Korea's 1997 Currency Crisis: Causes and Implications*

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1. Introduction

By the mid-1990s, the Korean economy appeared to have leveled off, having reached a plateau of a high single digit growth rate. As the world's 11th largest economy, Korea's new found stature was officially acknowledged in 1996 when it became a member of the OECD. At the beginning of 1992, general inflation, measured in terms of GDP deflator, stabilized at close to 5 percent. There was no real concern over the financial condition of the government as it had generally maintained a balanced budget over the years. A current account deficit persisted but did not seem to be a cause for alarm. In fact, in the previous ten years it never rose beyond 5% of GDP. These indications were all drawn from key Korean macroeconomic data until the end of 1996.

However, the situation started to deteriorate rapidly in 1997. The speed with which foreign exchange liquidity problems reached crisis proportions caught many of us by surprise. Beneath the hitherto placid surface, some potentially serious structural imbalances had been building up over time. A lack of a self-regulating price mechanism was a fundamental cause of some of the problems. Many viewed the government-led Korea's economic growth experience as a development model success story in which the government could play a more important role in making resource allocation decisions vis-à-vis markets. Lack of competition in goods markets gave rise to inefficiency in the corporate sector. Scarce bank credit was used as a key inducement and made available inexpensively to businesses entering the industries which government policy targeted. Thus, a weak banking sector resulted. Prudential regulations took a back seat to financing industrialization. One immediate consequence was lending concentration. Another was heavy reliance on cheap foreign short-term capital. Even allowing for an over-reaction by foreign investors, the ground was fertile for the liquidity problem to bloom into a full blown crisis.

The approach of this paper is to provide a systematic account and analysis of the recent development in and outside Korea rather than to merely compare data to a

particular theoretical model. In our judgement, any shortcomings that arise from not using a specific frame of reference are adequately compensated for by the benefits of offering general descriptions and analyses of factors that have been key in the evolution of the recent crisis.

We provide an overview of key structural as well as cyclical issues using anecdotes, descriptive statistics, and a time series Vector Error Correction Model (VECM) of nominal wage, labor productivity, and inflation. In particular, we hold that Korea's strong won foreign exchange policy deserves a large portion of the blame. In addition, we examine cyclical and short-term Korean macroeconomic and external developments in 1996 and 1997.

Our use of the model are for purposes of a purely descriptive nature. In that, it differs from some work by Korean authors. For example, Lee and Lee (1998) employ a stylized model of key macro variables to ask whether the foreign exchange crisis could have been predicted based on the behavior of a set of key macro and external conditions. In our view, a stylized macro model is not rich enough to incorporate the various structural imbalances that contributed to the breakout of the crisis. To the extent that the problems are microeconomic in nature, a model that focuses on macroeconomic variables is unlikely to be adequate.

As to the key immediate causes of the crisis, it is our opinion that it is the collection of measures taken by the Korean government in 1997 that triggered the blow out rather than any one particular policy measure implemented during the second half of the year. Some Korean authors have focused on finding the key catalyst event of the crisis development in late 1997. For example, Park and Lee (1998) point out the Korean government's blanket guarantee of deposits and interest on all deposit at all financial institutions including technically insolvent ones in October of 1997. Some point to the effective nationalization of the failed Kia Motors and the downgrading of credit ratings of the Korea Development Bank's papers by Moody's that closely followed. The KDB

papers carrying de facto sovereign rating of Korea were traded in international capital markets.

But our view is that under the circumstances faced by the Korean economy, nothing short of a complete removal of the exchange rate band sometime in early-1997 could have made a difference. The crucial factors were the structural backdrop, the Korean government's insistence on the strong won policy until early 1997 and the breakout of the ASEAN crisis in the summer of 1997.

Aside from reasons related to the rapid movement of international capital flow, both structural as well as cyclical causes for the recent crisis also exist. Understanding these factors and how they contributed to the crisis will be invaluable to both policy makers and academicians here and abroad. The next crisis will almost certainly be of a different variety. Nonetheless, a clear understanding of this one cannot help but give us an advantage in preparing for the next one.

The rest of the paper is organized as follows: Section II provides a quick sketch of what happened in Korean financial markets around the latter part of 1997. In Section III, we will make an overview of key structural issues. Section IV examines more cyclical and short-term Korean macroeconomic and external developments in 1996 and 1997. In Section V, we employ a time series Vector Error Correction Model (VECM) of nominal wage, labor productivity, and inflation to add some quantitative content to the issue of the effect of the strong exchange rate on inflation. In Sections VI and VII we offer some assessment of the post-IMF intervention period and the dilemma facing Korean policy makers. Section VIII concludes.

II. A Quick Glance at the Crisis

This section sketches the key events of Korean financial markets during the latter part of 1997. The single most important development in the period leading up to Korea's financial crisis was the currency crisis among the ASEAN countries in mid-

1997. The focus of the international capital market naturally shifted towards what was seen as the next set of vulnerable economies, i.e., four first generation tigers (Hong Kong, Singapore, Taiwan, and Korea) with potential exchange rate misalignments. International investors started to probe these countries beginning in August for 'quick profit' opportunities. Already beset by a series of bankruptcies of large firms that started early in the year, Korea appeared particularly susceptible to trouble.

The uneasiness felt by international investors over about the Korean situation manifested itself in several ways. After hovering near 750 in June and July, the KOPIX (stock price index) started to fall rapidly in September. It reached a nadir of 350.7 on December 12th. This falling trend more or less reflected a large scale exit by foreign investors. Foreign investment in the Korean equity market shrank rapidly by about one billion dollars in November alone.

Starting in November, Korean banks started to face severe difficulties in rolling over their short-term foreign borrowing. The roll-over rate fell from about 80 percent in October to close to 50 percent in November then to about 30 percent in December. Korean banks faced the worst in December when only about 30 percent of their foreign counterparts agree to extend credit on an on-going basis. In terms of amount, short-term credit extension to Korean financial institutions fell to about $46 billion from the 1996 level of $65 billion. It fell even further to $29 billion in December '98. Such a constriction of foreign credit accompanied an accelerated downgrading of Korea's credit rating, as shown in Table 1.

The exchange value of the Korean won started to fall precipitously in late 1997. The $/won rate fell by 11.4 and 44 percent in November and December, respectively. Concurrently, the daily exchange band within which the exchange rate was allowed to fluctuate was widened to 10% in the second half of November from 2.25%. This band was abandoned altogether in mid-December. Foreign exchange authorities started to intervene in the FX market from early 1997 to prevent a rapid fall in the exchange rate,

expending a substantial amount of foreign exchange reserves. The usable reserve level fell below $10 billion by late November (Table 2).

Together, these developments raised the real prospect of a debt moratorium to both domestic as well as international observers. Such a perception added to the urgency of both foreign and domestic investors in their stampede to exit from won holdings. To avert a crisis, the Korean government made a request for IMF financial aid on November 21. The IMF intervened and extended the first installment of its financial commitment, a $10 billion emergency loan, on December 24, 1997.

