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1. Introduction

Ten years after recovering from a devastating financial crisis, Korea has once again been engulfed in another crippling economic downturn and financial turmoil. This time Korea is not the epicenter of the crisis, but it has not been spared from the collateral damage inflicted by the global economic crisis that was touched off by the US sub-prime crisis in August 2007, and which has since degenerated into the deepest recession since the 1929 depression. As the latest IMF WEO Update (July 2009C) concludes, "Even with determined policy actions, … global activity is now projected to decline 1.3 percent in 2009. This would represent by far the deepest post–World War II recession. Even once the crisis is over, there will be a difficult transition period, with output growth appreciably below rates seen in the recent past" Most of East Asia's export oriented economies including Korea have been hardly immune to the crisis. However, it appears the crisis is over in these economies. Two years after the crisis broke out, according to a popular journal like *The Economist* (April 15th-21st), East Asia's emerging economies have engineered an astounding rebound from the crisis, and now are leading the way out of recession for the global economy.

Before the eruption of the sub-prime crisis, it looked as though Korea was set for robust growth in a stable environment as it was leaving behind a period of a real estate bubble. In two consecutive years before slipping into recession in 2008, Korea had grown more than five percent per year. The current account was in surplus. The won was gaining ground on the dollar and the yen. By the end of 2007, Korea had accumulated more than $260 billion in foreign exchange reserves. Time and again, Korea was told its reserve holdings were excessive. And then suddenly it looked as though the roof was falling down. In 2008, Korea lost almost $60 billion in foreign exchange reserves as it had to rescue banks experiencing shortages of dollar liquidity s. After the collapse of Lehman Brothers, which set off the onslaught of the global financial crisis, Korean banks also endured a severe dollar liquidity crunch

beginning in the fourth quarter of 2008 as they were unable to rollover their short-term foreign currency loans.[2] For almost six months, borrowings from the global overnight interbank market were the only option other than the central bank window for short-term dollar liquidity before the current account began improving in the early months of 2009, thereby easing the dollar liquidity crunch.

In retrospect, up until the third quarter of 2008, Korea had been holding up relatively well in a rapidly deteriorating global economic environment, as the IMF-WEO predicted in its November update (IMF 2008) that it would grow 2 percent in 2009. Less than three months later, however, the IMF revised its forecast for Korea downward to a contraction of GDP by 4 percent in 2009, which would be the worst performance expected among Asian economies. This gloomy forecast had provoked a spate of journal articles that placed Korea at the top of the list of the countries facing serious systemic risk among emerging economies (*The Economist* February 20- 26, 2009). The Economist.com/Country Briefings, an affiliate of *The Economist* magazine, predicted in its April forecast that the Korean economy would shrink more than 10 percent in 2009. There were many reasons to be bleak about the future prospects of the Korean economy.

Since early April, however, there has been a rather sudden change in the outlook for the Korean economy as seen by foreign media and investors. The April 2009 WEO (IMF 2009C) was more pessimistic about the prospect of an early recovery of the global economy.[3] But it did not change its January forecast for Korea in 2009, which indicated that the current recession was not getting worse, allaying the pessimistic expectations that had gripped the country in early 2009. In the first quarter of 2009 positive growth returned. The economy grew a little over 0.1 percent compared to the previous quarter; in the second quarter the economy did

[2] Unless specified otherwise ‘ banks ‘is used as a generic term that includes commercial banks(both domestic and foreign), specialized banks, savings banks, and foreign bank branches.

[3] The WEO shows that recessions such as the ongoing one associated with financial crises tend to be severe. Recoveries from such recessions are typically slow. If such recessions are globally synchronized then they tend to last even longer and be followed by recoveries that are even weaker(IMF 2009A).

much better than expected by growing 2.6 percent, quarter on quarter.

There is now a general consensus that, defying all previous forecasts, the economy will record positive growth in 2009. Adding to the upbeat assessment, the current account balance has posted a positive figure, the stock market has managed a sustained rally and the exchange rate has gained vis-à-vis major currencies. This optimistic outlook was further bolstered by the OECD composite leading indicators (June 8 2009) which showed that among its members the sharpest upturn during the first quarter of 2009 took place in Korea.[4] These recent positive developments appear to have led foreign investors and media to believe that the Korean economy has taken a turn for the better.

The purpose of this paper is to analyze the impact of the crisis on the Korean economy and the manner in which Korean policy authorities have managed the financial crisis and economic downturn. It has two parts. Part One is devoted to the management of the crisis and Part Two offers an analysis of the lessons Korea has learned from the crisis.

Sections 2 through 3 analyze the evolution, causes and consequences, along with the strategy for the resolution of the crisis. Some of the internal and external developments precipitated by the global economic crisis that may shed light on the economic plight Korea has endured are described in Section 2. It also delves into the structural fragilities of the Korean economy that have been exposed by the crisis to assess their importance as causes of the liquidity crisis Korea succumbed to during the fourth quarter of 2008. It will be argued that the main cause of liquidity shortages was the market's overreaction to deterioration in some financial market indicators. This is followed in Section 3 by an examination of the effectiveness of the several strategies Korea deployed to resolve the liquidity crisis and economic slump. Part Two, which includes Sections 4 through 6, sets out lessons to be drawn from the global financial meltdown that may help identify the areas where further reforms are

[4] See OECD (2009A).

needed to prevent future crises in emerging economies like Korea. One of the major messages of Part Two is that emerging economies like Korea are largely helpless to prevent on their own a financial crisis triggered by panic and herd stampedes by global financial market participants. Financial stability for emerging countries would call for the provision of liquidity services from a global lender of last resort. Such an institution is not likely to come into existence anytime soon. Herein lies the dilemma for emerging economies. Concluding remarks are set out in a final section.

Part One: How Korea Has Managed the Crisis?

2. Causes and Consequences of the Liquidity Crisis

What were the financial market indicators whose deterioration frightened foreign investors and lenders so much to hurry them to the exit? In this section it is argued that Korea fell victim to a speculative attack on its currency as a result of panic and herding on the part of international financial market participants, one that was presumably exacerbated by structural frailties of the financial system. A disconcerting question is then how the market participants came to make an assessment as pessimistic as they did on Korea's ability to overcome what was basically a short-run problem stemming from US dollar liquidity shortages and why panicked toward the latter part of 2008 only to change their judgment a few months later? At the beginning of the crisis, there must have been structural vulnerabilities of the economy foreign lenders and investors saw serious enough to pose systemic risk to the economy in general and the financial system in particular. In subsequent periods, there must also have been market developments that have caused them to change their erstwhile views on the future prospects of the Korean economy for the better.

It is always dangerous to read too much into changes in economic indicators. In retrospect one could brush aside the liquidity crunch as having been a

crisis episode without long lasting adverse effects. The stock market rally that began in the second quarter of 2009 could easily fizzle out. The current account surplus could also disappear as the local currency appreciates and the fiscal stimulus kicks in. A reversal of capital flows could recur if economic recovery falters in advanced countries. When they see these adverse developments again, what will these unpredictable foreign market participants do? Since they are likely to become nervous again, it is important to identify some of the structural weaknesses unique to Korea that unsettled these market participants so much in the first place.

2.1 Structural Weaknesses of the Non-financial Sector

On the real side of the economy, the culprit for the recession and financial market instability has been vanishing export markets. When the global economy is mired in crisis, a country like Korea, which still heavily depends on the export markets of the US and China, is likely to suffer more as global trade shrinks. But the export loss has not been confined to Korea and hence could not have been a major cause of the crisis. More serious causes are found elsewhere in the structural weaknesses of the Korean economy. One such weakness is the widespread perception that Korea is bound to see its potential growth falling off and at the same time to lose its global export market share as its major exporters have been increasingly losing out in the competition with producers from both China and Japan. On the one hand they have been pursued and in many cases overtaken by their competitors from China in low and medium technology export products, while they have been finding it difficult to move up the ladder of technology to catch up with their counterparts in Japan (Kim and Lee 2006).

Another is the concentration of exports in a limited number of manufactures and producers. In 2007, 57 percent of total exports were shipped out by four industries- automobiles, ship building, electronics, and chemicals. Over the past decade, top ten export products comprised more than 65 percent of Korea's total exports as shown in Table 1. The ten largest industrial categories made up 80 percent

of Korea's total exports in 2007. A set back in export earnings would then undermine financial health of these groups that constitute the backbone of the Korean economy. The global demand for manufactures is more income elastic than other categories of exportables and hence more sensitive to cyclical fluctuations of the global economy. As shown by Blanchard (2009), compared to countries with a diversified mix of export products, those with a heavy concentration in a limited number of manufactured export goods, which are highly cyclical, have been hit harder by the current crisis. It should be noted, however, the heavy concentration has an advantage too: once a full recovery begins output growth will accelerate.

Table 1.Exports by Principal Commodity

(In Billions US dollars)

	2007	
	Amount	Ratio
Total	3,714.90	100.0
Semi-conductors	390.5	10.5
Wireless telephone equipment	291.9	7.9
Displays	167.2	4.5
Computers	137.9	3.7
Cars	497.1	13.4
Chemicals	368.2	9.9
Iron n & steel products	315.9	8.5
Machinery	287	7.7
Shipbuilding	268.6	7.2
Petroleum, petroleum products	242.1	6.5

Source: ECOS, Bank of Korea

A third weakness was a rather wide spread perception that Korea may have become complacent in continuing the reform of its financial and corporate sectors initiated after the 1997 crisis. Since the restructured financial and corporate sectors had not been subject to any market test, there was no way of knowing whether they had become more resilient to global downturns. In the eyes of foreign investors, there was no clear evidence that economic liberalization and market opening had improved

and expanded Korea's institutional capacity to ward off external disruptions such as the US sub-prime crisis. There was no visible evidence that Korea's policymakers were committed to restructuring the economy to move resources to the non-tradable sector for more balanced growth. In the meantime the decline of the potential rate of growth together with chronic labor union militancy, domestic demand stagnation, a bout with a credit card crisis in 2003 and the real estate bubble in 2005-06 may all have left many foreign investors with the assessment that Korea was vulnerable to a global economic crisis, no matter how unfounded it was.

A fourth weakness in our economy is high dependency on import, as well as the dependency on export. During the 1st half of 2008, Korean economy faced with supply shock generated by weak dollar and the hike in international oil price. And thanks to its excessive dependency on export, Korea confronted with demand shock caused by worldwide economic recession since the second half of 2008; That is, its too much dependency on import and export acted as weaknesses externally for Korean economy.

2.2 Deterioration in Financial Indicators

On the basis of an overall risk ranking of emerging economies constructed in terms of the four indicators- a current account deficit or surplus as percent of GDP, the volume of short-term external debt as percent of foreign exchange reserves and banks' loan deposit ratio- a report by HSBC for instance placed Korea as the third most vulnerable country to a currency crisis among emerging economies (The Economist February 15- 21 2009). While there are questions as to whether these indicators are reliable measures of the degree of systemic risk, compared to other emerging economies in East Asia, there was little doubt that they had deteriorated much more in Korea than elsewhere in East Asia to place it in a crisis zone by the end of September 2008.

