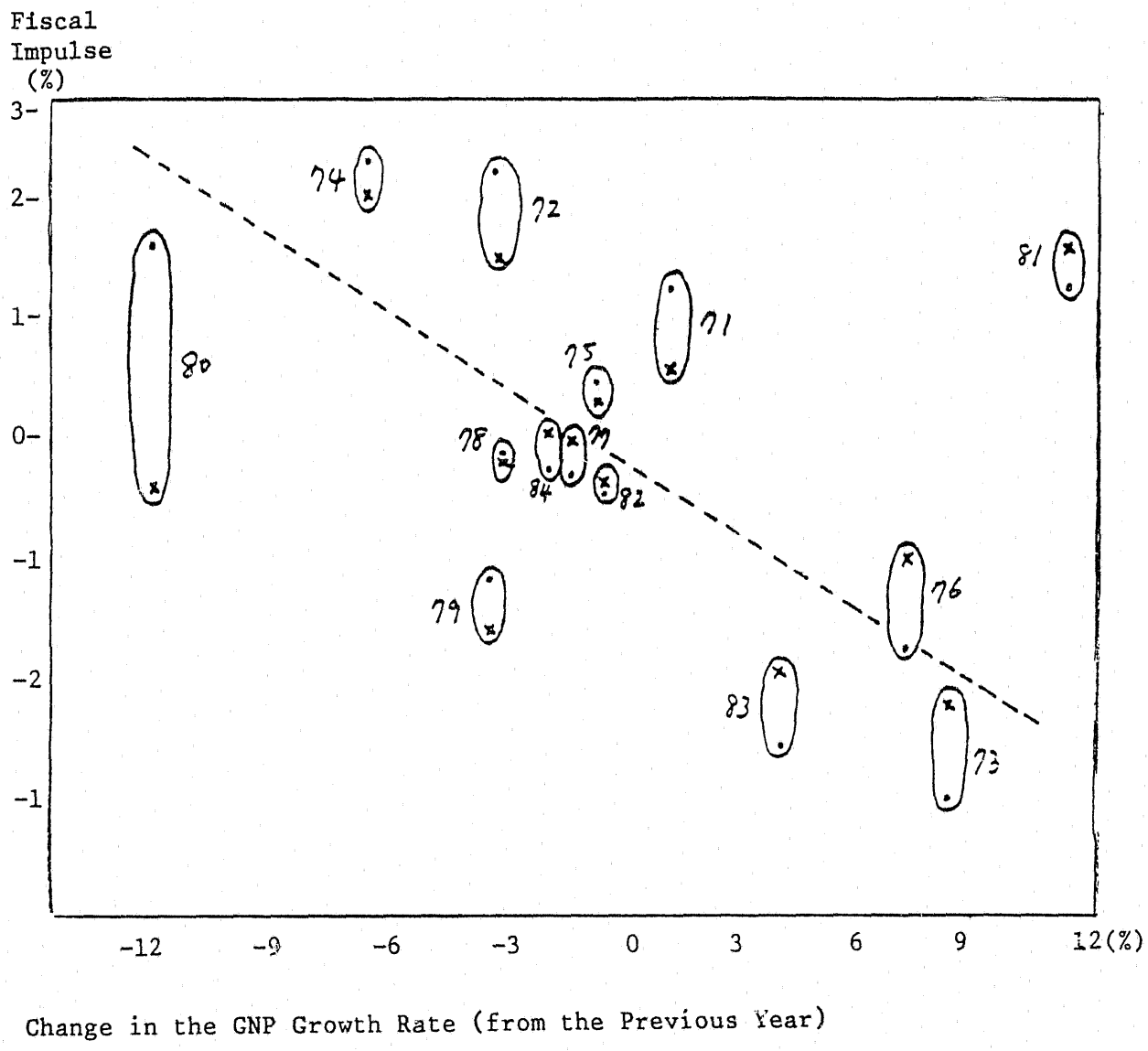
The Role of Monetary Policy

To study the role of monetary policy, we estimate a fairly standard transaction demand for money equation, using quarterly data. The model is estimated first with data from the first quarter of 1972 to the last quarter of 1978. Forecasts for 1979 to 1981 generated from the estimated model are then compared with actual values of M2. Then the model is estimated again with data for the period ending in the last quarter of 1982 and forecast values are generated for 1983 and 1984. The forecasts are then compared with actual values of M2 for these last two years.