III. Deeper Look: Structural and Long Term Factors

Unfortunately, there are number of structural long-term problems that have provided fertile ground for the recent crisis to germinate. Bolstered by the success of a government-led growth strategy starting in the 1960s, key economic players--government, businesses, academia--took active government intervention to be most suitable for Korea. A similar experience in Japan during the rapid growth period also provided a useful benchmark. As in many other areas, both foreign exchange demand and supply (quantity) as well as exchange rate (price) were heavily regulated. The obvious and direct legacy of such history has been a lack of a self-correcting price mechanism. Key items will be reviewed in turn.

Firstly, Korea relied on foreign borrowing by government or banks rather than foreign direct investment (FDI) for her industrialization. Foreign borrowing has been necessary as rapid growth in investment almost always out-paced that in domestic saving. For some reason, very little emphasis was placed on inward foreign direct investment. Table 3 and Figure 1 show some relevant data which indicate the extent to which Korea relied on foreign direct investment in relation to other sources in order to finance industrialization effort. Table 3 shows, in terms of both absolute size as well as in proportion to the gross domestic capital formation, that FDI has actually been quite

modest. This has been the case even when compared to other Asian economies at different stages of development. For example, in proportion to the overall size of capital formation, FDI measured up to about one percent or less for six years running since 1990. In Indonesia, which ranked just above Korea in terms of reliance on foreign direct investment, FDI made up of 2.8 to 8.5 percent of overall capital formation. In comparison, the ratio ranged from 12.1 to 26 percent in Malaysia. FDI in Korea was similarly minimal in the 1980s. According to Figure 1, Korea's outward direct investment overtook inward investment in 1988-1989 period. Figure 1 also shows that FDI has been dwarfed by external debt in Korea. The right hand scale, which measures the external debt, is about 30 times the left hand scale that measures FDI.

At the same time, tight control has been imposed on corporate borrowing from abroad.[1] This put excess demand on bank funds, which in turn pushed banks to borrow from abroad. Also, since the early 1990s the Korean government has adopted policies that discourage long-term borrowing, leading banks no alternative other than to rely heavily on short-term foreign borrowing.[2] These led to the accumulation of a large stock of foreign debt and a vulnerable foreign liability structure.

Secondly, the strong industrial policy pursued by the government for several decades has left clear marks on the Korean industrial organization. Using easy credit as the main inducement, the Korean government encouraged businesses to participate in sectors favored by government. The push for heavy, chemical industries up to the early

[1] It is interesting to note that blocking the Korean corporate sector from borrowing directly from international financial institutions had a distinct drawback that has been overlooked. Typically, large international financial institutions have to justify their lending decisions based on their objective creditworthiness analysis. This means asking many questions on the prospective projects, general level of financial obligations, profitability of the project to be funded, etc. In comparison, Korean businesses did not have to answer many of these kinds of questions when they dealt with Korean banks. Thus, the policy that blocked corporate sector's direct foreign borrowing might have had more adverse consequences than benefits envisioned when the restriction was initially put into place.

[2] For some reason, the Korean government discouraged long-term borrowing. For example, financial institutions needed to clear a much higher level of bureaucratic permission to raise long-term funds opposed to raising short-term funds. (A rapid growth in domestic credit appears to have been one key concern for this restriction?)

1980s is the most well known example. Such a policy regime has fostered growth of large corporations engaged in many lines of business. It paid to get into industrial areas favored by the government regardless of immediate difficulties such as a lack of know-how or related experience. Such a policy led to a monopolistic or oligapolistic market structure. Resulting industrial organization structure tended to reduce competition among businesses in the product market which in turn fostered inefficiency in many Korean firms.[3]

Three, a key consequence of the government's close involvement in directing bank credit has been a weak Korean banking sector. Other than banks, businesses had few alternative domestic funding sources such as equity and bond markets. Nonetheless, the impetus to expand has remained strong. So, they turned to banks for funds. The Korean government controlled interest rates charged by banks were kept artificially low until a few years ago, making bank funds even more attractive. Consequently, the demand for bank funds has been very strong since the early development period. In addition, a double digit inflation rate was not uncommon during the past three decades.[4] These conditions together gave rise to heavy domestic interest rates and high reliance on bank funds by Korean businesses.

Another manifestation of the imbalance between banks and non-financial

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[3] It is difficult to quantitatively capture this conjecture in a succinct way. However, one could use indicators of concentration of firms in a particular industry as a proxy for the degree of competition. One such measure is the so called "concentration ratio of k", denoted as CR, which measures the share held by k largest firms in a particular product market. For example, CR4 for the soft drink market measures the share of the four largest firms in the soft drink market. According to Shepherd (1982), about 76% of GNP in the U.S. was produced by industries with CR4 of less than 40% until 1980. In comparison, only about 44% of Korea's GDP were produced by industries with the CR3 of less than 40% (Hwang, 1998). According another study on Korea's market concentration, over 87% of markets for manufactured products exhibited the CR3 over 50% in 1980, but the ratio slightly declined to 76% in 1994 (Ju, 1997). There are different views regarding the relationship between market structure and economic efficiency. The fact that only a small number of firms are present in a particular market does not necessarily lead to economic concentration in which few dominant firms exhibit rent seeking behavior. For a more detailed discussion of this issue in Korean setting see Hwang (1998).

[4] Inflation reduces the real value of debt burden of debtor. The Korean corporate sector benefited from high inflation in the past since a high leverage ratio has been common to most large businesses.

industries is the comparative positions of each type of businesses in their respective global markets. To use lists from 1997's Fortune global list of the 500 largest firms in terms of asset size, 13 Korean firms made the list including two insurance companies. On the other hand, the top Korean bank was ranked in 136th place overall in terms of strength (measured by the size of the tier 1 capital) in the Banker's list of 1000 largest banks in the same year. This bank's global ranking in terms of asset size was 186th. As a consequence of such disproportionate growth in the banking and non-bank industries, it is quite conceivable for an average industrial project to become too large compared for the bank's capital. Under such a circumstance, banks become more vulnerable to the potential business failure of a non-bank industry firm. Some authors attribute the currency crisis to this weakness in the banking system.[5]

Four, the industry-bank nexus discussed above also might have been the key factor behind giving rise to the high leverage ratio seen in the Korean corporate sector. When there is a plentiful provision of bank funds at concessionary interest rates for those setting foot into the industries targeted by governmental policies, it made sense in every way to load up on as much cheap credit as possible. This directly translates into expanding the overall size of business operations above and beyond the level that might be justified by the prevailing cost of funds in open market. Such an environment might have determined the initial condition of the corporate financial structure that has persisted ever since. The resulting pattern of corporate financing would require an on-going supply of funds with low costs to sustain. By pursuing one industrial policy after another (ex. heavy and chemical industries in the 1970s, "high-tech" industries in the 1990s), the government has continued to provide new sources of subsidy. However, the more direct forms of governmental subsidy have been gradually phased out, thus increasing financing burden on the Korean corporate sector. In some senses, the series

[5] For a comprehensive discussion of international comparisons, see Kaminsky and Reinhart (1996). For further discussion on the Korean banking sector, see Jwa and Huh (1998).

of the bankruptcies of early last year may have been taken as a strong signal that the government was ready to withdraw from the close industry-government relationship of the past. This might have set off the alarm to investors regarding the viability and sustainability of many firms, which in turn provided yet another reason to depart from the Korean equity market.