- Rise in foreign short-term debt

At the end of 2008 Korea's short-term foreign liabilities as a proportion of foreign exchange reserve rose to 97 percent, close to overstepping the G-G-S rule for reserve adequacy (100 percent). They climbed up to 55 percent from 53 percent a year earlier as a proportion of total foreign debt. Korea also became a debtor country for the first time since recovering from the 1997 financial crisis (Table 2). Rumors were also going the rounds that the bulk of Korea's foreign exchange reserves were invested in illiquid assets such US agency bonds and not usable. At the same time the loan- deposit ratio at banking institutions had risen steadily since 2001 to exceed 125 percent by the time the crisis erupted (Figure 1) as they had increasingly relied on both domestic and foreign wholesale funding. Put together, these changes indicated a sharp deterioration in maturity mismatches in the foreign assets and liabilities of bank balance sheets-borrowing short from international financial markets and lending long to domestic borrowers- at banks, making them vulnerable to the drying up of US dollar liquidity.

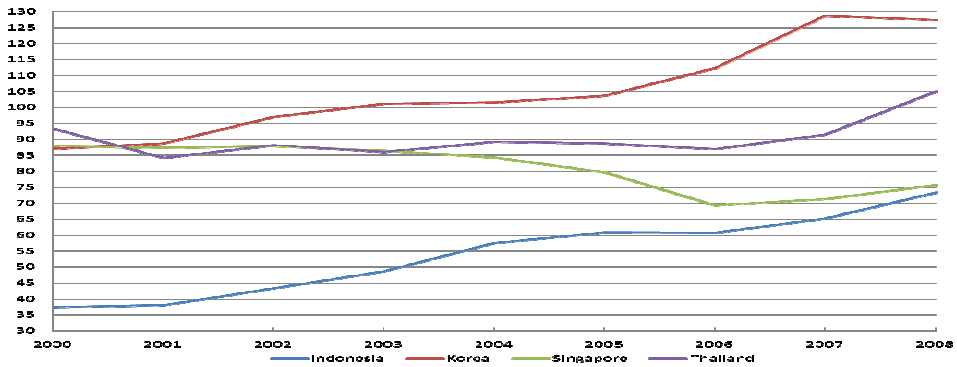
Table 2.External Assets and Liabilities of Korea

(unit:100 million US dollars)

	Gross External Debt Position				External Assets			Foreign Exchange Reserves
	Gross External Debt	Short-term	Long-term	**Short-term loans***	External Assets	Short-term	Long-term	
	A=B+C	B	C	D	E=F+G	F	G	H
2002.12	1,415	482	933	673	1,843	1,614	228	1,214
2003.12	1,574	508	1,066	713	2,301	2,007	294	1,554
2004.12	1,723	563	1,159	769	2,889	2,496	393	1,991
2005.12	1,879	659	1,220	864	3,171	2,620	550	2,104
2006.12	2,601	1,137	1,463	1,341	3,809	2,971	838	2,390
2007.12	3,832	1,602	2,229	2,040	4,206	3,331	875	2,622
2008. 3	4,158	1,760	2,398	2,215	4,282	3,390	892	2,642
2008. 6	4,217	1,762	2,455	2,264	4,239	3,364	876	2,581
2008. 9	**4,255**	**1,896**	**2,359**	**2,328**	**4,016**	**3,199**	**816**	**2,397**
2008.12	3,811	1,511	2,300	1,940	3,484	2,796	688	2,012
2009. 3	3,693	1,481	2,212	1,858	3,455	2,788	666	2,063
2009. 6e	**3,801**	**1,482**	**2,319**	**1,876**	**3,694**			**2,317**

* long-term debt maturing within one year
Source: Bank of Korea

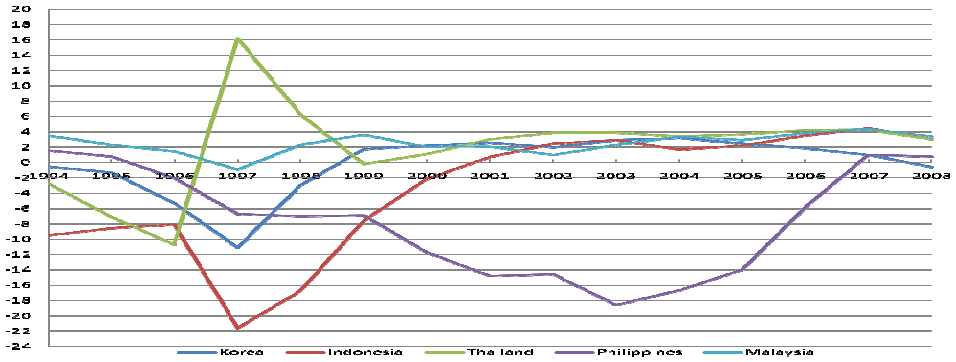
Figure 1.Loan-Deposit Ratios of Selected East Asian Economies



Source: Korea Center for International Finance

More worrisome was the fact that the increase in the maturity mismatch was also accompanied by a rise in the currency mismatch (Figure 2). Korea was the only country where the AECM became negative again in 2008. Under normal circumstances, these were problems that could have been ignored, but the period under review was far from being normal when the bankruptcy of Lehman Brothers ushered in a highly uncertain and volatile period in global finance. In deleveraging and fleeing to quality, foreign investors scrutinized the risk profiles of their holdings of emerging market assets, and in the process a few large global players apparently concluded Korea stood out as a riskier place than other East Asian emerging economies to invest and other smaller players simply joined their herd.

Figure 2.Currency Mismatches (AECM)



Source: Goldstein and Turner (2004 and 2008)

Furthermore Korea has structural mismatch problem: foreign assets are concentrated in the monetary authority and foreign debts in the banking sector. This problem pose risks of generating social costs owing to the gaps between the costs of financing foreign capital and management profits, and asymmetrical change of the liquidity between foreign asset and external debt in a eruption of economic shock.

Table 3.External Assets and Debt in Korea (period-end, USD bil)

	2005	2006	2007	2008	2009.Q2
Ext. Debt	**187.9**	**260.1**	**383.2**	**381.1**	**380.1**
(short-term)	(65.9)	(113.7)	(160.2)	(151.1)	(147.3)
Banks	83.4	136.5	192.9	171.7	168.0
(short-term)	(51.3)	(96.1)	(134.0)	(113.0)	(106.1)
Ext. Assets	**317.1**	**380.9**	**420.6**	**348.4**	**372.6**
(short-term)	(262.0)	(297.1)	(333.1)	(279.6)	(303.6)
Banks	53.0	63.2	76.4	83.0	76.5
(short-term)	(39.0)	(39.9)	(45.5)	(52.4)	(45.4)

Comparing the domestic banks with foreign branches, the domestic banks imposed with the regulation on foreign currency liquidity, are aligned with the movement whereas the foreign branches without the regulation show great currency mismatches. In terms of external currency mismatch with an exception of foreign currency transaction between local residents, both the domestic banks and foreign branches, and for the foreign branches, their maturity mismatches have been aggravated since 2006.

Table 4.Banks′ Net External Assets in Korea

	1997	2000	2003	2006	2008	2009.3
External Assets (net)	224.6 (100.0)	-13.0	-23.7	-73.4	-88.7	-84.7 (100.0)
Domestic Banks	-7.3 (29.9)	-4.5	-9.5	-28.8	-27.9	-26.7 (31.6)

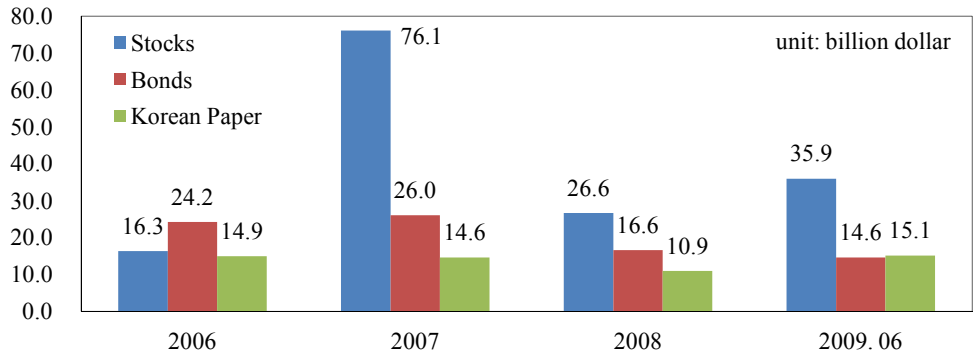
(short-term)	12.7 (-51.6)	6.7	3.9	-12.3	-0.4	0.9 (-1.1)
Foreign Branches	-17.2 (70.1)	-8.6	-14.2	-44.6	-60.8	-57.9 (68.4)
(short-term)	-15.9 (64.7)	-8.5	-12.2	-43.9	-60.2	-57.5 (67.9)

Having experienced the dire consequences of a large currency mismatch in the 1997 financial crisis, one would expect that the Korean authorities would have built a regulatory system tight enough to prevent its recurrence. As shown in Section 9 they had indeed built one, but it did not work. The ineffectiveness of regulation was also compounded by the pitfalls of undisciplined capital account liberalization. At the end of 2005, the banking sector held $83,429 million in foreign currency liabilities, or 44 percent of Korea's total foreign debt. Two years later the amount had more than doubled to $194,045 million or 50 percent of the total foreign debt. Non-bank financial institutions and private and public enterprises were equally active in borrowing from abroad. Their external debt jumped from $88,920 million at the end of 2005 to $134,808 million two years later. What caused such a spurt of external borrowing? There were two developments that precipitated the increase: one was related to capital account liberalization and the other to poor risk management at banks.

The Korean won, which had started strengthening against the dollar in late 2005, continued to appreciate, falling below 920 won per dollar toward the end of 2006. Throughout 2007 and during the first two months of 2008 it remained around 930 won per dollar on average. During this period the won's appreciation in real effective terms was equally large as prices remained relatively stable. Concerned about the loss of export competiveness and the rising costs of sterilization, Korea's policymakers took steps to liberalize capital account transactions to induce capital outflows. The deregulation of capital outflows touched off massive outflows in the form of portfolio investments in foreign securities of emerging as well as developed economies by Korean institutional and private investors. In 2005, Korea's total

portfolio investments abroad had amounted to US$16.7 billion. These investments almost doubled in value to US$31.3 billion in 2006 and soared again to US$56.4 billion in the following year. As a result of these increases, the market value of stocks, bonds, and Korean paper (CB, DR, BW and CD) denominated in foreign currencies held by Korean institutional investors (banks, insurance companies, asset management companies, and securities firms) more than doubled to $116.6 billion between year-end -2006 and year-end-2007 (See Figure 3).

Figure 3.Korean Portfolio Investments in Foreign Securities



Source: Bank of Korea

In 2007, banks also invested $60 billion in buying long term forward dollar contracts issued by ship-builders. Since it takes a long period to construct ships, a typical ship-building order designates payment, mostly in US dollars, at a future date, often more than a year later. In order to avoid the exchange rate risk, the ship-builders usually take a short position in the forward market. Banks take a long position as the counterparts in the forward market. The banks are not strictly required to, but do customarily maintain a square position in their holdings of foreign currency assets and liabilities to avoid foreign exchange rate risks.[5] This means that they have to borrow the same amount of US dollars at the same maturity so as to square their foreign currency position.

[5] This arrangement could trigger a liquidity crunch if some of the ship-building orders are not fulfilled because the ship-buyers are unable to pay as discussed below.

As a result of these two developments-large increases in portfolio investment in foreign securities and banks' holdings of ship-builders' forward contracts- the demand for US dollars and other foreign currencies grew rapidly at a time when the domestic supply was shrinking. The current account surplus plunged to $5.4 billion in 2006, which was about one third of the level of 2005. The surplus was equally small in the following year. In the meantime Korea's policy authorities continued sterilization operations. By the end of 2007 sterilization had added more than $50 billion to the central bank reserves from about $210 billion two years before to stem appreciation of the won. This caused a further squeeze on the availability of US dollar liquidity in the local foreign exchange market, which if other things were equal, would have weakened the currency. But others things were not equal. Much of the excess demand for US dollars was met by capital inflows as banks and other financial institutions went on to finance a large share of their portfolio investment abroad by external borrowings.

