



**Managing Capital Flows:
The Case of the Republic of Korea**

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Abstract

The Republic of Korea has recently experienced: (i) large capital inflows, in particular a surge in portfolio inflows, and (ii) an appreciation of asset prices, including stock prices, land prices, and nominal and real exchange rates. We first document the recent trend in capital inflows and asset prices in Korea, and review how a surge in capital inflows can increase asset prices. Then, we empirically investigate the effects of capital inflows on asset prices using a VAR model. The empirical results suggest that capital inflows shocks increased the stock prices but not land prices. The effects on the nominal and real exchange rates are limited, and this is related to the accumulation of foreign exchange reserves. A catch-all solution to the problems that capital inflows present does not seem to exist. Therefore, the most should be made of the available instruments at hand.

JEL Classification: F32, F21, G12

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1. INTRODUCTION

Recently, the Republic of Korea (hereafter Korea) has experienced huge capital flows. Gross capital flows have increased almost 38 times from \$1.2 billion in 1980 to \$49.2 billion in 2006.¹ Among them, capital inflows have increased 11 times from \$1.2 billion in 1980 to 14.6 billion in 2006. In the 1980s and early 1990s, bank loans and transfers were the primary source of capital flows, accounting for more than half of all private capital inflows into the Korean economy. However, the recent huge capital inflows have been mostly driven by a surge in portfolio investments. In recent years, portfolio investments have come to make up to 80 per cent of total private capital inflows.

The current surge in capital inflows into Korea has been induced by both pull and push factors related to Korea's new economic environment that emerged following the currency crisis. With low interest rates and dropping asset investment returns due to the economic slowdown in advanced economies, investors' demand for investment in emerging market portfolios began to soar. To these international investors, Korea is seen as a primary investment point. In recent years, the favorable global liquidity condition has contributed to increased capital inflows into emerging market economies including Korea. At the same time, Korea like other major East Asian countries relaxed its regulatory measures on foreign portfolio investment through capital market/account liberalization, further spurring the portfolio inflows.

However, the recent surge in foreign capital inflows and asset price hikes is a major concern for Korea as for other emerging market economies. Capital inflows, especially into financial markets, have surged, exchange rates have appreciated, liquidity in the market has been extended and asset prices have risen. Observing the rapid appreciation of asset and currency prices and huge capital inflows in recent years, policymakers and academics in the region have expressed concerns over the size of the capital inflows, since reversals could cause financial instability and have adverse consequences on the real economy. Given that financial market stability is critical to macroeconomic management, these trends have become significant factors for policy decisions in emerging Asian economies.

However, these countries have limited policy options in mitigating the adverse effects of huge capital inflows. Potential difficulties in policy options involve complicated policy objectives, since there are trade-offs between domestic and external objectives. To discern the potential policy implications of these increased portfolio inflows, it is essential to assess their impact on the region's capital markets. It is also important to understand the context surrounding these capital inflows.

To shed some light on this issue, we investigate the effects of capital inflows on the Korean economy, paying particular attention to asset prices. In Section 2, we summarize the trends in capital inflows in Korea and provide some explanation of the recent surge in capital inflows, with a special focus on portfolio inflows. In Section 3, we discuss the effects of portfolio inflows on asset prices and exchange rates and explain the relationship, based on the data, to discuss various issues on policy options. In Section 4, we perform an empirical investigation of the effects of capital flows in the economy based on a VAR model. Lastly we identify lessons from the Korean experience on managing capital flows, policy challenges, and appropriate policy responses at the national and regional levels.

¹ Gross capital flows are defined as investments by residents (outflows) and non-residents (inflows), limited to direct investment, equity investment, bank loans and bond investment. Transfers are not included since transfer payments are very small in Korea.

2. TRENDS OF CAPITAL FLOWS IN KOREA

This section presents the stylized facts of capital flows in Korea especially since the currency crisis. We identify the main factors behind the current surges in capital flows in Korea. The capital flows in Korea, like in other emerging market economies, have many important policy implications. The theoretical literature suggests the presence of many direct and indirect channels through which financial market liberalization and opening could help improve efficiency allocation, assimilate new foreign technology—mostly through FDI inflows—and stimulate growth in emerging market economies. In theory, integration with international financial markets enhances growth potential and eases the burden of adjustment to external shocks in emerging economies. An increase in capital mobility between rich and poor countries, for instance, allows a high rate of investment and hence a high rate of growth in capital-poor emerging market economies while offering a higher rate of return on capital to capital-rich advanced countries. In a financially open economy, domestic residents can diversify their asset portfolios to include those issued by foreign firms and financial institutions in addition to domestic ones. The increased ability to diversify risk allows firms in emerging market economies to reduce the cost of capital adjusted for risk and hence invest more than otherwise.

When it becomes integrated into the international capital market, an emerging market economy can relieve its external deficit as well as unemployment that reflects its internal imbalance. For example, an adverse supply shock to a given industry of the economy may require shifts in labor and capital to other industries. After all adjustments have been made domestically, including a fall in factor prices, some factors of production are likely to remain unemployed when the capital account is closed. However, deregulated and open domestic capital markets in theory can facilitate the migration of the unemployed capital to other countries, thereby mitigating the burden of adjustment through changes in factor prices and employment. In other words, real capital mobility can be a partial substitute for price-wage flexibility.

Financial capital can move freely and quickly across borders in the absence of capital controls, but installed capital such as plants and equipment is not mobile, at least in the short run. Firms in a country that sustains an adverse demand or supply shock may be able to close plants quickly, but it may take months or years to move production facilities to other countries, or to create facilities abroad.² As a result, in the short-run, real capital mobility is low and only in the long run can it ease difficulties of adjustment to demand and supply shocks. In the absence of price and wage flexibility, an adverse supply shock such as an oil price increase may thus result in a deficit on the current account in addition to both an increase in unemployment and a decrease in factor prices. Emerging market economies with easy access to both regional and global capital markets will find it easier and less costly to borrow in order to finance their current account deficits. External borrowing can make the real adjustment unnecessary if the deficit is transitory and hence reversible.³ Even when the deficit is permanent, the borrowing allows the cost of the adjustment of consumption spending to be spread over time.

Through the risk diversification of portfolio investments, an emerging market economy can share some of the loss resulting from an adverse supply shock with other countries to the extent that it holds claims on their outputs. This means that, together with the access to

² However, some of the investment planned by these firms may be relocated to other countries in a relatively short period of time in the form of foreign direct investment in response to the adverse shock, a possibility that is rather limited in a controlled capital account regime.

³ If the deficit reflects changes in economic fundamentals instead, external borrowing simply masks the imbalances that require real sector adjustments.

international capital markets, this diversification of country-specific risks allows the smoothing out of fluctuations in consumption that the shock would cause. The amount of the loss that can be shared will increase if the country holds a diversified portfolio of bonds and equities from countries with different structural characteristics and with lower business cycle correlations of macroeconomic variables.

There are other potential advantages associated with financial market integration. As pointed out by Prasad, Rogoff, Wei, and Kose (2003), financial market integration promotes specialization in production, improves efficiency in the financial intermediation industry, encourages better economic policies, and has the effect of signaling the commitment to liberalization. How significant are these gains in reality? Most empirical studies on financial market integration do not find such positive effects. Although their rates of return on capital are in general higher than those of advanced countries, many East Asian countries have long been net capital exporters, especially so since the 1997 crisis. Prasad et al. also indicate that financial integration is neither a necessary nor a sufficient condition for sustaining a high growth rate unless capital receiving countries have developed the institutional capacity to achieve efficient allocation of foreign capital.

Nor do they find any evidence that emerging economies can expect better consumption smoothing through integration into global financial markets. In fact, volatility of consumption relative to output increased in the emerging market economies during the 1990s—the heyday of financial integration. Prasad et al. argue that this volatility will decrease once the emerging market economies develop their capacity to absorb foreign capital. However, it will take a long time for many emerging market economies to improve human capital, governance, and the efficiency and stability of the financial system, which determine their absorptive capacity. By the time they have developed the capacity, they may not require any capital inflows from advanced economies.

Recently, Korea like other emerging market economies has experienced huge capital inflows. The profit-seeking activities and diversification of risks by domestic and multinational financial institutions were the main contributors to increased cross-border capital flows. On the other hand, with the turn to the 1990s, capital inflows on a global scale started to take multiple forms, as investors from advanced economies diversified their assets internationally. Cross-border capital flows in general grew rapidly from the 1980s, because institutional investors began to show a high tendency to diversify their international portfolios in order to lower risks. In addition, the development of information and communication technology enabled global investment and broadened opportunities for investors to manage risks through investment in diversified financial assets across countries. In line with this, the changes in the form of capital flows in emerging market economies have been induced to both push effect and pull effect. In other words, with lower returns on domestic capitals due to sluggish economic growth in the advanced economies, investors' demand for investment in emerging market portfolio began to soar. At the same time, major emerging market economies relaxed their regulatory measures on cross-border capital flows.

2-1 Patterns of Capital Flows

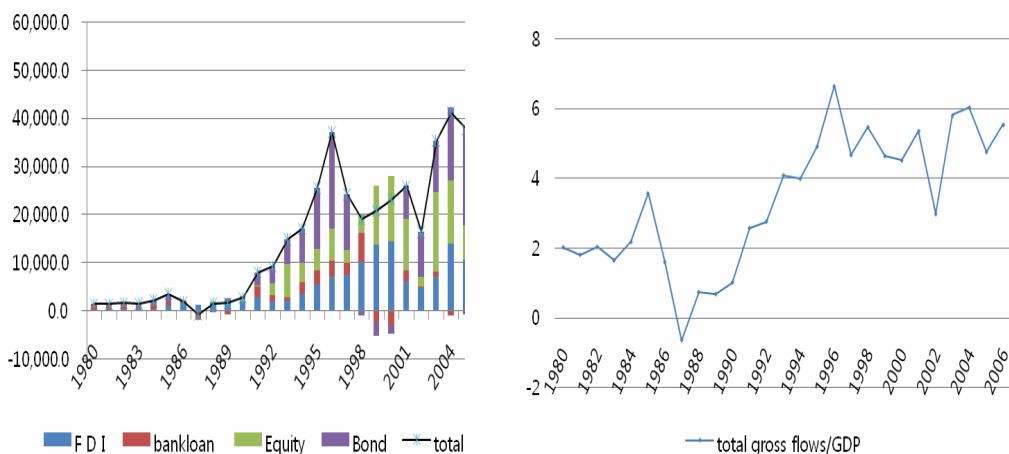
Korea has experienced different types of capital flows during the last three decades. The total gross capital flows increased from \$1.2 billion in 1980 to \$49.1 billion in 2006. The share of total gross capital flows to GDP also increased from 2.0 percent in 1980 to 5.5 percent in 2006 (see figure 1). In terms of type of gross capital flows, bank loans were the dominant form in Korea. Since the beginning of the 1980s, bank loans have made up most of the capital flows in Korea. However, in the second half of the 1980s, FDI flows increased beginning with the government's liberalization of FDI inflows, and became a primary source until the currency crisis in 1997. Although equity investment caught up with FDI investment

after the crisis, FDI is expected to continue to remain an important source of capital flows in Korea. As a result, the equity-related capital flows now dominate capital flows in Korea. In 2003, the equity gross flows made up 50 percent of the total gross flows in Korea.