Five, we turn to labor market issues. Rapid industrialization and a broadening in the scope of economic activity led to high demand for labor which naturally resulted in a general shortage of labor. The wage level came under heavy pressures. This was particularly noticeable in the late 1980s when organized labor gained power in the wake of the Korean government's abandonment of its long-standing anti-labor union posture. This step was taken as part of comprehensive liberalization of democratic political activities. Upward wage pressures continued to increase in the early 1990s. The overall wage level rose by 12.8% on average over the 1992-96 period, while the average CPI inflation rate was 5.3%. These imply an average real wage growth rate of 7 to 8%. It is difficult to believe that there were efficiency induced productivity spurts of that magnitude per year in the same period. It turns out a rapid accumulation of capital during the same period could account for a good part of the increase in labor productivity.

In addition, the growing influence of unions added to rigid labor market practices. The number of labor strikes surged in 1987 to 3749 after averaging less than 300 until then. Increasing influence and militancy of unions made the laying off of workers more difficult. The continuing practice of life-time employment also contributed to the problem of low job mobility. These factors gave rise to high labor costs (see Table 4 for an international comparison).[6] [7]

[6]There is a strong positive correlation between the size of firms (in terms of number of workers) and the degree of union formation at work places. For example, for firms with 100 to 999 workers, the union organization rate which measures the proportion of work shops with organized unions was about 30 percent. The unionization rate jumps to 76 percent for firms with more than 15,000 workers in 1993. Unions at large firms in general tend to be more militant. One interesting explanation focuses on the

Six, there have been sporadic attempts to address the problems mentioned so far, especially since the early 1990s. Unfortunately they have all failed. Persistent high domestic factor costs started to erode the Korean export competitiveness. Some observers also point to a lack of new product lines to overcome cost disadvantages as another factor for the loss of competitiveness. One way that businesses responded to the declining competitiveness was by relocating manufacturing facilities to low wage Southeast Asian countries, as well as to China. Many firms in light manufacturing sectors reacted this way. The rapid rise in outward FDI shown in Figure 1 appears to reflect such a movement by light manufacturing firms. Increases in exports to Southeast Asian countries was another manifestation of weakening export competitiveness. For example, the proportion of exports to Asian countries to the total Korean exports rose from 10.2% in 1991 to 15.5% in 1996. While this could be interpreted as a diversification in the destinations of exports, the fact that the total exports to the US (and other advanced countries) has declined suggests a lesser favorable interpretation. The net effect was a deterioration in international competitiveness and terms of trade. Subsequently, current account deficits started to grow.[8]

Seven, more directly related to the recent crisis was the foreign exchange rate

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Korean industrial organization. As mentioned earlier, large firms faced inelastic demand in goods market due to a monopolistic or oligapolistic industrial structure. This, in turn, increases the margin for rent sharing behavior on the part of the employees. There is also some evidence suggesting a presence of a "large" firm premium. In the late 1980s, wage increases were more rapid for employees of large firms compared to wages for employees of smaller firms. (Lee and Kim, 1997, in Korean).

[7]An interesting survey was conducted by the Korea Federation of Employers in 1997 using a sample of 233 firms with over 100 employees regarding worker overhang. 37.5% of responding firms with 1000 or more workers said that they have too many workers. Respondents pointed to mid- to upper level management rank as the most saturated. About 80% of firms that responded that they have too many workers indicated that they need to reduce 5-15% of employees to achieve the appropriate level (KFE, 1997).

[8] A factor might have negatively affected profitability of businesses is high cost of transportation and distribution of goods. Surface road transportation made up some 50 to 70 percent of the total physical distribution in a typical year in the early 1990s. By some estimates, the distribution cost in Korea was about 15% of the Korean GDP in 1993 compared to 10% in the US. Basically, poor and congested road conditions due to a prolonged period of little investment in social infrastructures and increased traffic appear to have raised the distribution cost in Korea.

policy. Since the early 1990s, Korean foreign exchange authorities had pursued a strong-won policy. The two main reasons for this stance were to achieve domestic price stability and to encourage a shift in the composition of exports to more high value-added items by removing the simple price advantage due to a weak won.[9] Both goals were reasonable in that they aimed to address some of the problems explained earlier. However, with the benefit of 20-20 hindsight, the standpoint of policy makers turned out to have been too rigid. Unfortunately, market pressures for the won depreciation were partly deflected by increases in capital inflow that followed capital flow liberalization measures taken since the early 1990s. Table 5 shows our estimates of an equilibrium won/US$ exchange rate and the extent of the won over-valuation.

Another key factor that contributed to the FX policy complacency was the strengthening trend in the yen/dollar exchange rate following the 1985 Plaza Accord. After rising to 168 yen per dollar in 1986 from 239 yen per dollar in 1985, yen more or less continued to strengthen against the dollar and reached a peak of 84 in the second quarter of 1995. Such strong yen enhanced the price competitiveness of Korean exports competing against goods made in Japan. Many firms in heavy and chemical industries as well as semiconductor manufacturers enjoyed a robust export growth. Largely aided by the strong yen, Korea experienced a current account surplus for four years running starting 1986.

IV. Deeper Look: Cyclical and short-term macroeconomic and external factors

In addition to the structural issues discussed above, there was a set of medium- to short-term cyclical, policy developments building up to the recent crisis. To begin with the cyclical factors, the most recent cyclical peak in output growth was reached in late 1995. However, in some senses, the Korean economy has not really recovered from

[9] Some policy makers viewed this as a very important issue for improving Korea's competitiveness in the long term.

the extended slowdown that started in 1987. There were identifiable sources for the two subsequent upturns seen in 1989 and 1993 (Figure 2). The first one could be attributed to the stimulative government policy drive to add two million new housing units, which was a key campaign commitment.[10] For example, the construction sector's real output grew at the rate of about 15 percent for 5-year period starting in 1987. In comparison, it averaged at about 5 percent in the previous three years.

The second upturn can be explained mostly by a stalwart pickup in semiconductor exports. Aiding the 1993 upturn was Japanese yen's appreciation that lasted until 1995. Also, due to healthy economic conditions in many G-7 countries, especially in the US, demands for imports have been strong.

Since late 1995, macroeconomic conditions started to deteriorate once again due to the ever-worsening terms of trade (see Table 6). Conditions for the external sector turned unfavorable and the current account balances started to deteriorate (Figure 3). Although the situation was not as serious as in the ASEAN countries, the Chinese yuan's devaluation of 1993-94 was also a negative factor for Korea's exports. The yen started to depreciate against the US dollar in 1995, eroding the competitiveness of Korean exports. In addition, starting in 1996, the price of semiconductors that made up almost a quarter of the total Korean exports started to fall rather dramatically. For example, the price of a 16 DRAM chip fell from $50.6 in 1995 to $3 in February 1998. Also during the period leading up to 1997, imports of both consumption as well as capital goods have increased rapidly. This was a by-product of the strong-won policy which made imports inexpensive. Consequently, the current account deficit widened to 4.9% of GDP in 1996 from 1.4% in 1995.

As shown in Table 7, the pace of short-term capital inflow has noticeably

[10] Though the Korean government did not expend any of its budget on building housing units, policy measures were taken to facilitate such goals. For example, land for new construction projects was readily made available. Several medium size new satellite cities that house about half million each were constructed around the Seoul metropolitan area as a result.

quickened since 1994. After remaining below 45 percent until 1994, the proportion of short-term debts started to increase and exceeded 60 percent of the total external debts by 1997. Such a shortening of the average debt maturity made Korean economy's debt structure vulnerable to distresses associated with rapid movements of foreign capital.

