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## **Capital Account Liberalization and Macroeconomic Performance: The Case of Korea**

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# **CAPITAL ACCOUNT LIBERALIZATION AND MACROECONOMIC PERFORMANCE: THE CASE OF KOREA**

## **Abstract**

The macroeconomic effects of capital account liberalization in Korea are examined. Based on the vector auto-regression (VAR) model, the following stylized facts are found: first, after capital market liberalization, capital flows become less driven by current account imbalances, and therefore become more autonomous. Second, capital account liberalization significantly changes the effects of capital flows on macroeconomic variables. Third, capital account liberalization is highly related to consumption and investment booms, and subsequent appreciation of nominal and real exchange rates, which leads to the current account worsening. Finally, strong evidence is found of sterilized foreign exchange market intervention in response to capital inflows.

## **1. Introduction**

Industrial and emerging market economies alike share a common interest in building a strong and safe system for managing global capital flows. To the extent that international capital markets are well-functioning and competitive and that capital flows respond to proper price signals, capital flows contribute to an efficient cross-country allocation of resources and risks. A healthy capacity to digest free capital mobility is critical to successful financing of the steady growth of the world economy. In particular, capital account liberalization can provide developing countries access to foreign capital, increasing the amount of capital available to an economy by narrowing the gap between domestic savings and investment. Furthermore, capital inflows can help developing countries to break the poverty trap and to obtain high growth rates.

However, capital account liberalization also entails risks and potential costs, particularly in the case of excessive short-term flows. Large capital flows, whether inflows or outflows, can complicate the macroeconomic management of an economy.

Sudden and massive reversals of capital flows can also create serious liquidity shortages, as showcased in the recent turbulence in East Asian financial markets and elsewhere. In order to fully realize the benefits of capital flows, risk exposure associated with capital flows should be properly managed. Many economists have blamed the governments of the East Asian countries for undertaking rapid financial liberalization and capital account opening without addressing the concomitant needs to strengthen their supervisory capacity (Furman and Stiglitz, 1998; Rodrik, 2000). In this regard, there has been considerable discussion as to whether a particular sequence of capital account liberalization or capital controls can minimize the potential disruption of the domestic economy.

While a large body of literature has examined the impact of capital account liberalization on the domestic financial system or the link between capital account liberalization and financial crises, only a few studies have attempted an empirical analysis of the macroeconomic effects of capital account liberalization. Since macroeconomic policies also change in the wake of capital account liberalization (especially exchange rate regimes, particularly from fixed to floating), it would be empirically difficult to single out the pure impact of capital account liberalization on macroeconomic variables such as output, inflation, interest rate, exchange rate, and current account balance.

The previous empirical studies are mostly based on static analysis with multi-country cross-sectional data.<sup>1</sup> Some researchers used the data from industrialized countries to examine if there were any differences in the behaviour of key macroeconomic and policy variables in the presence or absence of capital controls. Eichengreen, Rose and Wyplosz (1996) find that inflation, money growth, budget and trade deficits are higher in the presence of capital controls, and therefore, capital controls have a significant impact on macroeconomic performance. Countries imposing controls tend to have higher inflation and greater seigniorage revenue but lower real interest rates. However, no significant correlation exists between capital controls and the rate of economic growth (Alesina, Grilli, and Milesi-Ferretti, 1994; Grilli and Milesi-Ferretti, 1995). Rodrik (1998) obtains similar results with a sample of

developing countries; the average rate of economic growth during 1975-89 is uncorrelated with the number of years that countries had capital controls in place.<sup>2</sup> Using cross-sectional data, Razin and Rose (1994) focus on business cycle volatility and openness and examine whether reducing barriers in trade and capital mobility increases volatility of output, consumption and investment.

Several studies suggest that capital controls do not produce positive effects in terms of attaining governments' objectives.<sup>3</sup> Most empirical results suggest that controls have been effective in the narrow sense in that they affect yield differentials. However, there is little evidence that controls have helped the governments meet policy objectives, except for reducing governments' debt-service costs, and controls do not enhance economic welfare.

In general, these studies suggest that there are some differences in macroeconomic performance in the presence and absence of capital controls, generally in favor of capital account liberalization. However, caution should be exercised in drawing strong conclusions from these studies. First, these studies in general fail to fully investigate the direction-of-causality problem. Macroeconomic performance may affect the degree of capital controls, but these studies do not fully address this aspect. Second, the measure of capital controls is incomplete. In addition, most measures mainly reflect restrictions on capital outflows, not inflows, which may be more relevant to the issue.

More importantly, these studies do not consider the fact that the impact of capital account liberalization on capital flows is not linear (deterministic), which means that the economy passes through alternating phases of boom and slump in the process. Therefore, it is necessary to develop a dynamic framework for capturing boom and bust associated with capital inflows and outflows – the so-called boom-bust cycles.<sup>4</sup> According to Obstfeld (1986) and others, it is generally agreed that capital account liberalization leads to an initial period of capital surges, real exchange rate appreciation, domestic credit expansion, consumption/investment boom and asset price bubbles.<sup>5</sup> Over time, however, the process tends to reverse itself: real exchange rate appreciation worsens the international competitiveness of firms and brings about a current account

deficit. This in turn influences foreign investors to lower their views on the domestic market and withdraw capital investment. Therefore, net capital inflows decline and eventually net capital outflows start, which reverses the "boom" phase and starts the "bust" phase.

In this paper, the effects of capital account liberalization on the macroeconomic performance of the Korean economy are empirically analysed. The case of Korea provides a unique example to analyse the effects of capital account liberalization policies on economic performance and potentially, on the financial crisis. Korea being a typical small open economy depends largely on trade as a source of growth. Since the 1980s and mostly during the 1990s, capital account transactions in Korea were made open for both domestic residents and foreigners. Even after the financial crisis in 1997, Korea continued to relax capital account restrictions along with domestic financial market restrictions. Therefore, the Korean case supplies a good data set to test the effects of capital account liberalization before, during, and after the financial crisis.

First, the extent to which capital account liberalization policies affect the actual capital inflows and outflows of Korea is investigated. Quarterly and monthly balance of payments data from 1980 to 2000 are used, and a time series analysis is performed to find any systematic relationships between external policies and capital flows. A vector auto-regression(VAR) model is constructed to formally examine how capital flows affect domestic macroeconomic variables. The empirical studies focus on macroeconomic performance rather than the corporate and financial sectors, such as output, investment, consumption, interest rates, real exchange rates, and monetary aggregates.

The results of this paper contribute to the existing literature by providing a good example of how capital account liberalization affects the macroeconomic performance of a country, and potentially, policy implications for the speed and coverage of capital account liberalization. However, there appears to be no single "road map" to implementing capital account liberalization, as shown in the cross-sectional survey of 16 developing economies undertaken by the IMF (2000). Indeed, the IMF study concludes that "...the key to orderly liberalization lies beyond the concept of

sequencing and pace, in the strength and the full commitment to undertaking supporting policies.”

The rest of this paper consists of the following sections. Section 2 summarizes the history and brief implications of Korea’s capital account liberalization policies in the 1980s and 1990s. The capital flow data is extensively analysed in section 3, and the links between capital flows and macroeconomic performance are examined. In particular, the data in the 1980s is compared with the 1990s, and differences in the main characteristics of various economic variables are reported. In section 4, a VAR model is constructed, and the effects of capital account shocks on various macroeconomic and monetary variables are investigated, based on impulse responses and variance decomposition. Finally, section 5 discusses some lessons and policy implications.

## **2. Capital Account Liberalization Policy in Korea**

### *Liberalization in the 1980s*

Throughout the 1980s, the policy of the Korean government on capital flows was residual: developments in the current account balance dictated the government’s interventions in the foreign exchange market and transactions related to the capital account (Johnston, Darbar and Echeverria, 1997; Park, 1995; Park and Song, 1998). Under the pegged exchange rate system, current account balances were determined autonomously. Then, policies on capital flows were used to accommodate the overall balance of payments.

In the first half of the 1980s, the current account continued to record deficits, although the size of the deficit was steadily declining. For the purpose of financing the current account deficit, the Korean government undertook several measures to liberalize capital inflows, while tightening regulations on capital outflows, mainly by restricting residents’ overseas investment. In particular, the Korean government encouraged domestic banks to borrow from abroad. Moreover, in 1981, foreign investors were allowed to participate in the Korean stock market through investment trust funds set up exclusively for them. The Korea Fund, organized under the United States law and listed

on the New York Stock Exchange, was launched in 1984.<sup>6</sup> In 1985, Korean firms were permitted to raise foreign capital by issuing overseas convertible bonds (CBs), bonds with subscription warrants (BWs) and depository receipts (DRs).

As a result of liberalization measures on capital inflows during the first half of the 1980s, Korea saw significant net capital inflows. In 1986, the current account recorded a surplus, which continued to grow until 1989. This surplus also resulted from external factors, such as the recovery of the world economy and the rapid appreciation of the Japanese yen, which improved the competitiveness of Korean exports. Foreign exchange reserves, only \$2.8 billion at the end of 1985, reached \$12.6 billion a year later and \$15 billion by the end of 1989.

In order to reduce excessive foreign exchange holdings and maintain export competitiveness, the government dramatically changed its policy stance toward capital flows by reimposing direct controls on capital inflows as well as easing restrictions on capital outflows. The government undertook various measures aimed at reducing capital inflows, including encouraging the early repayment of external borrowing, tightening the regulations on foreign commercial loans and foreign bank borrowing, and imposing restrictions on the volume of foreign exchange that could be brought in and sold to domestic banks (Johnston, Darbar and Echeverria, 1997). On the other hand, all restrictions on residents' overseas direct investment (ODI) below \$1 million were abolished in 1987 (since then automatically approved) and residents were permitted to purchase foreign real estate for bona fide business purposes in 1988.

However, gradual movement towards capital account liberalization was not absent. After three consecutive years of current account surplus over the period 1986-88, the Korean government formally accepted the obligations of Article VIII, Section 2-4 of the International Monetary Fund's (IMF's) Articles of Agreement in 1988. This move pushed Korea to abolish its remaining restrictions on payments and transfers for current account transactions. With limited but gradual capital account liberalization, the Korean government also found it increasingly more difficult to manage the *multiple currency basket peg* (MCBP) exchange rate system. As capital mobility increased, managing a pegged or targeted exchange rate became increasingly inconsistent with an

independent monetary policy, since sterilization of capital inflows through sales of government securities became costly (Chinn and Maloney, 1998). Thus, in March 1990, the Korean government adopted a variant of a managed floating exchange rate regime, which allowed for a more market-based determination of the exchange rate.

