

A New Macro-Financial System for a Stable and Crisis-resilient Growth in Korea

**Keun Lee*, Ginil Kim, Hong Kee Kim,
and Hong-Sun Song**

A structuralist macroeconomics perspective is taken to interpret the two recent financial crises in Korea, and new policy framework and reform measures are suggested to build a crisis-resilient macro-financial system. This paper focuses on the “Frenkel-Neftci” cycle (Taylor 1998) and the two kinds of expected spreads, interest spread and capital gain spreads, which initially motivate foreign investment in emerging economies. To establish a crisis-resilient macro-financial system, a new macro policy framework that can be described as “an intermediate system” is proposed, with full capital mobility but with an explicit option of Tobin taxes, flexible basket, band, and crawl (BBC) exchange rate system, and relative independence in monetary policy striking a new balance between interest rates and exchange rate targeting. An intermediate system is proposed because it is not easy to prevent the “two kinds of spreads” from happening simultaneously in a standard open macro-economic policy setting.

Keywords: Financial crises, BBC (basket, bands, and crawl),
Tobin taxes, Intermediate system, Capital controls

JEL Classification: E6, F2, F4

* Corresponding Author, Professor, Department of Economics, Seoul National University, Seoul 151-746, Korea, (Tel) +82-2-880-6367, (Fax) +82-2-886-4231, (E-mail) klee1012@plaza.snu.ac.kr; Associate Professor, School of Economics, Kookmin University, Seoul 136-702, Korea, (E-mail) ginilk@kookmin.ac.kr; Professor, Department of Economics, Hannam University, Daejeon 306-791, Korea, (E-mail) hongkee@hnu.kr; Research Fellow, Korea Capital Market Institute, Seoul 150-974, Korea, (E-mail) dna0214@kcmi.re.kr, respectively. This research was supported by a grant (RISA 2009-6) from the Research Institute for Social Advancement. The authors would like to thank Wai Mun Chia, Doowon Lee, Soyong Kim, and Inhyung Lee for their helpful comments or information; and Jin Son for research assistance.

[Seoul Journal of Economics 2010, Vol. 23, No. 2]

I. Introduction

The 1997 crisis demonstrated a typical crisis occurring among developing countries: Korea suffered a balance of payment deficits and insufficient international reserves prior to the crisis. After this economic collapse, however, Korea managed to attain an economic status matching that of advanced countries in 2008, achieving a per capita GDP exceeding USD 20,000. During the first half of the 2000s, Korea's potential growth rate was 1-2% higher than the average of the OECD. Its unemployment rate was 1-2% lower than the average of the OECD; it showed successive current account surpluses from 2003-2007; and its international reserve reached over USD 200 billion (6th in size worldwide).

Nevertheless, the Korean economy suffered another serious financial crisis along with the 2007-2008 subprime crisis in the US, revealing its susceptibility to international financial crises. The huge capital outflows (USD 50 billion, which is about 5% of the GDP) in 2008, which caused the exchange rate to plummet, revealed the instability of Korea despite its advanced macroeconomic performance. As such, the pertinent question that follows is: how can the Korean economy establish a crisis-resilient macro-financial system?

This paper aims to discuss this issue corollary to the finding by UNCTAD and UN reports (UNCTAD 2009; UN Commission 2009), which state that after the most recent global financial crisis, a new perspective and paradigm on economic policies for dynamic emerging economies like Korea is required. Establishing a crisis-resilient macroeconomic system is recognized as the final step for Korea to advance into the status of rich countries. More importantly, opening and liberalizing capital markets to the fullest scale will not necessarily bring Korea into such status. The situation requires more careful policy initiatives, given the currently more volatile and uncertain global economic environment and the fact that the Korean currency is not an international delivery currency.

The global financial crisis in 2008 is another important factor that pushes Korea and other Asian countries to seek a new mechanism to run the economy. Asian economies pursue an export-oriented growth model that relies on the US for market. However, as the American economy suffered greatly, with a loss in asset value of about USD 15-20 trillion amounting to 1.5 times of the US GDP, the US economy

is expected to reduce consumption, ceasing to serve as the consumer market for world. Thus, Asian economies are seeking new growth forces from domestic markets; this is inevitable if they want to advance into a decent, rich country status. However, the problem with this setup is the possibility of domestic market-based growth decreasing the foreign exchange (FX) earnings and running the risk of balance-of-payment crisis. Thus, turning into a new growth mechanism requires an “external safety net” against possible FX liquidity crisis.

As a theoretical framework, we find the structuralist macroeconomics perspective developed by Taylor (1998) and others, such as Eatwell and Taylor (2000), useful. A key idea is that the operation of the financial market, especially that of the international capital market, fits into *the beauty contest* of Keynes (1936) rather than the efficient market. Thus, market failures arising from asymmetric information, incompleteness of contingent markets, and bounded rationality (not to mention irrationality) are endemic to financial markets. The market is likely to be highly unstable and prone to occasional severe loss of liquidity as all opinions shift in the same direction (Eatwell and Taylor 2000). A key concept explaining crisis in emerging economies is the so-called “Frenkel-Neftci” cycle (Taylor 1998). This cycle rests on two kinds of expected spreads, namely, interest spread and capital gain spreads, which initially motivate foreign investment in emerging economies. If spreads open (meaning there is a possibility for profit making), then local players take positions in relevant assets, and foreign loans and foreign investment also rush in domestic assets. Nonetheless, any movement threatening the overall position (*i.e.*, sudden change in expected return such as exchange rate devaluation, real estate price collapse, and/or stock market crash) can result in sudden capital outflows in a very short period, triggering a currency crisis.

This paper discusses this framework and interprets the two crises in Korea from this perspective in Section 2. In Section 3, macro-level policy issues are discussed to maintain macro-stability, with focus on capital account management (capital controls) and alternative exchange rate systems. Sections 4 and 5 present the microeconomics issues. Specifically, Section 4 explores the micro-level sources for macro-instability, with focus on FX markets. Korean economic crises have always been closely related to FX markets, implying that systemic risks in Korean economy either come directly from the FX channel or are aggravated because of the disturbance in the FX market. On this ground, Korean economic crises have always had currency liquidity

crises, and thus we have to consider the FX market from a microeconomic perspective. Section 5 discusses micro-level policy reform issues. Finally, Section 6 concludes the paper with a summary and the concluding remarks.