The total amount of external funds raised by banks by borrowings from foreign banks and issuing securities ran to $76 billion at the end of 2006. In the following year, it expanded by 37 percent to $104 billion and by another 28 percent in 2007. Banks and other financial institutions borrowed so much that despite a substantial increase in capital outflows the financial account registered a surplus of $6.2 billion in 2007. The bulk of foreign borrowing was secured from the short end of international financial markets, because this was less costly. The total volume of short-term foreign liabilities had steadily risen to reach the level of foreign exchange reserves by October 2008. Korea did not go over the Greenspan-Guidotti-Fischer (GGF) prescription for reserve holdings, but the increase was perceived to be too large to preserve the soundness of banks and other financial institutions and hence to keep speculators at bay when both the current and financial accounts were expected to run deficits in the second half of 2008. The ballooning short-term foreign liabilities were also bound to exacerbate balance sheet mismatches at financial institutions, rendering Korea susceptible to a foreign currency liquidity crunch. For three

consecutive years, a little over 60 percent of foreign currency assets held by banks consisted of foreign currency loans to domestic borrowers. These loans were instrumental in causing a large increase in currency and maturity mismatches as the banks relied heavily on external wholesale funding, while domestic borrowers were not prepared to pay off their debts as they were accustomed to rolling them over repeatedly. The mismatches were at the root of liquidity shortages that threatened their safety and soundness in the 1997 crisis. These mismatches cropped up again in the 2008-09 crisis despite the fact that Korea's regulatory authorities had been on a close watch for and introduced precautionary measures to mitigate the spread of the two mismatches. As discussed in Section 9 it appears regulatory enforcement did little in the way of putting banks on their guard against the potential risks associated with the mismatches.

The risks associated with the ballooning of short-term foreign liabilities were further compounded by heavy losses sustained by Korean investors who bought large amounts of foreign securities when the global financial system melted down. In 2008, more than 50 percent of their investments totaling $116.6 at the end of 2007 evaporated due mostly to the collapse of the financial markets they had entered. Most striking was the loss incurred by private investors in their foreign stock investments. At the end of 2006 their holdings of foreign stocks were valued at $14.9 billion. A year later the market value of these holdings had jumped to $73.3 billion, almost five times the amount of the previous year. In 2008 the crisis struck and they lost more than two-thirds of their stock investments. Worse yet more than 80 percent of these investments were hedged against currency risk. Since they had bet against depreciation of the won, most private investors ran up large foreign exchange losses when the won weakened as much as it did.

Under normal circumstances, these book losses would not have provoked a liquidity crunch as short-term foreign loans are likely to be renewed continuously. But once the crisis erupted, they could not be readily rolled over. When they could not, it was obvious that some of these assets would have to be sold at heavily

discounted prices. This prospect of capital losses implied a large potential increase in Korea's foreign debt burden and a drain on foreign exchange reserves. Many ship-buyers did not help improve the prospects as they could not honor their forward contracts. As a result, on the delivery date, ship-building companies were forced to purchase US dollars in the spot market to clear the position. This added demand for US dollars together with the capital losses and the emergence of balance sheet mismatches enlarged the scale of the external borrowing requirement when foreign investors were leaving the Korean market. Unable to secure short- or long-term loans, Korea was thrown into a deeper liquidity crisis.

- Deterioration in the Soundness of the Banking Sector.

The increase in the maturity and currency mismatches was compounded by a large drop in bank profits in 2008. The poor earnings performance was brought on by a substantial increase in non-performing loans and the funding cost at commercial banks. Before the onset of the crisis, banks had directed an increasing share of their loanable resources to households and small and medium sized firms and away from large ones, in particular those affiliated with the chaebol, which were sitting on large amounts of cash reserves. The total volume of household loans extended by banks and all other financial institutions rose to about 73 percent of GDP at the end of 2008 compared to about 40 percent in 1997 when the Asian crisis broke out. Much of the increase in the household debt went for the financing of housing during the 2005-06 bubble period. As the recession gathered force, it softened up housing prices and sent many consumer loans into arrears. The share of substandard loans (delinquent for more than three months) in total loans rose to 0.6 at the end of 2008 and then to 0.73 three –month later from 0.55 a year earlier. During the same period, the total amount of loans granted to small and medium-sized firms also climbed up to 32.5 percent from 29.2 percent of GDP. With an increasing number of these firms going under, a growing share of the loans to them became also non-performing. At the end of 2007, the share of substandard loans in total commercial bank lending was 0.7. A year later this ratio had more than doubled. The share of non-performing loans was not so

alarming when compared to the surge in the non-performing loan ratio to 13 percent at the end of September 1999, but it appears that foreign investors took it a sign of a serious deterioration in bank profits and soundness.

Ever since financial market deregulation was set in motion after the 1997-98 crisis, an increasing number of deposit customers had migrated to the short-term money market in search for high yields. This shift has led banks to rely more on high cost wholesale funding through the issuance of such instruments as CDs and financial debentures. The expansion in wholesale funding resulted in a rise in the loan-deposit ratio and a decline in the net interest rate margin to below 2 percent in 2007 and 2008, which in turn cut into bank profits. After tax bank profits in 2008 were less than half of what they were in 2007. In 2008, the return on assets sank to 0.54 from 1.08 percent in the preceding year and the return on equity to 9 from 16.2 percent. The rise in the loan-deposit ratio also led to a larger share of interest rate-sensitive short term liabilities, thereby exposing banks to a greater risk of maturity mismatch in local currency.[6]

Shortages of domestic currency liquidity could be relieved by injecting more money into the economy and by restructuring and recapitalizing the banks. Even the foreign currency liquidity crunch could have been avoided if capital account liberalization had been carried out in a more incremental manner and the crunch would not have triggered a crisis if Korea had held sufficiently large foreign exchange reserves. Although Korea abided by the GGF rule, this in itself was not enough to convince foreign investors that Korea had built up sufficient insurance to safeguard it from a crisis if foreign investors and lenders panicked as discussed in Section 8.

[6] Recognizing the need to improve the capital base of the banks, the government created a Bank Capital Expansion Fund with an initial subscription of 20 trillion won with the purpose of buying preferred stocks, redeemable preferred stocks, and hybrid bonds issued by banks for the build-up of their tier 1 capital. But banks' fear that credit rating agencies may view applications for recapitalization as ' an admission of poor management and lower their ratings. This together with the concern about losing management control has meant that few banks have so far shown interest in borrowing from the fund.

3. Korea's Policy Response to Economic Downturn and Liquidity Crisis: August 2007-June 2009

Over the two-year period since its outbreak in August 2007, the US sub-prime crisis has dealt a severe blow to Korea: it has led to a sharp contraction of the economy and set off a liquidity crisis. In 2008, the economy grew 2.2 percent, less than half the annual average since the 1997 crisis. A 2009 IMF forecast (2009D) sees a contraction of the economy by about 2 percent, although the crisis had bottomed out by the end of the second quarter of the year. During the six-month period beginning in October of 2008, Korea suffered US dollar liquidity shortages, which at one point set off a run on central bank foreign exchange reserves. In retrospect there is little doubt that the crisis was mostly panic driven. It is not clear whether Korea's policy makers diagnosed the overreaction on the part of international financial market participants as the main cause of the crisis, and acted accordingly to deal with it, but they set out to thwart a liquidity crunch spiraling into a currency crisis by restoring the confidence of the global financial community in the Korean economy.

Since April 2009, there have been signs indicating a sharp rebound of the economy. There is now an emerging consensus that Korea is likely to recover from the current global crisis well ahead of many other developed and emerging economies. For example, a recent OECD Economic Outlook (2009) forecasts that Korea will be the fastest growing economy among its members in 2010. The present section delineates macroeconomic developments that began from an economic downturn early in 2008, which was in turn exacerbated by a liquidity crunch, and ended with a return to financial stability in the second quarter of 2009. It focuses on the causes and consequences of the liquidity crisis and the manner in which Korean policy authorities responded to it during this period.

3.1 Onset of Recession and Liquidity Crisis

After growing more than 5 percent for two successive years and turning in

an equally strong performance in the first quarter of 2008, the Korean economy began to show signs of cooling off. In the second quarter GDP growth fell to 3 percent year on year, after which it , it continued to decelerate. While the economy was slowing down, the soaring prices of oil and other raw materials in early 2008 further the current account worsened, sending it into deficit in December 2007, while driving up the rate of CPI inflation well above the target range. In September consumer price inflation began to subside and around the same time the economic slump resulted in the slashing of imports to produce a surplus that reduced the current account deficit to $7 billion for 2008 as a whole.

In the first nine months of that year, consumption and investment demand showed little sign of recovery, but exports continued to grow at a brisk pace, soaring 23.1 percent and 27.0 percent in the second and third quarters respectively, up from 17.4 percent in the first quarter year on year. In October, however, the global recession started making inroads into Korea's export performance. Exports fell off by 19 percent in November and by a further 18 percent in December compared to the same months of 2007. By then it was becoming evident that weak domestic demand and the drop in exports would combine to throw the Korean economy into a deeper than expected recession. Not surprisingly in the final quarter economic growth turned negative: GDP shrank by 5.1 percent quarter on quarter.

In retrospect, the global financial crisis did not reach Korea until the last quarter of 2008; much of the growth slowdown during the first three quarters was therefore brought about by weak domestic demand. As was argued in Section 4 the tight stance of monetary and fiscal policy amid suppression of domestic demand dictated by rapidly rising prices is likely to have deepened the economic downturn. For the year as a whole, private consumption grew less than one percent – a sharp decline from a 5 percent increase in 2007 – and total investment fell by 1.7 percent. The contraction of consumption and investment was offset by increases in export earnings (in local currency terms) of 12.5 percent and in government spending of 4 percent to attain 2.2 percent GDP growth. Investment demand, which collapsed

during the 1997 Asian crisis, has not since responded to various incentive schemes and low market interest rates and continues to remain a major cause of the barriers to the restoration of the economic dynamism of the pre-1997 crisis period.

3.2 Eruption and Resolution of a Liquidity Crisis: October 2008-March 2009

In its April 2009 WEO, the IMF presented the results of a financial stress test for emerging economies that revealed a rapid and strong contagion of the financial crisis in advanced economies to the emerging economies. In line with this pattern, the financial meltdown in advanced economies in the third quarter of 2008 had a major effect on emerging economies and the financial stress on all emerging region was on average exceeded the levels seen during the Asian crisis. At the beginning of the US sub-prime crisis it was widely believed that Korea was well braced for deflecting or adjusting to the crisis without incurring much damage. After all it had built up a cushion of foreign exchange reserves exceeding $260 billion at the end of 2007, which was seen as excessive by many, on top of having succeeded in strengthening its economic fundamentals through an extensive economic reform since the 1997-98 financial crisis. It was also expected that the flexible exchange rate system would provide a first line of defense. Yet, unlike other emerging economies in the region Korea could not steer clear of a wrenching US dollar liquidity crunch, which provoked a series of speculative attacks on its currency for a six-month period beginning in October 2008. In retrospect, as noted in Section 2, it is obvious that Korea was hit harder than other economies in the region as it was the only country unable to ward off a run on the central bank foreign exchange reserves without securing additional foreign currency liquidity from the central banks of the US, China, and Japan.