#### *Liberalization in the 1990s Prior to the Crisis*

In 1990, the current account balance started to deteriorate again because of rising inflation, real appreciation of the Korean won, and recession of the world economy. The current account worsened in 1991, recording a deficit of \$8.7 billion, which was more than four times the level of the preceding year. The amount of foreign exchange reserves held by the Bank of Korea fell sharply. Facing difficulties in financing the mounting current account deficit, the government responded by encouraging capital inflows. Some of the earlier measures aimed at limiting capital inflows were reversed.<sup>7</sup> Furthermore, capital account liberalization was once again significantly accelerated by amending the Foreign Exchange Management Act (FEMA) in 1991 (Park, 1995).

Under the amended FEMA, those transactions classified as capital inflows were liberalized first, although the positive system of capital control – in which only those transactions specifically permitted are listed – remained intact. Conditions under which residents could raise funds by issuing securities abroad were eased by stage, first in 1991 and in the following years. Foreign direct investment was considerably liberalized, and measures included: lifting the ceilings on the amounts of direct investment inflows automatically approved (investments with a foreign participation of less than 50 per cent in manufacturing projects were made subject to notification in place of approval); providing tax incentives; and expanding sectors where foreign direct investment was permissible (Johnston, Darbar and Echeverria, 1997). Most importantly, effective from January 1992, nonresidents were allowed to directly purchase Korean stocks up to three per cent of the outstanding shares of each company per individual, but no more than ten per cent of a company in total.<sup>8</sup> Furthermore, in June 1993, the Korean government announced a blueprint for financial liberalization and opening of the financial sector, which aimed at substantial progress in the deregulation of domestic financial markets.<sup>9</sup>

The plan envisaged further easing of requirements for foreign exchange transactions, widening the daily won-dollar trading margins, expanding limits on foreign investment in the stock market, and permitting long-term commercial loans.

Even the partial nature of capital account liberalization undertaken during the early 1990s triggered massive capital inflows. Policy makers were particularly concerned about the appreciation of the Korean won, which could undermine the competitiveness of Korean exports, rather than the financial instability generated by volatile capital flows. The government took several steps to liberalize capital outflows. Residents' overseas direct investment was significantly liberalized, except for specifically restricted businesses. Domestic institutional investors such as securities firms, insurance companies, and investment trust companies were allowed to invest in foreign securities without any restrictions as of February 1994.

Despite a series of capital account liberalization measures, the Korean government maintained a gradual approach and thus, a considerable number of capital controls on foreign exchange and cross-border capital transactions still remained. For example, the opening of the domestic bond market was given special attention because interest rate differentials were still large.<sup>10</sup> While most capital outflows were in general liberalized, capital inflows in the form of foreign portfolio investment remained subject to various ceilings and certain other regulations. However, domestic firms, particularly large business companies (the so-called chaebol) were severely critical of remaining restrictions, and claimed that the rigid control on capital inflows undermined the international competitiveness of domestic firms in the world market due to high financial costs. Amidst these complaints and foreign pressure for further deregulation, the Korean government unveiled the new Foreign Exchange System Reform Plan in December 1994 (Park, 1995).

The Plan attempted in three stages to completely liberalize current and capital account transactions with a few exceptions and to develop an efficient foreign exchange market over a five-year period. It stipulated a gradual and staged liberalization process, with the speed of liberalization adjusted depending on the state of the economy. Implementation of the first stage of capital account liberalization, which focused on the

liberalization of capital outflows, began in February 1995. However, the cautious approach towards capital market opening continued when Korea joined the Organization for Economic Cooperation and Development (OECD) in 1996. The Korean government maintained many reservations to the OECD Code of Liberalization of Capital Movements and Current Invisible Operations.<sup>11</sup> According to the membership negotiations, the government was reluctant to liberalize the capital account because of its concern about a dramatic increase in foreign capital inflows due to the interest rate differentials and excess demand for investment. The government had therefore planned to delay liberalizing the long-term bond market and commercial loans until the interest rates significantly converged.

#### *IMF Programme and Further Liberalization*

The East Asian financial crisis emerged as Thailand's currency crisis in July 1997 spread to the neighbouring countries, which eventually forced Indonesia and Korea to request assistance from the International Monetary Fund (IMF). The Korean government officially made the request on November 21, 1997 after nearly all of its foreign reserves were depleted in defense of the Korean won. For the short run, the IMF programme stressed on a tight aggregate demand policy to stabilize the foreign exchange market. For the intermediate and long run, it emphasized the need for structural reform of the financial and corporate sectors, which were the underlying causes of the currency crisis.

With regard to capital account liberalization, the Korean government aimed for a far more extensive capital market opening than what had been agreed with the IMF. A variety of policies were developed to induce foreign capital in an attempt to overcome the currency crisis, and measures for capital account liberalization were undertaken. The individual shareholding limit of foreigners increased drastically from 7 to 50 per cent on December 11, 1997. The ceiling was lifted completely on May 25, 1998. All regulations on foreign purchase of debt securities were eliminated in December 1997. As of December 1997, all domestic enterprises, regardless of size, were allowed to borrow without limit from overseas as long as the maturity would not exceed one year.

All the short-term money market instruments, such as commercial paper and trade bills, were also completely liberalized on May 25, 1998, and this brought Korea's capital markets on a par with the level of openness of advanced economies.

To induce foreign direct investment, all institutional restraints on the takeovers and acquisitions of domestic firms by foreign investors, including hostile mergers and acquisitions (M&A), were completely abolished. As an institutional response to the need for improvement of the environment for foreign direct investment, the previously interspersed counselling and service support functions for foreign investors were unified under the Korea Trade and Investment Promotion Agency (KOTRA) through the creation of a 'one-stop service' system on April 30, 1998. Thirty additional industries, which included insurance and leasing, were opened to foreigners on two occasions in April and May of 1998.<sup>12</sup>

The Korean government responded to the currency crisis by adopting a free floating exchange rate regime, and by more actively pursuing capital account liberalization.<sup>13</sup> Thus, the liberalization of restrictions on capital movement was accompanied by a relaxation of the rules governing the use of foreign exchange. The Korean government established a simple and transparent framework to replace the cumbersome laws and regulations that had governed such transactions. The new Foreign Exchange Transactions Law replaced the old Foreign Exchange Management Law and took effect in April 1999. While foreign exchange dealings in the past had to be based on *bona fide* real demand, speculative forward transactions are now permitted. This far-reaching liberalization is important in bringing Korea closer to being in line with the market-oriented principles adopted by more advanced foreign exchange markets.

The new system was implemented in two stages, in April 1999 and at the end of 2000, in order to allow sufficient time to improve prudential, regulatory and accounting standards before full liberalization. The first stage of the new system eliminated the one-year limit on commercial loans while liberalizing various short-term capital transactions by corporations and financial institutions. Moreover, foreign exchange dealing was opened to all financial institutions.<sup>14</sup>

Following the first-stage foreign exchange liberalization in April 1999, the second-stage liberalization was implemented from January 2001. The year 1999 saw the liberalization of foreign exchange transactions by corporations and financial institutions related to their external activities. From 2001, foreign exchange transactions and capital account transactions by individuals were liberalized in addition to further streamlining of the remaining restrictions on foreign exchange transactions by corporations and financial institutions.

### **3. Trends in Capital Flows to Korea and Macroeconomic Performance: Stylized Facts**

#### *Characteristics of Capital Flows in Korea*

In this section, the analysis focuses on how various stages of capital account liberalization actually affected the amount of capital inflows and outflows to and from Korea. First, the current account, capital account and overall balance are examined in order to examine the main characteristics of aggregate balance of payments terms before and after liberalization. Next, the detailed components of the capital account— foreign direct investment, portfolio investment and other investments – are examined in order to investigate the changes in the composition of capital flows over time. In particular, the items that consist of portfolio investment and other investments in financial account are considered. Finally, the maturity structure of foreign assets and liabilities is also examined.

#### *During the 1980s*

During the 1980s, Korea maintained an intermediate exchange rate system, in particular pegged exchange rate to a basket of currencies. Therefore, the current account imbalances were not automatically adjusted by market exchange rate; instead, they were managed by induced changes in the capital account in the opposite direction. For example, the current account deficit was financed by either an increase in net private capital flows (an increase in non-reserve capital account) or a decrease in foreign reserves (or an increase in reserve account). Therefore, there was not much autonomous

movement in the capital account, and most of the movement was initiated by changes in the current account.<sup>15</sup>

Figure 3.1 shows the plot of quarterly data of the current account, capital account and overall balance from 1980 to 1999. As can be seen from Figure 3.1, during the first half of the 1980s, the overall balance fluctuated around the net zero balance, and the current account and capital account moved in opposite directions. In particular, current account deficits were financed by capital account surpluses. In other words, since the exchange rate was practically fixed, imbalances in the current account imbalance were matched by movements in the capital account in the opposite direction.

However, during the second half of the 1980s, especially during the 1986-89 period, the current account recorded surpluses (the peak of current account surplus reached around US\$5 billion in 1989). The various external and internal factors that produced current account surplus during this period have already been explained in the previous section. One important feature is that a non-parallel movement of current and capital accounts started to show up since late 1987 - the current account surplus was not fully matched by a deficit in the capital account, and the overall balance started to show a surplus. As a consequence, foreign reserves (or net foreign asset position) started to accumulate since 1988.

One explanation for this asymmetric adjustment of current and capital accounts under the fixed exchange rate regime is as follows: deficits in the current account should be matched by surpluses in the capital account if there is no change in foreign reserves. In other words, a country should find a way to finance net imports from the real side of the economy, if net imports cannot be sufficiently financed by capital inflows in the private sector. However, the surplus in current account does not have to be matched by an immediate outflow of capital because there is no urgent constraint to remove extra capital out of the country.

#### *During the 1990s - before the Crisis*

The current account started to show deficits in the early 1990s as the world economy slowed down. Up until 1993, the capital account moved in the opposite direction of the current account, implying that the financing of the current account was

still the major factor that explained capital account movements. The current account temporarily improved in 1993 but started to show significant deficits from 1994 until the Asian crisis occurred in 1997. The level of the current account deficit reached beyond US\$23 billion in 1996. However, as a percentage of GDP, the amount of deficit was below five per cent, which is similar to the amount of surplus in 1988.

As the capital account in Korea was liberalized significantly from the mid-1990s, it started to reflect the autonomous movement of capital not used for financing current account imbalances. As a consequence, the overall balance started to show a surplus. Compared to the late 1980s when the overall balance surplus had its root in the current account surplus, the surplus in overall balance in the mid-1990s was not healthy because it was based on a surplus in the capital account.