II. Theoretical Framework and Interpreting the Crises

A. Structural Macroeconomics Perspective

The last three decades have been marked as the era of financial globalization. After the fall of the Bretton Woods system, the world economy has moved towards liberalization and deregulation. This movement was endorsed by the belief that the financial market, including the international capital market, operates efficiently. Eichengreen (1999) well summarizes this idea: "There are clear benefits from being able to borrow internationally. Capital mobility creates valuable opportunity for portfolio diversification, risk sharing, and intertemporal trade. By holding claims on foreign countries, households and firms can protect themselves against the effects of disturbances that impinge on the home country alone. Entrepreneurs can pursue high-return domestic investment projects even when domestic finance is lacking. Capital mobility can therefore enable investors achieve higher rates of return. And, higher rates of return can encourage saving and investment, ultimately supporting faster rates of growth."

However, financial market operation is different from this belief. Market failures arising from asymmetric information, incompleteness of contingent markets, and bounded rationality (not to mention irrationality) are endemic to financial markets. The operation of the financial market, especially that of the international capital market, fits into *the beauty contest* of Keynes (1936) rather than the efficient market. That is, the market follows what average opinion believes average opinion to be. A market that operates as a beauty contest is likely to be highly unstable and prone to occasional severe loss of liquidity as all opinion shifts in the same direction (Eatwell and Taylor 2000). Therefore, prudent regulation is absolutely necessary for a stable economy. According to this view, whenever the government retreats from its role of regulating the financial markets, including the international capital market, financial and/or currency crisis becomes a possibility, especially for developing countries.

Based on this idea, Taylor (1998) proposes the "Frenkel-Neftci" cycle,

a view in which the currency crisis pivots around the withdrawal of the government from regulating the real side of the economy, the financial sector, and especially the international capital market. This premeditated laxity creates strong incentives for destabilizing the financial behavior of private sectors, both domestic and external. Feedback of their actions to the macroeconomic level upsets the system.

Examining the proposition of Taylor (1998), the capital inflows occur as the interest rate spread (Σ_i), and/or the capital gain spread (Σ_Q) opens because of lax public sector regulation, such as financial liberalization. The definitions of spreads are as follows:

$$\Sigma_i = i - [i^* + (\Delta e / e)^E] \quad (I)$$

$$\Sigma_Q = (\Delta Q / Q)^E - [i^* + (\Delta e / e)^E] \quad (C)$$

where (I) is the interest spread equation, and (C) is the capital gain spread equation. In the equation, i is the domestic interest rate; i^* is the foreign interest rate; e exchange rate; Δ denotes the changes of the variables; Q is the relevant asset price; and superscript E is the expectation. If spreads open, then only few local players take positions in relevant assets, and foreigners also invest in domestic assets. Their exposure is risky but small, and in this stage, risk for the system as a whole is negligible.

In the second stage, the destabilizing market competition is induced. If some players are exploiting these spreads, then others can hardly resist engaging in that business despite their awareness of the risks. After some time in the process, the balance sheet of financial system will be risky overall, that is, short on foreign currency and long on local asset. Such setup means that the risks on individual players have now been shifted to the economy as a whole. Then, any movement threatening the overall position (*i.e.*, sudden change in expected return such as exchange rate devaluation, real estate price collapse, and/or stock market crash) can result in rapid capital outflows in a very short period and currency crisis.

Other currency crisis models mainly emphasize the role of government policy measures that cannot be sustained by fundamentals, leading to an abrupt change of condition or crisis in the end. That is, in these models, financial and currency crises are caused by an alert private

sector pouncing upon the presumptuous actions of the public sector, such as running an unsustainable fiscal deficit or creating moral hazards. These models also need a regime shift when a spread Σ_I or Σ_Q switches signs from positive to negative. However, in a Taylor model, movements in the spread itself feed back into the cyclical changes within the economy concerned, which ultimately lead to massive instability in the system as described before.

B. Interpreting the Two Crises in Korea

In comparing the two episodes of currency crisis in Korea (1997 and 2008), we noticed that even though Korea is at a different stage of economic development, the currency crisis could be explained by the same analytic framework a la Taylor (1998). We cannot attribute both episodes to a single cause, either wrong policy measures or moral hazard. Although there is some possibility of moral hazard in 1998 as stated by Taylor (1998), it was not the main source of crisis, and there was no fiscal profligacy problem at all, which is one of the main culprits for the mainstream crisis model in either episode. In our view, the Taylor model provides more succinct, plausible, and realistic historical accounts.

Taylor (1998) provides detailed accounts on how the Korean economy with relatively sound fundamentals fell into the debacle of the 1997 crisis. The study emphasizes the government's deregulation of both the real side of economy (*i.e.*, the government retreats from its traditional role of coordinating investments in large-scale industries) and the financial sector (*i.e.*, failures in monitoring foreign loans, especially by newly licensed merchant banks and derivatives). With the financial liberalization, there were huge capital inflows, such as Yen-carrying trades, as the spreads opened. Inexperienced Korean financial intermediaries made some fatal mistakes while engaging in the international capital market with little regulation: maturity mismatch problem, currency mismatch problem, and dealing with non-customary products (derivatives). Along with other unfortunate situations, the crisis in Southeast Asia changed the expectation of the investors, bringing about the run against the won.

The Korean crisis of 2008 can be explained with the same analytic framework similar to that of the 1997 crisis. This time spreads opened because of (1) the high interest rate policy by the Korean government aimed to suppress real estate price increase, (2) the expectation about

exchange rate appreciation, and (3) the stock market returns after recovering the crisis. The subprime crises produced the sudden change in expectation of the market participants. The credit crunch in the international capital markets and the possibility of exchange rate depreciation by the Korean government to promote exports led to huge capital outflows.