Figure 1

Fiscal Impulse and Change in the Real GNP Growth Rate

x Fiscal Impulse (IMF Measure A)
. Change in Actual Deficit/GNP Ratio



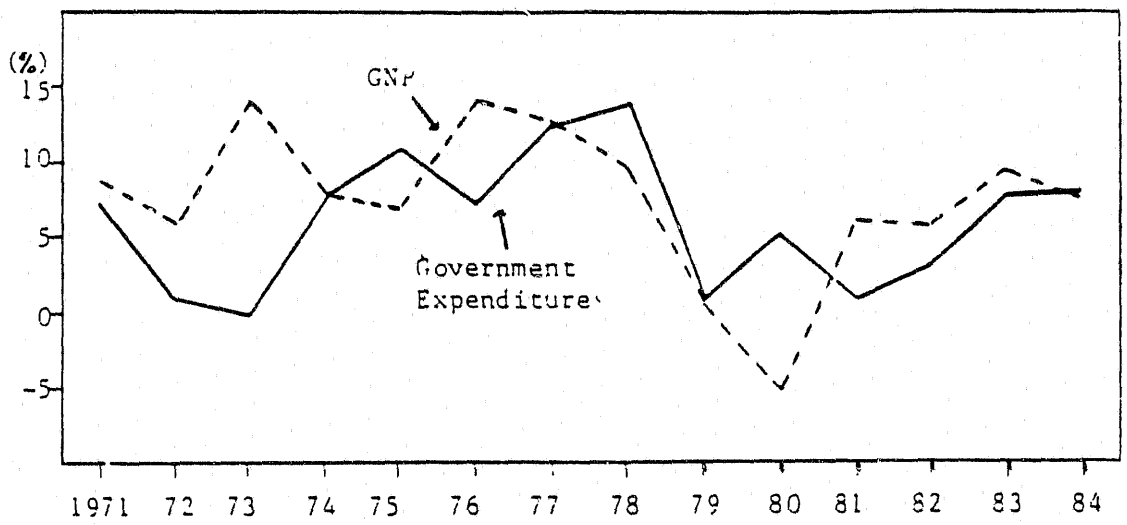
Change in the GNP Growth Rate (from the Previous Year)

Note: The regression line was fitted for fiscal impulse excluding observations for 1980 and 1981.

$$FI = -\underset{(0.57)}{0.162} - \underset{(3.14)}{0.210}\,\Delta\dot{Y} \qquad R^2 = 0.496$$

Figure 2

Growth Rates of Government Expenditures and GNP (Real)



We proceed to measure the stance of monetary policy by using both demand for money models estimated in the Appendix. The difference between the two models is in the variable used to measure the opportunity cost of holding money. In the first model, this opportunity cost is measured by the curb market rate; in the second, it is measured by the expected rate of inflation. The results of the dynamic simulations with the shorter sample are presented in Table 10.

For both specifications of the demand for money, monetary policy was mildly restrictive in 1979 and 1981. For 1980, however, the results are ambiguous: on the basis of the equation using curb market rate, monetary policy was marginally expansionary while the equation with the expected inflation measure suggests that monetary policy was restrictive.

To evaluate the stance of monetary policy in 1983-1984, we use the equations for the larger sample and simulate the demand for money for the 1983-1984 period. The results of the simulations appear at the bottom of Table 10; for both equations, they indicate that monetary policy was restrictive during this period.

Further insights into the stance of monetary policy can be obtained from observing the trajectory of real interest rates (refer to Table 2). In the present case, however, the sudden, unexpected drop in the inflation rate could result in a higher real interest rate than can be attributed directly to a restrictive monetary policy. The curb market rate had reached 15.2 percent in 1979; it was reduced to 4.4 percent in 1980, but climbed to 18.3 percent in 1981 and 27.4 percent in 1982. It then declined somewhat, to 26.7 percent in 1983, 22.6 percent in 1984 and 23.0 percent in 1985. The real bank rate shows a similar trajectory. It was -4 percent in 1979 and -11.4 percent in 1980. It then began to rise, reaching 4.4 percent in 1981, 8.2 percent in 1982 and

Table 10

The Stance of the Monetary Policy: 1979:I - 1984:IV [1/]