The liquidity crisis was sparked off by a combination of factors including panic and herding among international financial market participants, which in turn

appears to have been exacerbated by some of the structural weaknesses of the financial sector in addition to the reemergence of the current account deficit in the first half of 2008. In the nine months to September 2008, most monetary and financial market indicators showed that there was an adequate amount of market liquidity: credit market conditions were relatively loose despite a tighter stance of monetary policy. Market interest rates as measured by the yields on corporate and government bonds remained stable, although after the Bank of Korea began lowering its policy rate in October a perverse development took place in which the interest rate on corporate bonds inched up almost 100 basis points while that on government bonds fell back. There was little change in the growth rates of all monetary aggregates including M2, Lf, and L. There is no evidence of a significant increase in pro-cyclicality in bank lending throughout 2008.

Since Korean financial institutions did not hold sizable amounts of US toxic assets, the outbreak of the US sub-prime crisis itself did not impinge on their soundness or disrupt the Korean, stock market. Instead the deficit on the balance of payments in the first half of 2008 together with the deterioration in the economic outlook, as exemplified by the piling up of inventories and a large drop in the manufacturing capacity utilization ratio, appears to have triggered a deep plunge in stock prices and their greatly heightened volatility and a sharp depreciation of the exchange rate. After breaking through the 2,000 level in December 2007, stock prices measured by the KOSPI began a sharp slide, falling below the 1,000 mark by November 2008. The plunge reflected one of the worst performances among East Asia's stock markets.

The nominal exchange rate, which had remained below 1,000 won per US dollar during the first quarter of 2008, began a sharp rise in April to reach a peak of 1,509 won per US dollar on November 24. Among East Asian currencies, the Korean won lost most in exchange value vis-a-vis the US dollar in 2008. As will be discussed in Section 7 changes in the won-dollar exchange rates have been closely linked with changes in stock prices. The high degree of volatility of stock prices has therefore

meant equally high instability of the foreign exchange rate in Korea. Although there is no universally accepted definition of a currency crisis, depreciation of a currency by more than 50 percent over a six-month period (July-November) and almost 18 percent over a month period in October 2008 (before Korea secured a swap line amounting to $30 billion from the US Fed on October 30) would certainly place the country of the currency in the crisis category.

During the crisis period, the foreign exchange market was marked by a high degree of instability. The won- US dollar market in Korea is small in size and shallow as the number of market participants is limited. On average the volume of daily foreign exchange trading has been less than 6.5 percent of GDP. The small size and lack of liquidity left the market exposed to a series of external shocks after the collapse of Lehman Brothers, resulting in volatile swings in the exchange rate.

As the US sub-prime crisis spread to other parts of the world, foreign investors and lenders began retreating from East Asia to deleverage and increase the share of safe assets in their portfolios. Compared to the rebalancing of their portfolios elsewhere in Asia, foreign investors divested themselves of relatively more of their holdings of Korean financial assets, because they were led to believe that deterioration in certain financial market indicators made Korea highly vulnerable to a financial crisis. Since Korea's financial markets were relatively larger and more liquid than those of other East Asia's emerging economies it was also easier for them to pull out of Korea. The share of foreign investors in stock market capitalization was close to 45 percent at the end of 2007. A year later it had fallen to below 25 percent.

Foreign banks were also been more averse to rolling over their short-term loans to Korean financial institutions than before until they saw an improvement in the current account and a better growth outlook in the early months of 2009. After the collapse of Lehman Brothers in September 2009, Korean banks became increasingly hard-pressed in rolling over their short-term foreign currency liabilities. At the lowest point in November, the renewal rate fell to below 40 percent (Table 5). This

difficulty caused large capital outflows and a huge liquidity drain at these institutions. During 2008, the financial account recorded a deficit of $ 46.1 billion in addition to a current account deficit of $7 billion, leading to an almost 20 percent loss of foreign exchange reserves. Not surprisingly this dollar liquidity shortage had reduced the availability of foreign currency (mostly US dollar) loans and trade credits before it eased in the early months of 2009. For an export oriented economy this credit squeeze was much more painful than for other less export dependent economies. With the worsening of the liquidity crisis, both the sovereign spread and CDS premium began a steep rise. At the height of the crisis, on October 27, the spread jumped to 751 and the CDS premium to 700 basis points. It was therefore not surprising that foreign investors' confidence in the Korean economy plummeted.

To respond to the unstable financial market and sharp economic downturn, the BOK and the Korean government adopted diverse policy instruments in addition to traditional monetary easing. These policy instruments mainly included measures to facilitate fund flows to the financial markets, to stimulate bank lending, and to stabilize the FX market.

Table5. Rate of Renewal of Foreign Loans at Banks

(unit: 100 million $)

		2007	2008					2009	
				1/4	2/4	3/4	4/4	1/4	2/4
Short-term	Total borrowing	764.6	795.8	208.6	270.6	237.7	86.3	110.0	111.3
	Due for repayment	739.8	957.9	210.3	270.8	250.9	235.9	108.9	89.7
	Rollover rate (%)	103.4	83.1	99.2	99.9	94.7	36.6	101.0	124.1
Long-term	Total borrowing	162.6	134.5	28.6	75	23.8	7.2	49.4	76.6
	Due for repayment	72.5	131.5	18.5	38.6	34.8	39.6	29.3	21.1
	Rollover rate	224.3	102.3	154.6	194.3	68.4	18.2	168.6	361.3
Total	Total borrowing	927.2	930.3	237.2	345.6	261.5	39.5	159.4	187.9
	Due for repayment	812.3	1089.5	228.9	309.5	285.8	275.6	138.3	110.9
	Rollover rate	114.1	85.4	103.6	111.7	91.5	33.9	115.3	169.4

Source: Bank of Korea

Part Two: What Lessens Has Korea Learned from the Global Economic Crisis?

4. Financial Market Opening and Macroeconomic Policy Conundrum

Although the end of the global crisis has yet to be seen on the horizon, Korea and other Asian emerging market economies have already learned several lessons from the turmoil. One such lesson that has been drawn is that emerging market economies whose financial markets are open and fully or partially integrated into the global financial system are likely to lose some of their independence in managing macroeconomic policy, more so in a crisis situation, even when their exchange rates are freely floating. This conclusion runs counter to what the theory would predict in an inflation targeting framework with a deregulated capital account and free floating. In such a regime, foreign exchange rate flexibility is expected to insulate the economy from much of the impact of external shocks on domestic financial markets and thus to enhance the effectiveness of national monetary policy. In this section it will be shown that in a world of globalized finance where stock markets of the US and emerging economies with deregulated capital account transactions move together and foreign equity investments dominate capital flows as in Korea free floating cannot effectively insulate emerging economies from external market developments, thereby weakening the effectiveness of monetary policy. This conclusion follows largely because foreign equity investors are not as much concerned about currency risk as bond investors are. To elaborate on this policy conundrum, this section examines the causes and consequences of the co-movement of stock markets of the US and Korea as a case study.

In this analysis, cross-border investments in bonds between the two countries are ignored for two reasons: (i) restrictions on foreign holdings of Korean bonds and domestic residents' investments on foreign bonds and (ii) the relatively small size of foreign holdings of Korean government and corporate bonds

denominated in won compared to those of Korean equities. These two features suggest that the impact of changes in the US interest rate on Korea's bond markets would be relatively small. This appears to be the case in most other emerging economies of East Asia. At the end of 2007 foreign investors held 4.6 percent of the face value of public and corporate bonds or 3,517.4 billion won (9.2 percent of government bonds outstanding) in comparison to their holdings of domestic equities, which amounted to 308,416 billion won or 32.4 percent of Korea's stock market capitalization (excluding KOSDAQ). This was almost nine times the holdings of their bond investments. A year later the share of foreign stock holdings went down to 27 percent and that of bonds to 4.3.

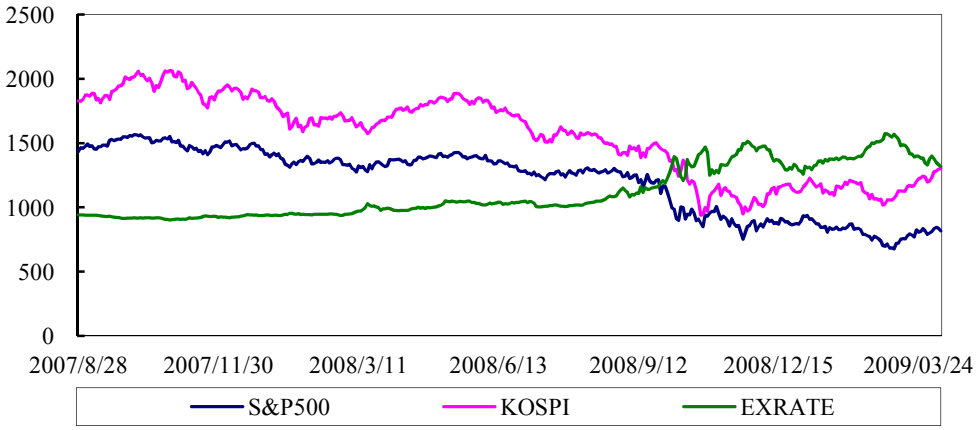
Registration requirements, withholding tax, and paucity of investment grade corporate bonds are the main reasons that have limited foreign entry into Korean bond markets to make cross-border transactions in bonds less responsive to interest rate differentials between Korea and the US than otherwise.[7] In contrast, the stock market is wide open to foreign investors and had grown rapidly until 2007 before the onset of the global economic crisis when its market capitalization reached 35 percent of GDP (including Kosdaq). It has provided an important channel through which foreign capital has flown in and out of Korean financial markets.

Trading in Korean stocks has also been sensitive to changes in stock market developments in the US. In fact, there has been a remarkable increase in the positive correlation between changes in S&P500 and the Kospi and a substantial increase in the negative correlation between changes in the Kospi and the won-US dollar exchange rate since the outbreak of the US sub-prime crisis in August 2007 (see Figure 14-A). Correlations are less tight, but also positive and high before the crisis (see Figure 14-B). That is, whenever S&P500 falls, so does the Kospi because

[7] Only a small number of Korean firms have been able to obtain an investment grade rating from international rating agencies. This paucity of investment grade corporate bonds is one reason why foreign investors have preferred government bonds.. During 2008 there was a large shift to bonds: foreign investors reduced their equity investment to $173,938 million while increasing their bond portfolio to $144,702 million, suggesting that their deleveraging took the form of liquidation of stocks rather than bonds.

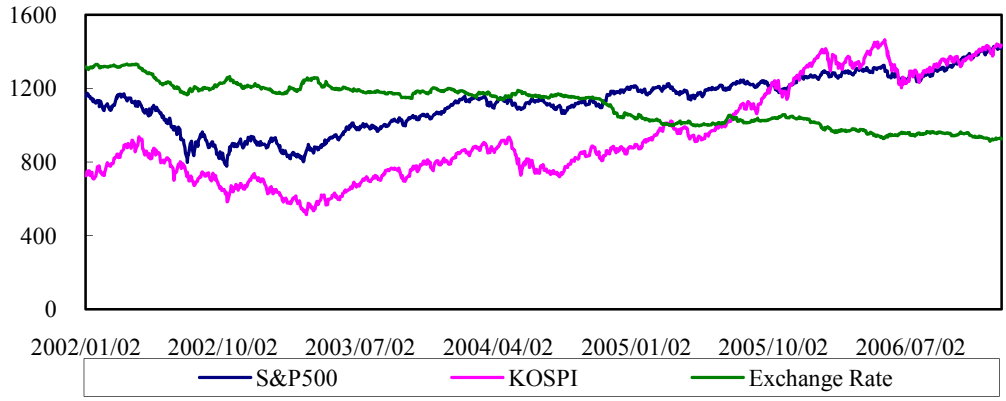
foreign investors withdraw their investments from the Korean stock market and many local investors blindly follow suit independently of changes in stock market conditions or the economic fundamentals of the Korean economy.