In addition, Korean businesses have continued to rely heavily on debt financing. For example, the average leverage ratio for the 30 largest businesses in 1996 was 387%. Thus, the resulting heavy debt service burden has not only depressed profitability but has also exposed corporate sector to potentially serious cash flow problems. Sluggish export growth since 1995 has started to put a damper on the profitability of firms as shown in Table 8.

Indeed, starting in early 1997, there has been a string of failures of some well known businesses. The Hanbo Group topped the list with its sudden demise in January 1997, and then Sammi Steel failed in March 1997, with the Kia Group following in September 1997. These events heightened concerns about the near-term prospects for the Korean corporate sector in general.

These directly led to a rapid deterioration in the soundness of the banking industry due to the latter’s exposure to the troubled firms through lending concentration (see Jwa and Huh, 1998). According to the official statistics on the Korean banks non-performing loans, which is said to adopt more forgiving definitions, the proportion of non-performing loans to the total rose from 3.9% at the end of 1996 to 6.6% by September 1997. For the two banks that were mostly affected, the non-performing loan ratios rose from 6.7 and 9.3 at the end of 1996 to 17 and 15 percent by September 1997 respectively.

Such deteriorating conditions among the Korean banks was obviously a real cause for concern in international capital markets. One immediate effect was the cutback in credit extensions to overseas branches of Korean banks by international financial institutions. This in turn forced the Korean foreign exchange authorities to use

official foreign exchange reserves to ease financing difficulties experienced by overseas branches of Korean banks (see Table 2). Such cutbacks in credit extensions continued towards the end of 1997. This was a special factor that served to exacerbate the currency crisis towards the end of 1997.

Roughly concurrent with these domestic developments, foreign exchange market instabilities in the ASEAN countries turned into a full-blown currency crisis. Some spillover, if not a full contagion of the crises in the ASEAN countries to Korea was inevitable. Doubts about the sustainability of the exchange rate regime did indeed rise and capital outflow followed from the region. Such an environment could not have been more conducive to a reinforcing escalation of both a perceived and a real foreign exchange crisis.[11]

Pressures on the won exchange rate continued from the beginning of 1997. One clear indication of a potential misalignment was the growing gap between the on-shore market and the rate in the offshore forward market. The off-shore won/dollar exchange rate exceeded the on-shore rate at times by close to 30 percent. However, foreign exchange authorities resisted these pressures with vigor. The Korean FX authorities appeared to have successfully resisted the devaluation pressure by late spring of 1997.

Then the downward pressures intensified with the outbreak of the ASEAN crisis in July. Korean FX authorities continued to expend foreign exchange reserves to defend and/or slow depreciation of the won. Their efforts were decidedly unsuccessful and in the process, a rapid depletion of foreign exchange reserves resulted as shown in Table 2. The pace of capital outflow quickened and the downward pressures on the won became inescapable due to dwindling foreign exchange reserves. The prospect of failing to meet external obligations became real. The IMF intervention took place as this

[11] See Choi (1998) for a comprehensive overview of the external developments in the period leading up to the Korea's crisis.

realization started to spread widely.

V. Deeper Look: Quantitative Examination of the Role of Strong Exchange Rate

Here we attempt to add more quantitative content to the key issue of the strong exchange value of the Korean won overviewed in the previous section. Our approach is to estimate a time series model of nominal wage, labor productivity, and inflation in general price level using data since the 1970s as a benchmark. Once we establish the baseline model we can then examine the question of how unusual the behavior of those variables in the recent period have been. We also gauge whether or not some of the factors discussed in the previous section could account for the unusual behavior in those variables included in the model.

The baseline model consists of nominal total compensation (nominal wage), output per hour (labor productivity), and the consumer price index (inflation). The setup is motivated by a well found intuition that real wage and labor productivity should move together, that is, that they should have a cointegrating relationship over a long horizon.[12] Based on this, real wage could be separated into the two components of nominal wage and price level. Hence, they make up a three variable system of the vector error correction model. Table 5 shows the estimation results of the baseline model using data from the two sample periods of 1975Q1-1987Q4 , and 1975Q1-1996Q4.[13]

Table 5 shows that the model does much better in explaining inflation in the CPI and nominal wages than in explaining productivity. This is intuitive because one can expect a closer coherence between wages and inflation than between either one with

[12] We follow the reasoning and application of a VECM model to the U.S. data by Huh and Trehan (1996).
The data used were; total compensation (including benefits), total output divided by total hours, and the consumer price index for nominal wages, productivity, and prices, respectively. Series were logged first then adjusted by multiplying by constant numbers to scale them to be comparable to each other. Growth rates were calculated by first differencing each series.

[13] The first sample period was chosen based on the discussion given in the previous section regarding the late 1980s. Namely, there was a clearly identifiable shift in the social and political environment in Korea.

productivity. Hence, it is reasonable to expect a simple model of the three variables to exhibit the pattern of explanatory power as seen in Table 5.

It is interesting to note that the error correction term enters significantly only in the inflation equation for the first sample period then in the wage equation in the second case. Such a shift suggests that the relationship between the two variables of nominal wage and price index might have shifted since 1987. In terms of short-term dynamics, there is generally more interaction between nominal wage and the CPI inflation than between either of the two and productivity.

Our intention is to use the model as a frame of reference to learn about potential misalignments in the Korean economy in the late 1980s as well as in the 1990s. One way to capture unusual data patterns is to compare the model's forecast to actual data. For these, we use the model estimated from the 1975Q1-1996Q4 sample period to forecast one to four quarters ahead until 1996Q4. The top panel of table 6 provides the forecast accuracy statistics for the model's inflation forecast. One clear pattern that stands out is the fact that the model over-predicted the actual inflation. Since a forecast error is measured as actual minus forecast, minus signs on mean errors suggest this point. It is not surprising given the rapid rise in nominal wages in the forecast period. Also noticeable is the fact that mean errors and mean absolute errors have same magnitudes with the opposite sign. This is a clear indication the model's over-predicting bias.

One conjecture from the discussion given in the previous section is that strong won exchange rate has helped to keep inflation low despite very strong wage growth. This can be examined by gauging the impact of adding an exchange rate variable in the model. The bottom panel of table 6 compares forecast accuracy measures from the model that includes exchange rate variable. The variable used for this exercise is the difference between actual won/dollar exchange rate and a Purchasing Power Parity-based equilibrium exchange rate. Both are shown in Table 5. They are to be compared

to those shown in the top panel. The first strong contrast is that the mean errors drastically smaller in the case with exchange rate. For example, for the 6-quarter ahead forecast, the forecast error of the model with the exchange rate is about one-seventieth of that for the baseline case. Adding the exchange rate variable clearly reduces the model's tendency to over-predict actual inflation. Furthermore, all forecast accuracy measures improve substantially. That is, the robust inflation record since the late 1980s can be explained by the strong exchange rate value of the Korean won.