Although the capital account liberalization was one of the main reasons leading to the currency crisis, the International Monetary Fund (IMF) and the Korean government pursued greater liberalization. In November 1997, the Korean government fully liberalized capital inflows. In April 1999, regulations on capital account transactions were converted to a negative system, abolishing the *bona fide* principle for FX transaction authorization. The regulation on FX institution for engaging in FX activity was also revised from a licensing to a registration system. In January 2001, OTC securities transactions between resident and non-residents were liberalized.

Strong macroeconomic performance with such measures again opened the spreads and pulled foreign capital inflows into Korea. The scale of aggregate capital inflows rose steadily, amounting to 6.1 and 7.4% of the GDP in 2006 and 2007, respectively. Since the Asian currency crisis, Korea has enjoyed sizable current account surpluses. As both the current and capital account posted continuing surpluses, oversupply in the FX market intensified, leading to a substantial increase in foreign reserves and appreciation of the won for a prolonged period. Foreign reserves of Korea amounted to USD 262 billion at the end of 2007. According to various studies, the surge in foreign bond investment inflows is due to the widening of the covered interest differential except the period of financial turmoil resulting from the subprime crisis (Kim, Kim, and Suh 2009; Kim and Song 2007; Park and Kim 2008; Yang and Lee 2008; Ryou and Park 2008; Lee 2006). Foreign equity investment flows also gradually increased up until the second half of 2007. In 2007, the outstanding foreign equity investment amounted to USD 320 billion. According to Yoon and Bae (2007), these flows increase when the expected returns increase because of the forward stock price index increase and the forward exchange rate appreciation in offshore NDF markets, as well as of the widening of domestic and foreign interest rate differential.

Meanwhile, the Korean government encouraged capital outflows to facilitate appreciation pressure in 2006 and 2007. Accordingly, the investment of residents in overseas real estate, after standing at a mere

USD 22 million in 2005, increased to USD 1.3 billion in 2006 and USD 2.7 billion in 2007. Overseas equity investment also rose substantially, from USD 11 billion in 2005 to USD 24 billion in 2006, and USD 50 billion in 2007. As the won is not a key international currency, investors sold forward exchange on a large scale to avoid exchange rate risk, leading to a considerable increase in overseas foreign currency loans. In addition, exporters, mainly shipbuilders, hedged their exchange rate risks by selling forward exchange contracts for their coming export revenues. Domestic banks that buy these forward exchange contracts had to adjust their foreign currency position by selling foreign currency in the spot market. They obtained the required foreign currency *via* currency swap contracts and FX swap contracts with foreign bank branches or foreign investors who wanted to exploit the arbitrage opportunities by investing in Korean bonds. As a result, there has been a surge of the external debt of Korea, especially that of short-term debt, since 2006.

As a consequence of the subprime crisis during the second half of 2007, the international financial catastrophe led to a credit crunch in the international capital market, affecting the Korean economy. Continuous considerable foreign capital outflows from Korea brought about the collapse of stock prices and the values of the won. Crisis-stricken foreign investors trying to make up for the liquidity while preparing for the credit crunch sold a large sum of equity holdings. In addition, foreign investors cancelled derivative contracts, such as foreign currency and exchange swap contracts, and did not roll over these contracts with domestic banks. What made the situation worse was the existence of considerable amount of external debt (USD 380 billion in 2007-2008), which left doubts on the ability of the Korean authority to handle the crisis situation. All of these, in turn, led to the collapse of stock prices and huge depreciation of the won and the increase in volatility and instability of the domestic financial and FX market.

C. Proposing a New Macroeconomic Policy Framework

By analyzing the two episodes of the Korean currency crisis, the following inquiry will be investigated: What must be done to prevent any further crisis in the future from the perspective of macroeconomic policy makers?

The "Frenkel-Neftci" cycle begins with the government retreating from participating in the regulation of the international capital market.

Therefore, to prevent future crisis, sound regulation and supervision is necessary. Experiences in the recent crisis have proven that having sound regulation and supervision in a single country is not sufficient in the era of globalization. Without international synchrony, achieving the desired results is not possible. With regard to sound regulation issues, we must extend the scope of regulation from monitoring capital adequacy to asset management of individual financial intermediaries, including off-balance sheet activities such as derivative contracts. Not only the Total Return Swap (used in 1997 in the Korean case) but also the MBS (mortgage backed securities) and the CDO (collateralized debt obligations) used in the recent subprime case clearly demonstrate the potential risks inherent in these financial goods. This issue will be discussed in Section 5, with detailed reform measures suggested.

Thus, the main issue in terms of macroeconomic policy is to pay attention to the movements of spreads; wide-open spreads can pull off capital inflows, which can be extremely destabilizing. As Taylor (1998) point out, another source of spread is through off-balance sheet activities and derivatives. Here, we must thoroughly investigate the experience of long lasting arbitrage opportunity in the Korean economy. As we have already examined, these arbitrage opportunities were exploited by foreign bank branches and foreign investors, which finally led to the surge of external debts and contributed to the instability of the Korean FX market when the subprime crisis hit the international capital markets. As Yang and Lee (2008), Ryou and Park (2008), and Kim and Song (2007) point out, these arbitrage opportunities result from the systematic imbalance between supply and demand in the domestic forward exchange markets (and disequilibrium in swap market due to difficulties on the part of domestic FX banks to acquire FX in the global credit crunch situation). The Korean authority should have tried harder to correct this systematic imbalance, considering the potential risks of sudden withdrawal.

Let us examine the movements of spreads more thoroughly. External conditions affecting the movements, such as weak dollar after the collapse of the IT bubble and low foreign interest rate, are relatively out of reach for the Korean authority. The won-dollar exchange rates continuously appreciated before the second half of 2007, except in the years 2001 and 2002. Thus, the relatively affordable policy measure remaining in the hands of the Korean authority was the domestic interest rate. Although the domestic interest rate was considerably lower than that before the 1997 crisis period, it was higher than the foreign

interest rate except during very short periods (Yoon and Bae 2007). Hence, exchange rate appreciation together with interest rate differential opened the long lasting spreads. However, it seems that the Korean authority had severe constraints in lowering the domestic interest rate for reducing spreads due to the stock market boom and real estate price increase. Housing price, especially that of apartments in Seoul, began to increase considerably in 2000 and continued during the Roh government era, except for few intermittent periods despite numerous policy measures (Kang 2006; Kim 2007; Kim 2008). The Roh government tried to contain the housing price increase such that lowering the interest rate became an implausible option. The stock market boom that began in early 2003 might have aggravated this situation.