#### *During the 1990s – after the Crisis*

During the crisis period, foreign capital moved out of Korea at a rapid pace (capital flight), and the capital account revealed deficits of up to US\$6.4 billion in 1998. The overall balance also showed large deficits. As a result of the crisis, the current account sharply improved and moved into the surplus zone (Figure 3.1). Surplus in the current account contributed to an accumulation of foreign reserves in 1998.

In 1998, Korea received foreign liquidity assistance from the IMF and foreign investors recovered from panic while the capital account started to recover. It is important to note that after the crisis, the financing role of the capital account for any current account imbalances further decreased. That is, the overall balance followed almost the same path as the capital account, while the current account stabilized at the level of a small amount of surplus. The autonomous characteristics of the capital account resulting from capital flows in private and public sectors became more conspicuous. This can be seen in the changes in the composition of the capital account, shown later in this section.

The autonomous characteristics of the capital account are based on two factors. First, the IMF programme required further liberalization of the capital account as a condition for financial assistance from the IMF, therefore allowing for capital to flow in and out of Korea more freely than before. Second, Korea's exchange rate system

changed to a more market-oriented system. Any imbalance in the current account is now adjusted by movements in exchange rates determined in the market, rather than residual changes in the capital account.

However, there are two elements to consider in analysing the true role of the exchange rate system in this period. First, demand and supply of foreign currencies in the foreign exchange market are governed not only by trade-related transactions but also, and even more, by capital account related transactions such as portfolio and foreign direct investment. Therefore, the exchange rate does not always respond to clear the current account imbalances. Second, sterilized intervention alters the nature of market process and affects the exchange rate purely determined by market forces otherwise.

#### *Components of Capital Account*

In this section, the changes in the capital account over time are examined. The capital account (financial account) consists of direct investment, portfolio investment, financial derivatives and other investments. Direct investment includes cross-border transactions of equity capital, reinvestment earnings and other capital apart from exceptional financing such as debt-for-equity swaps. Portfolio investment mainly deals with equity and debt transactions. Other investments cover transactions in currency, loans and trade credits.

The time-series graph of the balances (credit minus debit) of each component of the capital account is shown in Figure 3.2. One important feature is that during the 1980s, other investments, and bank loans in particular, account for a major portion of the capital account, while during the 1990s, portfolio investment is the dominant item. Foreign direct investment is not volatile for the whole period compared to the other two components of the capital account.

Figure 3.2 can be used to easily explain some features of the capital account. The capital account deficit during the period from 1986-1989 is due to capital outflows in the 'other investment' category. Facing current account surpluses, the government encouraged banks and other financial institutions to pay back their foreign currency-

denominated loans (categorized as other investments), which resulted in a deficit in the capital account. During the first half of the 1990s, both portfolio and other investments showed surpluses, while direct investment maintained a small amount of deficit. For the period during and after the currency crisis, however, other investments showed continuous deficits, while portfolio investment showed surpluses, except for the year of 1998. This implies that after the crisis, capital inflows to Korea were mostly in the form of portfolio investment in the stock market, while the banking sector experienced capital outflows. An explanation for this is that the banking sector was suffering from a high debt-equity ratio and could not be financed through foreign sources due to low credit ratings. Another important observation is that foreign direct investment in Korea increased significantly in 1999 and 2000. This can be attributed to the increase in mergers and acquisitions of Korean firms by foreign firms, and to government policies which aimed to sell domestic firms to foreigners.

### *Macroeconomic Variables*

This section examines the effects of capital flows on macroeconomic variables. In particular, the effects on growth and volatility of macroeconomic aggregates are examined. The section also looks at how the characteristics of these variables change before and after capital account liberalization. In addition, the paper explores how the cyclical behaviour of these variables, especially its correlation with output, changes over time.

#### *Growth Rate*

Table 3.1 displays average growth rates of major macroeconomic variables – output, consumption, government spending and investment. First, the whole period is divided into two sub-periods at the year when significant measures for capital account liberalization had been implemented. The statistical properties before and after the liberalization are then compared. 1990 is chosen for the structural breakpoint.<sup>16</sup> Second, since the second half of the period contains the crisis period, the 1990-2000 period is further divided into two periods: 1990-1996 (without the crisis) and 1997-2000 (with the crisis). Third, the period from 1997-2000 is again further divided by

extracting the crisis period – from the third quarter of 1997 to the second quarter of 1998 – to see if there are any differences in statistical properties.

It can be seen that average growth rate of output in the 1980s (3.5 per cent) is higher than in the 1990s (2.7 per cent). The sub-period analysis indicates, however, that this is due to the inclusion of the crisis period in which the growth rate of output is negative (-0.5 per cent). Average growth rates during 1990-1996 and 1998/3-2000, 3.2 per cent and 3.3 per cent respectively, are similar to that in the 1980s. The table indicates that during the crisis period, growth rates of other variables also sharply decreases, especially investment (-15 per cent). Consumption growth rate also decreases to -2.4 per cent. Government spending is relatively stable, maintaining low but positive growth rate even during the crisis period.

**Table 3.1 Average Growth Rates**

(Unit: per cent)

	Y (Output)	C (Consumption)	G (Government spending)	I (Investment)
1980-1989	3.5	3.2	2.1	4.5
1990-2000	2.7	2.4	1.5	1.8
1990-1996	3.2	3.2	2.2	4.2
1997-2000	1.8	0.9	0.4	-2.5
1997/3-1998/2	-0.5	-2.4	0.2	-15.0
1998/3-2000	3.3	2.9	0.4	4.9

Source: Bank of Korea

Note: All the data are quarterly, real and seasonally adjusted. Logged differences from the same quarter in the previous year are used to measure the growth rate.

#### *Volatility and Persistence*

Volatility is measured by the per centage standard deviation and persistence is measured by the first-order autocorrelation coefficient. Volatility measures the amplitude of fluctuations and persistence indicates the amount of inertia in business cycles. Table 3.2 presents detailed data for the volatility of four variables – output, consumption, government expenditure and investment. The volatility of output increased from 1.19 per cent in the 1980s to 2.06 per cent in the 1990s, but this result is due to the inclusion of the crisis period. The standard deviation of output during 1990-1996 is only 0.84 per cent, while it is over 3 per cent between 1997 and 2000. The high

volatility of output in this period results from the crisis and the V-shape recovery of the economy. The conventional hypothesis is that after capital account liberalization, a small open economy becomes more vulnerable to external shocks and volatility of output increases. However, as can be seen in the table, volatility of output is quite stable in the 1990s prior to the crisis, although there has been progressive liberalization since the early 1990s.

**Table 3.2. Volatility of Major Macroeconomic Variables**

	Y (Output)	C (Consumption)	G (Government spending)	I (Investment)
1980-1989	1.19	0.68	2.21	3.65
1990-2000	2.06	2.69	1.38	8.78
1990-1996	0.84	0.69	1.30	3.57
1997-2000	3.11	4.04	0.48	12.92
1997/3-1998/2	2.73	4.15	0.58	9.73
1998/3-2000	2.44	2.95	0.38	8.88

As can be seen from Table 3.3, persistence of all variables is higher in the 1990s. This phenomenon is consistent even without taking the crisis period into consideration. High persistence implies that shocks the economy faces become more persistent and the degree of inertia in the macroeconomic system becomes higher.

**Table 3.3. Persistence of Major Macroeconomic Variables**

	Y (Output)	C (Consumption)	G (Government spending)	I (Investment)
1980-1989	0.53	0.65	0.39	0.45
1990-2000	0.83	0.80	0.68	0.81
1990-1996	0.80	0.76	0.63	0.70
1997-2000	0.78	0.74	0.43	0.76

Note: Persistence is estimated by the first-order autocorrelation coefficient from the regression of time  $t$  variable on time  $t-1$  variable for the estimation period.

#### *Correlation with Output*

The degree of contemporaneous correlation with output is measured by the correlation coefficient and this co-movement provides information on whether a series behaves pro-cyclically or counter-cyclically. Table 3.4 presents the correlations of

expenditure components with output. For the entire period, all three variables are on average positively correlated with output at the same time. Positive correlation, or in other words pro-cyclical variables, implies that business cycles in Korea are formed as the macroeconomic variables fluctuate simultaneously with the components of aggregate output. These regularities are also observed in the data of G-7 and other Asian countries: while consumption and investment series are strongly pro-cyclical in both the 1980s and 1990s, government spending displays weak pro-cyclicality. It can be seen that correlations increase in the 1990s for all three variables. In particular, consumption and investment are more pro-cyclical, irrespective of the crisis period.

Government spending is positively but not significantly correlated with output, except for the period 1990-1996. The correlation is strongly positive during the crisis period. If government spending is pro-cyclical, an increase in aggregate output coincides with an increase in government spending. It might be the case that Korea heavily relies on production-based indirect taxes that can prevent the government from implementing a counter-cyclical fiscal policy. Moreover, as government coffers increase with economic expansion, expenditures on pet industrial and other projects also increase, making those projects easier to undertake. Particularly during the crisis period, the rise in government spending for the ailing financial sector encouraged a pro-cyclical movement.

**Table 3.4. Correlation with Output**

	C (Consumption)	G (Government spending)	I (Investment)
1980-1989	0.46	0.15	0.61
1990-2000	0.96	0.29	0.95
1990-1996	0.80	-0.15	0.82
1997-2000	0.98	0.68	0.96
1997/3-1998/2	0.97	0.56	0.98
1998/3-2000	0.97	0.84	0.93

#### **4. Empirical Analysis**

In this section, several important issues relating to capital account liberalization are empirically analysed, using a VAR (vector auto-regression) model. As a preliminary

step, the basic nature of capital flows is examined. Specifically, the question of whether the capital account (or capital flows) becomes less dependent on current account movements, and more autonomous during the period of more liberalized capital account is considered. Next, the interrelation between capital account liberalization, capital flows and macroeconomic variables is addressed. The issue of whether macroeconomic variables respond to capital flows created by capital account liberalization and if so, how, is investigated. Empirical evidence on foreign exchange intervention and sterilization policy in reaction to capital inflows is outlined towards the end of the section.

Based on the history of capital account liberalization summarized in section 2, the whole sample period (1980-1999) is divided into two sub-periods: the 1980s, during which severe capital account restrictions were imposed, and the 1990s, during which the process of capital account liberalization was gradually underway. By comparing the empirical results of the 1980s with those of the 1990s, the way in which capital account liberalization affects the nature of capital flows and the relationship between capital flows and economic behaviour is inferred.<sup>17</sup> In addition, the effects of capital account liberalization on the economy are inferred by analysing the empirical evidence of the 1990s.