Unlike equity, debt financing is not an important component of capital inflows in Korea. In particular, the rudimentary development of the bond market has been cited as one of the main reasons for the Asian crisis. Ideas for promoting regional bond markets have been proposed and are under close examination.

Gross debt inflows have increased recently, from \$6.7 billion in 2001 to \$28.9 billion in 2006. The increase is mainly due to purchases by domestic financial institutions of domestic bonds from overseas. This is regarded as non-resident purchases of domestic bonds since transactions by domestic financial institutions located outside of the territory are recorded as non-resident. At the same time, domestic financial institutions have invested heavily into foreign long-term bonds since 2001, and this has caused huge portfolio outflows in term of long-term bonds. This is why bond flows recently seem to have become a dominant form of capital flows in Korea. Bank financing has had the most volatility in Korea. It has plummeted twice, in 1986 and after the 1997 currency crisis. Since then, it has accounted for only a negligible amount of capital flows in Korea.

Figure 1: Patterns of Gross Capital flows in Korea

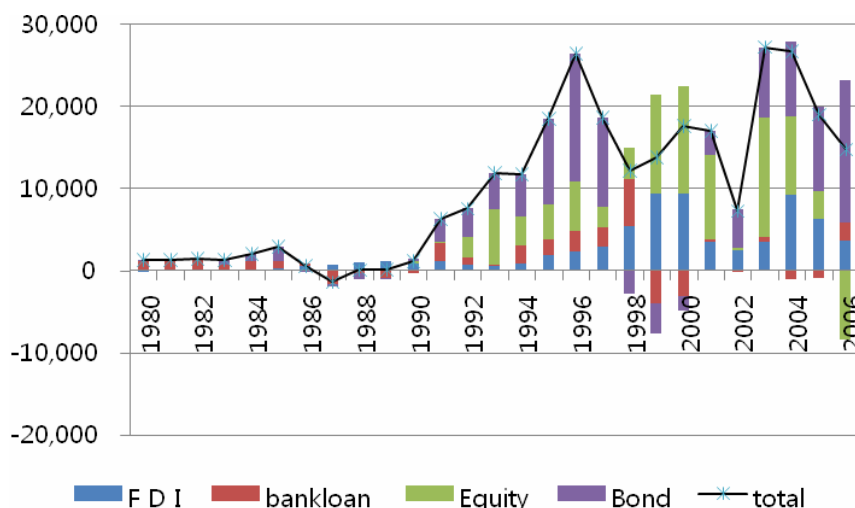


Source: Balance of Payments Statistics, IMF

The total amount of capital inflows into Korea has increased almost 11 times from \$1.2 billion in 1980 to \$14.6 billion in 2006. During this period, Korea has experienced different types of capital flows. In the early 1980s, bank loans were the most important capital inflows along with transfer payments. Since most other types of capital inflows were prohibited, the Korean government encouraged domestic banks to borrow from abroad in order to fill the current account deficit. Foreign investors were only allowed to participate in the equity market through investment trust funds such as the Korea Fund, which had been listed on the New York Stock exchange since 1981. In 1990, foreign equity investment in the Korean stock market was partially allowed with limitations on the share purchased by foreign investors, and since 1998 there have been no limitations on holdings of domestic equity by foreign investors. Following reflection on these liberalization measures, the equity inflows were increasing before the crisis. However, in 1997 the inflows declined significantly due to the crisis, but soon recovered and have increased steadily since then. Equity has been seen

as a candidate for resolving the currency crisis, and the government removed most barriers to investment in the equity markets in early 1998. As a result, equity financing decreased rapidly in 1999, but its momentum was reversed in 2000 due to the global burst of the IT bubble. In 2003, foreign investment in the domestic equity market reached a record high of US\$14.4 billion, but since 2005 the equity inflows have declined significantly due to the global rebalancing from the sub-prime mortgage crisis. FDI flows have shown a relatively steady increasing pattern. Foreign banks have been extremely cautious in their cross-border lending in Korea. Thus the inflows of bank loan have shown a negative value, implying that foreign banks have repatriated their loans since the crisis. In the post-crisis period, bank loan inflows have been negative except for the year 2006.

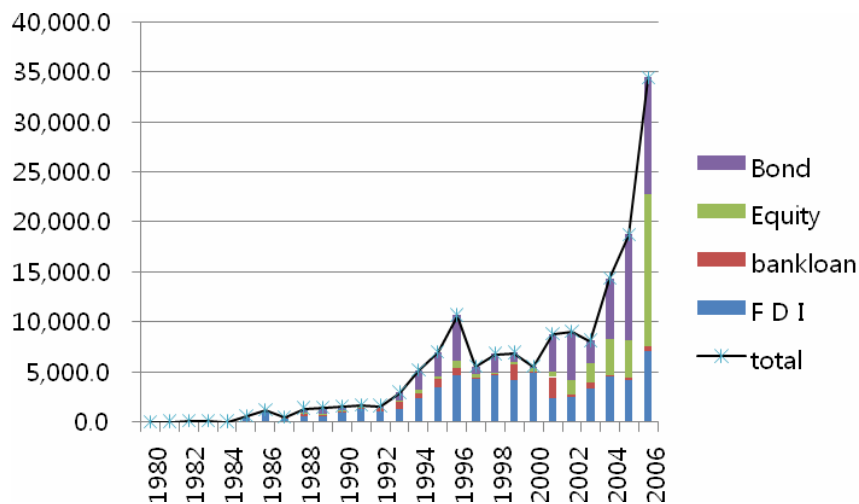
Figure 2: Patterns of Capital Inflows in Korea



Source: Balance of Payments Statistics, IMF

Capital outflows have increased rapidly in recent years and have reached an unprecedented level. Gross capital outflows reached \$34.3 billion in 2006, increasing nearly 5 times over the last 10 years. FDI investments have been the major components of outflows until year the 2000. Korea's direct investment abroad has increased at a steady pace. Since the late 1990s FDI investment to China has rapidly increased. However since 2001, portfolio investments have made up more than 60 percent of capital outflows in Korea. This reflects the liberalization of restrictions on resident investment abroad. It is surprising that equity investment abroad increased so rapidly in a single year, from \$3.6 billion in 2005 to \$15.2 billion in 2006. This trend is expected to continue for some time since overseas fund investments are increasing due to risk diversification and profit-seeking behavior by individual and institutional investors in Korea.

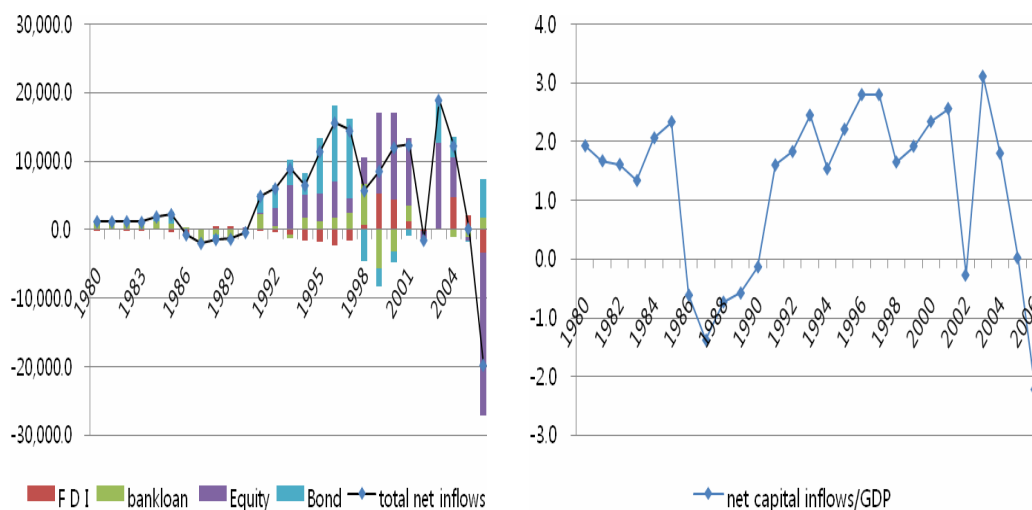
Figure 3: Patterns of Capital Outflows in Korea



Source: Balance of Payments Statistics, IMF

Since capital outflows have been increasing from 2004, net capital inflows into the Korean economy have actually decreased over the last two years. In 2006 in particular, net capital inflows recorded -\$19.7 billion. A fall in net portfolio inflows was the main driver for the rapid decline in net capital inflows. The fall in net portfolio inflows has been driven, more recently, by a large increase in Korea's outward investment in equity. The equity investment abroad reached an unprecedented level of \$23.6 billion in 2006. On the other hand, the net capital inflow scaled by GDP maintained a stable level in terms of historical average. The ratio of net capital inflows to GDP has been 1.4 percent since the crisis.

Figure 4: Patterns of Net Capital Inflows in Korea



Source: Balance of Payments Statistics, IMF

2-2 Brief Summary of Capital Account Liberalization in Korea

Capital flows in Korea are to a large extent related to the openness of capital markets, as in other emerging market economies. Since the 1980s, the government has continued to open capital markets to foreign investors, as well as to allow domestic agents to invest abroad. Depending on the degree of openness of capital inflows and outflows, the patterns of capital flows have varied as we have seen in the previous sub-section. However, since the 1997 crisis, most restrictions in capital flows have been liberalized. As a result, capital flows have been determined by the market principle in and out of the Korean economy.

Throughout the 1980s, the policy of the Korean government on capital flows depended on the current account balance. Under the pegged exchange regime, the capital inflows were used to accommodate the overall balance of payments. Therefore, the overall balance of payments fluctuated around a net zero balance, and the current account and capital account moved in opposite directions (Kim, Kim and Wang, 2004). In 1988, the Korean government formally accepted the obligations of Article VIII, Section 2-4 of the IMF's Articles of Agreement and abolished its remaining restrictions on payments and transfers for current account transactions.

With the intention to join the OECD, Korea accelerated its capital account opening in the early 1990s. In 1992, foreign investors were given permission to purchase Korean stocks up to three percent of the outstanding shares of each company per individual, but no more than ten percent of a company in total. In June 1993, the Korean government put forth a blueprint for the liberalization and opening of the financial sector, aiming at substantial progress in the financial market deregulation. The plan envisaged further easing requirements for foreign exchange transactions, widening the daily won-dollar trading margins, expanding limits on foreign investments in the stock market and permitting long-term commercial loans (see details in Park, 1995). Further capital account liberalization became inevitable when Korea joined the OECD in 1996. However, the Korean government continued to maintain many reservations to the code of liberalization of capital movements and current invisible operations. In the membership negotiations, Korea was reluctant to liberalize its capital account out of concern that foreign capital inflows would increase dramatically due to the interest rate differentials between home and abroad. The government had thus planned to delay the capital account liberalization until the interest rates converged significantly.