VI. After the Crisis: Prognosis

The IMF stepped in with a "to do" list that prescribed a tightening of domestic credit conditions as well as stringent fiscal austerity. While tight credit (monetary) policy is necessary for the exchange market stability, it is not clear if it is indeed needed beyond the immediate period following the crisis. As discussed in the previous section, the current crisis had more to do with a collapse of international lenders confidence in the Korean economy than with a balance of payment imbalance accompanied by a raging domestic aggregate demand and rise in imports. Hence, tight monetary and fiscal policy prescription might be desirable only to the extent that they help to calm the frayed nerves of foreign investors. The policy prescription by the IMF can be better understood from the perspective of a creditor who is lending a sizable part of his scarce capital to a troubled debtor: the IMF has to make sure that it can recoup the financial resources committed to Korea on an emergency basis. To do that, you start with the most conservative sets of policy prescriptions implemented successfully many times before. Perhaps the fact that this had worked in the past figured more importantly to the decision makers than the uncomfortable hunch that the Korean illness may have needed a different medicine from the one that had earlier cured aliments of various Latin American countries.

Various foreign exchange indicators suggest that a short-term external liquidity

crunch is more or less over at the moment. The won/dollar exchange rate has remained stable around 1400 won per dollar for several months (Table 5). Official foreign exchange reserves stands at $34.4 billion at the end of May (Table 2). The total external debt is still quite large but with the successful completion of the debt re-negotiation early this year, the average maturity of debt has been extended and Korean financial institutions are reporting little trouble in obtaining roll-over of their foreign borrowing. Despite the apparent stability of the FX market, the Korean economy is still not out of woods.

At present, the Korean economy is entering uncharted territory. In particular, it has to implement many reform measures that were previously unthinkable in both the corporate and banking sectors. These are challenging tasks in ordinary times. However, the severity of the problem multiplies due to the fact that these are to be carried out in the face of an unprecedented and still rising unemployment rate.

A significant contraction in domestic aggregate demand appears to be under way. The unemployment rate has risen from the 1997 fourth quarter level of 2.8% to 5.3% in March. The consensus forecast is that this will rise in the immediate future as structural adjustment of closing down some operations by banks and businesses start in earnest. In the first quarter, industrial production and shipments each fell by close to 8%. A five percent contraction in inventories in the same period suggests that the reduction in industrial production and in shipment are not temporary stock adjustments. Indicators for domestic investment this year are also plunging. The industrial production and orders for machinery fell by 10 and 51% (year-over-year) in March respectively. Both construction order and building permit issuance fell by 20% in March. Most indicators for consumption such as sales at both retail and wholesale levels, also fell by large amount in the first quarter. The current account balance exhibited a surplus of $107 billion in the first quarter. Both a moderate increase in exports (8.7%, on a year-over-year basis), and a sharp reduction in imports (-35.4%, on a year-over-year basis) have

contributed. However, continued cutbacks in imports do not bode well for a continued growth in exports. That is because raw materials for exports typically make up a good portion of imports. Thus, cutbacks in imports of raw material will lead to lower export growth down the road.

The seriousness of the current dire situation is not helped by the fact that key Korean economic policy decisions have to be decided jointly with the IMF. Beggars can not be choosers. However, a strong case can be made to the partner if Korean policy makers come to the conclusion that a different policy priority and prescriptions are needed to preserve the long-term viability of the Korean economy. Viewed from this perspective, it might be more desirable to think about how to approach the problem from the roots.

The first agenda should be lowering interest rates. In the absence of a large scale debt write-off or debt-equity swap that can drastically reduce the debt servicing burden borne by the Korean corporate sector, the current level of interest rates are not tenable. Secondly, the Korean government should be given room to use fiscal policy more flexibly. It is general practice in advanced economies to make clear distinction between cyclical and structural government deficits. For example, the Maastricht criteria for an acceptable level of budget deficit for the countries joining the EMU was delineated in terms of structural deficit. Hence, given the current dire economic conditions in Korea, now is the time to rely on deficit financed fiscal policy.

VII. After the Crisis: Policy Dilemma

The basic dilemma is as follows: On the one hand, as discussed above, the crux of the structural problems underneath the current difficulties is the fact the Korean government has played an active role in all facets of economic life, leaving various market institutions weak. The government relied for too long on its ability to direct or morally persuade banks and businesses. Hence, phasing the government out of its spot

center stage has to be the top priority consideration. For example, it was the government who made long-term foreign borrowings more difficult hence directly forcing Korean banks and businesses to rely mostly on short-term borrowing. This makes one wonder whether this kind of concentration on short-term debt might have resulted, had the government completely refrained from attempting to control the external debt maturity structure.

On the other hand, however, the current economic conditions that are already fairly appalling might deteriorate too much, leading to a general breakdown of economic and social orders. In addition, there is a need for a responsible "monitor" who can ensure the implementation of genuine reform measures to address the past neglect. The government might be the only player who could step in to moderate the speed as well as the magnitude of the economy's fall. These two considerations call for an active role to be carried out by the government. For example, the government has to decide on how to address the banking sector's bad loan problems. Without substantive resolution of the issue, putting troubled banks on the selling block will not attract any takers.

Deciding what to do and what not to do under the current circumstances is not an easy task. At the same time, making a priority agenda list is paramount. The highest priorities should be given to the following two issues: One, how to address the rising unemployment rate which, according to some forecasts, is expected to reach 10 percent or beyond later on this year. Koreans have not experienced such large scale unemployment for over three decades. The fact that a good number of the disappearing jobs will be permanently cut adds to the insecurities and uncertainties already felt by workers. Enhancing labor market flexibility has been high on the wish list of many economists who study the Korean economy. So the current round of labor market turmoil could be the catalyst for a more flexible labor market in the future. At the same, however, the severity of the unemployment problem could be so extreme that it could

swamp any other economic issues.[14]

Two, the rehabilitation of the Korean banking sector needs to be treated as an urgent policy issue. The adverse impact of financial dis-intermediation is seriously worsening the degree of contraction in economic activity lately. The problem of how to dispose of the non-performing assets on banks' book should command immediate attention of policy makers since it is a problem that is going to get worse for each day of not dealing with. Only prompt and decisive corrective actions can restore domestic as well as international investors' confidence about the viability of the Korean banking sector and the government's ability to deal with difficult issues.

VIII. Conclusion

Most macroeconomic indicators did not betray any signs that things were seriously wrong until the end of 1997. However, the situation started to deteriorate very rapidly indeed. Foreign exchange liquidity problems reached crisis proportions within several month. Among the probable causes, an element of over-reaction on the part of foreign investors definitely existed. However, regardless of such a modus operandi of foreign capital, we need to put effort into implementing any structural reforms that are beneficial to Korean economy in the long-run. The recent experience heightened awareness about the need to reform various segments of the Korean economy.

However, the cyclical and short-term economic conditions are deteriorating very rapidly. If the contraction prolongs too long, the Korean government might not be able to implement much needed reform measures due to mounting social and economic

[14] It is imperative that the government establishes a minimum social safety net for the unemployed very soon. Otherwise, the growing size of the unemployment problem as well as attendant social unrest could well derail any effort to take a long-term view and address structural problems in a systematic fashion. Two general approaches are possible. One is the government taking the leading role in addressing the problem. The other is to delay structural adjustments in various private sectors of the economy to blunt the contractionary momentum. In our view, the imputed social costs over a long horizon would be minimized if the government takes the lead and raised financial resources to provide the necessary income support to the affected workers.

disorder. Thus, from the perspective of ensuring the successful implementation of structural reforms, efforts should be made to arrest the fall of the Korean economy.