The next issue is how to manage exchange rates in the overall macroeconomic policy. The fully floating exchange rate system and the capital account convertibility have been regarded in the mainstream economics as the elements which isolate a country from speculative attacks, in that the government has no commitment at any level to the exchange rate. Accordingly, such combination can be attributed to the problem on "the impossible trinity," which states that a country cannot have a floating exchange rate, capital account convertibility, and autonomous monetary policy simultaneously. According to this view, for an emerging country open to a substantial volume of capital flows, a flexible exchange rate reduces the sources of external vulnerability and increases the efficiency of monetary policy, and at the same time, financial liberalization allocates efficiently savings, disciplines macroeconomic policies, and consequently improves economic growth (Ferrari-Filho and Paula 2008). However, as shown in Grenville (2000), general experience demonstrates that fundamentals cannot explain the behavior of the exchange rate over a short- or medium-term horizon, and exchange rates at times exhibit long-lived swings with no apparent changes in fundamentals significant enough to justify them. In addition, no country can bear any level of exchange rate and considerable volatility in the FX market, which can have real and devastating economic consequences for particular sectors and whole economies. As the Korean economy relies greatly on trade performance and on imports for needed materials such as oil, the authority not managing the exchange rate at all is virtually impossible. The following example of the Korean authority is very suggestive of its inability to implement policy in a liberalized world. As previously stated, the Korean government encouraged capital outflows to alleviate pressure on the exchange rate appreciation. Indeed,

capital outflows increased substantially, but capital inflows due to hedging demands also increased remarkably, nullifying the intent of the authority.

What kinds of macro policy framework should be sought for Korea to prevent excessive exchange rate fluctuations and to achieve macroeconomic stability represented by price stability and full employment? The solutions to the impossible trinity, namely, the combination of free-floating exchange rate system with autonomous macroeconomic policy and full capital accountability, cannot be one among the above-mentioned reasons. That is, first, Korea heavily depends on trade (both imports and exports), and, second, capital flows and exchange rates can be extremely volatile. In addition, we cannot exclude autonomous policy measures because even a partial autonomy is important for emerging economies (Malovic 2007). According to Williamson (1999), although we cannot simultaneously fully liberalize capital flows while retaining both absolutely fixed exchange rate as well as absolutely independent monetary policy, never has it been said that capital flows cannot be partially controlled or reasonably flexible currency rate and relative independence in monetary policy making cannot be retained.

A flexible BBC exchange rate system can be a plausible alternative for such purposes. The elements of this system are as follows: a basket (of currency pegged against), a band within which floating is limited, and a crawl according to inflation differentials or other pre-specified fundamentals (Malovic 2007; Wang 2008). However, to enhance the possibility of a successful management of exchange rate system, some measures are necessary to reduce volatility of capital flows and likelihood of speculative attacks on domestic currency (Ferrari-Filho and Paula 2008). The use of official intervention requires substantial stocks of foreign reserves for avoiding speculative attacks and the use of sterilized intervention for mitigating pressures of appreciation. As the recent experience of the Bank of Korea clearly shows, using sterilization policy for a long time brings about certain concerns, such as deterioration of the balance sheet of the Bank of Korea, additional capital inflows through the increase in domestic interest rate, and so on (Kim, Kim, and Suh 2009).

Therefore, supplementation by capital account management techniques, that is, capital controls, is required. Capital controls can reduce the vulnerability of a country to financial crisis, including capital flight during any currency crisis, and drive a wedge between onshore and offshore interest rates to provide monetary authority through some au-

tonomous policy, at least in the short run, and to reduce exchange rate pressures derived from excessive capital inflows (Ferrari-Filho and Paula 2008). In any case, capital controls on inflows provide certain benefits, according to Magud and Reinhart (2006). UNCTAD reports (2009) further recognize the role of capital account management, stating that capital account can be managed in a counter-cyclical manner by restricting the buildup of excessive financial liabilities in good times and restraining capital flight during crises.

In sum, the new macro policy framework proposed can be described as “an intermediate system” with partial capital control, flexible BBC exchange rate system, and relative independence in monetary policy making.

III. Macro-level Reform Issues for Stability

A. Exchange Rate versus Interest Rates as the Key Macro Policy Variable

Given the trilemma, a country has to give up control over either exchange rate or interest rates. Globally, most of the advanced countries have adopted the fully floating exchange rate system and tend to maintain their control focus on interest rates. In terms of the possible source of instability or crisis in the financial system, focusing on interest rates makes sense because the sources of crises are often the banks, as in the case of the 2008 US financial crisis. However, if we turn to the emerging economies, the sources of crises usually have to do with currency liquidity crises even with the sound prudence of banks measured at domestic currency. The importance of exchange rate over interest rate will become clearer if we again consider the “two-spread.”

Suppose the policy authorities want to prevent the two spreads from opening. If interest rates are used to close the spread, a trade-off is inevitable (*i.e.*, closing one spread will lead to the opening of the other). For example, if interest rates are reduced to close the interest spread, credit and asset market bubbles associated with low interest rates are brought in. On the other hand, if interest rates are increased to reduce the asset market bubble, the interest rate spread is opened, and hot money targeting higher interest rates is invited to a country. However, if exchange rates are used, their impacts work on the same direction on both spreads. For example, if exchange rates are allowed to ap-

preciate, both spreads of interest rate differentials and capital gains are reduced.

The above reasoning supports the benefits of having autonomy over exchange rate in terms of crisis prevention-oriented macro policy setting. The debate over optimal exchange rate has a long history. Nowadays, most advanced countries adopt a floating exchange rate system, but a floating exchange rate system is not uniform. There are various floating exchange rate systems depending on the degree of government intervention in the exchange market. Even advanced countries frequently intervene at varying degrees in exchange markets to maintain desirable levels or stability of exchange rates.