Thailand's sudden decision to float the baht on 2 July 1997 also caused the Korean won to depreciate rapidly. Following futile attempts to defend the currency, the Korean government widened the won's trading band from 2.25 percent to ten percent on 19 November, and finally abolished the band, allowing the won to float, on 16 December. With the floating exchange rate system in place, the Korean government also accelerated its ongoing capital account liberalization plan. Under the IMF program, the Korean government agreed to undertake bold liberalization measures. The capital markets, including the short-term money markets as well as the real estate market, which had once been off-limits and considered non-negotiable, were all completely opened to foreigners in 1998.

Most of the important liberalization measures were adopted during the free floating exchange rate regime period under the IMF program. In December 1997, the government raised the ceiling on the overall foreign ownership of stocks from 26 percent to 50 percent. The individual ceiling was raised from seven percent to 50 percent. These ceilings were lifted completely on 25 May 1998. All regulations on foreign purchases of debt securities were eliminated in December 1997. As of that date, all domestic enterprises, regardless of size, were allowed to borrow without limit from overseas, as long as the maturity did not exceed one year. All the short-term money market instruments, such as commercial papers and trade bills, were also fully liberalized on 25 May 1998.

The liberalization of restrictions on capital movements was accompanied by a relaxation of rules governing the use of foreign exchange. The Foreign Exchange Transactions Law was newly drawn up as a substitute for the Foreign Exchange Management Law, and went into effect in April 1999. In particular, it replaced the positive list system with a negative list system, which allowed all capital account transactions except those expressly forbidden by law. While foreign exchange dealings in the past had to be based on *bona fide* real demand, speculative forward transactions were now permitted. The new system was set to be 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 eligible financial institutions. Further, in 2006, the Korean government announced its decision to advance the implementation schedule of the ongoing foreign exchange liberalization, which will be completed in 2009.

Even though these relative rapid liberalization measures have been implemented since the crisis, there remain a couple of policies which might impede the capital flows in Korea.⁴ All direct restrictions on original transactions of current and capital transactions have been removed with the exception of the ceiling of US\$3 million on overseas real estate investments. However, procedural restrictions on original transactions still exist, for example, some of capital transactions still must be reported to the Ministry of Finance and Economy and the Bank of Korea. As for foreign exchange transactions, or the settlement of original transactions, only overseas transactions using abnormal means of transfer that bypass banks, such as exchange manipulation, are required to be reported to the Bank of Korea in order to restrict unlawful transactions.

2-3 Stylized Facts on Capital Flows in Korea

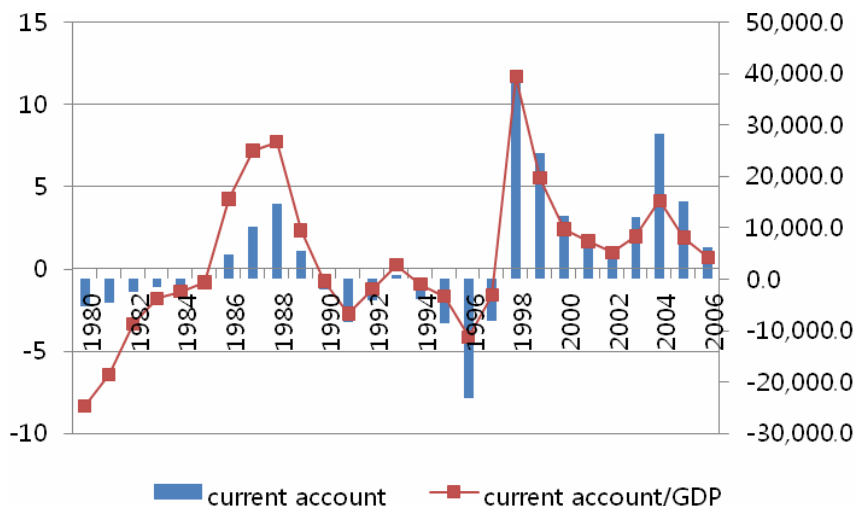
In terms of the type of capital inflows in Korea, bank loans were the most important capital inflows in the 1980s. Debt financing increased significantly in the late 1980s. On the other hand, beginning in the early 1990s, equity inflows increased significantly and became a major source of capital flows. FDI, compared to other investment flows, is known to be a stable source of capital. It has been steadily increasing since the early 1990s. It is interesting to note that bank financing has shown to have the most volatile flows in Korea. On the contrary, since the crisis, equity has been the most dominant type of capital flows. In the following section, we will describe major stylized facts on capital flows in the Korean economy.

2-3-1 From Capital Importer to Capital Exporter

Traditionally, Korea has been a capital importing country. Foreign capital has financed domestic investment, increased the general productivity of the economy, and contributed to long-term economic growth. As a result of the high economic growth and increasing domestic investment, Korea experienced a current account deficit before the crisis. With the exception of the period from 1986 to 1989, the current account deficit recorded an average of 2.5 percent of the GDP before the crisis. However, the rapid devaluation of the won/dollar exchange rate, fall in domestic investment and imports, and increase in exports, have resulted in a current account surplus since the crisis.

⁴ Professor Shinji Tagaki comments that, according to the liberalization index of Chinn and Ito, Korea's liberalization procedure went backward just before and after the crisis. It is strange that the index shows a temporary setback, indicating a smaller degree of liberalization during the 1996-2000 period. However the general picture is of Korea moving toward greater liberalization.

Figure 5: Current Account in Korea



Source: Bank of Korea

Moreover, as we saw in the discussion of net capital inflow trends in the previous section, Korea has recently become a capital exporter due to its more recent increase in gross capital outflows, especially equity outflows. Owing to the capital outflows and current account surpluses, Korea turned from a capital importer into a capital exporter in 2006. The trend is expected to continue during the next few years. This implies that the foreign capital inflows are no longer functioning to provide capital for domestic investment.

2-3-2 Exporting Risky Assets and Importing Safe Assets

Portfolio investment, including into bonds and stocks, has been increasing in most emerging economies since the 1990s. Portfolio transactions were almost negligible in most emerging market economies in the 1980s, but in the following decade, portfolio investment inflows such as bonds (especially for Latin American economies) and stocks (especially for Asian economies) began to expand in proportion to the total capital inflow in emerging market economies. Normally it is difficult to expect active cross-border portfolio investment in a country without well-developed macroeconomic policy instruments or with a weak financial system. Nevertheless, the fundamental reason for the extensive spread of portfolio investment across regions is the international diversification of assets by advanced economies. Cross-border portfolio investment in emerging market economies is rising, as the demand for bonds and stocks of emerging markets by institutional investors from the United States, Japan, and Europe is increasing. Bottom-low interest rates and the slowdown of economic growth in the major advanced economies are other significant reasons. At the same time, emerging market economies loosened their regulatory measures on domestic portfolio investment through capital liberalization, leading to the expansion of international portfolio investment.

The patterns of capital flows show that Korea has exported risky assets to developed economies and imported safe ones from advanced countries. Even though capital outflows increased in recent years, Korea's investors have revealed a strong preference for wise assets. The yearly average amount of cross-border bond purchases by domestic investors has been \$5.5 billion from 2001 to 2005. On the other hand, the yearly average amount of cross-border equity purchases by domestic investors has been \$2.2 billion during the same period. This reveals that domestic investors have a strong preference for safe assets due to their risk-averse behavior, as they consider equities to be riskier assets than bonds.

Korea's portfolio inflows, however, show that foreign portfolio inflows are heavily concentrated into equity flows. With the exception of 2005 and 2006, domestic equities have been the dominant portfolio investments by foreign investors since the crisis. Furthermore, comparing the foreign holdings of domestic equities and bonds, the share of foreign equity holdings to the total market capitalization in Korea was very high, at 35.2 % in 2006, while the share of foreign bond holdings was merely 0.59 percent in the same year.

Figure 6: Foreign Equity Holdings

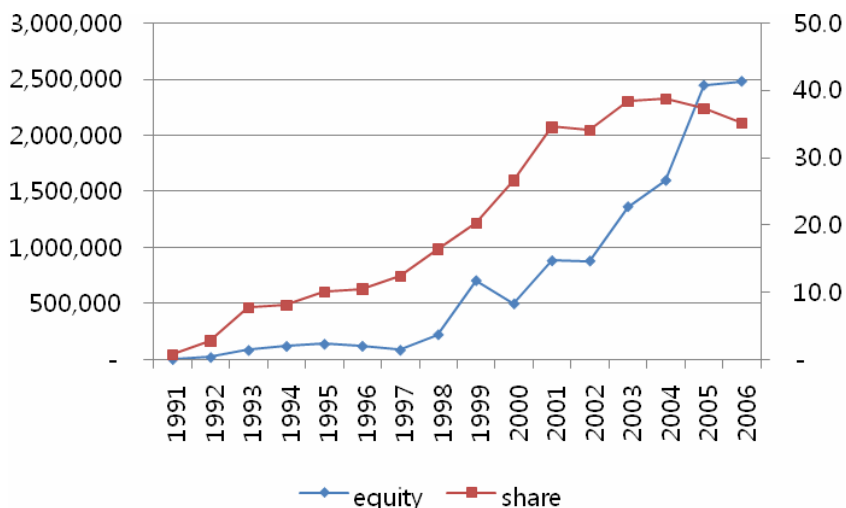
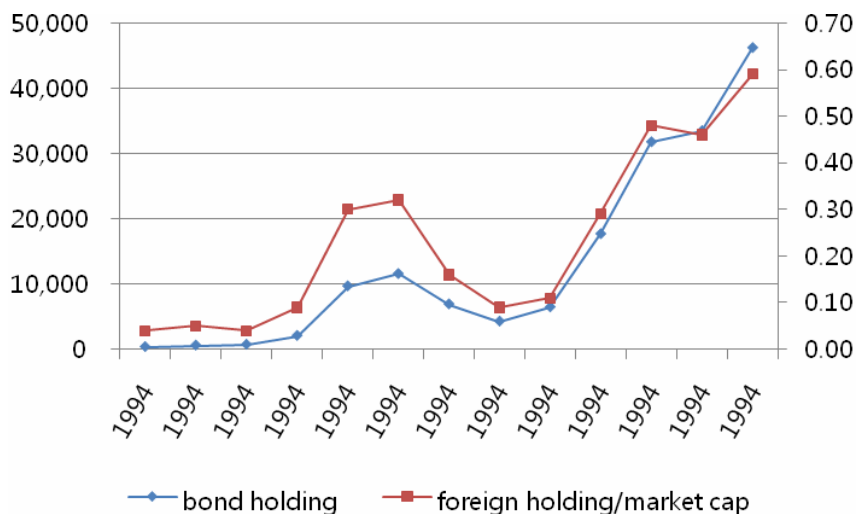


Figure 7: Foreign Bond Holdings



2-3-3 FDI as a Stable and Primary Source of Capital

FDI inflows in Korea have proven to be a stable and steady source of capital inflows. Unlike other types of capital inflows, FDI inflows have increased steadily from the early 1980s. FDI began to play a dominant role in total capital flows in the mid 1990s. The government also promoted increased FDI inflows, providing special incentives to foreign firms to set up companies. This trend was caused by the following reasons: (1) they give positive

externalities to the recipient country, such as transfers of technology and management skills and (2) it is costly for FDI to reverse direction, thus having less volatility; FDI relies on long-term profits of investor companies, as it has little sensitivity to international interest rates.