	Predicted M2 (1)	Predicted M2 (2)	Actual M2	Percentage Difference (1)	Percentage Difference (2)
	(billion won)		(billion won)	(percent)	
A. First Period					
1979:I	8120.5	8143.1	8096.5	-0.3	-0.6
1979:II	8579.9	8617.4	8232.3	-4.1	-4.5
1979:III	8951.1	9113.3	8629.1	-3.6	-5.3
1979:IV	9270.4	9702.0	9264.2	0.0	-4.5
1980:I	9894.0	10441.9	10015.8	1.2	-4.1
1980:II	10312.2	10881.7	10439.8	1.2	-4.1
1980:III	10657.5	11387.3	10948.7	2.3	-3.9
1980:IV	11552.6	12154.3	11652.1	0.9	-4.1
1981:I	12668.1	13002.8	12682.8	0.1	-2.5
1981:II	13331.3	13752.9	13212.7	-0.9	-3.9
1981:III	14181.8	14731.2	14029.3	-1.1	-4.8
1981:IV	14455.5	15706.1	14934.6	3.3	-4.9
B. Second Period					
1983:I	20976.8	20652.2	19993.6	-4.5	-3.4
1983:II	20409.3	21538.7	20459.6	0.2	-5.0
1983:III	21740.3	23157.8	21348.7	-1.8	-8.0
1983:IV	22471.8	24184.7	22218.0	-1.1	-8.1
1984:I	23660.5	25458.8	22800.2	-3.6	-10.4
1984:II	24287.1	26526.6	22742.2	-6.4	-14.3
1984:III	25019.6	27567.3	23349.2	-6.7	-15.3
1984:IV	25249.2	28512.3	24152.9	-4.3	-15.3

Note: (1) is based on the equation using curb market rate as the opportunity cost of holding money, while (2) is based on the equation using expected rate of inflation (see Appendix for the equations).

8.8 percent in 1983. It fell to 7.3 percent in 1984 and reached 9 percent in 1985.

The picture that emerges from this pattern of rates is one of a monetary policy that was restrictive during 1983-84, but had if anything been expansionary in 1979-80. In any event, the evidence for the restrictiveness of policy 1983-84 is clear; it therefore seems reasonable to conclude that a moderate fiscal policy and a moderately restrictive monetary policy contributed to the macro adjustment of the 1983-84 period and helped in the slowdown of inflation (Corbo and Nam 1986).

6. Conclusions

In this paper, we have presented an overview of recent macroeconomic developments in Korea. We have also evaluated in some detail the impact of external shocks on the Korean economy. Finally, we have analyzed the stance of monetary and fiscal policy.

We have found that external shocks had strongly adverse effects on Korea's current account and external debt position. The process of adjustment to these shocks initially involved a slowdown in absorption and output growth accompanied by a build-up of foreign debt. Our findings indicate that the recovery of the Korean economy in the early 1980s was significantly helped by improvements in the terms of trade, the recovery of the US economy, and the general decline in interest rates. Interestingly enough, in 1980, and especially since 1983, the real exchange rate has taken a central position among the macroeconomic policies used to encourage growth.

On the standard macroeconomic front, we have found that the government has used both fiscal and monetary policies in a very discretionary way during the last twenty five years; while it has practiced a lot of fine

tuning, the key consideration has been to keep the momentum of export growth. Thus, it is not surprising that the most enduring aspect of policy has been the effort to maintain a stable real effective exchange rate, taking due account of the size and sustainability of the current account deficit. Indeed, it is remarkable that an economy with such a high rate of technical progress in tradables has kept its real effective exchange rate so relatively constant over the past decade. The main lesson for other countries is the importance of maintaining the stability of incentives for tradable activities. In the early eighties, macroeconomic policies played a more important role, with both fiscal and monetary policy being used to achieve a slowdown in the inflation rate and a real devaluation.

References

Aghevli, B.B. and J. Márquez-Ruarte (1985) "A Case of Successful Adjustment: Korea's Experience During 1980-84," Occasional Paper 39, Washington, D.C., the IMF.

Balassa, B. (1985) "Adjusting to External Shocks: The Newly Industrializing Development Economies in 1974-76 and 1976-81," Weltwirtschaftliches, 1985(1), pp.116-141.

Buiter, W.H. (1985) "A Guide to Public Sector Debt and Deficits," Economic Policy, Vol.1, No.1.

Cho, J.Y. and D. Cole (1986) "The Role of the Financial Sector in Korea's Structural Adjustment," mimeo.

Chow, G. (1966) "On the Long Run and Short Run Demand for Money," Journal of Political Economy, Vol. 74 (February).

Corbo, V. (1982) "Monetary Policy with an Overrestricted Demand for Money Equation," Journal of Development Economics, Vol. 10.

_____ and S.W. Nam (1986) "Controlling Inflation: The Recent Korean Experience," Discussion Paper DRD207, World Bank.

Dornbusch, R. and Y.C. Park (1986) "The External Balance of Korea," mimeo, September.

Goldfeldt, Stephen M. (1973) "The Demand for Money Revisited," Brookings Papers on Economic Activity, No.3, pp.577-638.

_____ (1976) "The Case of Missing Money," Brookings Papers on Economic Activity, No.3, pp.683-730.

Heller, P.S., R.D. Haas and A.S. Mansur (1986) "A Review of the Fiscal Impulse Measure," Occasional Paper No.44, Washington, D.C., the IMF.