The econometric framework that is employed requires that there should be some economic stability during the sample period. But, it is expected that economic behaviour during the crisis period in the late 1990s would be substantially different from economic behaviour during the non-crisis period. Therefore, the crisis period (from the third quarter of 1997 to the first quarter of 1998) is omitted from the sample. The following three sub-sample periods are considered:

- (i) 1980-1989
- (ii) 1990-1997:2Q
- (iii) 1990-1999 (without the crisis period)

Both quarterly and monthly data are used for the estimations. First, the results based on the quarterly data are reported, since some data are not available in monthly frequency.

Then, the results based on the monthly data are reported to examine the robustness of the results from the quarterly data.

### *Vector Auto-Regression Model*

The economy is described by a structural form equation

$$(4.1) \quad G(L)y_t = e_t$$

where  $G(L)$  is a matrix polynomial in the lag operator  $L$  (the diagonal elements of  $G(0)$ , contemporaneous structural parameter matrix, are 1's),  $y_t$  is an  $n \times 1$  data vector, and  $e_t$  is an  $n \times 1$  structural disturbance vector.  $e_t$  is serially uncorrelated and  $\text{var}(e_t) = \Lambda$ .  $\Lambda$  is a diagonal matrix where diagonal elements are the variances of structural disturbances, so structural disturbances are assumed to be mutually uncorrelated.

A reduced form equation can be estimated:

$$(4.2) \quad y_t = B(L)y_t + u_t,$$

where  $B(L)$  is a matrix polynomial (without a constant term) in the lag operator  $L$  and  $\text{var}(u_t) = \Sigma$ . Note that  $\Sigma$  may not be a diagonal matrix, so reduced form residuals may be correlated with each other. For simplicity, a constant term, seasonal dummies and so on, are ignored both in the reduced form and the structural form equations.

There are several ways of recovering the mutually uncorrelated structural shocks  $e_t$  and structural parameters  $G(L)$  from the estimated reduced form parameters  $B(L)$  and the reduced form residuals  $u_t$ . Here, a popular method suggested by Sims (1980), orthogonalizing reduced form residuals by Cholesky decomposition is used. In this method, recursive structures of contemporaneous structural parameters are assumed. That is,  $G(0)$  is assumed to be a lower triangular matrix. Therefore, contemporaneous interactions among variables are assumed as recursive.

Further, the structural shocks are assumed to be recursive in this method. It can be shown that

$$(4.3) \quad e_t = G(0) u_t$$

Therefore, since  $G(0)$  is a lower triangular matrix, a recursive structure is assumed between structural shocks and reduced form residuals.

From equation (4.3), another representation can be obtained that shows how structural shocks are constructed from the reduced form residuals.

$$(4.4) \quad u_t = (I - G(0))u_t + e_t$$

Since  $I - G(0)$  is the lower triangular matrix without diagonal elements, the first element of the structural shock is equal to the first element of the reduced form residuals. The second element of the structural shock is constructed as part of the second element of the reduced form residuals that is orthogonal to the first element of the reduced form residuals (or the structural shocks). The third element of the structural shock is constructed as part of the second element of the reduced form residuals that is orthogonal to the first and second elements of the reduced form residuals (or the structural shocks), and so on.<sup>18</sup>

### *The Nature of Capital Flows*

In this section, the effects of capital account liberalization on the nature of international capital flows are examined. As discussed in the previous sections, theory predicts that capital account liberalization increases autonomous capital flows that are not related to financing the current account imbalances. In other words, it is expected that capital account movements are more likely to be induced by the current account imbalances in the 1980s, but it is also expected that capital flows are more likely to be autonomous (in the sense that they were not related to the current account movements) in the 1990s, when substantial capital account liberalization was under way.

To examine the issue, a two-variable VAR model is constructed that includes the current and capital accounts. It is assumed that the current account is contemporaneously exogenous to the capital account to obtain the following

interpretation of the structural shocks.<sup>19</sup> In this model, the relation between the reduced form residuals and structural shocks based on equations (4.3) and (4.4) are:

$$\begin{bmatrix} e_{CA} \\ e_{KA} \end{bmatrix} = \begin{bmatrix} g_{11} & 0 \\ g_{21} & g_{22} \end{bmatrix} \begin{bmatrix} u_{CA} \\ u_{KA} \end{bmatrix} \quad (e_t = G(0) u_t) \quad \text{and}$$

$$\begin{aligned} u_{CA} &= e_{CA} \\ u_{KA} &= -g_{21}u_{CA} + e_{KA} \end{aligned} \quad (u_t = (I-G(0))u_t + e_t)$$

where CA represents the current account and KA represents the capital account. The  $e$ 's are mutually uncorrelated structural shocks and  $u$ 's are reduced form residuals that can be interpreted as unexpected movements given history. Therefore, the structural shocks to the current account are constructed as its own residuals or unexpected movements of the current account, while the structural shocks to the capital account are constructed as the unexpected movements of the capital account that are orthogonal to the unexpected movements of the current account. Therefore, the current account shocks in this system represent all of the unexpected current account movements, while the capital account shocks represent the autonomous shocks to the capital account, in the sense that they are not related to unexpected current account movements. Both variables are included as the ratio to the trend GDP.<sup>20</sup> In the model, a constant term and complete seasonal dummies are included. Four lags are assumed.<sup>21</sup>

Table 4.1 reports the forecast error variance decomposition of the capital account. In the 1980s, 40-45 per cent of capital account movements can be explained by current account shocks. However, the role of current account shocks in explaining capital account movements decreases sharply in the 1990s (20-28 per cent). By the same token, capital account movements can be explained more by their own shocks (or autonomous capital account shocks) in the 1990s (71-79 per cent) than in the 1980s (54-59 per cent). Therefore, the results tend to support the claim that the autonomous parts of capital account movements that are not related to financing current account

imbalances increased from the 1980s to the 1990s as the capital account was liberalized.<sup>22</sup>

**Table 4.1 Forecast Error Variance Decomposition of Capital Account  
(Quarterly Data)**

	Horizon\ period	1980s	1990s, w/o C	1990-97:2Q
Current Account Shocks	2 quarters	40.3 (12.2)	20.8 (11.4)	20.7 (12.2)
	4 quarters	43.8 (12.3)	24.2 (12.1)	20.6 (12.3)
	8 quarters	45.6 (13.9)	28.2 (12.9)	25.4 (13.1)
Capital Account Shocks	2 quarters	59.7 (12.2)	79.2 (11.4)	79.3 (12.2)
	4 quarters	56.2 (12.2)	75.8 (12.1)	79.4 (12.3)
	8 quarters	54.4 (13.9)	71.8 (12.9)	74.6 (13.1)

Note: Numbers in the parenthesis are standard errors

#### *Effects on Macroeconomic Variables*

The effects of capital flows on macroeconomic variables are discussed in this section. The issue of how autonomous (in the sense that they are not induced by current account imbalances) capital flows affect macroeconomic variables is studied. First, by the results of the 1980s are compared with the 1990s, and then an inference is made about how the economic structures changes (in terms of the effects of capital flows on macroeconomic variables) as the capital account is liberalized. Second, from the results of the 1990s in which a number of measures for capital account liberalization were undertaken, the effects of capital account liberalization and the resulting capital inflows on the macroeconomic variables are inferred.

To examine the issue, extended VAR models are constructed. Considering the low degree of freedom due to the small sample size, only three variables are included in each model, though a larger model is more desirable to learn about the complete economic interrelation. In each model, the data vector is {CA, KA, X} where the contemporaneously exogenous variable were ordered first, and X is a macroeconomic variable of interests. A number of macroeconomic variables such as output, price, exchange rate, interest rate, and money are considered. The ordering of the variables is similar to the one in Park and Song (1998).

The ordering of the variable implies the following relationship between reduced form residuals and structural shocks.

$$\begin{bmatrix} e_{CA} \\ e_{KA} \\ e_X \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ g_{21} & 1 & 0 \\ g_{31} & g_{32} & 1 \end{bmatrix} \begin{bmatrix} u_{CA} \\ u_{KA} \\ u_X \end{bmatrix} \quad (e_t = G(0) u_t) \quad \text{or}$$

$$u_{CA} = e_{CA}$$

$$u_{KA} = -g_{21}u_{CA} + e_{KA} \quad (u_t = (I-G(0))u_t + e_t)$$

$$u_X = -g_{31}u_{CA} - g_{32}u_{KA} + e_X$$

Therefore, structural shocks to the capital account or capital flows, which are the main concern of this paper, are constructed by their own residuals that are orthogonal to current account shocks. It is assumed that structural shocks to the capital account are unexpected capital account changes orthogonal to unexpected current account changes, since the interest is in identifying autonomous capital flow movements that are not related to current account changes.<sup>23</sup>

On the other hand, in constructing structural shocks to the capital account, whether there is a need to condition on unexpected changes in other macroeconomic variables is more controversial. Here, it is not conditioned on those for a practical purpose: to construct stable structural shocks to capital account across the models that include different macroeconomic variables. That is, if capital account shocks as orthogonal to unexpected changes in X are constructed, then the nature of capital account shocks may differ substantially across models since different macroeconomic variables are included in each model.

Due to the difficulty in justifying the ordering of the variables from the economic structure per se, the empirical results may be better interpreted in an unusual way in some cases. In some cases, the empirical results show how economic variables are related to the capital flow shocks that are not related to unexpected current account movements, rather than how capital flows shocks affect economic variables. That is, the empirical results show the general relationship between capital flows and macroeconomic variables, which may represent simultaneous changes in

macroeconomic variables and capital flows, rather than the causal relationship from capital flows to macroeconomic variables. For example, if it is found that investment increases in response to capital account shocks, it may be interpreted that investment demand induces capital flows rather than that capital inflows causes the investment increase.<sup>24</sup>

In each model, a constant term and complete seasonal dummies are included, with four lags assumed. Each variable is used in the logarithm form, except for the interest rates that are used in the level forms and the current and the capital accounts that are used as the ratio to the trend GDP.

Figure 4.1 reports the impulse responses (95 per cent probability bands) of the capital account, current account, real GDP (constant won), consumption (constant won), and investment (constant won) over three years in each sub-period<sup>25</sup>. The scale shows the per centage changes. Interestingly, the response of real GDP is substantially different in the 1980s and 1990s. Positive capital account shocks (capital inflows) substantially increase output in the 1990s but not in the 1980s. In the 1980s, output tends to decrease a little in about a year, which seems to be due to a current account deficit. In the 1990s, consumption and investment booms contribute to the substantial output increase.