The coefficient of variation of FDI flows in Korea is lower than that of other capital flows. The coefficient of variation of FDI is 0.81, while it is 1.13 for equity, 1.19 for bank loans and 0.90 for debt. This confirms the view that FDI flows are considered cold money which is generated by the long-term considerations of foreign investors. In contrast, portfolio investments are seen as unstable hot money, which is triggered by short-term consideration of the foreign investors.

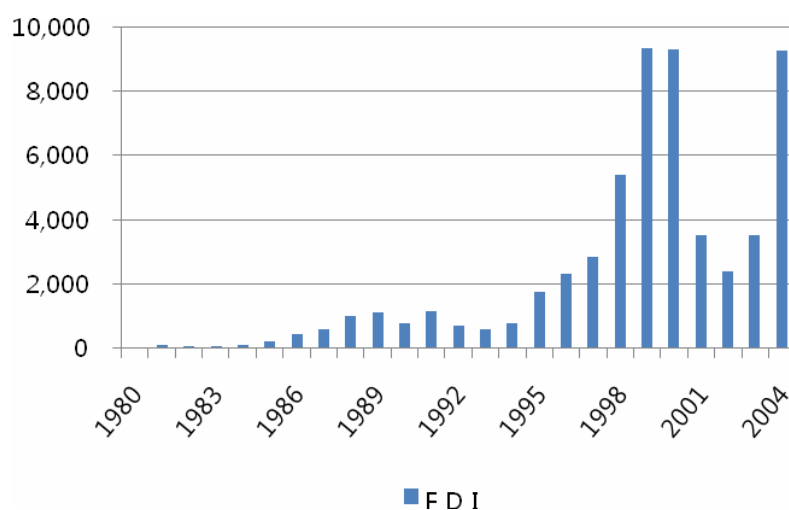
Table 1: Coefficients of Variation of Capital Flows in Asia

	FDI	Equity	Debt	Bank Loans
Coefficient of Variation	1.45	4.44	2.04	5.60

Note: The sample period of estimation is from 1980 to 2006.

However, the argument for the irreversibility of FDI is worth examining more carefully. Albuquerque (2002) suggests that withdrawals of FDI do not necessarily have to include the liquidation of physical capital, and in fact foreign investors in FDI have many ways to withdraw funds that are invested as direct investment, such as by selling shares. Related to this, the liquidity condition of the capital market is crucial in determining the lower volatility of FDI flows in a country. Lipsey (1999) shows that the volatility of net FDI flows is smaller in developing than in developed countries, and the differences in volatilities between net FDI flows and other types of net inflows are smaller in developed economies.

Figure 8: FDI Inflows



3. EFFECTS OF CAPITAL FLOWS ON DOMESTIC ECONOMIES

Capital inflows may result in an increase in asset prices and appreciation of the nominal and real exchange rates. In this section, we summarize the main mechanisms. Capital inflows can affect asset prices in three ways. First, foreign portfolio inflows can directly affect the demand for assets. For example, capital inflows into the stock market increase the demand for stocks and consequently inflate the stock price. In addition, portfolio inflows may affect

other markets. For example, as capital flows into the stock market, the stock price increases but the expected return on stocks may decrease. As a result, investors may seek higher returns on other asset markets, such as the real estate market and the bond market, putting upward pressure on other asset prices.

Second, capital inflows may lead to an increase in money supply and liquidity, which in return may boost asset prices. Capital inflows tend to boost the nominal and real exchange rates. To avoid exchange rate appreciation, monetary authorities must intervene in the foreign exchange market. They can cope with excess demand for local currency (due to capital inflows) by buying foreign currencies following such inflows. This results in an accumulation of foreign exchange reserves and accordingly, of domestic money supply. When this leads to an increase in liquidity flows into asset markets, asset prices may surge. The foreign exchange intervention may be sterilized through sales of government securities in an open market operation. However, if the sterilization is only partial, liquidity and asset prices may increase.

Third, capital inflows tend to generate economic booms in a country and to lead to an increase in asset prices. Past studies have documented that economic booms often follow capital inflows. The monetary expansion following capital inflows can lead to economic booms. Capital inflows following a fall in the world interest rate can lead to consumption booms and investment booms. A falling world interest rate also leads to decreases in the domestic interest rate, which may lead to investment booms. For a debtor country, a fall in the world interest rate induces income and substitution effects, which can lead to consumption booms.

Capital inflows tend to appreciate nominal and real exchange rates. In a floating exchange rate regime, foreign portfolio inflows directly affect the demand for domestic currency assets, leading to an appreciation in the nominal exchange rate. Combined with sticky prices, the real exchange rate can also appreciate. On the other hand, if the monetary authority intervenes in the foreign exchange market, the nominal appreciation may be averted in a managed floating regime. However, the real exchange rate may still appreciate. As discussed, consumption and investment booms are likely to increase the price of non-traded goods more than the price of traded goods because the supply of non-traded goods is more limited than that of traded goods.

Next, we will analyse the impacts of capital flows and current transfers on domestic liquidity, credit, exchange rate, inflation and the real sector of the Korean economy.

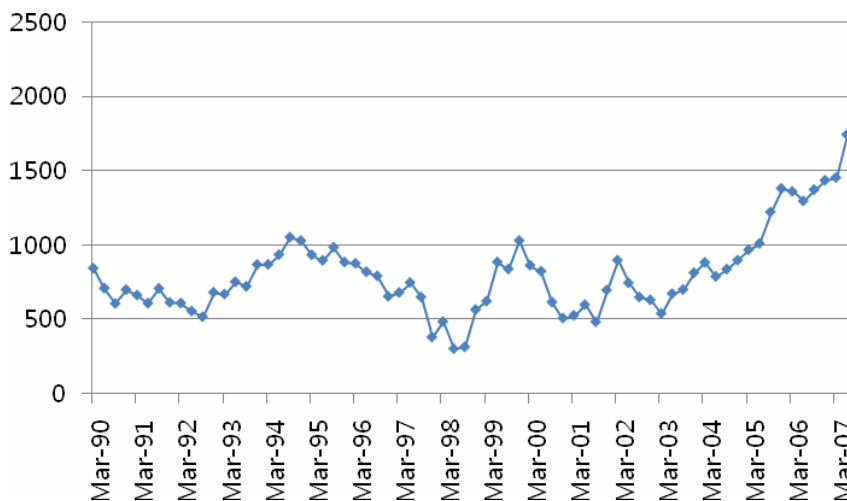
3-1 Trends in Asset Prices

Since the crisis, equity prices in Korea have increased significantly. Since the market collapse in 1997, the upward trend in stock prices has been very clear. As shown in Figure 6, foreign investment in the domestic stock market increased along with the stock price hike until 2000. However, this momentum was reversed in 2000 with the burst of the global IT bubble. In 2003, foreign investment in the domestic equity market reached a record high of \$14.4 billion but since 2005, the equity inflows have declined significantly due to the global rebalancing from the sub-prime mortgage crisis in the US.

While the upward trend in stock prices began on a large scale in 1998, a downward trend in bond yields generally started in late 1999. This trend may have been influenced, among other factors, by spillover effects from equity markets. Most foreign capital flows enter the stock markets, partly because Korea has relatively few developed domestic bond markets. However, as stock prices rise, expected returns on equities drop and bonds become more attractive to local investors, who bid up bond prices, lowering bond yields.

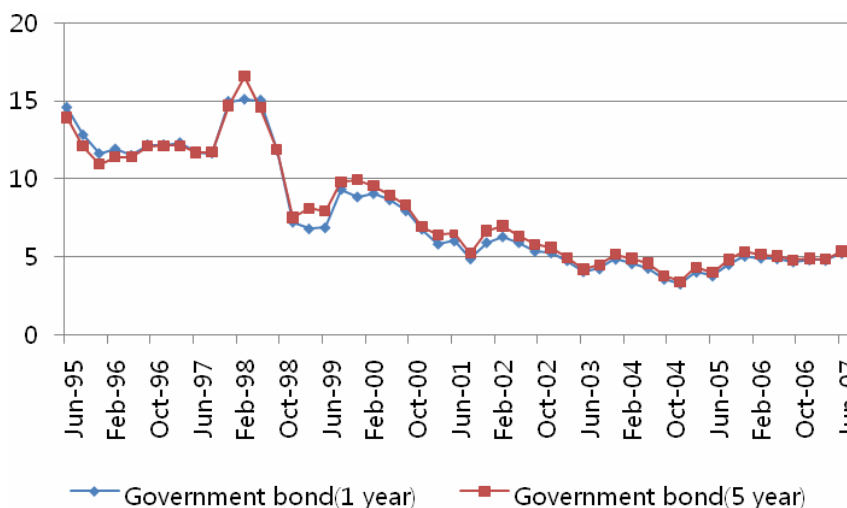
The real estate market has also been influenced by the equity market boom since the crisis. Like the bond market, the real estate market substitutes equity investment for better rate of returns, not only to domestic investors but also to foreign investors. At the same time, the wealth effects from equity price hikes and liquidity effects from portfolio inflows contribute to the price hike in real estate market. Figure 11 shows the land price index of the Seoul metro area. Since late 1999, the real estate price has increased steadily. The price index has rapidly increased during the last four years, up to almost 40 percent in 2007.