Kim, K.S. and J.K. Park (1985) Sources of Economic Growth in Korea: 1963-82, Seoul, Korea Development Institute Press.

Krueger, A.O. (1986) "The Importance of Economic Policy in Development: Contrasts Between Korea and Turkey," mimeo.

Nam, C.H. (1985) "Trade Policy and Economic Development in Korea," Discussion Paper No.9, Korea National University, Seoul.

Nam, S.W. (1984) "Korea's Stabilization Efforts Since the Late 1970s," Working Paper 8405, Korea Development Institute, Seoul.

Park, Y.C. (1985a) "Korea's Experience with External Debt Management," in G. Smith and J. Cudington (eds.). The International Debt and the Development Countries, Washington, D.C.: The World Bank.

Park, Y.C. (1985b) "Economic Stabilization and Liberalization in Korea: 1980-84" in Bank of Korea Monetary Policy in a Changing Environment. Seoul, Korea.

Sachs, J. (1985) "External Debt and Macroeconomic Performance in Latin America and East Asia," Brookings Papers on Economic Activity, 2.

Samuelson, P. (1964) "Theoretical Notes on Trade Problems," Review of Economics and Statistics, (May).

Westphal, L. (1978) "Republic of Korea Experience with Export-Led Industrial Development," World Development, Vol. 6, No.3.

Appendix

1. A Simple Model of the Current Account

The structure of the model is as follows:

$$\ln EX_r = f_1[\ln y^*, \ln(Px/\$ULC_k), \ln(\$ULC_k/\$ULC_o), D(1974,79), \ln(EX_{me}/EX)]$$

$$\ln IM_r^o = f_2[\ln V, \ln(PM^o \cdot Rex/WPI)]$$

$$\ln IM_r^n = f_3[\ln V^a, \ln EX_r, \ln(Pm^n \cdot Rex/WPI)]$$

$$\ln V^a = f_4(\ln EX_r, \ln V^a_{-1})$$

$$\Delta i_k = f_5(\Delta LIBO)$$

$$EX = EX_r \cdot Px$$

$$IM = IM_r^o \cdot Pm^o + IM_r^n \cdot Pm^n$$

$$NIP = (i_k/100) \cdot (ND + ND_{-1})/2$$

$$CA = EX - IM - NIP + CA_o$$

$$ND = ND_{-1} - CA + SD$$

$$V = V^a + (EX_r - IM_r^o - IM_r^n) \cdot (Rex(80)/1{,}000) + V^o$$

where

EX_r	=	Real commodity exports (1980 constant million US dollars)
IM_r^o, IM_r^n	=	Real imports of crude oil and non-oil products, respectively (1980 constant million US dollars)
Px	=	Unit value of exports in US dollars (1980=1.0)
Pm^o, $P\overline{m}^n$	=	Unit value of crude oil and non-oil imports, respectively (1980=1.0)
y^*	=	Real GDP of the industrialized countries (1980=100.0)
Rex, Rex(80)	=	Nominal exchange rate, and the rate for 1980, respectively (won per US dollar)
$\$ULC_k$	=	Korea's unit labor cost in the manufacturing sector measured as the value added per employee in US dollar terms (1980=100.0)
$\$ULC_o$	=	Average unit labor cost of the manufacturing sectors for competing countries (Taiwan Province, Singapore and Hong Kong), measured as the value added per employee in US dollar terms (1980=100.0)
D(1974,79)	=	Dummy variable for 1974 and 1979 that captures the speculation effect (leads and lags effect) before the exchange rate devaluation
EX,IM	=	Commodity exports and imports, respectively (nominal million US dollars)
EX_{me}	=	Commodity exports to the Middle East (nominal million US dollars)
V	=	Gross domestic product (1980 constant billion won)
V^a	=	Domestic absorption (1980 constant billion won)
V^o	=	Net exports of non-factor services and statistical discrepancies in the national income accounts (1980 constant billion won)
WPI	=	Wholesale prices (1980=100.0)
i_k	=	Effective interest rate on external borrowing (%)
LIBO	=	Two-year moving average of short-term Eurodollar interest rate (%)

NIP	=	Net interest payments on external borrowing (million US dollars)
ND	=	Balance of net external borrowing (million US dollars)
CA	=	Current account balance (million US dollars)
CA_o	=	Residual items in the current account balance (million US dollars)
SD	=	Statistical discrepancy and foreign exchange gain or loss from non-dollar-denominated external debt (million US dollars).

The structural equations above were estimated by ordinary least squares using annual data. The result of the estimatede equations are represented below.