Once the current crisis passes without inflicting too severe structural damage, one beneficial legacy will be that the experience will have increased the awareness of businesses, government, the press and the general public on the need to improve efficiency in all areas. Indeed, since the implementation of the IMF regime, Korea has undergone significant institutional changes that would never have been enacted in the absence of such developments.

Table 1: Rapid deterioration in credit ratings

	Oct.23 '97	Nov. 25 '97	Dec. 11 '97	Dec. 23 '97	Feb.17 '98
Standard and Poor's	AA^-	A^-	BBB^-	B^+	BB^+

Table 2: Shortage of foreign exchange reserves (unit: billion dollar)

	Jan. '97	Sep. '97	Nov. '97	Dec. '97	Jan. '98	Mar.'98
Total reserves	31	30.4	24.4	20.4	23.5	29.7
Held at overseas branches	(3.8)	(8.0)	(16.9)	(11.3)	(11)	5.6
Usable amount	27	22.4	7.3	8.9	12.4	24.1

Table 3: Ratio of FDI flows to gross fixed capital formation in the Asian countries most affected by the financial crisis, 1990-1996
(Percentage)

Country	1990	1991	1992	1993	1994	1995	1996
Indonesia	2.8	3.6	3.9	4.3	3.8	6.7	8.5
Republic of Korea	0.8	1.0	0.6	0.5	0.6	1.1	1.3
Malaysia	16.8	23.8	26.0	22.5	15.9	12.1	13.2
Philippines	5.2	6.0	2.1	9.6	10.5	9.0	7.3
Thailand	7.1	4.9	4.8	3.6	2.3	2.8	3.2
Memorandum: South, East and South-East Asia	4.0	3.9	4.5	6.5	7.3	7.3	8.2

Table 4: International Comparison of Factor Costs (unit: %)

	U.S	Japan	Taiwan	Korea
wage(manufacturing '87-'94)	3.0	1.2	5.4	16.2
Land(factory, $/m^2, '95)	5-10	195.6	48.4	226.8
Borrowing rate of interest('95)	8.5	4.3	6.2	11.7

*Source: Federation of Korean Industries

Table 5: Real Effective Exchange Rate

	Actual rate(A)	Real effective rate	PPP-based Equilibrium rate(B)	A-B
1986.12	864.49	104.32	828.68	35.81
1987.12	794.74	104.19	762.78	31.96
1988.12	685.03	88.03	778.18	-93.15
1989.12	675.17	81.90	824.38	-149.21
1990.12	715.75	87.29	820.01	-104.26
1991.12	757.28	87.63	864.20	-106.92
1992.12	788.62	88.67	889.34	-100.72
1993.12	809.4	89.78	901.56	-92.16
1994.12	791.86	87.52	904.78	-112.92
1995.12	771.08	83.74	920.77	-149.69
1996.12	839.02	86.46	970.46	-131.44
1997.03	896.2	88.92	1007.82	-111.62
1997.06	889.49	89.62	992.47	-102.98
1997.11	1035.22	96.76	1069.84	-34.62
1997.12	1494.04	134.77	1108.56	385.48
1998.01	1707.3	149.10	1145.01	562.28
1998.03	1489.26	133.14	1118.59	370.67
1998.05	1399.05	119.30	1172.69	226.36

Notes : The real effective exchange rate index(REERI) is obtained by below formula, where *i* means *i'*th country among the Korea's major 16 trading partners, St is the foreign currency price in terms of Korean Won at period t, and Pt means the price level at t and superscript *k* means Korea's variable. The Korea's major 16 trading partners include Australia, Canada, Taiwan, France, Germany, Hong kong, Indonesia, Italy, Japan, Malaysia, Netherlands, Singapore, Thailand, United States, United Kingdom, China.

$REEI = \Sigma[\{(Sit/Si0)\times(Pit/Pi0)\}/(Pkt/Pk0)]\times 100$

Source: KERI

Table 6: Terms of Trade

	unit value of export	unit value of import	terms of trade
'95	100.0	100.0	100.0
'96	86.6	98.8	87.7
'97 1/4	77.8	98.6	78.9
2/4	76.3	93.5	81.6
3/4	75.1	97.1	77.3
4/4	69.0	96.7	71.3
'97	74.5	96.5	77.2

* base year 1995=100.0

* Source: BOK and KERI

Table 7: Details of Korea's total external liabilities (unit: billion dollar)

	End of 1996	End of Nov.'97	End of Dec.'97	End of Apr.'98
Long-term debts	57.5	72.9	86.0	113.3
Short-term debts	100.0	88.9	68.4	41.9
Total	157.5	161.8	154.4	155.2

Notes: The difference between the total debts between the IMF standard and World Bank standard is $33.6 billion in Dec., 1997. The IMF standards includes the offshore financing of the head office($17.8 bil.) and overseas branches($15.8 bil.) of domestic financial institutions, which has been employed in overseas limitedly. Source: MOFE

Table 8: Listed Firms' Profits in 1st half of recent years(unit: billion won, %)

	1995	1996	1997
Sales(Y-over-Y change)	25.46	18.60	14.22
Net Profit(Y-over-Y change)	42.05	-40.22	-28.45

Table 9 : Vector Error Correction Model of Nominal wage, Consumer price index, and Output per hour

	(Sample 1975:1 – 1987:4)			(Sample 1975:1 – 1996:4)		
Variables	**ΔCPH**	**ΔPDF**	**ΔOPH**	**ΔCPH**	**ΔPDF**	**ΔOPH**
Constant	0.04	**0.028**	**0.03**	**0.07**	-0.00	0.01
	(1.55)	**(1.96)**	**(2.34)**	**(4.92)**	(-0.09)	(1.70)
ΔCPH t-1	**-0.71***	**-0.49**	-0.12	**-0.40**	0.66	0.13
	(-2.19)	**(-2.62)**	(-0.79)	**(-3.06)**	(0.85)	(1.96)
ΔCPH t-2	-0.03	-0.28	0.04	-0.10	0.15	**0.14**
	(-0.10)	(-1.42)	(0.25)	(-0.67)	(1.59)	**(1.86)**
ΔCPH t-3	**0.48**	-0.26	0.11	0.14	0.06	0.11
	(1.70)	(-1.65)	(0.84)	(0.97)	(0.65)	(1.48)
ΔCPH t-4	0.11	0.08	0.05	0.13	0.12	0.09
	(0.50)	(0.66)	(0.50)	(1.07)	(1.60)	(1.38)
ΔPDF t-1	**-0.45**	-0.00	-0.06	-0.15	0.15	0.02
	(-1.71)	(-0.05)	(-0.54)	(-0.79)	(1.31)	(0.20)
ΔPDF t-2	**0.52**	0.21	0.08	**0.51**	**0.39**	0.09
	(1.97)	(1.38)	(0.64)	**(2.64)**	**(3.32)**	(0.95)
ΔPDF t-3	-0.00	**0.32**	0.08	-0.11	0.20	0.05
	(-0.00)	**(2.12)**	(0.64)	(-0.55)	(1.73)	(0.47)
ΔPDF t-4	0.16	0.18	0.03	0.20	-0.08	-0.05
	(0.61)	(1.19)	(0.25)	(1.14)	(-0.72)	(-0.51)
ΔOPH t-1	0.22	**0.61**	**-0.48**	-0.34	0.03	**-0.51**
	(0.47)	**(2.22)**	**(-2.13)**	(-1.15)	(0.17)	**(-3.43)**
ΔOPH t-2	0.11	0.38	-0.24	**-0.55**	-0.05	-0.25
	(0.20)	(1.23)	(-0.96)	**(-1.70)**	(-0.26)	(-1.58)
ΔOPH t-3	-0.05	0.21	-0.23	**-0.59**	-0.12	-0.22
	(-0.11)	(0.73)	(-1.00)	**(-1.87)**	(-0.63)	(-1.44)
ΔOPH t-4	-0.34	0.11	**0.02**	**-0.79**	-0.02	-0.10
	(-0.85)	(0.47)	**(2.34)**	**(-2.87)**	(-0.12)	(-0.77)
EC(-1)	0.18	**0.41**	0.15	**-0.09**	-0.02	-0.01
	(0.95)	**(3.59)**	(1.63)	**(-3.74)**	(-1.06)	(-0.56)
R^2/adj.R^2	0.44	0.73	0.39	0.42	0.59	0.22
	(0.22)	(0.63)	(0.15)	/0.31	/0.52	/0.07
S.E.E	0.05	0.03	0.02	0.04	0.03	0.02