Figure 9: Korea Stock Price Index



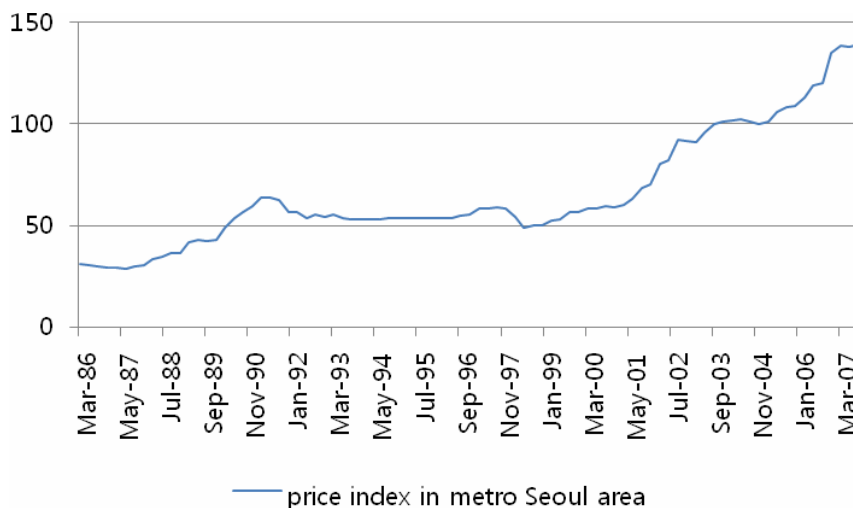
Source: Bloomberg

Figure 10: Government Bond Yield



Source: Bloomberg

Figure 11: Land Price Index of Seoul Metro Area



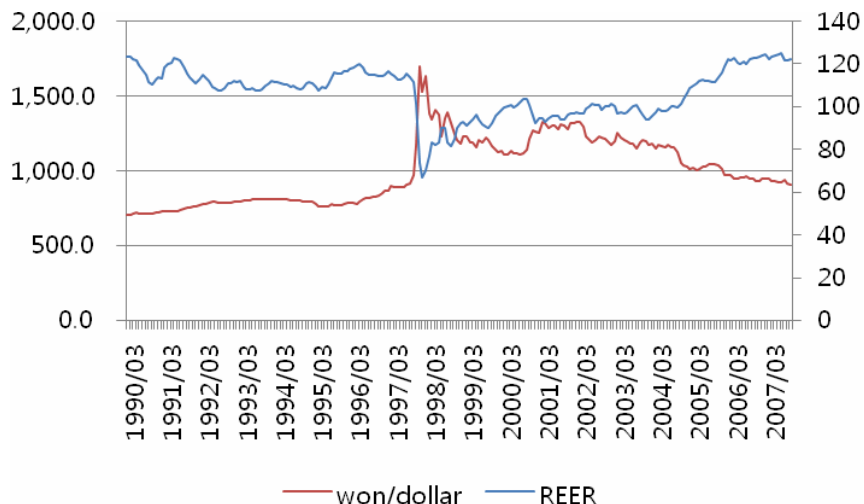
Source: Bloomberg

3-2 Exchange Rate, Liquidity and Foreign Reserves

Portfolio inflows are closely tied to the movements of exchange rates. Under a floating exchange rate regime, foreign portfolio inflows can directly affect the demand for domestic currency assets, leading to an appreciation in the nominal exchange rate. Combined with the sticky price, the real exchange rate can also appreciate. On the other hand, if the monetary authority intervenes in the foreign exchange market, the nominal appreciation can be avoided in a managed floating regime. However, the real exchange rate may still appreciate. As discussed above, consumption and investment booms are likely to increase the price of non-traded goods more than the price of traded goods because the supply of non-traded goods is more limited. Therefore, it can be argued that increases in asset prices and exchange rate appreciation in Korea are the result of capital inflows. To roughly check this hypothesis, we examine the trends in various macroeconomic variables.

The won/dollar exchange rate has shown a long-term downward trend since the crisis. The nominal exchange rate has appreciated steadily since 2003. However, the real appreciation started from 2004 (see Figure 12).

Figure 12: Won/dollar Exchange Rate and Real Effective Exchange Rate

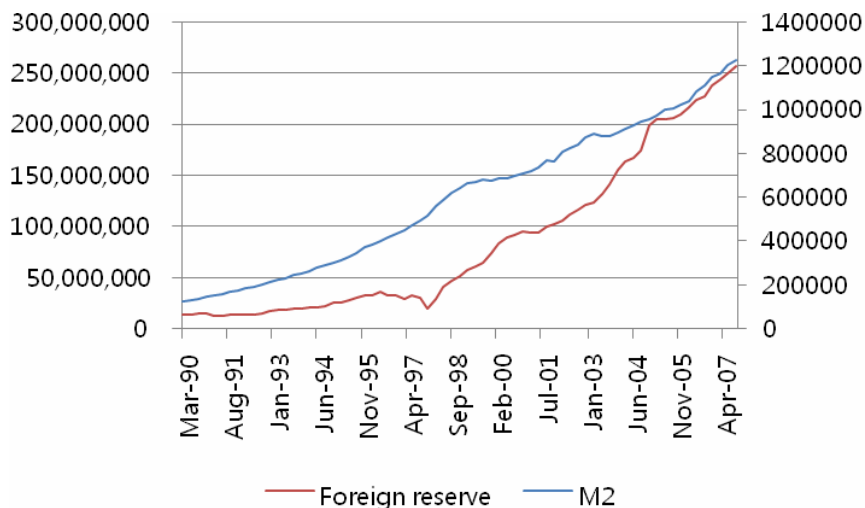


Source: Bank of Korea

Figure 13 shows Korea's foreign exchange reserves. Foreign exchange reserves have increased rapidly since the crisis based on a precautionary demand for foreign reserves due to the crisis. Furthermore, while Korea has been running sizeable surpluses on its current accounts, it has also accumulated large capital inflows as seen in the previous section. The bulk of the current account surpluses and capital inflows have been sterilized and added to reserves, for these countries that want to stabilize either the nominal or real effective exchange rate with the objective of maintaining their export competitiveness. Although the sterilization of reserve accumulation was substantial, money supply (M2) also seems to have increased sharply in Korea, which may imply that the sterilization was only partial.

In general, these data provide some support for the hypothesis that surges in portfolio inflows led to increases in the asset prices and nominal exchange rate appreciation in the 2000s. The timing of the surge in portfolio inflows and the asset price increase and exchange rate appreciation all coincide. In addition, during the same period, although foreign exchange reserves increased (which suggests some sterilization), money supply also increased (which suggests that sterilization was only partial). There was an economic boom, although there were no consumption and investment booms. The nominal exchange rate appreciation can be justified by capital inflows. Monetary expansion, along with portfolio inflows and the economic boom, may have contributed to the increase in the asset prices.

Figure 13: Foreign Reserves and Money Supply (M2)



Source: Bank of Korea

However, some other factors may explain the asset price increases and exchange rate appreciation in the Korean economy. The recovery from the crisis and improved economic prospects may have also led to asset price increases. Monetary expansion and low interest rates, beginning from the recession in the late 1990s and early 2000s, may be other factors that Korea experienced as asset price booms. The exchange rate appreciation against the U.S. dollar can also be explained by a number of other factors. For example, the massive US current account deficit and national debt problem may have led to a depreciation of the U.S. dollar. In the following section, we will attempt to formally assess the effects of portfolio inflows on asset prices and the exchange rates.

There are three important issues related to current capital flows in Korea. First, we will identify the problems of concentrated equity-related capital flows. Even though net capital flows are either nearly balanced or negative in Korea, current capital flows have been dominated by equity-related flows. This will further contribute to the asset price hike, and in return influence other capital markets such as the bond and real estate markets. We will further examine the effects of equity flows in Korea.

Second, global expectations for a depreciation of the dollar due to global imbalances create downward pressure on the won/dollar exchange rate. This is related to the patterns and directions of capital flows in Korea. With the expectation of a depreciation of the dollar, capital gains from investment in Korea are expected to increase. Moreover foreign investors in the equity market do not generally hedge the currency risk from their investments in Korea as long as the downward pressure on the won/dollar exchange rate exists. This will reinforce the appreciation of the won against the dollar.

Third, Korea is currently experiencing a surge in short-term borrowing by foreign banks due to the expectation of the won's appreciation and mismatches in the forward market. Domestic exporters face full currency risks, since most transactions in trade are contracted in terms of the U.S. dollar. Therefore, they purchase forward contracts in order to fix their cash flows in terms of the Korean won (see Figure 14 and 15). This reduces forward swap rates. On the other hand, banks, which intermediate these contracts, are in the opposite position of selling forward contracts to buyers of forward contracts. Since foreign banks have an advantage on dollar-denominated funding in the global market, and the interest rate

differential between Korea and the U.S. creates risk-free arbitrage profits (Figure 16) by borrowing from abroad and trading forward contract in the domestic forward market. This will lead to a further appreciating of the Korean won.

Figure 14 Forward Contracts and Exchange Rates (1)

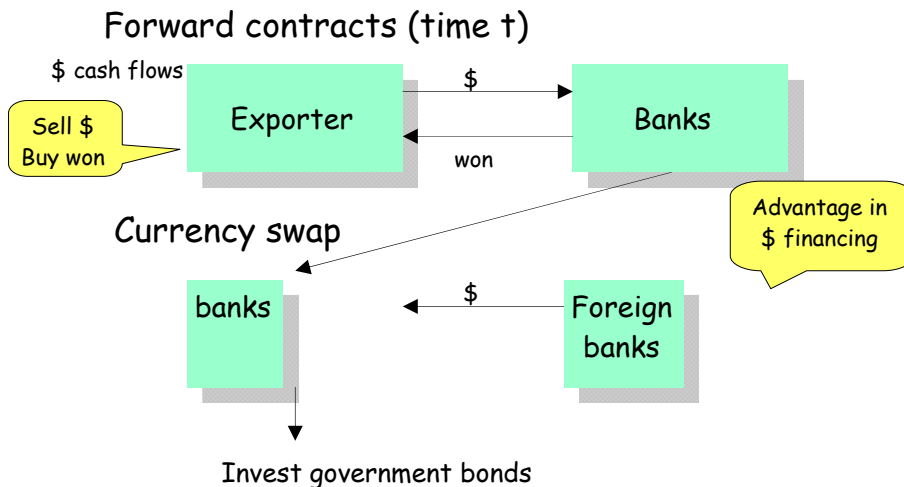


Figure 15 Forward Contracts and Exchange Rates (2)

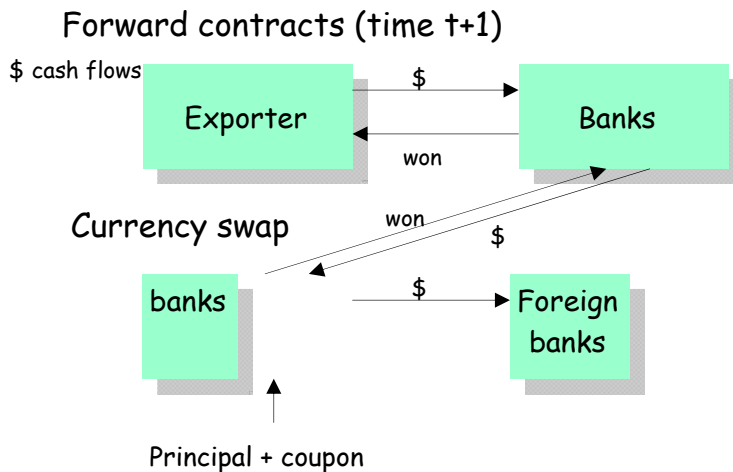
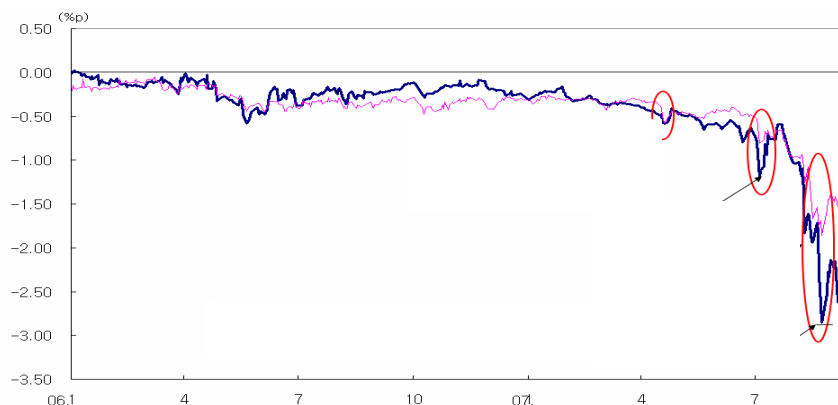


Figure 16: Difference Between the Swap Rate and Interest Rate Differential



4. EMPIRICAL ANALYSIS

4-1 VAR Model

Here, we examine the effects of foreign capital inflows on various economic variables, especially asset prices, using a VAR (Vector Auto-Regression) model. VAR models provide a useful methodology for investigating this issue. First, VAR models are data based, with a relatively small number of restrictions. This empirical framework is useful for documenting empirical facts. Second, the effects are expected to be inherently dynamic. For example, foreign capital inflows may affect different types of asset markets with different timing. VAR models are useful for inferring dynamic effects.