(1) Commodity Exports

<u>Sample: 1971-85</u>

$$\ln EX_r = -15.30 + \underset{(19.7)}{5.376} \ln y^* - \underset{(4.06)}{0.518} \ln(\$ULC_k/\$ULC_o) - \underset{(1.09)}{0.058} D(1974,79)$$

$$+\underset{(4.42)}{0.162}(EX_{me}/EX)) - \underset{(2.39)}{0.226} D(1985)$$

$$R^2 = 0.993$$

Sample: 1975-85

$$\ln EX_r = -13.10 + \underset{(32.7)}{4.887} \ln Y^* - \underset{(3.94)}{0.301} \ln(\$ULC_k/\$ULC_o) - \underset{(3.25)}{0.106} D(1974,79)$$

$$+ \underset{(4.32)}{0.197}(EX_{me}/EX) - \underset{(3.00)}{0.127} D(1985)$$

$$R^2 = 0.997$$

(2) Commodity Imports

$$\ln IM_r^o = 5.92 + \underset{(6.07)}{0.866} \ln V - \underset{(1.30)}{0.092}(Pm^o \cdot Rex/WPI)$$

$R^2 = 0.890$ Sample = 1972-85

$$\ln IM_r^n = 9.29 + \underset{(4.62)}{0.944} \ln V^a + \underset{(3.02)}{0.240} \ln EX_r - \underset{(6.24)}{0.847} \ln(Pm^n \cdot Rex/WPI)$$

$R^2 = 0.995$ Sample = 1966-85

Alternatively, an aggregate import equation was estimated as follows (and this equation was used for the simulation):

$$\ln IM_r = 7.77 + \underset{(6.33)}{1.054} \ln V^a + \underset{(3.95)}{0.259} \ln EX_r - \underset{(5.00)}{0.668} \ln(P_m \cdot Rex/WPI)$$

$R^2 = 0.997$ Sample = 1966-85

(3) Domestic Absorption

$$\ln V^a = 0.183 + \underset{(2.07)}{0.100} \ln EX_r + \underset{(5.78)}{0.697} \ln V^a_{-1}$$

$R^2 = 0.991$ Sample = 1966-85

(4) Interest Rate on Foreign Debt

Sample: 1971-85

$$\Delta i_k = \underset{(1.30)}{0.38} + \underset{(2.38)}{0.337} \Delta LIBO$$

$R^2 = 0.303$

Sample: 1975-85

$$\Delta i_k = \underset{(1.00)}{0.33} + \underset{(3.09)}{0.492} \Delta LIBO$$

$R^2 = 0.516$

In the above, D(1985) is dummy variable for 1985; IM_r and Pm are total real commodity imports and unit value of aggregate imports, respectively; and numbers in parentheses are t-values.

In estimating the export equations, the two price variables could not be included simultaneously because of the multicollinearity between them. The equations incorporating Korea's unit labor cost vis-a-vis the three competing countries ($\$ULC_k/\$ULC_o$) proved to be superior to the ones using the ratio of the unit export price to unit labor cost ($Px/\$ULC_k$). Because of data

limitations, the export equations with ($\$ULC_k/\$ULC_o$) could only be estimated only for the small sample starting from 1971.

The elasticity of Korean exports with respect to the GDP of industrialized countries is estimated to have been as high as 4.9 - 5.4. The relative unit labor cost is also very significant, with the estimated elasticity ranging 0.30 and 0.52. The coefficient for D(1974,79) shows that the exchange rate speculation that occurred just before the large devaluations in late 1974 and early 1980 reduced exports, by 6 - 11 percent in 1974 and 1979. The share of exports to the Middle East, introduced to reflect export growth related to the new Middle East construction boom, also turned out to be significant. Finally, the coefficient of D(1985) shows that Korea's export environment was aggravated substantially with higher protectionist barriers on the part of the industrialized countries.

The estimation of the crude oil import equation was also based on a small sample, 1972-85, since it was only in the early 1970s that Korea had an adequate refinery capacity. In earlier years, substantial quantitites of processed oil products had been imported in the place of crude oil imports. The elasticity of crude oil imports with respect to GDP was 0.87, and the price elasticity was low and insignificant. In the non-oil import equation, both absorption and exports showed quite reasonable and significant coefficients. The absorption elasticities of import demand were estimated at 0.94 for non-oil imports and 1.05 for total imports. The elasticities of both non-oil and total imports with respect to exports were estimated at around 0.25, a result that is consistent with the information on the import intensity of exports. The price elasticity of imports relative to domestic wholesale prices was estimated at 0.85 for non-oil imports and 0.67 for total imports.

As expected, domestic absorption is influenced by exports. Finally, each 1 percentage point increase in the Eurodollar rate raised the effective interest rate on external debt by 0.34 - 0.49 percentage points depending on sample periods. This effect was somewhat smaller than the share of debt at variable interest rates, which was more than 60% of the total in recent years. The positive but insignificant constant term in the Δi_k equation seems partly to reflect the increasing share of debt at variable interest rates at the time when interest rates were rising.