Figure 4A.Correlation Coefficients between S&P500 and KOSPI and between KOSPI and the exchange rate (After the Crisis)



Dependent Variable	Independent Variable	Coef.	Std.Err	T-value
Exchange Rate	KOSPI	-0.750	0.011	-65.00
	Constant	5.427	0.036	147.67
R-squared = 0.916				

Figure 4 B.Correlation Coefficients between S&P500 and KOSPI and between KOSPI and the Exchange Rate (Before the Crisis)



Dependent Variable	Independent Variable	Coef.	Std.Err	T-value
KOSPI	S&P 500	1.802	0.023	76
	Constant	-5.834	0.166	-35.06
R-squared = 0.8276				

It has been well known that stock prices of advanced economies move together largely because their stock markets are highly integrated.[8] Similar developments have been observed between advanced and emerging economies as their financial markets become integrated.[9] In Korea, there has been growing integration of the stock market with the US market with the speeding up of capital account liberalization since the 1997 financial crisis. But market integration has been partial and asymmetric in that foreign investors are relatively free in moving in and out of the Korea's stock market whereas domestic residents are restricted in investing in US stocks. This one way integration implies that in the short-run, the co-movements are asymmetrical: changes in US stock returns affect Korean stock returns, but not vice versa. According to Lee (2002) the stock returns co-movements between the US and Korea first appeared in the mid-1990s and started to increase after the 1997 Asian financial crisis. Over the medium-turn, the co-movements expanded and rose to levels similar to those between the US and Japan or the US and UK. As possible causes of the co-movements, Lee (2002) emphasizes the effects of contagion and the investment strategy of global investors that keeps each country's weight in their equity portfolio at a fixed level.

When foreign investors liquidate their Korean equity investments in response to a fall in S&P500, this causes depreciation of the won-US dollar exchange

[8] Shiller(1989) show that between the US and other countries, stock price variables move together a lot more than do the economic fundamentals.

[9] Johnson and Soenen (2003), using daily returns from 1988 through 1999 for Argentina, Brazil, Chile, Mexico, and Canada, and from 1993 to 1999 for Colombia, Peru and Venezuela, find a high degree of stock market co-movements between the eight equity markets of the Americas and the stock market in the US. The high degree of synchronization is ascribable to the high weight of trade with the United States for these economies. On the other hand, an increase in bilateral exchange rate volatility and a higher ratio of stock market capitalization relative to that of the United States contribute to lowering the co-movement.

rate in Korea.[10] But a free floating regime does not provide a buffer by way of currency depreciation that can allow domestic equity prices to move independently of stock price changes in the US. This is because, as argued below, stock investors are by and large insensitive to changes in the foreign exchange rate and hence do not often hedge against the currency risk.

In order to examine the effects of changes in US stock prices, consider the Fed's tightening of monetary policy, which would *ceteris paribus* be expected to increase market interest rates and dampen stock prices in the US. In general it is not clear whether or not the higher interest rate will the boost the expected rate of return on US equities. If expected prices of equities remain unchanged, the return on stocks will increase. On the other hand, if they are adjusted downward, then the expected rate of return will decline. In the former case, the higher US interest rate would, other things being equal, induce foreign investors to sell off Korean equities to adjust their portfolios to increase the share of US stocks and Korean investors also liquidate their holdings. These changes depress Korean stock prices and cause capital outflows from Korea and a depreciation of the won. In the latter case, the adjustment process will be reversed: a higher interest rate lowers the stock return in the U, and raise Korean stock prices to result in an appreciation of the won. In general a higher interest rate may or may not increase the return on stocks in the US, largely because future changes in stock prices are rather unpredictable. Given this uncertainty one would expect the effects of an increase in the prices of US stocks on the foreign exchange and stock markets of Korea to be ambiguous. In contrast to this theoretical prediction, in reality, stock prices of both the US and Korea have moved together closely.[11]

Hau and Rey (2006) develop a model where exchange rates and capital flows

[10] Market interest rates are likely to decline, but again data do not necessarily support this conclusion in part because the foreign investors' demand for Korean bonds does not respond to changes in the S&P as much is that for equities does. For instance, in 2008, foreign investors went on to add to their holdings of Korean bonds, while dumping Korean stocks. This portfolio substitution was in part responsible for lower yields on government bonds in 2008.

[11] If the increase is perceived to be a temporary spurt in the short run, it will have a limited effect on the bond markets

are determined jointly under the assumptions of incomplete hedging of foreign exchange risk and a low price elasticity of the foreign exchange supply. In this model, differences between buy and sell orders in the foreign exchange market, which are derived from optimizing international investment behavior, determine the equilibrium exchange rate. It is shown that only a small proportion of foreign equity investments of institutional investors is hedged against foreign exchange rate risk owing to transaction and agency costs. As a result, foreign equity investors are exposed to both foreign equity return and currency return risks. The two types of risk imply that the benefits from international diversification come at the cost of bearing foreign exchange rate risk.

In the Hau-Rey model foreign equity investors rebalance their stock portfolios in response to changes in the two types of risk they are exposed to. When their foreign equity investments outperform relative to their domestic equity investments, they are exposed to a larger expected loss arising from depreciation of foreign currencies in terms of which their equity investments are denominated as the market value of their foreign equity holdings rises. In order to minimize this potential currency loss they then repatriate some of their foreign equity investments, thereby causing depreciation of the foreign currency in question. Thus the model provides a theory explaining the co-movement of stock prices of Korea and the US and the negative correlation between the stock return and foreign exchange rate return in Korea. However the model leaves out the behavior of domestic investors in response to the withdrawal of foreign investors and information flows between domestic and the foreign stock markets where they invest. For example, domestic investors could buy those stocks foreign investors divest if they are optimistic about the future prospects of the economy. This then may not lower domestic stock prices or weaken the currency. This result could be more pronounced in countries where financial market opening has been asymmetrical as it has been the case in Korea. There are several other issues that are not fully taken into consideration. Global investors are not likely to consider stocks of emerging market as good substitutes

for those of advanced countries when they rebalance their foreign stock portfolios. If they do not, then the Hau and Rey model may not explain the observed correlations among stock prices of Korea and the US, and the won-US dollar exchange rate.

The high correlations involving S&P500, the Kospi, and the dollar-won exchange rate could pose a dilemma to Korea's policy makers. To see this, consider a fall in the Kospi as a result of a decline in S&P500, which is in turn caused by the Fed's tighter stance of monetary policy. There are three possible policy options they could entertain. One option is to do nothing if the fall off is likely to be a short-run development and is not likely to exert any adverse effects on the real economy, that is, if it does not set off changes in aggregate demand or supply. On the other hand, if the decline in the Kospi is persistent and signals a weakening of domestic demand, Korea's policy authorities could elect to lower interest rates as a second option to prevent economic slowdown. However, the expansionary policy may not succeed in stimulating domestic demand if households and firms hold a firm expectation that Korea's business cycle developments are closely tied to those of the US and hence do not respond to the policy change. Korea will find it difficult to have an interest policy different from that of the US.

If the decline in the KOSPI brings down the exchange-value of the won vis-à-vis the dollar independently of changes in the real economy, there is a third policy option the policy authorities could consider: they may raise domestic interest rates if they are concerned about the possibility that the currency depreciation builds up inflationary pressure and even provokes a destabilizing expectation of further depreciation. But in so far as the US stock market continues to remain weak, so will the Korean market. In this case, the higher interest rate may not stem capital outflows and hence may not strengthen the currency, although it poses unnecessarily the risk of weakening domestic demand. In fact whichever option the policy authorities may choose, it may not be effective unless it can change the expectation of the general public that Korea's stock market will be bearish as long as the US stock market does

not rebound.

The co-movement of stock prices between the US and Korea also have a serious implication for the conduct of macroeconomic policy in managing the current crisis in Korea. Stock price movements are closely watched as they are, rightly or wrongly, perceived to reflect the future prospects of the Korean economy. Likewise, the co-movements of S&P 500 and the Kospi reflect the expectations of the general public that unless the stock market of the US begins a rally as a result of the recovery of its economy, the stock market of Korea will not be able to bounce back on its own. This means that households and firms believe that recovery of the Korean economy is predicated on that of the US economy. Under these circumstances, expansionary macroeconomic policy will not be as effective as it could be unless it can break up the expectations. Changing the expectations would require a much larger dosage of macroeconomic stimulus than would be needed under normal circumstances to convince both households and firms that such a policy stance would stimulate domestic demand enough to compensate for the loss of exports associated with the slump in the US and to pull the economy out of recession. Otherwise there will be a limit to which Korean policy authorities are able to prevent a further slide of the economy as long as the US economy cannot break out of the slump.

5. Maturity and Currency Mismatches: Can they be moderated?

During the 1997 Asian crisis, currency mismatches between foreign currency assets and liabilities on bank balance sheets were among the top of the list of financial vulnerabilities of Asian banks that exacerbated, if not triggered, the financial meltdown. A number of studies argue that currency mismatches were found to have played a central role in the 1997-98 Asian financial crisis (Chang and Velasco, 2000; Corsetti, Pesenti and Roubini, 1999; Rodrik and Velasco, 1999). Goldstein and Turner (2004) argue that all prominent financial crises in emerging economies in the 1990s and early 2000 share one striking characteristic: a large currency mismatch. Most of these studies find the causes of the currency mismatch in

market failures stemming from asymmetric information and moral hazard. In the current episode of crisis, it appears currency mismatches have been moderate compared to the massive deterioration in the run-up to the 1997-98 crisis, although the same cannot be said about maturity mismatches.

The current financial crisis has brought up maturity mismatching as a major cause of crisis not only in emerging but also advanced economies. Brunnermeiers et al. (2009) point out that one of the most critical lessons of the current crisis is that the maturity mismatch - short-term funding of long-term assets with potentially low market liquidity - has been the main source of financial instability. As shown below, in emerging economies with foreign currency liabilities, maturity mismatches create a more serious systemic risk as they are invariably accompanied by currency mismatches.

5.1 Causes of the Two Mismatches

All banks, whether they are operating from advanced or emerging economies, are essentially engaged in a debt-maturity transformation function. Banks earn a substantial share of their profits by engaging in maturity transformation in which they borrow from the short end of the financial market as in the case of issuing CDs and lend long as in the case of extending loans to households for the financing of housing and to business firms for the financing of long-term investment in addition to short-term working capital.[12] That is, banks borrow short and lend long: the maturity mismatch is ingrained in bank asset and liability management. "This maturity mismatch reflects the underlying structure of the economy in which individuals have a preference for liquidity but the most profitable investment opportunities take a long time to pay off. Banks are an efficient way of bridging the gap between the maturity structure embedded in the technology and liquidity preference (Allen and Gale 2007, pp.59)."

[12] Brunnermeier et al. (2009) argue that there are many caveats to this generalization and that the mismatch is a matter of degree. The incentive for committing maturity mismatch is most pronounced when the yield curve is upward sloping in a boom.