**Figure 4.1 Impulse Responses of GDP Components**

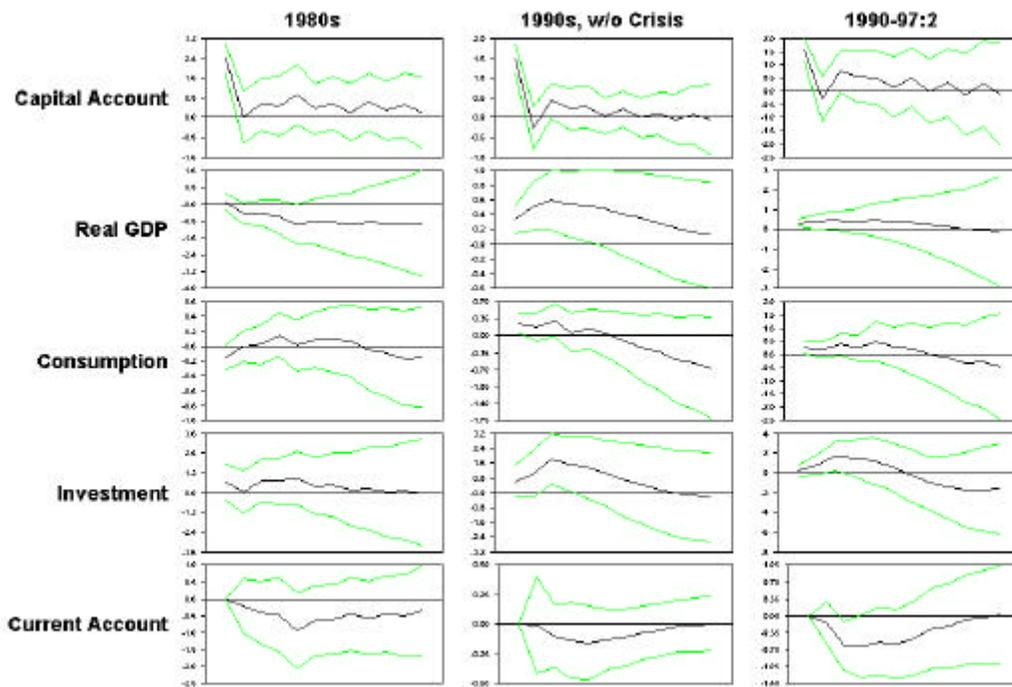


Figure 4.2 reports the responses of nominal exchange rate, real exchange rate, consumer price index, and GDP deflator. In the 1980s, the price levels and the exchange rates do not change much. In the 1990s, the price levels do not change much, but the nominal and real exchange rates tend to appreciate.

**Figure 4.2 Impulse Responses of Price Variables**

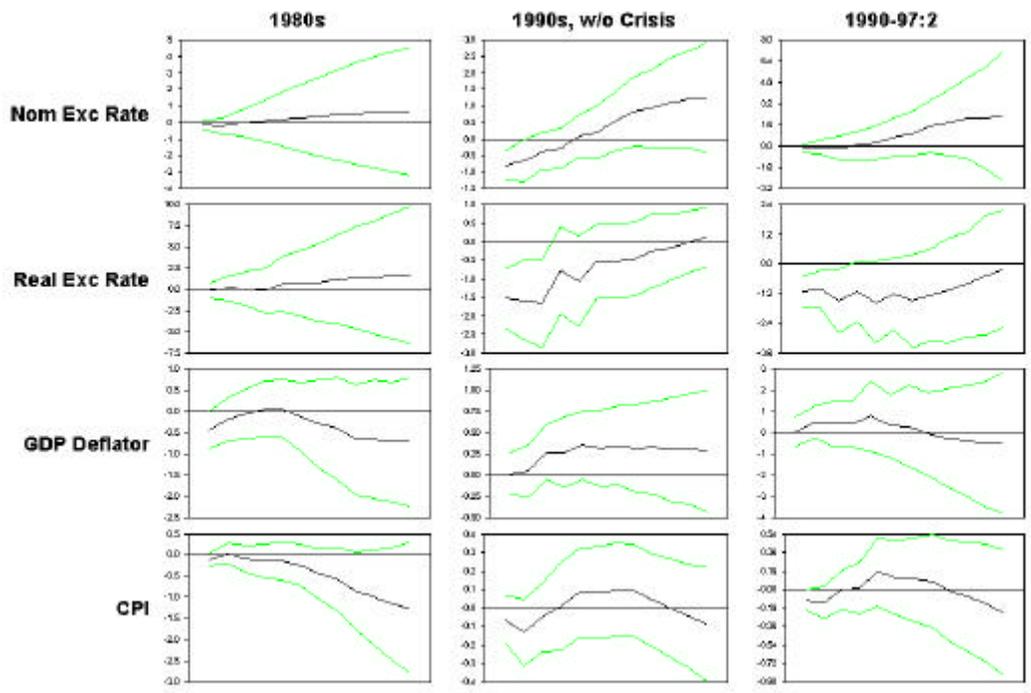


Table 4.2 reports the variance decomposition of each macro-variable due to capital account shocks. The results provide a rough idea of the relative importance of capital account shocks in explaining each macro-variable, though this small model cannot properly take care of all the sources of structural shocks in the economy. The contribution of capital account shocks to fluctuations in real GDP, consumption, investment, and nominal and real exchange rates tends to increase from the 1980s to the 1990s. The contribution to the price levels does not differ much in both periods.

**Table 4.2 Forecast Error Variance Decomposition (Macroeconomic Variables)**

Horizon\ period	1980s	1990s, w/o C	1990-97:2Q
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Real GDP	2 quarters	13.7 (8.6)	36.7 (14.0)	30.3 (14.7)
	4 quarters	19.4 (12.7)	34.1 (15.5)	31.9 (17.4)
	8 quarters	31.9 (18.3)	24.1 (14.4)	28.0 (18.2)
Consumption	2 quarters	10.3 (7.6)	17.7 (11.6)	26.3 (14.7)
	4 quarters	12.5 (7.7)	17.0 (11.6)	29.4 (17.3)
	8 quarters	11.4 (9.1)	9.3 (6.9)	19.7 (14.7)
Investment	2 quarters	7.3 (6.3)	12.4 (9.6)	12.9 (10.8)
	4 quarters	12.5 (9.1)	23.9 (13.5)	33.6 (18.3)
	8 quarters	14.2 (10.8)	14.3 (10.1)	28.1 (16.1)
Nominal Exchange Rate	2 quarters	4.6 (5.2)	36.1 (14.1)	7.0 (6.9)
	4 quarters	5.0 (5.6)	28.5 (13.8)	7.2 (7.4)
	8 quarters	9.5 (11.3)	20.0 (9.4)	21.6 (15.0)
Real Exchange Rate	2 quarters	3.7 (4.4)	45.7 (14.3)	53.5 (13.3)
	4 quarters	6.1 (6.7)	43.2 (16.5)	46.7 (16.1)
	8 quarters	11.3 (12.4)	32.9 (15.7)	37.3 (17.3)
GDP Deflator	2 quarters	12.6 (9.2)	4.3 (4.9)	12.8 (10.0)
	4 quarters	12.0 (8.2)	9.4 (7.6)	16.2 (12.0)
	8 quarters	9.1 (7.8)	14.3 (9.9)	18.4 (13.8)
CPI	2 quarters	6.0 (4.5)	10.4 (8.9)	22.5 (14.0)
	4 quarters	9.9 (8.4)	8.1 (6.9)	16.2 (10.4)
	8 quarters	19.1 (14.4)	9.9 (7.0)	21.0 (14.4)

Note: Numbers in the parenthesis are standard errors

The difference in the effects of capital flows between the 1980s and the 1990s can be explained by the differences in the exchange rate regimes and the degree of capital account liberalization or capital controls. In the 1980s, the government controlled capital flows to match the current account imbalances by changing the capital account restrictions, as discussed in section 2. In addition, the exchange rate was mostly fixed against the major currencies. In this regime, capital flow shocks (identified in the empirical model) are more likely to represent erratic movements of capital flows in financing the current account imbalances. In other words, capital flow shocks are kind of residuals parts in matching current account imbalances. Such capital account shocks are likely to have relatively minor effects on the economy as in the results, especially given that the exchange rate is tightly controlled, which is also reflected in the responses of the exchange rate (the exchange rate does not change much).

However, in the 1990s, the capital account was liberalized gradually, and the exchange rate regime changed toward floating, as discussed in section 2. In this regime, capital flow shocks are more likely to represent capital account changes due to the

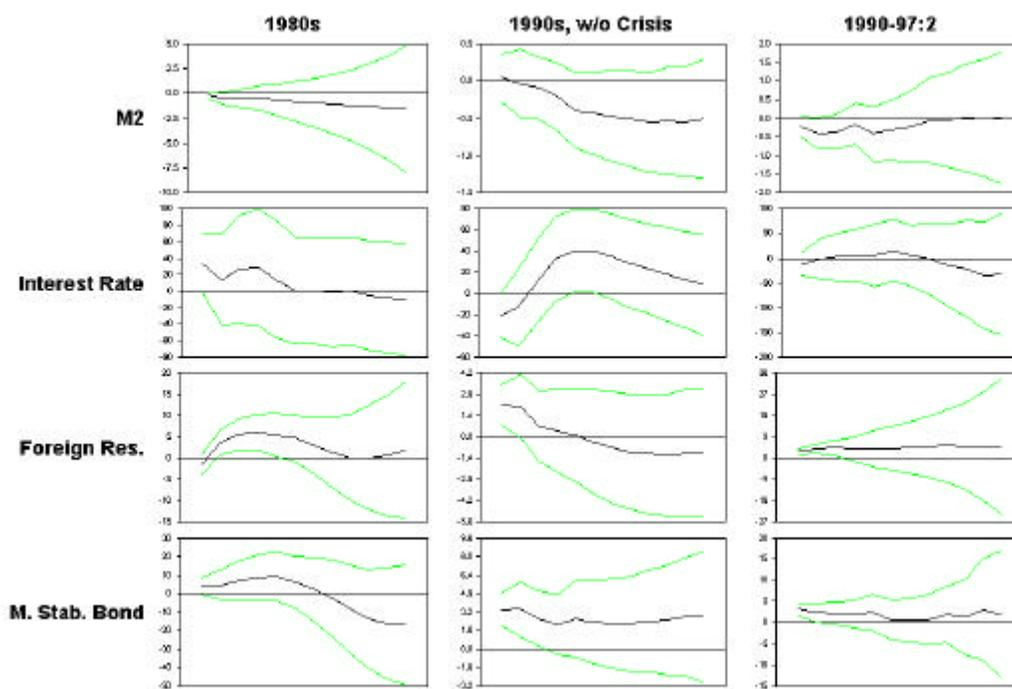
gradual actions for capital account liberalization. Therefore, a larger response of macroeconomic variables is likely, as is observed in the impulse responses. For example, it is observed that consumption and investment increase significantly, which may reflect that capital inflows in this period are driven by consumption and investment demand, as is expected in the case of liberalized current account.