Let us assume that an economy is described by the following structural form equation:

$$G(L)y_t = e_t \tag{1}$$

where $G(L)$ is a matrix polynomial in the lag operator L , y_t is an $m \times 1$ data vector, m is the number of variables in the model, and e_t denotes a vector of structural disturbances. Constant terms are dropped for notational simplicity. Assuming that structural disturbances are mutually uncorrelated, $\text{var}(e_t)$ can be denoted by Λ , which is a diagonal matrix where diagonal elements are the variances of structural disturbances.

We estimate the following reduced form panel VAR with the individual fixed effect:

$$y_t = B(L)y_t + u_t, \tag{2}$$

where $B(L)$ is a matrix polynomial in the lag operator L , and $\text{var}(u_t^i) = \Sigma$.

There are several ways of recovering the parameters in the structural form equation from the estimated parameters in the reduced form equation. The identification schemes under consideration impose recursive zero restrictions on contemporaneous structural parameters by applying Cholesky decomposition to the reduced form residuals, Λ , as in Sims (1980).

Note that our statistical inference is not affected by the presence of non-stationary factors since we follow a Bayesian inference (see Sims 1988 and Sims and Uhlig 1991).⁵

4-2 Empirical Model

In the basic model, the data vector, y_t^i , is $\{Y, P, R, CAP_OUT, CAP_IN, X\}$ where Y is the log of a measure of output, P is the log of the measure of price level, R is the interest rate, CAP_OUT is capital outflows or portfolio outflows, CAP_IN is capital inflows or portfolio inflows (as a ratio to trend GDP), and X is the domestic variable under consideration.⁶ For X , we consider the following set of variables: the log of the KOSPI 200 index (KOSPI200), the log of the KOSPI index (KOSPI), the log of KOSDAQ index (KOSDAQ), the log of the won-dollar exchange rate (ERUS), the log of the won-yen exchange rate (ERJ), the log of the won-euro exchange rate (ERE), the log of the nominal effective exchange rate (NEER), the log of the real effective exchange rate (REER), the log of apartment price (APT), the log of housing price (HOUSE), the log of foreign exchange reserves (FRES), the log of monetary base (MB), the log of M1 (M1), and the log of M2 (M2). We included CAP since they are the main variable of our interest. Y and P are included to control for the factors that can affect X , including asset prices.

The factors or variables affecting domestic variable X can be divided into three types. First, certain factors affect X mostly through changes in foreign capital inflows. For example, a policy change toward a more open foreign capital market would affect capital flows and then affect X . Second, certain factors affect a domestic variable X mostly through channels other than foreign capital inflows. For example, an increase in the price level (which may be the result of a monetary expansion) may increase domestic asset prices, but in this transmission, foreign capital inflows are not likely to play an important role. Third, there are certain factors that affect X not only through changes in foreign capital flows but also through other channels. For example, a change in the domestic economic condition induces foreign capital inflows and then affects the domestic variable X . But a change in the domestic economic condition also influences investments by domestic investors and thereby affects asset prices.

The first type of factor affects X mainly through the changes in capital inflows. Therefore, to analyze the effects of capital inflows, it is unnecessary to control for this type of factor in the model. However, the second types of factor should be controlled because there may be an omitted variable bias if an important factor is not included in the model. On the other hand, we also try to control some third type of factors. If we exclude this type of factor in the model, all the effects of this factor, including the effects through channels other than changes in capital inflows, may be captured as the effects of foreign portfolio inflows.

As a second type of factor, we control for the aggregate price level. The aggregate price level shows the nominal and monetary condition of the economy, which can also affect X , for example, asset prices. As a third type of factor, we control for the domestic interest rate and aggregate output. Aggregate output is the most important variable representing the domestic economic condition, which may affect X both through changes in foreign capital inflows and through other channels. A change in the interest rate may affect asset prices directly, and also affect capital inflows. On the other hand, it may not be necessary to control some second types of foreign factors because their indirect effects are already captured in the control variables. For example, a change in the U.S. real economic condition may affect the

⁵ Specifically, we generate the standard error bands based on a Bayesian method, as described in the RATS Manual.

⁶ A linear trend in GDP is assumed. Assuming different types of trend such as a quadratic trend does not affect the results much.

domestic economy through real economic linkages, not by changes in capital flows. But if a variable reflecting the domestic economic condition (Y in our model) is controlled, such indirect effects can be controlled at least to some extent. Finally, we also control for capital outflows since capital outflows and inflows are sometimes inter-related, and we would like to separate the effects of capital inflows only.

Regarding the ordering of the variables, all the control variables are assumed to be contemporaneously exogenous to capital inflows in order to take out all the inter-related effects from capital inflows shocks. On the other hand, capital inflows are assumed to be contemporaneously exogenous to X . This type of assumption is used by Kim, Kim, and Wang (2004), Froot, O'Connell, and Seasholes (2001), and Bekaert, Harvey, and Lumsdaine (2002). In order to make the assumption more reliable, the data is constructed as of the end of the period value. Consequently, capital inflows are a flow variable that represents the activities during the period while X represents the value at the end of the period. Therefore, the assumption that other variables such as capital inflows are contemporaneously exogenous to X is a reasonable one.⁷

Finally, we note that the ordering among Y , P , R , CAP_OUT does not matter when we examine the effects of shocks to capital inflows.⁸ Monthly data is used for the estimations. The estimation period is from January 1999 to September 2007. We exclude the period prior to 1999 since economic behavior before and after the Asian crisis may be considered different within the framework of our study. A constant term and three lags are assumed. As a measure of output, we use price level, the interest rate, industrial production, CPI, and the call rate. To construct capital inflows and outflows, we exclude FDI since its effect may be somewhat different from the effects of usual capital flows.

4-3 Results

Figures 17 and 18 report the impulse responses, with 90% probability bands for the 2-year horizon, of each variable to capital inflows shocks and portfolio inflows shocks, respectively. The names of the responding variables are reported at the top of each graph.

First, to discuss the nature of capital inflows or portfolio inflows shocks, we first examine the impulse responses of capital inflows or portfolio inflows. Typical capital inflows shocks involve an approximate 4% (as a ratio to trend GDP) immediate increase in capital inflows while a typical portfolio inflow shock involves an about 2.5% (as a ratio to trend GDP) immediate increase in capital flows. In both cases, the responses return the flows to the initial level very quickly, but the responses of portfolio inflows are a bit more persistent.

Both types of capital inflow shocks increase stock prices sharply on impact, but the effects of portfolio inflows are larger and more persistent. Capital inflow shocks increase the KOSPI index about 2% on impact while portfolio inflows increase it by about 3%. The KOSPI index returns to the initial level about four months after the capital inflow shock, and returns to the initial level about 1 year after a portfolio inflows shock. The effects on the KOSDAQ index are also large and significant. Capital inflow and portfolio inflow shocks, on impact, increase the KOSDAQ index by about 2.5% and 4%, respectively. The effect of portfolio inflow shocks is more persistent than that of capital inflows shocks.

On the other hand, the effect on housing and apartment prices are moderate and insignificant. The point estimate shows that the size of the change is relatively small, far

⁷ Exceptions are: housing price, apartment price, and nominal and real effective exchange rate. We could not obtain the end of period value for these data series.

⁸ Refer to Christiano, Eichenbaum, and Evans (1999).

below 5%. In addition, the 90% probability bands include zero responses in all cases. These small effects may be related to recent government policy measures for regulating the housing market in Korea.

The nominal and real effective exchange rates tend to appreciate in the very short-run. In the case of capital inflows, the impact effects of the approximate 0.25% appreciation are marginally significant. However, in the case of portfolio inflows, the probability bands are very wide, including zero responses. In both cases, the effects on the won-dollar exchange rate are also very small and insignificant.

The small effect on exchange rates seems to be mostly related to the foreign exchange intervention to accumulate foreign exchange reserves. In both cases, foreign exchange reserves increase significantly. In response to capital inflows shocks, foreign exchange reserves increase about 0.35% on impact and then increase up to about 0.5% within two or three months after the shock. In response to portfolio inflows shocks, foreign exchange reserves increase about 0.2% on impact and then increase to about 0.5% three months after the shock. As a result, the monetary aggregates like monetary base, M1, and M2 do not increase significantly.