From the perspective of an individual bank, it would be reasonable to assume that under normal circumstances, it would have access to wholesale funding markets. In fact most banks would make the same assumption because they would suffer a competitive disadvantage otherwise. The mismatch also displays procyclicality as banks have incentives to rely more on short-term money market financing when the yield curve is upward sloping in a boom and less in a downturn. In emerging economies, despite the regulation to prevent it, there has been an increase in maturity mismatching as a result of financial market deregulation and opening which has led to creation and rapid growth of a large variety of short-term money market instruments. Attracted by their relatively high yields, bank depositors have moved out of banks in increasing numbers and into money markets, thereby eroding the deposit base and forcing banks to rely more on both domestic and international wholesale funding markets

When there occurs a sudden increase in the demand for domestic currency liquidity, banks will find it difficult to secure wholesale market funding and will be forced to liquidate their assets or recall loans. As will be shown in the following section, there are few takers for those assets banks are trying to unload at a time of crisis. Refusing to roll over short- as well as long-term loans runs the risk of losing their loan customers with high credit ratings. If the asset liquidation incurs heavy losses or is not enough to ease the liquidity crunch, the central bank can step in to supply domestic currency liquidity to avert a liquidity crisis. In contrast, when foreign currency liquidity dries up, banks will run into the same difficulty in selling off foreign assets or recalling foreign currency loans to their local customers. But unlike in the case of domestic currency liquidity shortages, the central bank can meet only a limited amount of the increase in the demand for foreign currency liquidity. In this case, banks run up both maturity and currency mismatches at the same time. Some of the individual banks may be able to avoid a liquidity crisis, but the financial system as a whole cannot when it is faced with a sharp decrease in capital outflows.

In the aftermath of the 1997-98 crisis, Korea has made concerted efforts to

improve the efficiency and stability of its financial system. Banks and other non-bank financial institutions strengthened their risk management capacity, improved governance, and fortified themselves with more equity capital than is needed to meet the BIS capital adequacy requirements. On the macroeconomic policy front, it embraced greater flexibility in managing the exchange rate system. To complement these reform measures it also amassed large amounts of foreign exchange reserves for self-protection against future crises. Yet Korea was by no means immune to a similar liquidity risk when foreign lenders and investors liquidated their investments in financial assets or refused to renew their loans to Korean banks as they became more pessimistic about future prospects of these economies. The two mismatches brought about a US dollar liquidity squeeze even on sound banks, threatened the insolvency of the banking system as a whole, and thereby set off a run on central bank reserves and a currency crisis.

Figure 2 presents aggregate effective currency mismatches (AECM) of East Asia's emerging economies estimated by Goldstein and Turner (2004).[13] Recent figures are provided by Phillip Turner at the BIS. The estimates show that Indonesia, Korea, the Philippines, and Thailand had all blundered in letting the currency mismatch rise beyond a safe level in the run-up to the 1997-98 crisis. Since then the AECM has gradually declined while remaining in positive territory in most countries. Korea has been an exception: its AECM has risen since 2005, turning into a negative figure in 2008 due to a sharp decline in net foreign assets. Reflecting the ongoing liquidity crisis, there was deterioration in currency mismatches in all sample ASEAN countries in 2008.

As Goldstein and Turner admit, the AECM is an approximate measure. It does not fully reflect the actual scope of a liquidity crisis largely because it does not

[13] They define an aggregate effective currency mismatch (AECM) as follows:
AECM = NFCA/XGS (FC/TD), where
NFCA = Net foreign currency asset (+) or liabilities (-),
XGS = Exports of goods and services (national income account),when NFCA is negative
MGS =Imports of goods and services (national income account), when NFCA is positive
FC/TD = Foreign currency share of total debt

take into account differences in the maturity of foreign assets and liabilities. Even when the AECM is positive, a country can experience a foreign currency liquidity crisis if it is exposed to a large maturity mismatch between foreign currency assets and liabilities. To make it more practical, therefore the AECM needs to be adjusted for maturity mismatch. Unfortunately many of the micro-banking data needed for the construction of a more reliable mismatch measure are not readily available. In their absence, this section examines changes in the loan-deposit ratio and short-term foreign liabilities relative to foreign exchange reserves to qualify rather than quantify the extent of maturity mismatch. In general, a rise in the loan-deposit ratio indicates that banks rely more on both domestic and foreign wholesale market funding than on core deposits. An increase in short-term foreign liabilities relative to foreign exchange reserves is also the result of an increase in banks' external funding from the short end of global financial markets.

As can be seen from Figure 2, loan-deposit ratios have been stable and remained well below 100 percent in most countries, suggesting that, as a whole East Asian banks have had a sufficient deposit base to meet the local loan demand. Exceptions are Korea and Thailand where the ratios shot up to 135 and 105 percent in 2008, respectively. And Indonesia saw a large hike in 2008 to 73 from 65 percent in the preceding year. On the external liability side, short-term foreign indebtedness as a proportion of foreign exchange reserves of those East Asian countries where data are available has been well below the level prescribed by the Greenspan-Guidotti-Fischer (GGF) rule, which is the holding of an amount of reserves equal to the country's short-term foreign currency liabilities (see Table 6) The definition of short-term foreign liabilities varies from data source to source. In Table 6 short-term foreign liabilities do not include those long-term loans maturing within a year. The ratios have risen substantially in Indonesia, Korea, and Singapore but have remained below 100 percent.

Table 6.Short-term External Liabilities as Percentage of Foreign Exchange Reserves*

(unit: %)

	Korea	Indonesia	Thailand	Singapore
2005	31	85	31	142
2006	48	77	27	162
2007	61	41	25	170
2008	75	73	22	183

Source: Bloomberg and Fitch

*Do not include long-term loans maturing within a year

A recent Citibank study uses a reserve recovery ratio to measure foreign exchange reserve adequacy, which is defined as the ratio of reserves to the sum of short-term foreign debts by remaining maturity and expected current account surplus or deficit for the next 12 months. Estimates of these ratios for a number of East Asian countries show that at the end of 2008 Korea had barely enough reserves ,with a ratio of 1.1 for 2009 whereas other countries had an ample cushion of reserves with ratios ranging from 1.6 for Indonesia to 5.4 in Thailand (Huang 2009). These ratios, when combined with changes in the AECM, allow a tentative assessment that except for Korea, Indonesia, and possibly Singapore, most countries have remained outside the danger zone of a currency crisis so far. But the current liquidity crunch has been rather persistent and could spiral into a major financial crisis depending on the effectiveness of international efforts to stimulate the global economy. In this regard, it is worth noting a recent BIS report (2009) which shows that Asian banks are exposed to additional liquidity risks in 2009. The report estimates that $60 billion of syndicated loans in emerging Asia, which represents approximately 30 percent of maturing syndicated loans across all emerging markets, will mature in 2009. Unless market conditions significantly improve, the report warns that renewal of these loans may prove to be difficult.

5.2 The Maturity and Currency Mismatches: Can They Be Mitigated by Regulation?[14]

A strict regulatory restriction designed to prevent currency mismatches would dictate that bank lending and debt contracts be made in the currencies in which deposits are denominated and in which customers earn revenues. In an extreme case, loans to local customers whose earnings are in the local currency should be excluded from banks' foreign currency lending. Would such a regulatory restriction be desirable or, more importantly enforceable?

Banks are drawn into currency mismatches as they finance some of their local currency loans with foreign currency funds and even when they lend on foreign currency funds to their local customers, they often experience a currency mismatch because local borrowers include not only exporters with foreign currency cash flows but also borrowers from the non-tradable sector for imports without such flows and these foreign currency are not prepared for unexpected recall or denial of the rollover of their loans. The maturity mismatch makes banks vulnerable to a sudden change in the demand for liquidity. Failing to meet the demand, they could be left unprotected from liquidity and even insolvency risks. However, this is not the end of the story. As will be shown below, when combined with a currency mismatch it can easily cause the local currency to depreciate. The weakening of the currency then worsens currency mismatching further and could trigger a currency crises.

5.2.1 Private Precautionary Measures

Banks in Korea, in particular those susceptible to the twin mismatches ,have been required to take precautionary measures to avoid liquidity risks, knowing that their failure to do so, and much more so since the 1997-98 Asian crises, could have deadly consequences. Individual banks have four options they could consider to mitigate the risk: i) liquidating their holdings of foreign assets; ii) securing contingent lines of credit from foreign banks; iii) securitizing and marketing in global financial

[14] This section draws on Park (2009).

markets their loans to local customers; and iv) obtaining foreign currency loans from the central bank. Would these precautionary measures be reliable and effective in guarding against a reserve currency liquidity crisis? Would they help prevent a systemic risk such as a run on central bank reserves?

To begin with the last option first, the central bank does not stand ready to rescue banks beleaguered by liquidity shortages even when it does hold large amounts of foreign exchange reserves simply because it cannot assume the role of last lender of resort for reserve currency liquidity. On the first option, the share of foreign securities held by banks in Korea is relatively small. This is because the net return on investing in these assets is likely to be low because as their funding costs are higher compared to their competitors from advanced economies. They will find it more attractive to extend foreign currency loans to domestic customers instead of investing in foreign financial products. Even when they have large amounts of foreign bonds and equities, liquidation of these assets would incur heavy losses since these assets are likely to be sold at fire sale prices if they can be sold at all. This has systemic implications in that if all banks try to sell their foreign assets, they may worsen liquidity shortages for the banking sector as a whole. The fee for contingent credits to be drawn in case of a financial crisis could be also high as it is likely to reflect the solvency risk to which banks from emerging economies are exposed. More importantly contingent lines of credit may spare individual banks a liquidity crisis, but not the entire banking sector. This is because when foreign banks conduct their lending operations within a preset country exposure, they are likely to recall other loans or refuse to extend new loans to compensate for the drawdown of contingent credits.

The third option is also a costly one. In theory, some of the local as well as foreign currency loans to local borrowers held in bank asset portfolios could be securitized and insured by mono- or multi-line insurers via the CDS market. It is not clear whether banks could remain competitive if they had to bear the high CDS spread the securitization would entail. In most emerging economies, the

securitization of loans and other assets is a financial innovation in which they have little expertise. Even if some of their foreign currency loans to domestic borrowers could be securitized, market prices of these derivative products might not be high enough to cover the funding cost when credit and currency crisis risks are properly priced into the values of these instruments.

For example, Korea's largest commercial bank, Kookmin Bank, issued $1 billion by the sale of covered bonds in May 2009.[15] Its five-year, 7.25 percent notes were priced to yield 500 basis points more than the mid-swap rate[16]. By then Korea had largely overcome the liquidity crisis. Yet it still had to pay this high cost of borrowing[17]. Even when some of the banks are able to issue securitized products, for the economy as a whole the systemic risk cannot be shifted to foreign investors and lending institutions. This is because in a crisis situation foreign holders of these securitized products are likely to dump them, causing the free fall of their prices. The depressed prices will be taken as an indication that the crisis in the country where the products were issued is deeper than expected. This expectation will then provoke further capital outflows.

If none of the preceding precautionary measures is reliable, faced with a liquidity crisis, banks will then herd into the local foreign exchange market to buy dollars and euro, thereby weakening the local currency. As will be shown in the following sub-section, depending on the expectations of future currency movements, the initial depreciation could precipitate currency speculation, touching off a run on the central bank foreign exchange reserve. This may indeed happen when foreign investors are heading to the exit all at once or foreign banks suddenly stop rolling over their short-term loans.

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[15] Covered loans differ from mortgages backed securities in that they are secured by property loans or lending to public institutions and in addition backed by a borrower's guarantee to make payment.
[16] Earlier in April 2009, Hana Bank, Korea's fourth largest bank, sold $1 billion of three-year government-guaranteed notes priced to yield 490 basis points more than the mid-swap rate.
[17] The mid-market swap rate is the rate at which the discounted future values of the fixed and floating swap payments net to zero.