Finally, the results for the two sub-samples in the 1990s are in general similar. One interesting difference is the responses of the nominal exchange rate. In the sample including only the pre-crisis period (1990-97:2Q), the nominal exchange rate does not respond much, while in the sample including the post-crisis period (the 1990s without the crisis period), the nominal exchange rate responds notably. These results are consistent with the fact that the foreign exchange market was significantly liberalized in the post-crisis period.

#### *Foreign Exchange Market Intervention and Sterilization Policy*

Foreign exchange and monetary policy reactions to capital inflows are discussed here. Figure 4.3 reports the impulse responses of M2, the nominal interest rate, foreign exchange reserves, and monetary stabilization bonds. In each period, in response to capital inflows, the foreign exchange reserves have increased sharply, which suggests significant foreign exchange market intervention. In other words, to prevent exchange rate appreciations due to capital inflows, the government intervened in the foreign exchange market and accumulated foreign exchange reserves. In the 1980s, the foreign exchange intervention seemed to be almost complete so that the exchange rate does not change much (see Figure 4.2), which is consistent with the fixed exchange rate regime adopted during that period. However, exchange rate appreciation still continued in the 1990s, implying that the foreign exchange intervention was not complete, or the foreign exchange intervention was not in full effect since it was sterilized and the effects of sterilized intervention were limited.

#### **Figure 4.3 Impulse Responses of Monetary Variables**



Such foreign exchange interventions, if not sterilized (and the resulting increase in the foreign reserves that are central bank assets), would increase domestic credit (central bank liabilities). However, in each period, M2 did not increase significantly, which implies that there were substantial sterilization activities. In fact, a substantial increase is found in the monetary stabilization bond issues in each period, which offsets the initial increase in domestic credit.

Overall, the empirical evidence suggests that there was substantial foreign exchange intervention and sterilization in response to capital inflows. Though it is difficult to calculate the exact role of these policies, it may be concluded that these policies mitigate the economic impact of capital inflows. If the government had not intervened in the foreign exchange market, the exchange rate would have appreciated further and the current account might have worsened even more. If the central bank had not sterilized, the domestic credit would have increased and aggregate demand would have increased further.

Table 4.3 reports the forecast error variance decomposition for those monetary variables. It is found that the role of capital account shocks in explaining the changes in

foreign reserves and monetary stabilization bonds is substantial, but the role in explaining monetary variables is rather limited. These results are consistent with substantial sterilized intervention.

**Table 4.3. Forecast Error Variance Decomposition (Monetary Variables)**

	Horizon\ period	1980s	1990s, w/o C	1990-97:2Q
M2	2 quarters	4.9 (5.8)	5.7 (6.2)	8.0 (8.5)
	4 quarters	5.7 (6.4)	5.9 (5.2)	14.7 (10.1)
	8 quarters	8.6 (9.6)	8.4 (7.1)	20.2 (13.7)
Interest Rate	2 quarters	8.3 (7.1)	8.8 (7.7)	7.2 (7.2)
	4 quarters	14.6 (10.9)	11.3 (6.3)	8.7 (8.4)
	8 quarters	16.8 (11.5)	18.3 (10.2)	14.6 (11.0)
Foreign Reserves	2 quarters	21.6 (9.7)	19.9 (11.4)	54.6 (14.0)
	4 quarters	45.6 (14.2)	9.9 (7.1)	42.1 (17.9)
	8 quarters	44.9 (15.5)	7.4 (5.8)	38.0 (22.0)
Monetary Stabilizing Bonds	2 quarters	9.3 (8.3)	41.4 (13.0)	42.6 (14.0)
	4 quarters	17.7 (13.7)	25.2 (11.4)	25.2 (13.2)
	8 quarters	12.8 (10.0)	21.4 (11.7)	25.4 (13.8)

Note: Numbers in the parenthesis are standard errors

## 5. CONCLUSION: LESSONS AND POLICY IMPLICATIONS

Capital account liberalization is an important process for integrating developing countries into the global financial marketplace. However, the management of private capital flows has not proven easy. If developing countries join the process without adequate institutions and sound policies, they may lose more than gain from unprepared capital account liberalization. In order to maximize the benefits from open capital accounts and free capital flows, they should address the concomitant prerequisites. The following discussion will provide the general conclusion of this paper by outlining some of the prerequisites for successful capital account liberalization and the related policy lessons.

### *Strengthening Prudential Regulation and Supervision*

Many previous studies on capital account liberalization conclude that liberalization itself does not directly cause financial crisis, but if combined with poor domestic policies on financial regulation and supervision, open capital accounts can breed crises. Among them, Stiglitz (2000) asserts that capital account liberalization amounts to “putting a race car engine into an old car” only if national policymakers fail to create the preconditions for successful liberalization. In other words, free capital flows can be made much safer for the world if  $x$  is done at the same time, where  $x$  is the currently fashionable antidote to crisis. Today’s  $x$  is “strengthening the domestic financial system and improving prudential standards”. However, it should be also noted that putting in place an adequate set of prudential and regulatory standards to prevent moral hazard and excessive risk-taking in the domestic banking system is a lot easier said than done (Rodrik, 1998).

In Korea, the problem of under-capitalization of banks was neither fully acknowledged nor properly addressed before the crisis. The Bank for International Settlement (BIS) capital adequacy requirement was introduced for all commercial banks in 1992. Banks were required to meet the minimum ratio of 7.25 per cent by the end of 1993 and the full 8-per cent standard by the end of 1995. It appears that banks had no difficulty in satisfying the BIS ratio; the BIS ratio of 16 nationwide commercial banks ranged on average around nine per cent. Even at the end of 1997, immediately after the

crisis, that figure remained at 8.67 per cent. Moreover, those five non-viable banks that were closed down in June 1998 by the Financial Supervisory Commission (FSC) were reported to have BIS ratios of 7.4 per cent to 9.6 per cent as of the end of 1997.

However, the reported BIS ratios did not accurately reflect the true state of banks' financial soundness for various reasons. More importantly, Korea's standards with respect to risk management fell short of global standards. Inadequate loan loss provisions, partial recognition of stock revaluation losses, and loose loan classification standards and accounting rules led to a discrepancy between the official numbers and the actual state of the banks' health.

The Korean experience also vividly shows how inadequate regulation and supervision led to a serious maturity mismatch. For merchant banks, which served as an important vehicle for raising the funds required for the chaebols' voluminous investment, the liquidity ratio in foreign currency was only three to six per cent for all the periods up to the financial crisis. 30 merchant banks were heavily engaged in offshore operations by borrowing cheap short-term Japanese funds from Hong Kong to finance mostly long-term investment projects. With 80 per cent short-term debts put into 70 per cent long-term assets, the maturity mismatch blew up when Korea's credibility deteriorated. However, those merchant banks were not properly supervised. Neither unified accounting standards nor standards for classifying non-performing loans existed at that time. Supervision had been perfunctory at best. This lax supervision allowed merchant banks to enjoy freedom without any discipline.

The problem of lax prudential regulation and supervision was further aggravated by a fragmented supervisory system. Supervision of the financial sector was split between the Office of Banking Supervision at the Bank of Korea (commercial banks) and the Ministry of Finance and Economy (specialized banks and non-bank financial institutions). The lack of a unified supervisory framework created opportunities for regulatory arbitrage and permitted unsound banking practices to prevail (Chopra et al., 2001). On December 30, 1997, the Act for the Establishment of a Consolidated Financial Supervisory Body was passed to consolidate all the institutional functions for financial supervision.

Countries that received substantial capital inflows as part of the process of capital account liberalization also typically experienced a lending boom through direct and indirect intermediation of capital flows by the banking system. Korea was no exception. Korean banks enjoyed relatively greater freedom in borrowing from foreign creditors, while other capital account transactions were subject to various quantitative restrictions. As shown above, the recent Korean experience made a case for the lesson that market freedom requires regulatory vigilance. In Korea, as in so many other developing countries, financial liberalization and capital account opening led to a financial crisis precisely because of inadequate prudential regulation and supervision.

On the other hand, Dooley (2000) sets out a stylized model of bank behaviour based on deposit insurance guaranteed by the government. In the presence of insurance, without other checking mechanisms, capital inflows could lead to banking failures and crises (Dooley and Shin, 2000).<sup>26</sup> With regard to regulation and supervision, Dooley and Shin (2000) point out that capital account liberalization provided a loophole through which Korean banks could easily raise foreign capital. Indeed, in Korea, expansion of domestic banks' overseas operation lacked appropriate supervision. No regulation existed on foreign currency liquidity risk management by mid-1997, in contrast to domestic currency operation. Since these transactions were not reflected in domestic monetary indicators, Korean policy makers could not effectively detect a new source of risk and vulnerability in the banking sector.

Since the crisis, the Korean government has pursued financial sector restructuring through various measures – regulation of bank capital, supervision of bank balance sheets, and re-capitalization or forced exit of bankrupt banks. The main purpose of prudential regulation is to provide proper incentives to banks and other financial market participants to manage their own risk, and as a consequence, to minimize economy-wide systemic risk. For instance, the tendency to take on excessive risk would be contained through the operation of market discipline, facilitated by the adoption of best-practice accounting, auditing and disclosure standards. Public policy should not create a culture of implicit guarantees, so that lenders would face a significant loss of capital upon failing to assess credit risks prudently. Certainly, this is easier said than

done. If central banks and governments continue to provide a financial safety net, this would be a source of moral hazard. The appropriate policy is rigorous prudential regulation and supervision along with careful design of the lender of the last resort facility to limit the scope and incentives for financial market participants to take on excessive risk.

### *Strengthening Corporate Governance*

Overseas direct investment of Korean firms became active in the 1990s. In fact, strong overseas investment of Korean firms constituted the growing assets in the balance sheets of banks' overseas branches. In other words, expanded liabilities of overseas branches of banks were tantamount to rising overseas investment of Korean firms. Notably, suspicion has been raised that this investment behaviour of firms may be an outgrowth from the *bandwagon effect*. Large conglomerates pursued overseas direct investment most vigorously in order to cope with rising domestic factor costs on one hand, and to achieve international prestige on the other hand. However, due deliberation on the profitability of the overseas investment projects was somewhat lacking.

The high concentration of overseas investment in problematic countries (countries with high risk of default and poor financial infrastructure) also served as a cause of the crisis in Korea. As these countries were hit by crisis, investment by domestic firms became hard to collect, and firms started to have liquidity problems in acquiring dollars. This led to the dollar shortage in the banking sector and eventually to the central bank.