Figure 17: Impulse Responses to Capital Inflows Shocks

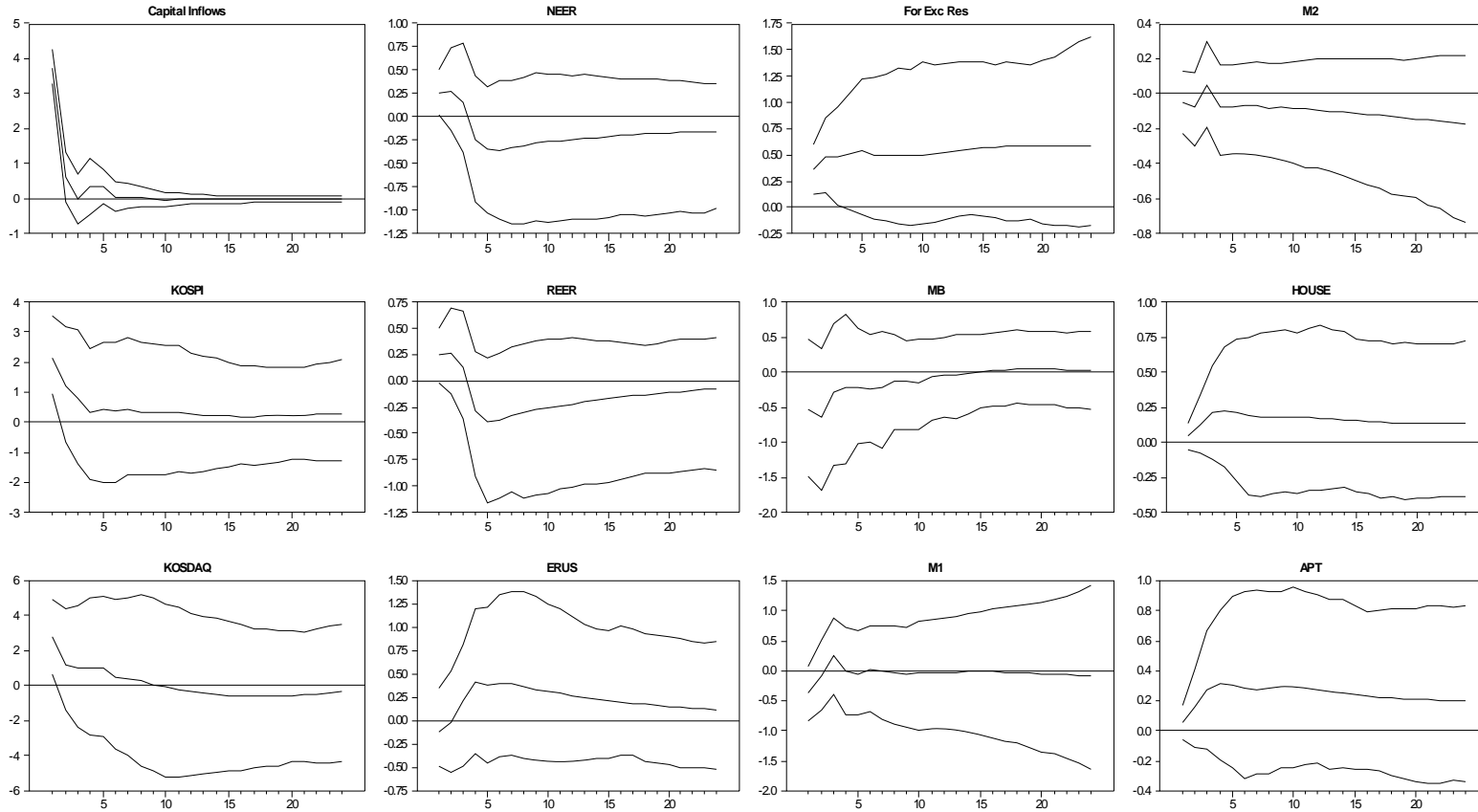
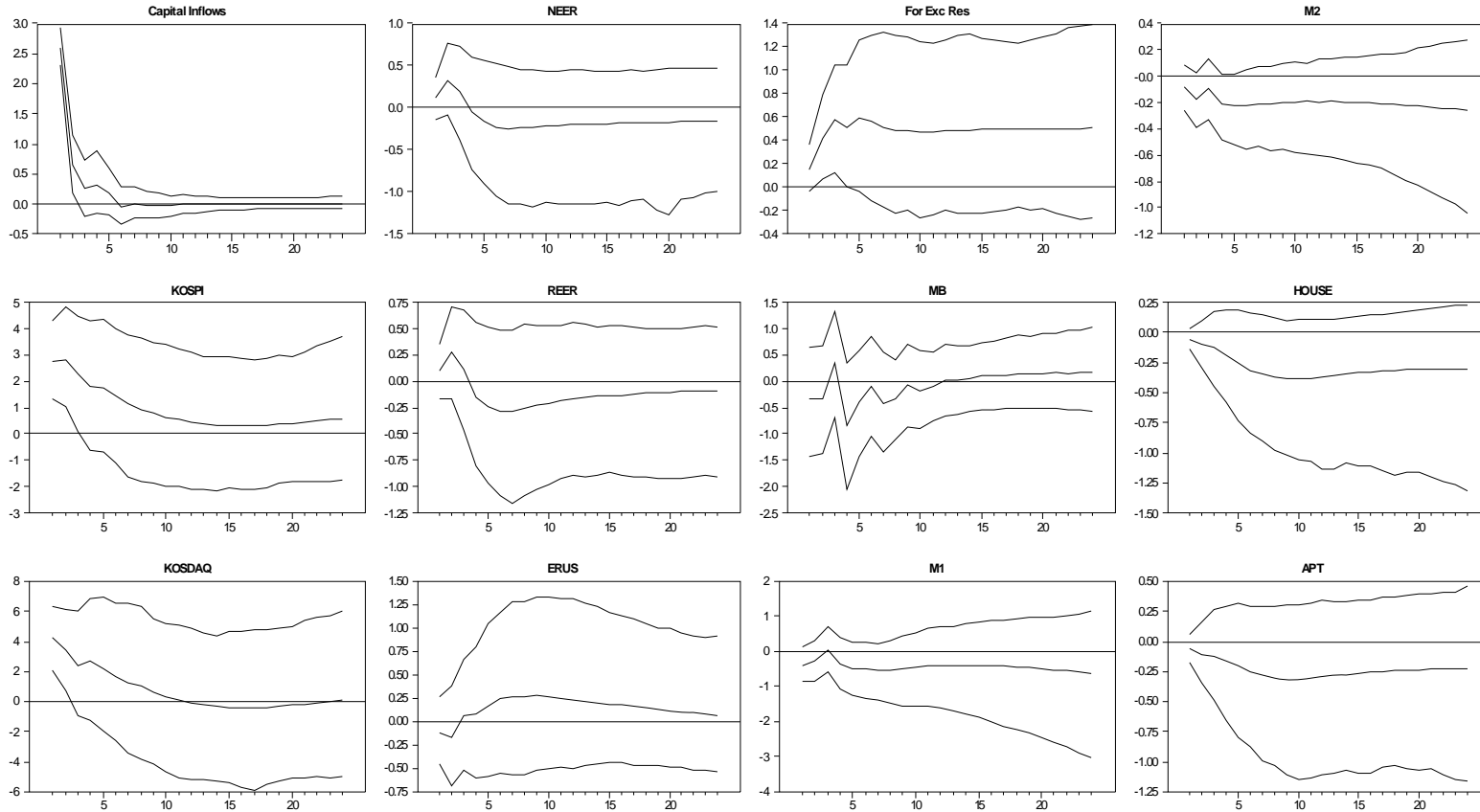


Figure 18: Impulse Responses to Portfolio Inflows Shocks



4-4 Determinants of Capital Inflows

Here, we will briefly examine the determinants of capital inflows by modifying the empirical model. To evaluate the role of various factors, we include various factors explicitly in the model. In the previous model, four pull factors (domestic interest rate, price level, domestic output, stock price) were explicitly included. We also included two important push factors, world interest rate and world output. On the other hand, we excluded capital outflows; capital outflows were included in the model to isolate the effects of capital outflows shocks, and now we exclude it to preserve the degree of freedom.⁹ As a result, we construct a model of $\{Y^*, R^*, Y, P, R, CAP_IN, SP\}$, where Y^* and R^* are world output and world interest rate, respectively, and we order the contemporaneously exogenous ones first.

In the model, we assume that world variables are contemporaneously exogenous to Korean variables since Korean economy can be regarded as a small open economy that cannot affect world variables much. We also assume that output and the price level are contemporaneously exogenous to the interest rate since aggregate variables tend to move sluggishly but financial variables tend to respond to information instantaneously.^{10,11} In the estimation, we use the U.S. variables as proxies for world variables.

To discuss the role of each factor, we report the variance decomposition of capital inflows and portfolio inflows in Table 2. From the result, one dominant factor does not emerge; each shock plays some role (about 5-10%) in explaining capital and portfolio inflow fluctuations. The role of two push factors is not very large; about 10% of capital and portfolio inflows fluctuations are explained by the two push factors. The role of each pull factor tends to be larger than that of each push factor. For capital inflows fluctuations, output shocks explain about 10%. For portfolio inflows fluctuations, stock price shocks explain about 10%.

Table 2: Forecast Error Variance Decomposition of Capital Inflows

(1) Capital Inflows

	6 month	12 month	24 month	48 month
Y^*	5.0 (3.3)	5.5 (3.4)	6.0 (3.7)	6.8 (4.4)
P^*	4.0 (2.6)	4.5 (2.8)	4.6 (2.9)	4.9 (3.1)
Y	9.6 (4.9)	10.2 (4.9)	10.8 (5.1)	11.2 (5.5)
P	6.7 (3.9)	7.0 (3.8)	7.2 (3.9)	7.6 (4.1)
R	5.7 (3.1)	6.4 (3.2)	6.9 (3.5)	7.2 (3.8)
CAP_IN	65.9 (7.2)	62.6 (7.7)	59.4 (8.9)	56.0 (11.2)
SP	3.1 (2.3)	3.9 (2.6)	5.1 (3.6)	6.5 (5.3)

⁹ The results on the determinants of capital flows are similar in the model with capital outflows.

¹⁰ This type of assumption is widely used in past studies. See, for example, Sims and Zha (2006), Kim (1999), and Kim and Roubini (2001).

¹¹ We also assume that domestic output is contemporaneously exogenous to domestic price level based on the idea that real variables are more fundamental than nominal variables. At any rate, the results are similar under the assumption that domestic price level is contemporaneously exogenous to domestic output. On the other hand, we assume that domestic variables are contemporaneously exogenous to capital inflows, but that there can be a simultaneity between domestic variables and capital inflows. We leave a more rigorous study to resolve the issue as a future study.

(2) Capital Outflows

	6 month	12 month	24 month	48 month
Y*	4.1 (2.7)	4.4 (2.8)	5.0 (3.3)	5.9 (4.7)
P*	4.4 (2.8)	4.8 (2.9)	5.0 (2.9)	5.2 (3.1)
Y	6.6 (4.0)	7.1 (4.2)	7.7 (4.5)	8.2 (5.0)
P	5.4 (3.5)	6.0 (3.7)	6.4 (3.7)	6.9 (4.0)
R	5.8 (3.1)	6.2 (3.2)	6.5 (3.5)	6.9 (3.9)
CAP_IN	64.6 (7.4)	61.8 (7.9)	59.1 (8.9)	55.6 (11.2)
SP	9.1 (4.7)	9.7 (4.8)	10.3 (5.1)	11.2 (6.4)

5. POLICY OPTIONS

The Korean government has implemented a variety of policy measures to deal with large capital inflows, including the mitigation of currency appreciation pressure by implementing sterilization methods, prepayment of foreign debt, encouragement of capital outflows, and tightening of credit growth by increasing lending rates and required reserves. Here, we assess the effectiveness of existing policies and measure adopted by the Korean authority to manage capital flows and domestic liquidity.

5-1 Exchange Rate Policy

The effects of capital inflows may vary depending on the exchange rate regime. Although real exchange rate appreciation pressures may increase under both a floating and fixed exchange rate regime, the adjustment under a floating regime is more direct and less costly. This is due to the availability of measures under each type of regime. The primary measure for adjustment under a fixed regime is a rise in inflation which naturally occurs as inflows stimulate domestic activity. Under a floating regime, nominal exchange rate appreciation is an option that can be used to augment adjustment with the additional benefit of discouraging inflows by reducing their returns in terms of foreign currencies. On the surface, adjustment under a floating regime tends to be less stable because of the utilization of the nominal exchange rate in adjustment; however, the effects of these measures may be less detrimental in larger and deeper financial markets.

One way to enhance monetary autonomy is through the implementation of a floating exchange rate regime, which enables monetary authorities to handle fluctuations in monetary aggregates resulting from fluctuations in capital flows with greater flexibility. In addition, the central bank may intervene in the event of a capital flow reversal, curbing financial instability as a safety net lender.

To deal with increasing capital inflows, countries must move more into flexible exchange rate regimes. This would enhance the maneuvering room for monetary authorities in a world of volatile capital flows. However, increasing the flexibility of exchange movements alone cannot cool down an overheating economy or prevent the development of asset bubbles. Allowing more flexibility in the exchange rate is one option, but not the only one. Even though Korea has allowed the exchange rate appreciation, capital inflows still increased in the 2000s.