ΔCPH : Growth rate in Compensation for an hour

ΔPDF : Growth rate in Consumer price index

ΔOPH : Growth rate in Output per hour

EC(-1) : Error Correction Term

- EC(1975:4 1987:4) = CPH – 0.380449PDF – 1.239144OPH + 0.003717

- EC(1975:1 1996:4) = CPH + 1.312306PDF – 5.030434OPH – 0.731934

* Numbers in parentheses are t-statistics. Significant cases(5% or less) are marked by bold prints.

Table 10 : Forecast Accuracy Statistics
for One to Six Quarter Ahead Inflation (1988Q1 – 1996Q4)

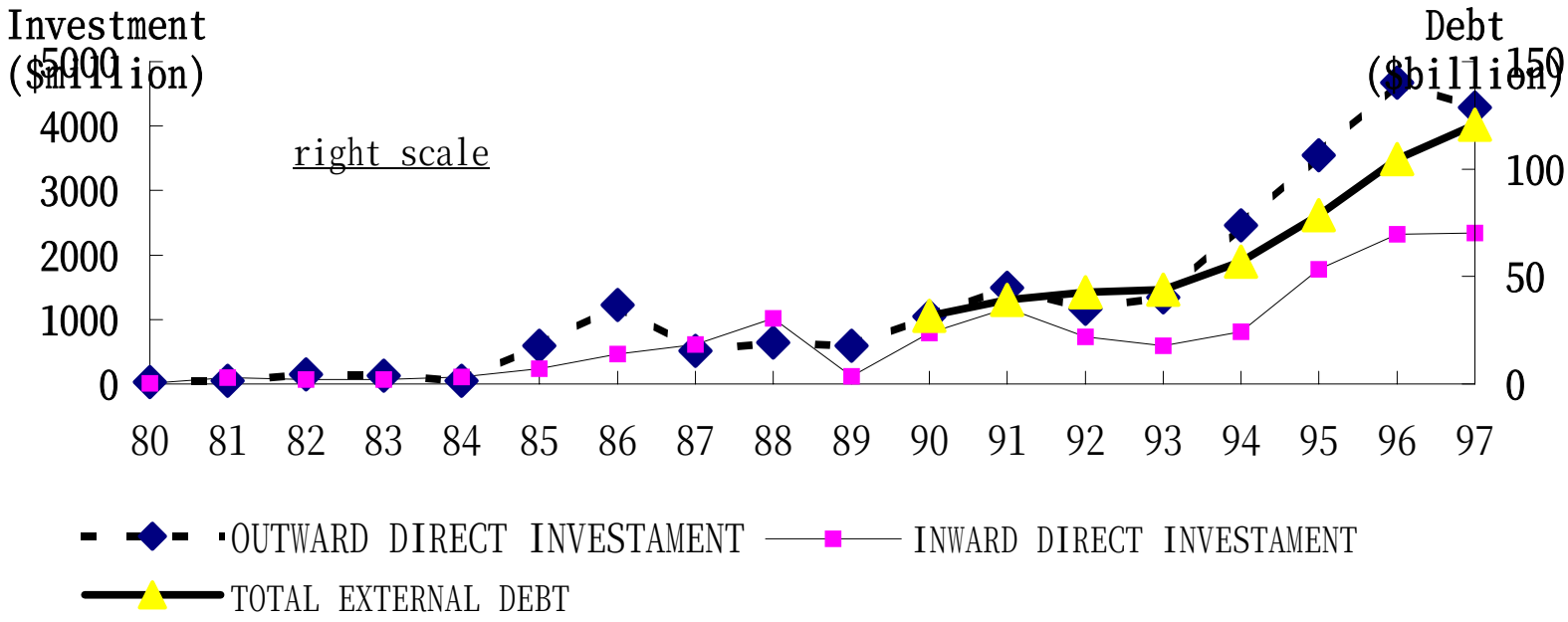
Base Line Model

	Mean errors	Mean absolute errors	Root mean square	Number of observations
1 quarter ahead	-0.075	0.077	0.089	36
2 quarter ahead	-0.078	0.081	0.914	35
3 quarter ahead	-0.108	0.110	0.124	34
4 quarter ahead	-0.115	0.115	0.128	33
6 quarter ahead	-0.147	0.147	0.162	31

Model with Exchange Rate Variable

	Mean errors	Mean absolute errors	Root mean square	Number of observations
1 quarter ahead	-0.038	0.055	0.066	36
2 quarter ahead	-0.020	0.051	0.059	35
3 quarter ahead	-0.028	0.059	0.068	34
4 quarter ahead	-0.009	0.062	0.070	33
6 quarter ahead	0.002	0.063	0.072	31

figure 1. OUTWARD DIRECT INVESTMENT(left scale),INWARD DIRECT INVESTMENT(left scale), TOTAL EXTERNAL DEBT(right scale)