After the crisis, it was recognized that Korea's weak corporate governance framework prior to the crisis was a major reason for the corporate sector's high level of debt and low profitability, and thus, was a key link in the chain of events leading to the crisis. Although the corporate sector relied heavily on bank lending, banks played an insignificant role in monitoring their clients. The role of non-bank financial institutions was extremely limited by the fact that they were, in many cases, affiliated with the companies to which they lent. Shareholding by institutional investors was relatively low

due to legal constraints, and was usually bound by shadow voting requirements. Contested takeovers were very rare (OECD, 2000).

In the wake of the crisis, the Korean government has improved corporate disclosure requirements and accountability to shareholders, as well as the transparency of economic and financial data. Although the legal framework for corporate governance has been put in place, the success of the new institutional framework depends on actual practices such as shareholder activism and strong independent directors.<sup>27</sup> In short, the creation of a strong corporate governance framework will require significant changes in Korea's corporate culture.

### *Promoting Inward Foreign Direct Investment*

Foreign direct investment (FDI) flows in general do not seriously affect equity markets because they are basically internal to each firm, and an inflow is usually irrevocable or only partly revocable, if possible. In this regard, FDI has been regarded as the most stable and dependable source of foreign capital inflows. Furthermore, FDI offers more than just capital. The FDI package is perceived to include transfer of technology and management 'know-how'.

Although the Korean government made efforts to liberalize FDI, its basic stance towards FDI had remained passive until the crisis broke out. However, the crisis provided the momentum for changing the government's long-cherished passive position to an active one. As a result, the government enacted the Foreign Investment Promotion Act in 1998. This new legislation focuses on creating an investor-oriented environment by streamlining FDI procedures, expanding investment incentives and establishing an institutional framework for investor relations, including one-stop services. The Korean government also undertook full-fledged liberalization in the area of hostile cross-border mergers and acquisitions and foreign real estate ownership.

A modest net increase was recorded in 1997, despite a strong upward trend in the first half of the year, due to the tapering off of FDI inflows noticeable towards the end of 1997. Picking up markedly during the spring and summer of 1998, FDI inflows reached a record of US\$ 5.2 billion for 1998 as a whole. This momentum continued in

1999, with net FDI inflows of US\$10.5 billion. However, it remains unclear whether the increasing trend of FDI will continue or not. In fact, the major proportion of the FDI surge in Korea since the crisis has taken the form of foreign purchases of Korean companies at bargain prices. 'Greenfield investments' could explain only a tiny proportion of overall FDI flows. As asset values of domestic companies recover, the aspect of 'fire-sale' FDI will diminish. As pointed out by Krugman (2000), however, its legacy of foreign ownership will be a blessing in disguise. A greater presence of foreign ownership, whatever reasons it would take, could contribute towards changing the inward-oriented business culture to a more liberalized one.

### *Getting the Exchange Rates Right*

As a lesson from the recent crisis, one widely shared conclusion is that soft-peg exchange rate regimes are extremely vulnerable and inherently crisis-prone in a world of volatile capital movements. Consequently, a number of relatively fixed rate countries in East Asia were encouraged, in their own interest and for the broader interests of the international community, to adopt floating rate regimes. An underlying notion of this argument is that a more flexible exchange rate regime leads to an awareness of both investors and borrowers about risk exposures related to exchange rate fluctuations, while a pegged exchange rate regime offers an implicit guarantee to creditors that leads to moral hazard and financial vulnerability.

The Korean government responded to the currency crisis by adopting a free floating exchange rate regime and by more actively pursuing capital account liberalization. As a natural consequence, it may be expected that the foreign exchange market is more likely to be linked to other financial markets, such as stock and bond markets. However, the foreign exchange market has been relatively stable during the post-crisis period, while the stock market has been extremely volatile. Park, Chung and Wang (2001) assert that the stability of exchange rates relative to stock prices could be interpreted as supporting evidence of the Korean government's intervention in the foreign exchange market.

Korea's foreign currency reserves exceed the level that is regarded as adequate in terms of their import requirements. The conventional benchmark level of foreign reserves, which is equivalent to the value of three months of imports, will not be adequate in times of free capital mobility. Korea is currently building a level of reserves (US\$96.20 billion as of the end of December 2000) equivalent to 20 per cent of its GDP, largely because of the increased volume of its capital account transactions. Given weak financial markets, the Korean government continued to accumulate foreign reserves as a self-defensive buffer to external shocks during the post-crisis period. By any measure, however, this level is excessive, costly and representing a clear case of resource misallocation. A more flexible exchange rate regime should definitely reduce the required level of foreign reserves, if Korea has a much stronger financial system.

Nonetheless, one concern should be noted. If the government intentionally makes the currency cheap through foreign exchange intervention in the name of foreign reserves holding, this undervaluation of the currency will not be sustainable because anticipated appreciation will continuously invite more foreign capital inflows. Many exporting companies in Korea still demand that the government not only maintains exchange rate stability but also keeps the currency undervalued, even after the free floating exchange rate regime has been introduced. Export competitiveness and resulting current account surplus might be policy targets, but in most cases might incur both external and internal imbalances. In this regard, the role of price mechanism under this free floating exchange rate regime should not be discredited.

### *Getting the Sequencing Right*

Conventional wisdom holds that properly sequenced and orderly external liberalization should be from the current account to the capital account, and capital account liberalization should be in the order of long-term to short-term. Major industrial countries that joined the OECD in the 1960s and early 1970s adopted this gradual and sequenced approach towards capital account liberalization. However, some emerging economies adopted wrongly sequenced liberalization programmes, and in the past,

sometimes rapid and premature liberalization was undertaken before necessary prior actions and measures were put in place.

The most serious sequencing problem that the Korean government created in the pre-crisis period was that they liberalized short-term financing through the banking sector too prematurely. Long-term financing and direct capital flows do not have as much devastating effects as short-term capital flows. As was seen during the crisis, a massive reversal of capital flows has potentially critical effects on the domestic economy.

However, if the actual regulations on capital flows in the pre-crisis period are examined, short-term capital movements were not liberalized greatly either. Neither firms nor banks could sell their short-term debt instruments in domestic currency to foreigners. The areas that were liberalized were trade-related financing of firms and short-term foreign currency borrowings of banks. The intention was clear: to first liberalize capital flows that are only trade-related.

Then, the question is - should more of the short-term capital movements (short-term borrowings of banks) have been restricted? The answer would be that more short term capital movements probably did not have to be restricted. It is extremely costly to control short-term transactions of banks. What was lacking was financial supervision and appropriate risk management of external debt. Without strengthening banking supervision and enhancing corporate governance, corporate debt crisis will be an inevitable outcome. In this regard, the main lesson of the Korean crisis is not the sequencing problem in capital account liberalization, but that structural deficiencies should be addressed as a prerequisite of capital account liberalization.

## NOTES

1. See Eichengreen (2001) for a comprehensive survey of cross-country studies.
2. Empirical studies of the effects of foreign direct investment (FDI) have reached more definitive conclusions than those of portfolio capital flows. There is now an overwhelming body of evidence that suggests that openness to foreign direct investment is positively associated with growth. FDI is a conduit for the transfer of technology and organizational knowledge. Countries that welcome inward FDI have been shown to

have higher levels of total factor productivity, and enjoy faster economic growth (see Borensztein, De Gregorio and Lee, 1998). In contrast, studies of the effects of financial capital flows are less conclusive. In part, this reflects the difficulty of measuring a multi-dimensional phenomenon like financial openness in an economically meaningful way. It also reflects the sensitivity of findings to the countries and periods considered (Arteta, Eichengreen and Wyplosz, 2001)

3. See Dooley (1996) for the survey of theoretical and empirical literature.
4. There exist a number of theoretical models which analyse the boom-bust cycles. See Engel and Kletzer (1989), Agenor and Hoffmaister (1998) and De Cordoba and Kehoe (2000).
5. See Allen and Stein (1990), Bacchetta (1992), Bacchetta and van Wincoop (1998), and Edwards (1989).
6. Other international trust funds followed, including the Korea Europe Fund (based in Guernsey and listed in London) in 1987 and the Korea Asia Fund (based in the Cayman Islands and listed in Hong Kong and London) in 1991.
7. For example, the residents' right to purchase up to \$5,000 in foreign currency was withdrawn in May 1990. Foreign exchange banks were again required to record the amount of foreign currency purchased by overseas travellers in their passports. See Johnston, Darbar and Echeverria (1997) for more detail.
8. The total ceiling was raised to 12 per cent in December 1994, 15 per cent in July 1995, 18 per cent in April 1996, 20 per cent in October 1996, 23 per cent in May 1997, 26 per cent in November 1997, and 50 per cent in December 1997 (completely lifted in May 1998). The individual ceiling was also gradually raised and completely lifted in May 1998.
9. There was continued pressure from the U.S. Treasury to open up the financial and services markets. The March 1992 bilateral talks formed the basis for the 1993 financial liberalization programme. In addition, the decision of the Kim Young Sam administration in 1993 under the declaration of "se-gye-wha" (globalization) as the top policy priority to apply for Organization for Economic Cooperation and Development (OECD) membership also made Korea subject to further external demands for financial deregulation and capital market opening (Chang, Park and Yoo, 1998).
10. Permitting foreign participation in equity markets has tended to precede the opening of domestic fixed-income markets in most developing countries. Ironically, this sequencing seems to be motivated by reluctance to share real returns on fixed-income claims that exceed worldwide real returns with foreigners. In practice, however, real yields gained by equity holders have often exceeded by large multiples real yields on fixed-income securities (Fry, 2000).
11. The OECD Code of Liberalization of Capital Movements and Code of Liberalization of Current Invisible Operations are the ones under which OECD Members should accept legally binding obligations. OECD members have maintained a considerable number of restrictions on capital flows under the two Codes all through the 1980s. However, gradualism and sequencing did not prevail all the time. In the 1990s, liberalization among OECD members continued further apace, especially among the new members, which faced pressures, if not pushed, to catch up quickly with the original members (Griffith-Jones, Gottschalk and Cirera, 2000).
12. The industries that opened according to the already announced plan on April 1998 included three insurance-related industries: insurance agency and brokerage industries, the insurance evaluation industry, and other insurance and pension-related services.