5-2 Monetary Policy

One way of dealing with capital inflows is to lower interest rates. Lower interest rates tend to reduce capital inflows and reduce appreciation pressures by making interest arbitrage less attractive. However, cutting interest rates may further boost liquidity and add to inflationary pressures, making this option less attractive if inflation is already elevated. At the same time, if asset prices are increasing, lowering the interest rate may boost asset bubbles.

On the other hand, in a time of surges in asset prices, the central bank may indeed consider raising interest rates. How monetary policy reacts to asset prices is highly controversial in general, both from an academic point of view and from a policy perspective. There is wide debate over whether monetary policy should target asset prices. The arguments against it are as follows. First, it is hard to determine the existence of asset bubble *ex-ante*, and thus, targeting asset prices may destabilize the economy. Second, large hikes in interest rates may be required to prick or burst asset bubbles, and this leads to a substantial recession. Lastly, if a bubble bursts, monetary authorities can respond quickly by providing liquidity to prevent severe asset price falls, and therefore a pre-emptive monetary policy that targets asset prices is not necessary. This is dubbed as a Fed-view (Roubini, 2006).¹² On the other hand, several authors have emphasized that central banks should target asset prices as well as inflation and output gaps. Filardo (2001, 2004) argues that the optimal monetary policy rule implies that asset prices generally enter into the reaction function of the monetary authority. If there is a rising bubble, monetary policy should be tighter than under a simple Taylor rule, while, when the bubble bursts, optimal policy should be easier than under the Taylor rule. Others also insist that highly leveraged asset acquisition fueled by excessive credit creation and asset misallocation may happen even when inflation is low. A monetary authority which focuses on the mean inflation rate alone may thus miss seeing possible growing financial imbalances (Borio and Lowe, 2002, 2004).¹³

It is not obvious that Korea should implement monetary policies that target asset prices in general. However, Bautista (2007) shows that asset price booms matter in East Asia because they affect the probability of the occurrence of adverse macroeconomic development, and insists that pre-emptive monetary policy is required to deal with asset price appreciations in the region. In addition, recent experiences in the United Kingdom, Australia and New Zealand suggest that it is possible to react to the formation of bubbles through a moderate and gradual monetary policy tightening without causing a financial and economic crash.

Korea tightened its monetary policy in 2006 to moderate housing prices. Even though inflation pressures persist due to economic recovery and high oil prices, the Bank of Korea (BOK) raised the benchmark call rate by 25 basis points from 4.25% to 4.50% in August 2006. This implies that even if the BOK is not targeting asset prices directly, it is indirectly considering potential inflationary pressures stemming from asset price appreciations.

However, monetary tightening is a limited policy option in emerging Asian economies, since higher interest rates can stimulate portfolio inflows and create more pressure in liquidity expansion. At the same time, exchange rates will also appreciate. This is not welcomed by most emerging Asian economies since it reduces export price competitiveness. On the other hand, in the presence of strong external inflows, many countries use sterilized foreign currency market intervention to neutralize appreciation pressures on the exchange rate. However, sterilized intervention may not be completely effective, and can lead to increases in domestic liquidity conditions which can feed into asset markets. Even if ineffective,

¹² See Mishkin (2007) and exponents of the Fed-view including Schwartz (2002), Bernanke and Gertler (1999, 2001), Gilchrist and Leahy (2002), and Goodfriend (2003).

¹³ See Bordo and Jeanne (2002), Cecchetti et al (2000, 2002), and White (2006).

sterilized intervention has some important effects on domestic asset markets. First, the domestic interest rate will be higher than otherwise. With inflows into the domestic bond markets, interest rates will tend to fall but sterilization will at least partially offset the drop. Thus, any gap between foreign and domestic interest rates will persist, encouraging capital inflows to continue. Second, sterilization increases outstanding domestic government bonds, which may increase the size of the public debt. This can undermine the credibility of macroeconomic policy, setting up a potential reversal in capital flows. Third, with sterilization, the monetary authority increases the holdings of foreign currency assets but decreases the holdings of domestic government bonds. This can be very costly because the domestic bonds are likely to provide higher interest payments than foreign currency assets. Fourth, sterilized intervention may hamper further financial reforms. Commercial banks will hold up the central bank's debts. To cut down the cost, a lower interest rate may be applied to the debts. It may eventually increase the burden of commercial banks or turn out to be a control over domestic interest rates.

The monetary authority may increase reserve requirements or the discount rate to prevent the increase in the money supply from reserve accumulation. However, these policies also involve some problems. They can be viewed as more regulation on financial markets—countering financial market liberalization. In addition, they can distort the banking system, for example, if participants discover counterproductive ways to bypass regulations. The Bank of Korea increased the average reserve requirement ratio from 3.0% to 3.8% in December 2006. This led to a slight lowering of the liquidity expansion, as the capacity of financial institutions to provide credit weakened in accordance with the increase in their required reserves.

In general, Asian economies have limited monetary policy options to mitigate the adverse effects of huge capital inflows, and potential difficulties lie on complicated policy objectives, since there are trade-offs between domestic and external objectives. In order to assuage the surges of capital inflows, lowering interest rates may be a good candidate. However, this will increase domestic liquidity and the formation of asset bubbles. At the same time, to cool down an asset price hike, monetary tightening can be considered, but this will put pressure on the exchange rate and exports will be adversely affected.

Nevertheless, current asset price appreciations in the region should be carefully managed by monetary policy at least in the short-run. In countries with huge asset price appreciations, such as China, a moderate short-term interest rate increase can help to alleviate asset price bubbles. A slight increase in the short-term interest rate will affect both credit conditions and decrease leverage and excessive risk taking by investors. This, in turn, will affect asset prices. It will also have a smaller effect on exchange rates if the increase in interest rate is minimal. On the other hand, Thailand and Indonesia, which have experienced a weaker asset price increase but higher inflationary pressure and weak domestic demand, have been able to cut interest rates. It may help to limit capital inflows by bridging the gap caused by the interest rate differential.

5-3 Fiscal Policy

The government can tighten fiscal policy to calm an overheating economy in order to counter some of the effects of capital inflows. In addition, decreasing government spending can reduce the relative price of non-tradables and relieve the appreciation pressure on the real exchange rate. See Eichengreen and Choudry (2005) for a fuller discussion of the use of fiscal policy to offset the effects of capital inflows.

In the East Asian countries that have high inflationary pressure, a fiscal contraction may be an important option since an alternative contraction policy (i.e., a monetary contraction) can cool down the economy but may further attract capital inflows and appreciate exchange

rates. Most Asian countries have displayed a generally balanced fiscal position for decades. The average budget deficit in the six emerging Asian economies since 1998 is a mere 1.6%. The Philippines, with the highest budget deficit, reduced its deficit from 5.3% in 2002 to 2.7% in 2005. China's budget deficit has fallen since 2002. All other countries have remained at a lower level of budget deficit. Therefore, it seems that fiscal contraction is not necessary for reducing the fiscal burden. However, tightening fiscal policy can reduce the impact of portfolio inflows by contracting domestic demand, and therefore limiting inflation and real appreciation.

On the contrary, the policy authority should be very careful in implementing fiscal contraction. Fiscal policy is subject to long decision lags, compared with very volatile and unpredictable capital flows. For example, by the time a fiscal contraction is implemented, the surge in capital flows may have subsided. In this case, the fiscal contraction can actually worsen the situation.

5-4 Encouraging Capital Outflows

In principle, one method for curbing disproportionate amounts of unproductive forms of capital inflows is the use of capital controls. In general, capital controls do not appear to be a viable option for curbing the short-run effects of capital inflows in Korea, since Korea liberalized most capital account restrictions in 1998. Alternatively, it can be considered that lifting restrictions on capital outflows by private investors may mitigate the adverse effects of huge capital inflows. Most emerging Asian economies have the potential to further liberalize the restrictions on capital outflows and achieve a greater degree of symmetry in controls on inflows and outflows. As restrictions on capital outflows are lifted, private investors have access to more diversified financial assets. Furthermore, they need not pursue limited investment opportunities in the domestic market. This may reduce the upward pressures of exchange rates and prevent asset bubbles from forming in the domestic capital market. However, countries should be careful in removing restrictions on capital outflows since it can aggravate the situation at the time of reversals in capital flows.

Korea has encouraged overseas investment by financial institutions and individuals to mitigate the negative effects of the huge capital inflows into the domestic capital market. In 2007, a temporary three-year tax exemption will be applied to capital gains generated from overseas stock investment by domestic investment trust and investment companies. The government has also eased regulations in order to boost overseas real estate investment through indirect investment. For example, the acquisition limit on overseas real estate by domestic residents for investment purposes will be raised from the current US\$1 million to US\$3 million.¹⁴

5-5 Financial Market Regulation and Supervision

If a government cannot directly control capital inflows and is concerned about an excessive appreciation of asset prices, strengthening financial regulation and supervision should be considered in order to prevent asset bubble bursts. When there is excess liquidity and lower interest rates in the market, it is highly plausible for economic agents to take risk investments. The government should access and influence risk-taking behaviors by financial institutions through a range of qualitative and quantitative methods. These measures include restrictions on portfolio composition, risk-based capital requirements, loan loss provisions, and stress testing of market risk exposures. Concerns can then be addressed using regulatory measures directed at specific asset markets. This will be all the more effective if a large portion of the funds flowing into asset markets derives from domestic agents. In general, a more targeted approach may reduce the chance of unintended macroeconomic

¹⁴ In Korea, foreign real estate purchases by domestic resident have been permitted since May 2006.

effects of broad-based monetary, fiscal, or exchange rate policies—or even capital controls. To the extent that the banking sector is funding speculative investments in stock and real estate markets, exposures can be closely monitored or reduced through selective imposition of higher reserve requirements, higher downpayment requirements for real estate purchases, or higher reserve margins for equity investments. However, effective financial market regulation and supervision requires well-trained professionals with independence, a professional code of standards, and the ability to engage sophisticated market players. Therefore, Korea, which has experienced current surges in capital inflows, should expand its risk management policies on credit expansion into the equity and real estate market.

6. CONCLUSION

In recent years, Korea has experienced (i) large capital inflows, in particular a surge in portfolio inflows, and (ii) an appreciation of asset prices such as stock prices, land prices, and nominal and real exchange rates. In this paper we examined how capital inflows, especially portfolio inflows, affect the domestic economy, focusing particularly on asset prices.

We first documented recent trends in capital inflows and asset prices in Korea, and reviewed various theories on how a surge in capital inflows can increase asset prices. Then, we empirically investigated the effects of capital inflows on asset prices by employing a VAR model. The empirical results showed that capital inflows shocks indeed contributed to the stock price increase in Korea, but not much to land prices. Capital inflows shocks had a limited effect on nominal and real exchange rates, which is related to the huge foreign exchange reserve accumulation.

Finally, we discussed the issue of how to manage these capital inflows. As yet, a catchall solution to the problems that capital inflows present does not seem to exist. Therefore, the most should be made of the available instruments at hand.

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