If some of the elasticities are believed to have a trend, an estimated elasticity would be most reasonable for the mid-sample years. In our model, the foreign income elasticity of exports and the impact of Eurodollar rate on interest rate on foreign debt were found to be sensitive to the sample periods. In analyzing the effect of the first oil price shock, therefore, the export and interest rate equations fitted for the 1971-85 sample were utilized. For the analysis of the impact of the second oil price shock and the subsequent improvement of the external environment, the equations based on the 1975-85 data were used.

2. The Stance of Fiscal Policy

The IMF measure of fiscal stance (FIS) is defined as

$$FIS = -B + Bcn$$
$$= -B + (t_o\ Y - g_o\ Y^P)$$

where B = Actual budget balance

Bcn = Cyclically neutral budget balance calculated under the assumption of unitary elasticities of expenditures and revenue with respect to potential and actual output, respectively

t_o, g_o = The revenue and expenditure ratios to GNP, respectively, in the base year, when actual and potential GNP is judged to be the same, and

Y, Y^P = Actual and potential GNP (nominal), respectively.

Fiscal impulse (FI) (which indicates any change in fiscal stance) is defined as FI = Δ(FIS/Y). This measure of fiscal impulse includes not only the effects of discretionary fiscal policy changes, but also the contribution of the automatic stabilizers; it is supposed to show simply whether the budget is moving toward expansion or restriction.

The OECD measure of fiscal stance (FIS) is calculated residually by subtracting the effect of the built-in stabilizers from the actual budget deficit.

$$FIS = -B - \tau\ (Y^P - Y)$$

where τ is the marginal tax rate with respect to the divergence between actual and potential levels of output. Again, fiscal impulse is obtained by $\Delta(FIS/Y)$. In this measure of fiscal impulse, a discretionary shift in fiscal policy and in fiscal drag arising from inflation is included, while the automatic stabilizer effects are excluded.

In order to derive τ, a revenue equation was estimated as follows over the sample period 1971 through 1984.

$$R^* = -195.4 + 0.172\,Y + (0.646/10^6)\,Y^2 \qquad R^2 = 0.9993$$

$$(2.36) \quad (24.7) \qquad (6.13) \qquad D.W. = 1.54$$

where R^* is public sector revenue adjusted for discretionary changes in the tax system.[1/] Based on the equation,

$$\tau = \partial R^*/\partial Y = 0.172 + 2\,(0.646/10^6)Y, \text{ and } \tau \text{ increases}$$

continuously from 0.176 in 1971 to 0.256 in 1984.

1/ The Prest Adjustment Method was used to get R^* with 1980 as the benchmark year. In other words,

$$R^* = \left(\frac{R-DIS}{R_{-1}}\right) R^*_{-1}$$

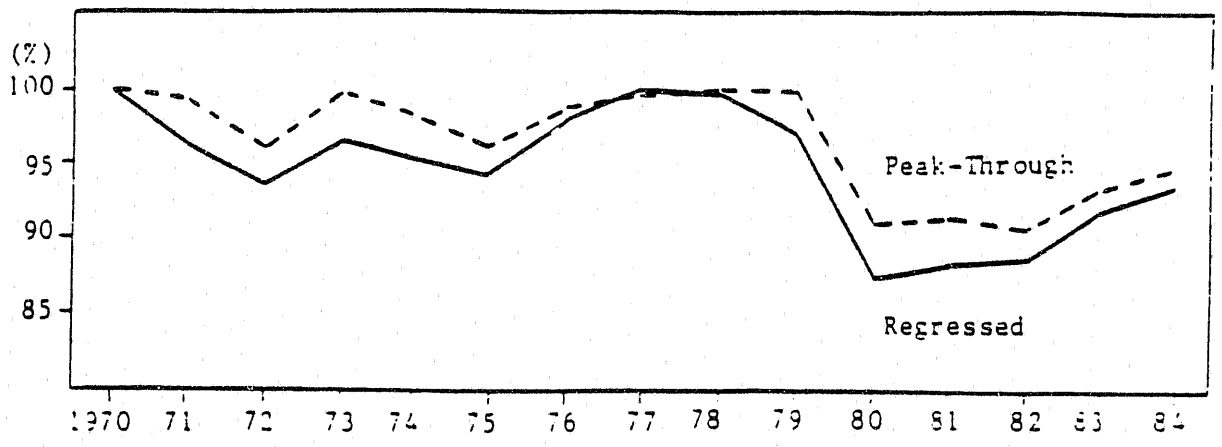
where R is actual public sector revenue and DIS is the effect on revenue of any discretionary changes newly made in the tax system (estimated by the Ministry of Finance).