Korea adopted a free-floating exchange rate system in the middle of the 1997 financial crisis to prevent speculative attacks against the Korean won (KRW). Notably, the IMF pushed Korea to adopt a freely floating exchange rate system as part of the conditions for the bailout. At that time, Korea was not in the position to investigate which exchange rate system was appropriate for the Korean economy because its top priority then was how to emancipate from status quo. Today, it is high time to reexamine the exchange rate system in Korea, considering the changing international financial environment and the Korean economy.

Economists do not have a consensus on which exchange rate system is better, the fixed or the floating. Arguments supporting fixed exchange rate systems put emphasis on the benefits of a stable exchange rate, stating that the fixed exchange rate system reduces the exchange risks associated with international trade and promotes international trade transaction, thereby contributing to economic growth. In contrast, the arguments for the floating exchange system are based on the view on the advantages of market efficiency in resource allocation. That floating exchange rate systems deal better with external imbalances is also assumed. That many advanced countries adopt a floating exchange rate arrangement may imply that the benefits of floating exchange rate systems are greater than those of a fixed exchange rate in advanced countries.

But, the benefits of floating exchange rate arrangements are based on the assumption that exchange rates are determined by the "real" fundamentals. However, there is evidence that exchange rates are frequently determined not by economic fundamentals but by volatile capital flows or herding. Therefore exchange rates are excessively volatile and in disequilibrium level. Market mechanisms are also acknowledged



Data: The Bank of Korea, ECOS.

FIGURE 1
TREND OF THE KRW EXCHANGE RATE AGAINST THE USD
(UNIT: WON OVER 1 DOLLAR)

to work only in stable environments and through signaling effects. The volatile fluctuation of the exchange rate only increases uncertainties and risks but does not enhance resource allocations.

The KRW has experienced excessively volatile fluctuation, even recently. The exchange rate of the KRW against the USD changed from 920s in August 2007 to around 1,590 in March 2009 (Figure 1). The KRW depreciated by up to 60% against the USD at the onset of the US sub-prime mortgage crises. By comparison, the KRW depreciated most significantly among competing countries, such as Taiwan and Singapore. The excessive volatility of the KRW exchange rate has motivated policy makers and academic economist to reconsider the strength and weakness of the current exchange rate systems.

Korea is a typical small and open economy whose trade openness amounts to almost 80%, indicating that the exchange rate plays a crucial role in running the economy. In general, Korea enjoys the benefits of a floating exchange rate system because of its advantage in

insulating the economy from foreign shocks. However, the economic volatility experienced by Korea in 2008 and 2009 indicates this was not the case.

On account of such experience, considering an alternative exchange rate system, such as the flexible BBC exchange rate system, specifically the intermediate exchange rate system between the fixed and floating exchange rate systems of Korea, is now required. Flexible BBC means that the exchange rate is permitted to fluctuate within the band, while government intervenes in the exchange market if it reaches a certain level. Such has been the system adopted by Singapore since the 1980s, and it has successfully braced Singapore from two financial crises and speculative attacks (Wilson 2009; Chow 2007). In Singapore, exchange rates are managed against unpublished trade-weighted basket or index of currencies of major trading partners and competitors. The weights in the basket are updated periodically. The basket acts as a more stable reference point for monitoring the movements of the Singapore dollar than if a single currency, such as the USD, is used (Wilson 2009). The policy band itself is adjusted from time to time and is allowed to “crawl” as circumstances change locally and internationally. The BBC in Singapore is not just an exchange rate system but is also a key feature of its macro policy. In other words, it uses exchange rates (appreciation) rather than interest rates to control domestic inflation.

Certainly, there are several conditions for such BBC and exchange-based macro policy to work in other countries, such as Korea. In Singapore, the influence of exchange rates policy on GDP, exports, and the consumer price index is found significantly stronger than an equivalent change in interest rates (Wilson 2009). Thus, to adopt this policy regime, one has to check whether an exchange or interest rate is a good (controllable) intermediate target or instrument and bears a stable and predictable relationship with price stability as the ultimate target of monetary policy over the medium term. A recent study by the Bank of Korea (Kong and Han 2009) shows that the impact of interest rates on key macro variables tend to be greater than that of exchange rates in Korea, but that the impacts of exchange rates, especially on inflation, tend to jump when people are concerned about the possibility of inflation.

Although Korea may not be able to adopt a macro policy regime with exclusive focus on exchange rates and relegating control over interest rates fully, it needs a new balance between them. A new balance means that the Bank of Korea should put equal weight on maintaining

the value of Korean currency by adjusting interest rates and exchange rates. The Bank should always be concerned whether exchange rates are moving closely to the equilibrium rates or not as equally as it is concerned about interest rates. Furthermore, the Bank of Korea should not allow the KRW to be excessively overvalued or undervalued because such condition will open the "spreads" and invite currency attacks. For example, in the mid-2000s when the KRW faced strong pressure to appreciate because of the strong performance of the Korean economy, the government tried to restrain it to maintain its trade competitiveness. Such stance led to the massive inflow of hot money because it opened the spread for real interest differentials. The point is that a new system should not use exchange rates as a means to trade policy but as a monetary policy. Maintaining the value of the Korean currency is one of the key duties of the Bank of Korea. While the Bank failed terribly in this regards, there were no suggestions to reform the system. The Bank should set up a special committee to have oversight over exchange rates as it does with regard to interest rates and try to move the exchange rates within some "equilibrium band."

In the meantime, running the BBC system requires an amount of FX reserves large enough (but not extremely large) to generate confidence in the exchange rate systems, thereby preventing speculative attack. The Bank of Korea was reported to hold an international foreign reserve of USD 250 billion in the late 2007, which was not enough. In previous literature, the optimal amount of reserves was three months of import bill, whereas a more recent suggestion is to add the amount of short-term foreign liquid debt and even one-third of stock capitalization held by foreigners. As of March 2009, Korea was reported to have reserves of USD 206.3 billion, extremely greater than the three months of import bill (USD 69.9 billion) or liquid foreign debt (USD 185.8 billion). However, such amount was less than the sum of these two (*i.e.*, three months of import bill and liquid foreign debt) and far less than the sum of these two plus one-third of foreign-held stock values. To meet this new criterion, Korea needs an additional USD 100 billion, reaching about USD 300 billion.