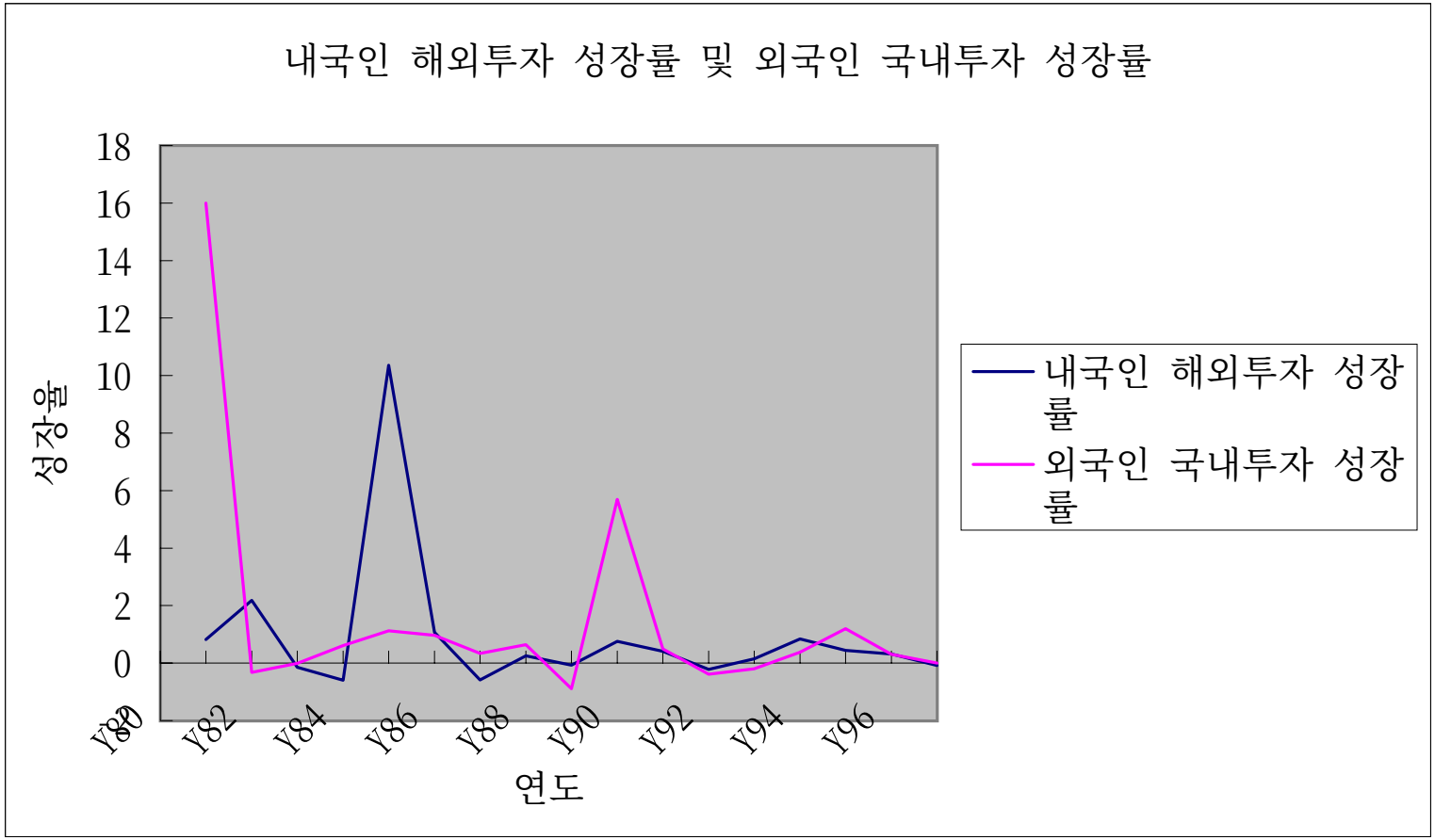
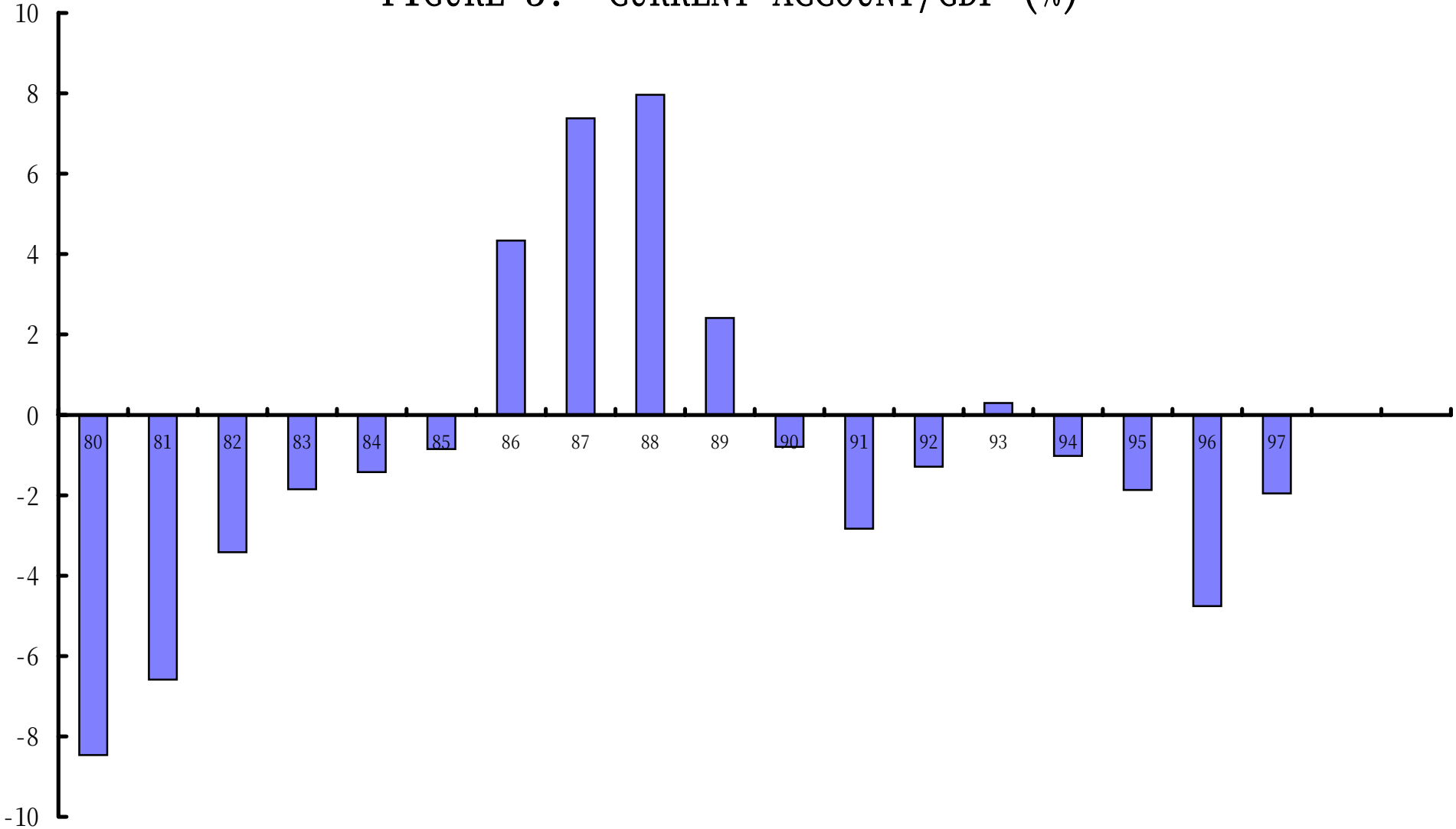

내국인 해외투자 성장률 및 외국인 국내투자 성장률
18
16
14
12
10
8
6
4
2
0
성장율
Y80
Y82
Y84
Y86
Y88
Y90
Y92
Y94
Y96
연도
내국인 해외투자 성장률
외국인 국내투자 성장률

FIGURE 3: CURRENT ACCOUNT/GDP (%)



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