13. Korea widened its won trading band from 2.25 per cent to 10 per cent on November 19, 1997, and finally abolished its band and allowed the won to float on December 16, 1997.
14. Financial institutions satisfying the government-set requirements, such as necessary computer system, will be allowed to conduct foreign exchange dealing businesses.
15. The definition of the capital account that that is used in this paper is different from the classification used by the International Financial Statistics (IFS) or the Bank of Korea. Capital account in this paper refers to the sum of capital account and financial account in the IFS classification. Capital account according to the IFS classification method includes transaction of fixed assets plus non-produced and non-financial assets, while financial account contains transactions of financial assets in the traditional term.
16. See section 3 for the detailed steps of capital account liberalization. For the sensitivity analysis, 1991 and 1992 were used for the dividing year but the results were similar.
17. As discussed in the previous sections, the exchange rate regime was changed in 1990. Therefore, some differences in the empirical results of the 1980s and the 1990s may reflect the differences in the exchange rate regimes, in addition to the differences in the degree of capital account liberalization.
18. Refer to section 11 of Hamilton (1994) and Sims (1980) for the details of the methodology.
19. The identifying assumption is not easy to be justified by the economic structure, since capital account changes may affect the current account within one period by affecting other macro-variables such as the exchange rate. Therefore, the identifying assumption is better to be interpreted as definitional. In other words, the identifying assumption itself defines the nature of the shock.
20. An exponential trend on the GDP level (or a linear trend on the log level of GDP) is used. Both variables are denominated in U.S. dollars.
21. The Bayesian inference is used, which is not subject to conventional criticism in the presence of unit root and cointegration. Refer to Sims (1988) and Sims and Uhlig (1991). On the other hand, the authors also experiment with the log level of the variables, but the results are qualitatively unchanged.
22. There is a caveat in interpreting the result. The capital account shocks are defined as unexpected capital account movements that are not related to unexpected current account movements. However, capital account changes may induce current account movements within one period, and these parts are included in the structural current account shocks, not in the structural capital account shocks. Therefore, a more precise statement is that the autonomous parts of (unexpected) capital account movements that are not “correlated with” (unexpected) current account movements increase from the 1980s to the 1990s.
23. The same caveat applies to the ordering between the current and capital accounts, as in the two-variable model.
24. Again, the identifying assumption is interpreted as a definitional one or a practical one, rather than a structural one. That is, the recursive structure is not so easy to be justified by structural economic relations, but the identifying assumption can be viewed as a definitional one. In other words, it defines the nature of our structural shocks to the capital account, as capital account movements are orthogonal to current account shocks and not others.
25. Again, the capital and current accounts are entered as the ratio to the trend GDP.

26. Dooley and Shin (2000) examine three conditions under which dangerous capital inflows through banks might occur: (i) lack of self-monitoring (risk management) by banks due to declines in franchise values; (ii) lack of adequate supervisory monitoring; (iii) lack of foreign creditors' monitoring due to a government guarantee which is validated by sufficient insurance funds.
27. The Korean government established the Committee on Improving Corporate Governance in March 1999. The committee issued a "Code of Best Practices" in September 1999, which included the recommendations broadly in line with OECD principles for corporate governance. The recommendations were basically voluntary. However, the listed companies were advised to follow the recommendations of the Code and had to announce publicly whether they actually conformed to the Code.

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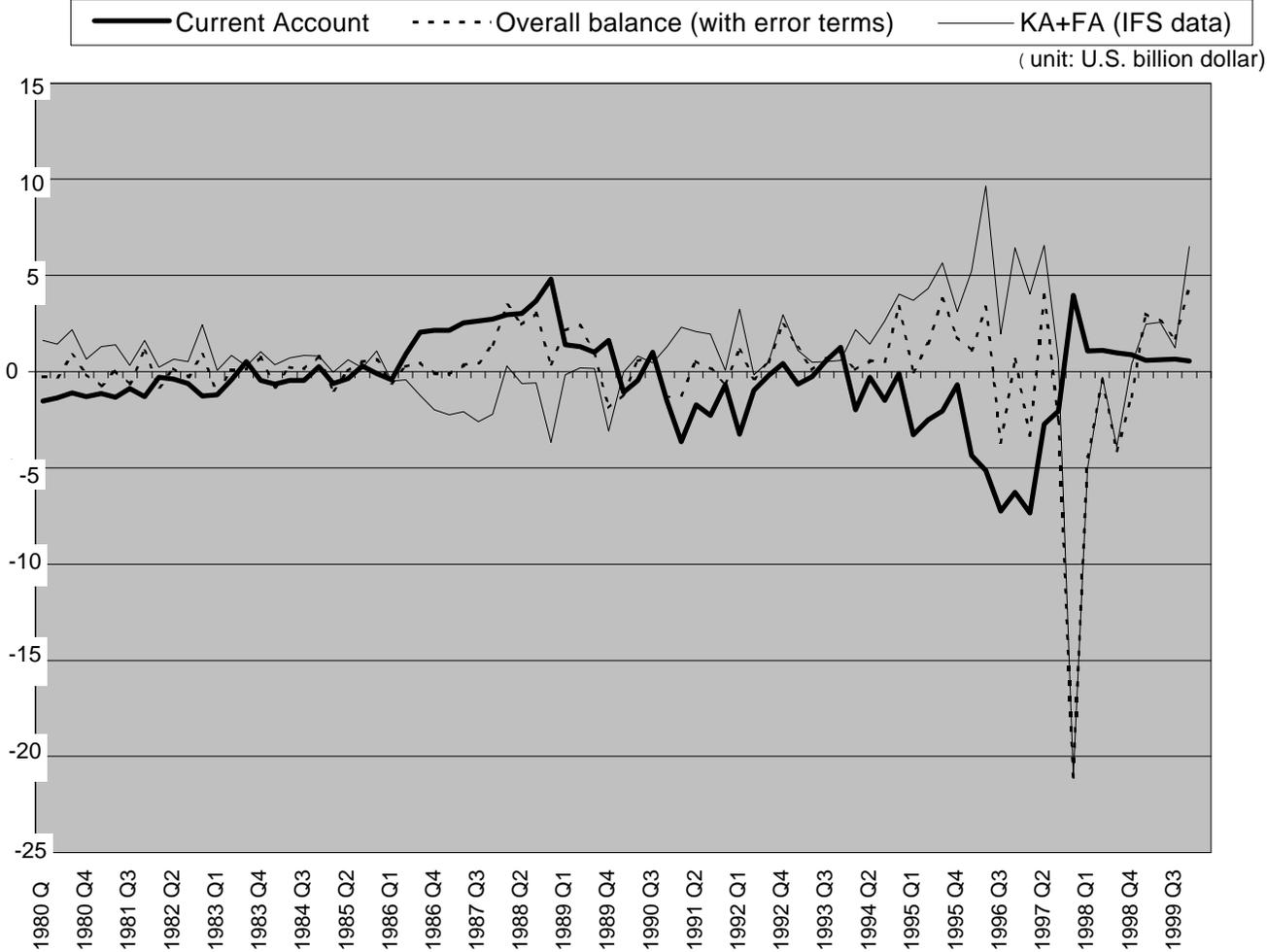
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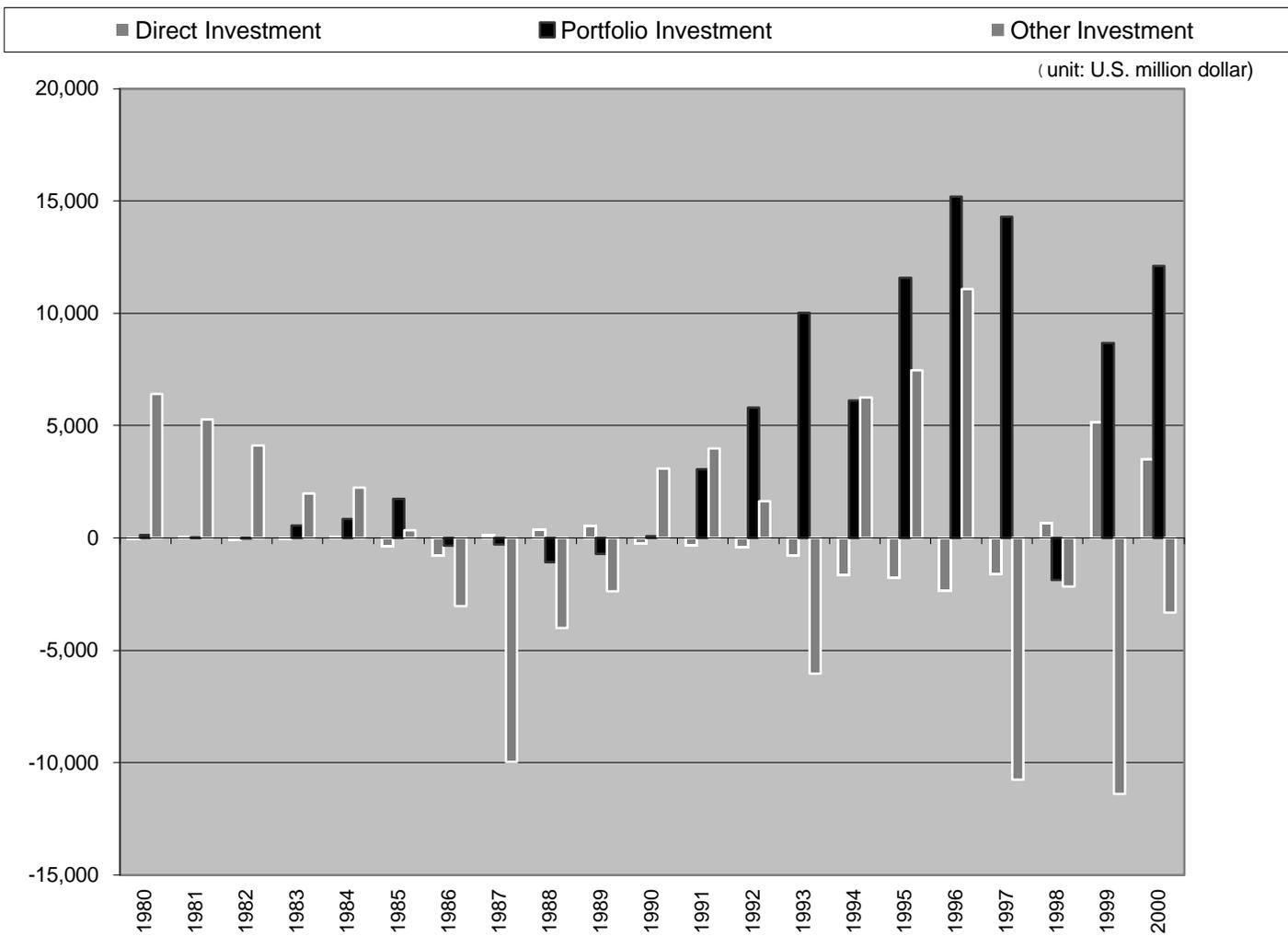
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**Figure 3.1 Balance of Payments Account (IFS data)**



Source: International Monetary Fund

Figure 3.2 Components of Finance Account (BOK Data)



Source : Bank of Korea

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