There are also other arguments against the pegged band exchange rate system. However, because the cost of the BBC system is still not established to be larger than that of the free-floating exchange rate, an alternative to the one-country level exchange rate system is considered: a multinational coordination for monetary stability at the regional level. The stability of the exchange rate can be attained with less cost and

more easily if the systems and policies among related countries are coordinated. ASEAN+3 meetings have started to discuss the currency and financial cooperation among East Asian countries, having transformed the ASEAN+3 meeting into a multilateral one during the last gathering. Therefore, the initial background for currency and financial cooperation among East Asian countries has been established as deemed necessary. Many ideas have been suggested from the Asian Monetary Fund, such as having a single Asian currency unit and surveillance systems, have been put on the table during the ASEAN+3 Meeting. However, a significant progress has also been made with the 2009 agreement on further developing the Changmai initiative. Most member countries want to stabilize the exchange rate; thus, cooperation for enhancing the stability of exchange rate should be enhanced (Chung and Eichengreen 2009).

Often discussed in this regard is the so-called “targeted floating keep the exchange rate within a specified range and permit the exchange rate to float with respect to currencies like the USD and euro. If the exchange rates fluctuate to a specified range, the member countries intervene in the exchange markets. To adopt such system, however, a benchmark currency must be set up. A single Asian currency unit has been suggested as a benchmark currency for pursuing the currency cooperation, which can be established by baskets of member currencies reflecting trade share or other economic size. Furthermore, this system considers the concrete measures for promoting Asian currency units and exchange rate systems at the level of government. Nonetheless, we are limited to suggesting the necessity of currency cooperation over the East Asian region to restore the stability of the exchange rate.

B. Debates on Capital Market Liberalization and Capital Control

a) Pros and Cons of Financial Liberalization

The main driver of the changing international economic environment since the late 1980s is the large amount of capital flows. The ratio of the sum of foreign assets and liabilities to world GDP increased from 0.86 in 1985 to 2.64 in 2003 (Lane and Milesi-Ferretti 2007). In particular, the degree of capital opening has been higher than trade opening in most countries since the mid-1980s. In Korea, the ratio of foreign assets and liabilities to GDP increased from 0.60 in 1997 to 1.09 in 2004. These large capital flows were spurred by capital market liberalization, with the measures for increasing capital opening derived

from the faith in the efficacy and virtue of an open capital account. That is, capital opening contributes to enhanced efficiency in resource allocation, investment, competition, and economic growth. These facts drive most countries to pursue financial liberalization, including domestic financial deregulation and the opening of capital account, because such system has opened the capital market of most countries.

There is large volume of economic literature examining the effects of capital market liberalization on the economy. We can categorize the literature into two groups: one is to support and focus on the benefits of capital market opening, and the other is to criticize the capital market opening, emphasizing on its higher economic vulnerability.

The first view is supported by Rogoff (1999), Fisher (1998), Summers (2000), and Kose *et al.* (2006). The main reasons for arguing for capital market liberalization are summarized as follows: higher investment owing to lower cost of capital; enhancement of the resource allocation; more rapid productivity growth and economic growth; and welfare improvement by consumption smoothing over time. Similarly, empirical evidence showing that capital account opening enhances economic growth is suggested by Quinn (1997), Klein and Olivei (1999), and Edwards (2001a, 2001b). Glick *et al.* (2006) find that there is little systematic empirical evidence to support the views that capital market liberalization by itself increases vulnerability to crises and that sample biases leads to the conclusion that a country with free international capital flows is more vulnerable to financial crises.

Currently, other perspectives against capital market liberalization emphasize on the effects of capital market liberalization on financial instability and vulnerability to economic shocks (Bhagwati 1998; Rodrik 1998; Stiglitz 2000; Rodrik and Subramanian 2009). Grilli and Milesi-Ferretti (1995), Rodrik (1998), Kraay (1998), O'Donnell (2001), and Edison, Klein, Ricci, and Slok (2002) do not agree that capital account convertibility can increase economic growth. Furthermore, they propose that the free capital mobility across countries contributes to financial and economic crises. The logic for the argument against international capital flows includes the following: asymmetric information, asset pricing with bubbles, maturity, and currency mismatch incurring serious bank run and financial panic owing to the lack of international lender of last resort. They argue that trades in assets are different from the trades in goods and services and that international capital flows enhance the vulnerability of economies to foreign shocks, preventing its efficiency and growth. Rather, international capital flows frequently generate eco-

conomic and financial crises.

In sum, the theoretical and empirical literature does not reach a consensus on the relationship between capital opening and economic growth. As Eichengreen (2001) notes, capital account liberalization remains one of the most controversial and least understood policies of our day. However, as Kose *et al.* (2006) concludes, as a whole, the vast empirical literature provides little robust evidence of a causal relationship between financial integration and growth. There is also a strong correlation between capital mobility and financial crisis as shown by Epstein (2009). The recent frequent crises have allowed policy makers and academic economists to more seriously reflect on the benefits of capital account opening and the cost of capital account convertibility (UNCTAD 2009).

b) Financial Crises and the Need for Capital Controls

The frequent currency crises and banking crises since the late 1980s have generated the belief that capital account liberalization raises the risk of financial instability. The relaxation of capital control in Europe following the implementation of the Single European Act of the 1990s accompanied the European Crises of 1992. Mexico (1994) was attacked by volatile international capital flows, following the liberalization of capital markets. Measures for capital account liberalization of East Asian countries in the early 1990s exposed those countries to speculative attacks and finally serious financial and economic crises in 1997. As Stiglitz (2000) and Rodrik (1998) note, China and India, which closed their capital markets from international markets, succeeded in insulating themselves from financial crises. These cases lead us to believe that capital account liberalization has a significant role in creating financial crises.