Two alternative estimates of Y^P were tried. First, it was derived from the peak-through interpolation of GDP (real) in the logarithmic scale between the benchmark years (1970, 1978 and 1979) and by assuming that the GDP capacity utilization rate for 1984 was 95 percent (see Figure A.1) (and adding net factor income from abroad and multiplying the actual GNP deflator).

As a possibly more refined alternative, the above peak-through GDP (GDP*) was regressed, with capital stock as given below; then the fitted values, readjusted proportionally to make actual and fitted GDP the same for 1970 (the starting benchmark year), were used as potential GDP (real). Net factor income from abroad was then added, and the result was multiplied by the actual GNP deflator to get Y^P.

Figure A.1

GDP Capacity Utilization Ratio



$$GDP^* = \underset{(10.0)}{-94.843} + \underset{(8.54)}{0.1734}\, K^m + \underset{(11.4)}{11{,}184}\, \ln K^m$$

$R^2 = 0.9984$

D.W. = 0.76

Sample = 1970-84 (annual)

where K^m is the mid-year capital stock. 1/

1/ The capital stock series (K) was obtained from the annual fixed investment data (I_i) and constant depreciation rates (δ_i) for each asset type.

$$K = \sum_i [K_{i-1} (1-\sigma_i) + I_i] .$$

The annual depreciation rates estimated by Dr. Kwack Taiwon at KDI, are 0.1282 for machinery, 0.1727 for transportation equipment, and 0.0272 for building and other structures.

The initial stock $K_i(1952)$ was estimated under the assumption that, before 1953, I_i increased at the same annual rate as the average for the 1954-58 period, and that the stock was destroyed by 25 percent during the Korean War (1950-53). The resulting economy-wide annual depreciation rate ranged from 5.4 percent to 6.0 percent during the 1970-84 period.

3. The Demand for Money

In this section we estimate a demand for money model to investigate the stance of monetary policy.

Following Goldfeldt (1973, 1976), Corbo (1982) and Nam (1984), we specify a semi-log demand for money equation of the form:

$$\ln M^*(t) = \alpha_o + \alpha_1 \ln Q^e(t) + \alpha_2 I^e(t) + \alpha_3 r(t) + u(t) \qquad (1)$$

where $M^*(t)$ = Long-run demand for real money balances in period t

$Q^e(t)$ = Expected non-agricultural domestic product in period t, expressed in constant prices

$I^e(t)$ = Expected cost of holding money in period t

$r(t)$ = Curb market interest rate.

$M^*(t)$ is not directly observable, however, because of the presence of adjustment costs, restrictions on international trade and unexpected money growth. As in Chow (1966), the adjustment of $\ln M(t)$ toward $\ln M^*(t)$ is represented by a logarithmic partial adjustment mechanism of the form:

$$\ln M(t) - \ln M(t-1) = \gamma(\ln M^*(t) - \ln M(t-1)) \qquad (2)$$

where $M(t)$ = the short-run demand for real money balances in period t.

Introducing (1) into (2) gives a short-run demand for money equation:

$$\ln M(t) = \gamma\alpha_o + \gamma\alpha_1 \ln Q^e(t) + \gamma\alpha_2 I^e(t) + \gamma\alpha_3 r(t) + (1-\gamma)\ln M(t-1) + \gamma u(t) . \quad (3)$$

There remains, however, the problem of expressing $I^e(t)$ and $Q^e(t)$ in terms of directly observable variables. For $I^e(t)$, the best alternative to holding money in Korea was holding real assets. Thus, the expected cost of holding money can be measured as the sum of the expected real interest rate and of the expected inflation rate. To arrive at the expected cost, a Cagan-Nerlove adaptive expectations model was assumed. In other words,

$$I^e(t) - I^e(t-1) = \beta[I(t) - I^e(t-1)]. \quad (4)$$

Similarly, as in most permanent income formulations $Q^e(t)$ is expressed in terms of actual output by assuming that

$$\ln Q^e(t) - \ln Q^e(t-1) = \delta(\ln Q(t) - \ln Q^e(t-1)) \quad (5)$$

Replacing $I^e(t)$ and $Q^e(t)$ using equations (4) and (5), we obtain the following equations in observable variables:

$$\begin{aligned}\ln M(t) = {} & \gamma\delta\alpha_o\beta + \gamma\delta\alpha_1[\ln Q(t) - (1-\beta)\ln Q(t-1)] + \gamma\alpha_2\beta[I(t) - (1-\delta)I(t-1)] \\ & + \gamma\alpha_3[r(t) - (1-\beta)\, r(t-1)] - \gamma(1-\delta)[r(t-1) - (1-\beta)\, r(t-2)] \\ & + [(1-\gamma) + (1-\delta)] \times [\ln M(t-1) - (1-\beta)\ln M(t-2)] \quad (6) \\ & - (1-\gamma)(1-\delta) \times [\ln M(t-2) - (1-\beta)\ell n M(t-3)] + (1-\beta)\ln M(t-1) + \varepsilon(t),\end{aligned}$$