The maturity mismatch involving bank borrowing and lending in domestic currency could be managed to prevent a bank run even when banks lose a large amount of their short-term deposits as long as the central bank can inject liquidity into the banking system as lender of last resort. But in international financial intermediation central banks of emerging economies can serve only to limited extent as a foreign currency lender of last resort.

5.2.2 Regulatory Restrictions

According to Goldstein and Turner (2004), regulatory restrictions could be a practical means of mitigating currency mismatches. They propose such restrictions as imposing limits on net foreign exchange positions, foreign exchange liabilities, and banks' holdings of foreign currency denominated securities. They also recommend introducing more restrictive rules for liquidity risk management and a higher reserve requirement on foreign currency deposits. More specifically these regulatory restrictions may include: i) linking the class of assets for which short-term funding is secured to the maturity of the funding such as restricting banks to hold only short-term safe and liquid assets for short-term funding[18]; and ii) imposing a capital charge on financial institutions with funding liquidity risks stemming from the two mismatches (Brunnermeier et al. 2009). In a crisis situation when these prudential regulations prove to be ineffective, governments may invoke more direct measures such as providing government guarantees on foreign loans and imposing capital controls. In what follows it will be shown that these measures are often ineffective and, yeah if carried out too rigidly, could be counterproductive as they run the risk of limiting the ability of even well managed banks from emerging economies to take part in international financial intermediation.

In order to alleviate the mismatch problems, the Korean supervisory authorities instituted a regulation in which banks are required to relend in foreign currencies to local borrowers for a minimum of 85 percent of their foreign currency

[18] This is a version of the mark to funding proposed by Brunnermeier et al. (2009).

funds maturing within three months (15 percent for domestic currency loans). The maturity of the local foreign currency loans must also be less than three months. Although not required to do so, banks also manage their balance sheets to square the position of their foreign currency assets and liabilities to avoid foreign exchange rate risk. In reality, however, these regulatory measures have hardly been effective in preventing or moderating the pervasiveness of the two balance sheet mismatches. In regard to government guarantees, recent Korean experience is instructive. In order to restore foreign investors' confidence the Korean government issued sovereign guarantees on new foreign loans maturing before the end of June 2009 for up to $100 billion on October 12, 2008 when Korean banks were not able to renew their short-term external loans. Similar guarantees had failed to allay fears of a financial meltdown at the beginning of the Asian crisis in 1997 and they failed again. As in 1997, the market's reaction was one of one of indifference.

Only when Korea secured a swap line amounting to $30 billion from the Fed on October 30 did the foreign exchange market settled down somewhat, but not for very long. The foreign exchange rate shot up to 1,509 won per dollar three weeks after the swap had been announced, since it was apparently not enough to remove uncertainties surrounding Korea's ability to service its foreign debt. Korea also managed to arrange won-local currency swaps with the central banks of both China and Japan, each amounting to an equivalent of $30 billion on December 13. Only when it was made clear that the Fed would extend the swap agreement did foreign investors' confidence in the Korean economy improve and stability in the foreign exchange market return toward the end of the first quarter of 2009. In addition to the regulatory restrictions, Goldstein and Turner (2004) recommend a managed floating foreign exchange policy to large emerging economies as it provides incentives for banks, other non-bank financial institutions and corporations to hedge currency risk in order to keep currency mismatches under control. However, as discussed in the preceding section, the recent bout with currency speculation in Korea has raised doubts about the extent to which free floating can relieve the burden of currency

mismatches at banks and reduce the incidence of a currency crisis. Indeed free floating can worsen currency mismatches, and in itself it may not be able to stop a run on central bank reserves in the absence of intervention on the part of a reserve currency country, the US, in the form of providing short run liquidity.

6. Reserve Adequacy for Self Insurance[19]

6.1 Relevance of the G-G-F Rule

The third and perhaps the most important lesson to be drawn from the crisis is that there is no easy way of determining an adequate level of foreign exchange reserves for self-insurance in emerging economies; that is, an amount large enough to prevent speculators from mounting an attack on their currencies. The Greenspan-Guidotti-Fischer rule, which prescribes the holding of an amount of reserves equal to the country's short term foreign currency liabilities, is accepted as a useful guide, but the Korean experience during the recent liquidity crisis raises doubts about the practicality of the rule as a guide, in particular in a crisis situation. In an emergency situation, the GGF rule implies that it would allow a central bank to avert a liquidity crisis by buying back all the short-term liabilities that investors liquidate. But the buying back may not necessarily stop speculation or restore financial stability for two reasons. When foreign lenders refuse to roll over their short term loans to or buy short-term bonds issued by local banks, it is reasonable to assume that they would, and in fact do, unload their holdings of domestic equities and even long-term bonds as well, if they see signs of an unfolding crisis. The distinction between short and long term liabilities is of limited relevance during a financial crisis as foreign investors are known to either sell or hedge all relevant assets. In an extreme case not only foreign investors but also domestic residents may try to offload their holdings of money and other financial assets denominated in the local currency when they consider that a crisis is inevitable.

[19] This section draws on Park and Wyplosz (2008).

It would be unrealistic to expect the central bank to buy back all these assets foreign investors liquidate directly or indirectly. If it cannot, then prices of both equities and bonds will fall and the exchange rate will depreciate. In theory the decline in asset prices and free floating may avoid a liquidity crisis to the extent that they stem outflows of capital and hence slow down the loss of reserves. However, the recent Korea experience casts doubt as to whether market adjustment works in a way that can prevent a run on central bank reserves. It is well established that asymmetric information and herd behavior of traders give rise to instability in the foreign exchange market. When mark to market accounting is enforced, falling prices of financial assets and depreciation will stack up losses at banks, other financial institutions, and corporations saddled with large net foreign currency liabilities. These losses will undermine the safety and soundness of financial institutions, making them unable to refinance their short term liabilities. If these losses are large and growing, they could easily set off destabilizing speculation in the foreign exchange markets. Recent developments in the Korean foreign exchange market bear out this possibility.

On November 20 2009, the dollar-won exchange rate shot up to 1,517 won from about 1,000 won per dollar before the collapse of Lehman Brothers. A depreciation of almost 50 percent over a three-month period did not stop speculators from dumping their holdings of local currency. Currency speculators continued selling the won after it had clearly depreciated below its long-run equilibrium. In fact they did not seem to care to know what the long run value of the currency was when the country was steeped in a crisis. It was clear that their expectations on the future exchange rate followed an extrapolative path.[20] Under these circumstances, there is

[20] Behavioral economists have long argued that human beings tend to be too confident of their own abilities and tend to extrapolate recent trends into the future, a combination that may contribute to bubbles" The use of a forecast algorithm that extrapolates from the last observation can also be viewed as boundedly rational because it economizes on the costs of collecting and processing information..”
Lansing (2006) develops an asset pricing model where extrapolative expectations can generate excess volatility of stock prices, time-varying volatility of returns, long-horizon predictability of returns, bubbles driven by optimism about the future, and sharp downward movements in stock prices that resemble market crashes. All of these features appear to be present in long-run U.S. stock market data.

no reason to believe that a further depreciation could have stopped capital outflows. Even if it could, questions arise as to whether faced with a crisis Korean policy makers would have had the temerity to let the won lose its value so much, knowing the possibility of runaway speculation.

In fact national policy authorities of most emerging economies are not likely to stand idly by watching the depletion of foreign exchange reserves when a currency crisis intensifies. They would move to impose some controls on capital flows regardless of their effectiveness. They would do so because a large depreciation is often seen as a symptom of structural problems that could undermine the ability to service foreign debts rather than an adjustment process. This perception then induces foreign exchange traders to assess higher risk premiums on foreign exchange markets, which then work through asset markets to cause further nominal depreciation without corresponding changes in macroeconomic economic variables (Duarte and Stockman 2005). They then sell more of the currency in the expectation of further depreciation. The herding among incompletely informed traders then realize the expectation of depreciation. If this happens, depreciation will follow an implosive trajectory instead of restoring equilibrium in the foreign exchange market.[21] A recent episode from Korea raises the possibility that free floating in itself may not have be able to stop a run on central bank reserves in the absence of the intervention of a reserve currency country-the US- in the form of providing a currency swap.

Even if the objective of holding foreign exchange reserves is the precautionary one of preventing liquidity shortages, the preceding argument does not support broadening the coverage of short-run external liabilities in gauging a sufficient level of reserves. For instance, in view of the fact that foreign equity investments often display wilder cycles of speculation and liquidation than short term foreign liabilities, their inclusion may be justified. If Korea had followed such a rule, it should have held more than $570 billion in foreign exchange reserves, more than

[21] New information could lead agents to change expectations as to GDP, productivity, money supply and other key macro variables.

half of its GDP, at the end of 2007. It is difficult to imagine that a small country like Korea could or would hold such a large volume of reserves. But suppose it did. Would this large holding of reserves be enough to fend off a currency crisis? It would not because the buying back of the equities foreign investors are selling off in addition to other short-term liabilities. It might not frustrate speculators since determined market with sufficient depth can virtually overwhelm any foreign exchange stockpile. According to Jean and Wyplosz (2005), speculators chiefly operate by taking short positions on a currency that they perceive as weak. If they are unsure about their expectations, they will not act when facing a central bank which holds sufficient reserves to sustain a speculative attack, because the outcome can be costly for them. On the other hand, if market sentiment builds up and expectations are firmly held, speculators can hold short positions of any size. In effect, a speculative attack is a run on the reserves of the central bank; the larger the reserves, the bigger the run. In this situation, prices of equities and bonds will continue to fall and the currency will continue to depreciate until the central bank runs out of reserves and becomes technically insolvent.

The main advantage of very large reserve stocks is that they are likely to raise the level of conviction required for markets to venture triggering a speculative attack. However, if emerging economies wanted to erect a foolproof line of defense, in an extreme case they would have to hold an amount of reserves equal to their total foreign liabilities. Since the bulk of reserves are held in safe but low yielding foreign assets such as US Treasury bills, the cost of self insurance can be prohibitively so high as to outweigh the benefits from the access to global financial markets. Emerging economies may then be better off by withdrawing from international financial intermediation altogether.

Destabilizing speculation in the foreign exchange market is likely to occur more often in small open economies where the size inconsistency of the foreign exchange market exacerbates the volatility of the exchange rate. To large foreign private and institutional investors, their exposure to an individual emerging economy

like Korea often accounts for a very small share of their total investments. But to a small emerging economy with shallow and illiquid domestic financial markets, foreign financial investments can be large, going beyond its absorptive capacity, and dictate movements of local financial prices including the exchange rate. Global investors continuously reappraise their investment risks and adjust their regional and country exposures in response to changes in market conditions at the regional and country level. For instance when they decide to reduce their exposure to East Asia's emerging economies, they often liquidate their holdings of financial instruments of these countries without discriminating among countries and securities. Their withdrawal may entail a small portfolio adjustment, but it could have a large impact on these countries' domestic financial markets, causing an unbearably large change in financial prices including the foreign exchange rate. For instance, before the US sub-prime crisis erupted, foreign investors accounted for almost 35 percent of Korea's stock market capitalization. At the end of 2008 the weight declined to below 30 percent. Few countries could withstand such a large decline without the stability of domestic financial markets being endangered.