Stiglitz (2000) argues that the recent frequent crises originate from the capital market liberalization (opening), comparing crises to car accidents as follows: "When there is a single accident on a highway, one can suspect that the driver's attention may have simply lapsed; but when there are dozens of accidents at the same bend in the same part of the highway, one needs to re-examine the design of the road." Rodrik (1998) also blames the international capital flows, arguing that capital account convertibility requires painful economic adjustment in the face of external shocks unrelated to any change in circumstances, such as the boom-bust cycle in East Asian crises. He argues that considering the capital account liberalization as the natural consequence

of the establishment of capital account convertibility is tempting. If international trade is beneficial, then why not international capital flows? He answers this question as follows: "The markets for goods and services are fundamentally different from financial and capital markets in the sense that the financial and capital markets have more asymmetric information and higher speed of adjustment than the markets for goods and services. And as there is no international lender of last resorts, capital open economy is vulnerable to small shocks." Kindleberger (1984) also notes that the financial markets are prone to herding, panics, contagion, and boom-bust cycles.

Epstein, Grabel, and Jomo (2003) examine the case of countries with close capital accounts, drawing the following important and attention-worthy lessons. First, capital management techniques (capital control) can enhance the overall financial and currency stability, buttress the autonomy of macro- and micro-economic policy, and bias the investment toward the long-term. Second, the macroeconomic benefits of capital management techniques probably outweigh their microeconomic costs. Third, the nimble, dynamic application of capital management techniques is an important component of policy success. Fourth, controls over international capital flows and prudential domestic financial regulation often function as complementary policy tools useful to policymakers in the long run.

The recent UNCTAD report (2009) also observes that the assertion that capital controls are ineffective or harmful have been disproved by the actual experiences of emerging economies. Nevertheless, there seems to be a consensus that short-term capital movements cause more costs than benefits. In particular, the volatile and easily reversible short-term capital movements (so-called hot money) cause tumbling stock prices, soaring FX rates, and credit contraction. Therefore, short-term capital flows concern the policy makers. Although designing effective policy instruments for handling short-term capital is not easy, the controlled short-term capital flows should be managed.

Most recently, the IMF staff position paper (Ostry *et al.* 2010) has acknowledged the necessity of capital control as a tool responding to transient surge of in-flows. The paper observes that if the economy is operating near potential, if the level of reserves is adequate, if the exchange rate is not undervalued, and if the flows are likely to be transitory, then the use of capital controls — in addition to both prudential and macroeconomic policy — is justified as part of the policy tool kit to manage inflows. The paper also argues that such controls

can retain potency even if investors devise strategies to bypass them, provided such strategies are more costly than the expected return from the transaction: the cost of circumvention strategies acts as “sand in the wheels.”

In general, capital control can be justified despite its possible distortion because the costs of crisis are far greater than the costs of distortion (Stiglitz Forthcoming 2010). Reinhart and Rogoff (2009) also find that the costs of financial crises are great, calculating that on a peak-to-trough basis, real housing price declines to an average of 35% stretched out over six years, while equity price collapses to an average of 55% over a downturn of about three years and a half. Banking crises are associated with profound declines in output and employment. The unemployment rates rise at an average of 7 percentage points over the down phase of the cycle, which lasts over four years on average. Output falls down to an average of over 9%. The large costs of financial crises calculated have led policy makers to make policy making in a safe or conservative way.

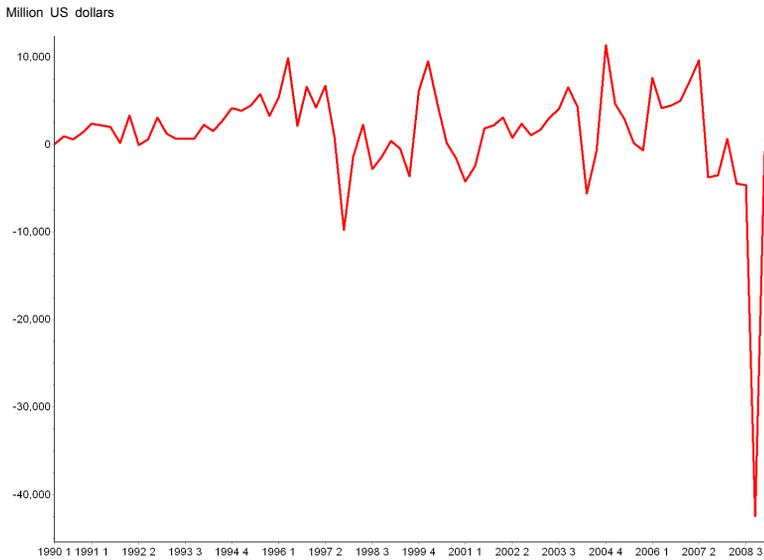
C. Policy Options for Korea on Capital Account Management (Capital Controls)

Although capital controls are not the first best policy, they can be one of the policy options for preventing crisis. The volatile international financial turmoil cannot be isolated from capital open economy. In particular, small open economies, such as Korea, are faced with capital inflows and outflows under the current circumstances with unfettered capital flows. By taking a casual look at the recent capital flows in Korea, volatility of capital flows is apparent (Figure 2). In 2007, the net capital inflows into Korea amounted to USD 9.5 billion (Table 1). In 2008, capital flows reversed from net inflows to outflows; the amount of net capital outflows was USD 50.9 billion in 2008 and peaked to USD 42.5 billion during the fourth quarter of 2008 when the subprime mortgage crises in the US spread around the globe. The capital flow reversals amounted to USD 60.4 in 2007-2008. In the second quarter of 2009, the capital flows again reversed into the net capital inflows. As Table 1 indicates, the capital inflows dominated the capital outflows during the second quarter of 2009. Such high volatility of capital flows, which Korea experienced recently, has led us to doubt the argument that capital flows generate positive effects on the economy by enhancing resource allocation and investment.

TABLE 1
TREND OF CAPITAL FLOWS IN KOREA (2007:I-2009:II)
(UNIT: USD IN MILLIONS)

	I	II	III	IV	Total (Annual)
2007	7,177.9	9,631.0	-3,749.7	-3,543.4	9,515.8
2008	633.5	-4,440.7	-4,631.1	-42,456.4	-50,894.7
2009	-1,273.7	8,598.9			7,325.2

Data: The Bank of Korea, ECOS.



Data: The Bank of Korea, ECOS.

FIGURE 2
TREND OF CAPITAL FLOWS IN KOREA (UNIT: USD IN MILLIONS)

As Epstein, Grabel, and Jomo (2003) note, there is no single type of capital account management technique that works best for all developing countries. Therefore, Korea must explore its own policy options for capital controls from which we can select and exploit the measures appropriate to every circumstance.