Table A.1

Quarterly Demand For Money Equation

Coefficient	Definition of Opportunity Cost			
	Curb Market Rate		Expected Inflation 1/	
α_o	-2.004 (-3.350)	-2.059 (-4.364)	-2.309 (-1.515)	-1.757 (-2.155)
α_1	0.803 (10.986)	0.839 (17.084)	0.872 (3.921)	0.794 (9.356)
α_2	0	0	-13.436 (-1.241)	-11.857 (-3.066)
α_3	-4.755 (-2.134)	-7.063 (-3.967)	0	0
β	1	1	0.522 (4.192)	0.491 (5.990)
γ	0.396 (2.589)	0.290 (3.530)	0.121 (1.125)	0.147 (2.579)
δ	0.933 (3.582)	1.026 (6.082)	1.288 (5.911)	1.292 (7.857)
R^2	0.975	0.989	0.993	0.997
DW	1.69	1.88	2.11	2.15
n	29	45	29	45

Note: n = 29 corresponds to the sample 1971.IV to 1978.IV;
n = 45 corresponds to the sample 1971.IV to 1982.IV.

1/ Expected inflation is measured as the percentage change in the non-agricultural GNP deflator.

We estimate equation (6) using the maximum likelihood (ML) estimation procedure. The estimates arrived at by this method will be consistent and asymptotically efficient if the disturbances $\varepsilon(t)$ are independent and identically normally distributed.

When both the expected cost of holding money and the curb market interest rates are introduced as regressors, neither is significant. However, both variables are individually significant. We present separate results for each individual measure in Table A.1. For each definition of the opportunity cost of holding money, we have two different sample sizes, which are defined in the note to the table.

From the point of view of magnitude of coefficients, the long run elasticities are fairly stable across specifications; the income elasticity ranges from 0.794 to 0.872. The partial adjustment coefficient, however, is substantially lower with the inflation measure of opportunity cost of holding money. In the shorter sample, the adjustment coefficient takes a value of 0.121. This coefficient implies an average lag in the adjustment of actual real balances towards desired real balances close to 7 quarters. In contrast, the result with the curb market rate, for the longer sample, implies the average lag of 5.8 quarters. The semi-elasticity of the demand for money is estimated with more precision for the curb market rate case. Finally, the coefficient of the adaptive expectations model for inflation expectations is around 0.5 which seems low for a country with a long period of intermediate inflation.

Some Recent DRD Discussion Papers

190. Problems, Development Theory and Strategies of Latin America, by V. Corbo, September 1986.

191. Criteria for Choice Among Types of Value-Added Tax, by C. S. Shoup.

192. Administrative and Compliance Issues Unique to VAT Lessons from the Two Periods of British Experience, by C. Sandford and M. Godwin.

193. Interjurisdictional Coordination of Sales Taxes, by S. Cnossen.

194. Computarization of VAT in Indonesia, by M. G. Lane and H. Hutabarat.

195. A Simple Model of Seniority and Turnover, by Y. Kislev.

196. Wages, Turnover and Job Security, by Y. Kislev.

197. Import Compression and Export Performance in Developing Countries, by M. Khan and M. Knight.

198. Fiscal Deficits, Exchange Rate Crises and Inflation, by S. van Wijnbergen.

199. Aid, Export Promotion and the Real Exchange Rate: An African Dilema, by S. van Wijnbergen.

200. Growth, Structural Transformation and Consumption Behavior: Evidence from Asia, by J.M. Dowling and A.K. Lahiri.

201. Theoretical and Policy Aspects of Dual Exchange Rate Systems, by M. A. Kiguel and J. S. Lizondo.

202. Fiscal Policies and Real Exchange Rates in the World Economy, by J. Frenkel and A. Razin.

203. Economies of Scale in Agriculture: A Survey of the Evidence, by Y. Kislev and W. Peterson.

204. Optimal Corporate Debt Financing and Real Investment Decisions under Controlled Banking Systems, by M. Dailami.

205. Optimal Profit-Sharing Contracts and Investment in an Interest-Free Islamic Economy, by N. Haque and A. M[illegible]hor.

206. Stabilization and Economic Growth in Developing Countries, by M. Khan.

207. Controlling Inflation: Korea's Recent Experience, by V. Corbo and S.W. Nam.