6.2 Global Lender of Last Resort and Regional Cooperation

Korea's experience in managing the current crisis underscores the critical need to establish a global lender of last resort. As noted in Section 5, there is general agreement that the swap line with the Fed, which has been serving as a de facto global central bank, was instrumental in turning around the pessimistic outlook on the economy that the bankruptcy of the Lehman Brothers had ushered in. The central banks of most emerging economies may not be able to supply enough foreign currency liquidity -often an unlimited amount- needed to stop a run on their financial systems. It will help if they hold large amounts of reserves. But as pointed out earlier, it is difficult to determine the adequate amount of reserves and in view of the virulence of surges in capital outflows it will have to be very large, certainly more that than the GGF rule requires.

Since it is costly to hold large reserves, the policy authorities of emerging economies may instead opt as a means of crisis prevention to intervene in the foreign exchange markets, regulate capital flows, and limit local banks' participation in international financial intermediation by imposing rigid restrictions on their foreign currency asset-liability management. These precautionary measures are also costly as they detract from the efficiency of the economy and put local financial institutions at a competitive disadvantage in international financial intermediation vis-à-vis their counterparts from reserve currency countries, which are not subject to similar restrictions and as a result enjoy a reserve currency premium. Because of this disadvantage, without the legal backing of a global lender of last resort, financial institutions operating out of emerging economies will eventually be driven out of global financial intermediation. Among the top ten international commercial and investment banks, none comes from East Asia. There may well be many reasons why a number of large East Asian banks are not able to compete against Western global financial institutions and remain as local players. The absence of the legal backing of reserve currency central banks is one of them

In the current system of international finance, it is highly unlikely that any global lender of last resort will come into existence. Which countries or international financial institutions will then be able to assume the role of a quasi global lender of last resort? Given the dominance of the US dollar as a reserve currency, the Fed could assume such a role. In fact it has established bilateral currency swap lines with 14 central banks of both advanced and emerging economies, although these lines represent an ad hoc short-run temporary arrangement for liquidity supply. The ECB could complement the role of the Fed as the distant second supplier of another reserve currency. The IMF has created a new facility known as the FCL designed to provide liquidity to those members suffering from a drain on their reserves, but because of their limited resources the Fund can inject only a limited amount of liquidity into the global economy. In the case of Korea, for instance, it needed to secure three currency swaps amounting to $90 billion, more than one third of its

largest reserve holdings at the end of 2007 to restore financial stability. As in the current crisis, when so many emerging economies have come under speculative attack, the IMF simply cannot help out all these countries at the same time.

There is also a regional source of liquidity in forms such as the CMIM (Chiang Mai Initiative Multi-lateralization). Could this assume the role of a regional lender to make up in part for the absence of a global lender of last resort? It is not likely. In recognition of the need to create a regional mechanism for liquidity support and policy coordination, the eight members of ASEAN+3 established a system of bilateral currency swaps among the members in 2001, which has been restructured into a reserve pooling arrangement known as the CMIM. On many occasions, the leaders of ASEAN+3 have affirmed their determination to offer assistance to members suffering from a short-run balance of payment problems. More than two years have elapsed since the eruption of the crisis, but so far their words have not been matched by their actions.

ASEAN+3 finance ministers did agree on enlarging the size of the pool to $120 billion. 80 percent of the pooled reserve will be contributed by the Plus Three countries and the reminder by ASEAN 10. The sharers of the contribution of the Plus Three will be 32 percent for China and Japan each and 16 percent for Korea. The share of voting power for the Plus Three is 71.59 percent of the total, divided among China (28.41), Japan (28.41) and Korea (14.77). The CMIM has a two-tier decision making structure. Fundamental issues for the CMIM will be determined at the annual ASEAN+3 Finance Ministers' meeting (AFMM+3). Lending issues are to be determined by executive-level meetings represented by central banks or authorities in charge of foreign exchange reserves as well as finance ministries allowed to represent the country. ASEAN+3 plans to establish an independent regional surveillance unit as soon as possible, but until then will continue to utilize the current surveillance mechanisms of ADB and ASEC. The IMF linkage has been retained and members will be allowed to exercise the escape option only upon both submission of sufficient evidence and agreement by other members.

The increase in the size of the reserve pool has hardly been noticed by the market. The market's lack of interest is understandable as both Korea and Singapore have established currency swaps with the US Fed. The CMIM's IMF linkage and the complicated borrowing procedures are also likely to dissuade any member from approaching the CMIM for liquidity support when they have access to the IMF's FCL with a minimum of policy conditionality. The guiding spirit of the CMIM is that the participating members utilize all formal and informal channels of mutual assistance in providing US dollar loans to those members experiencing short run balance of payments difficulties, provided they are not structural, so that they can pursue expansionary monetary and fiscal policies without the fear of kindling a liquidity crisis.

The eight members participating in the CMIM are currently sitting on a total of reserves of more than $ 4 trillion. The lack of US dollar liquidity is therefore one matter they could resolve if they enlarged the pooling of reserves through the CMIM and sped up the disbursement process, but the prospects for these changes are not very promising. As long as China and Japan remain at odds with each other and hence cannot provide needed leadership for promoting collective actions for domestic demand expansion and regional financial cooperation, ASEAN+3 may lose its effectiveness and become relegated to a symbolic grouping without any substance.

The current crisis has shown beyond doubt that global financial stability needs the services of a global lender of last resort as exemplified by the Fed swap line that subdued the panic and tumult displayed by foreign investors in Korea's financial markets. Emerging economies have learned from the current crisis that without access to such a lender they can easily fall prey to speculative attacks and liquidity crunches. Knowing that they can do so much on their own to ward off the vagaries of global financial markets, in particular when they are triggered by overreaction of financial markets, they are likely to conclude that they will have to fortify self-insurance by accumulating more reserves. This conclusion will bring pressure to bear on them to continue with the export-drive, which may in turn tempt

them to keep their currency undervalued. In the end the crisis may not bring about any changes in either the development strategy or macroeconomic policy management of Korea and other East Asian economies.

7. Concluding Remarks

More than two years have now passed since the outbreak of the US sub-prime crisis in August 2007. The crisis paralyzed the financial system and threw the US economy into the most severe recession since the 1929 depression. The financial crisis in the US was also so virulent and contagious that it engulfed Europe, Asia, and other parts of the world in a sharp economic downturn and rendered their financial systems dysfunctional as it has impeded trade flows and curtailed the availability of global liquidity. In order to avert the free fall of their economies, most countries - emerging as well as developed - set out to stimulate domestic demand by cutting the policy interest rate to the zero bound and implementing large fiscal stimulus packages. All of the East Asian countries including China put into effect stimulus packages of varying proportions consisting of increases in public spending, cuts in taxes, and making more credits available at lower interest rates.

Like many other export-oriented economies in Asia, Korea has not been immune to the current global economic crisis. If anything it has been the hardest hit victim. During the third quarter of 2008, Korea suffered a severe dollar liquidity crunch caused mostly by market overreaction. The liquidity shortages led to a run on central bank reserves, which in turn threatened the solvency of many financial institutions. As late as in February 2009, Korea was at the top of the list of countries most vulnerable to the current crisis in emerging Asia. Having managed another wrenching crisis in 1997-98, Korea's policymakers knew what had to be done: they were quick to put in place a crisis management strategy that included a fiscal stimulus package and expansionary credit policy to power an expansion of domestic demand, free floating to discourage currency speculation, supplementing foreign exchange reserve holdings by currency swaps with the central banks of the US, China,

and Japan, and restructuring of loss-making financial institutions and firms. Most of these measures appear to have worked to help Korea turn the corner.

Beginning in the second quarter of 2009 fiscal stimulus kicked in to contribute to expanding domestic demand. By then the liquidity crisis was over and positive growth returned. Since then Korea has sustained a rather vigorous pace of recovery. Contrary to earlier forecasts, the economy may not contract in 2009. The liquidity crisis was deep, but the recovery was equally steep. There has been also a number of positive financial market developments including the sustained rally in the stock market, strengthening of the won vis-à-vis major currencies, and the resumption of capital inflows. These developments lead to the conclusion that the symptoms of market failure such as panic, mania, and herding were the main causes of the liquidity crisis in Korea.

Although the recovery is likely to be sustainable, one should hasten to add that there are many market uncertainties that remain to cloud the path to recovery. As the latest IMF-WEO (July 2009C) predicts, global output is expected to decline by 1.3 percent in 2009, which is the largest contraction since WWII, and to recover only gradually in 2010. In emerging Asia questions remain as to whether the stimulus packages will pump prime consumption and investment. If they do not and their initial expansionary effects wear off, one cannot rule out the possibility that the early upswing will peter out to set in motion a W-shaped recovery in emerging Asia.

The global economic crisis has taught Korea several lessons in crisis management that will help guide future reform. In a small open economy where equity investments dominate capital flows, free floating does not necessarily enhance the effectiveness of monetary policy, all the more so when expectation formation is extrapolative. There seems to be no easy way of preventing the maturity and currency mismatching on the balance sheets of financial institutions that is often singled out as the most fundamental cause of financial crisis in emerging economies. Neither regulatory restrictions nor private insurance arrangements appear to work to mitigate

the balance sheet mismatches.

Large reserve holdings will help fend off financial crises, but the current crisis has shown that there is no level of reserves adequate enough to constitute a foolproof line of defense against speculative attack. Prevention of financial crises in emerging economies calls for the provision of the liquidity services of a global lender of last resort, but there is little or no possibility in the current situation that such an institution will ever come into existence. In the absence of such a global lender, emerging economies will have no choice but to run current account surpluses to accumulate more reserves, retreat from capital market opening, and move to the center of the exchange rate spectrum.

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<Abstract in Korean>

박영철

미국 서브프라임 위기의 발발 이후 신흥시장국중에서 상대적으로 큰 충격을 겪었던 우리 경제는 2009년 2/4분기 이후 빠른 회복세를 보이고 있다. 본고는 우리나라가 글로벌 금융위기 충격에 상대적으로 취약했던 이유와 경제당국의 위기 대응정책들을 살펴 본 후 최근의 위기경험이 우리 경제에 시사하는 바를 제시하고자 한다.

먼저 우리 경제의 대외 취약성으로는 높은 수출의존도, 소수업종에 편향된 수출구조, 단기외채 증가 및 통화불일치 심화, 금융부문의 건전성 악화 등을 들 수 있다. 이로 인해 글로벌 금융위기에 따른 성장둔화, 외환 및 금융시장 불안, 유동성 악화 등이 상대적으로 크게 나타났다. 이에 대응하여 정책당국은 전통적인 금리인하 및 재정지출 확대 정책 이외에 국내 유동성의 양적 완화, 외화유동성의 공급, 주요국 중앙은행과의 통화스왑 계약체결 등 다양한 조치들을 취하였다.

이러한 금융위기 경험이 우리 경제에 시사하는 바는 다음과 같다. 첫째, 자본시장 통합이 진전되면 환율이 자유 변동하더라도 해외충격을 완전히 중화하지 못 하므로 자본유출입을 통한 해외충격의 전파경로에 유의할 필요가 있다. 둘째, 현재의 외화유동성 규제는 통화 및 만기불일치 문제를 방지하기에 적절하지 않으므로 이에 대한 검토가 필요하다. 셋째, 개별국가의 외환보유액 축적은 위기방지에 충분하지 않으므로 국가간 협력을 제고할 필요가 있다.

이 연구내용은 집필자의 개인의견이며 한국은행의 공식견해와는 무관합니다. 따라서 본 논문의 내용을 보도하거나 인용할 경우에는 집필자명을 반드시 명시하여 주시기 바랍니다.