Before proposing the concrete measures for capital control, several points must be noted. First, capital controls must aim at managing

short-term capital flows, not long-term capital such as green field FDI (foreign direct investment). Second, the cost of capital inflow control is evaluated to be less than the cost of capital outflow control. Abrupt introductions of capital outflow control can damage a country's credibility greatly. According to global standards, lawfully flowed-in capitals are permitted to outflow, except in rarely exceptional cases. Third, price-based capital control is preferable to a quantity-based one. Finally, capital controls need to be well organized to attain the intended policy goals.

There are several measures for capital controls, such as Tobin tax, reserve requirement on flows, residence requirement, and so on (Epstein, Grabel, and Jomo 2003). Here, Tobin tax and reserve requirement are proposed as feasible measures for capital controls in Korea.

Tobin tax is the first candidate for capital control in Korea. It entails a small tax to be imposed on all FX transactions, thereby discouraging the buying and selling of FX for very short terms with speculative motives. Tobin tax impedes short-term capital flows because the tax is imposed in each exchange transaction, while not burdening long-term capital movement deemed favorable to the economy. This means that the cost of Tobin tax may be negligible but attains the original purpose of deterring short-term capital flows.

The view on Tobin tax has been received more favorably after the global financial crisis. Brazil has already adopted the financial transaction tax on foreign purchase of stock and equity (2% of purchases amount). The European Union (EU) has organized the specialist research committee to study how to adopt the tax on international capital flows, considering the tax rate of 0.005%. In December 2009, the EU summit meeting recommended the IMF to promote the international adoption of the Tobin tax. These should be taken as significant changes in the attitude toward Tobin tax, as advanced countries have previously taken a negative stance toward this scheme.

Some reserve requirements can be introduced, such as the policy requiring foreign investors to place some of the funds in a bank for a certain period of time, a policy which works like tax. As the fund can be used for investment after a specified period of time, long-run capitals are not hindered to flow.

The other capital controls seem to be inappropriate because they are based on quantity, thereby incurring higher costs.

IV. Micro Sources for Macro-Instability

A. Structural Changes in the FX Market and Their Implications

The Korean FX market has experienced great structural changes since the 1997 economic crisis. This paper focuses on two fundamental changes affecting the behaviors of market participants. The first and most important change is the transition from the managed FX regime into a perfectly flexible FX system. This transition has greatly changed the incentive structure and behaviors of market participants, causing them to take part in either the sell-side or the buy-side of the FX. Before the 1997 economic crisis or during the period of the managed FX system, most of the transactions in the FX market were done in view of real economic needs, such as exporters needing KRW instead of USD and importers needing USD instead of KRW. Rare are the demands for hedging against or speculating for FX risk.

However, as the flexible FX regime made FX rate more volatile after the economic crisis, the participants in FX market became heterogeneous, creating a great deal of new demands. Above all, exporters and importers sought to hedge their transaction values against FX risk, which in turn created a chain of transactions to accede to a series of the derived demands. That is, counterparties such as commercial banks, which matched the hedging demand of exporters, also had to hedge their position by transacting with other counterparties. Thus, hedging begot hedging. Speculators in the FX market played an essential role in acceding to a chain of hedging demands. In addition, the room for arbitrage widened as a big margin occurred between the domestic interest rate and the foreign interest rate. Moreover, much hedging demands created new types of FX markets, such as FX swap, Currency Swap, and KRX currency futures and option.

The second notable change is that FX liberalization and the opening of the capital market were rapidly undertaken since the 1997 economic crisis. The bond market was fully opened to foreigners at the end of 1997, whereas the securities markets were fully opened to foreigners in mid-1998. These steps were added to the FX liberalization policy to focus on attracting foreign capital. Congruent to this, capital inflow was led by the portfolio investment in 2005. However, this capital inflow-oriented policy brought about some adverse effects, provoking a spike in KRW valuation and a surge in interest burden by the sterilization policy of BOK. As KRW was expected to increase further because

of pressure, the liberalization policy was modified to focus on promoting the outflow of domestic capital in 2006. Outbound FDI was fully opened, and locals were allowed to buy foreign real estates without restrictions. Offshore fund and overseas fund domiciled in domestic jurisdiction were also admitted, thereafter making a boom of outbound foreign equity-related investments until 2007. In short, Korea has achieved perfect FX liberalization and capital market opening, except for the internationalization of KRW. As a result, Korea has been exposed more directly to external shocks from international FX markets since then.

B. New Source of Instability Involving Forward Exchange Contracts

Foreign currency liquidity crisis occurs when foreign currency debt fails to be rolled over due to unexpected shock despite foreign currency assets exceeding the foreign currency debt. Korea experienced two foreign currency liquidity crises in the past decade. However, these two liquidity crises have significant differences in mechanical structures that cause the liquidity crises. In the 1997 economic crisis, currency liquidity crisis was triggered not by commercial banks but by Korean merchant banks indulged in foreign equity investment with short-term seed loans. That is, the currency liquidity crisis of 1997 occurred because of an aggressive foreign equity investment without liquidity risk management. On the other hand, the foreign currency liquidity crisis of 2008 was different in that Korea had a flexible FX regime and a fully opened capital markets. Furthermore, the currency liquidity crisis of 2008 also occurred due to commercial banks that admitted to have treated the FX-related businesses widely.

In 1997, commercial banks obtained many FX assets, with a different purpose from that of merchant banks. That is, their FX assets were obtained mainly to accede to the hedging needs of counterparties against FX risk. Two hedgers comprised the FX markets. The first one came from actual economic activities under the flexible FX regime. Exporters, who had long time lags between exporting contracts and its settlements, tended to hedge their amounts of exports from the FX downside risk. Shipbuilders were among the most influential long-term hedgers, having sold future receipts in the USD forward markets to hedge the FX risk. The second hedger was related to domestic mutual fund markets. With the liberalization of investments about offshore fund and overseas fund domiciled in our jurisdiction, there was a sharp rise in foreign invest-

ment fund, which induced the massive hedging demands to manage FX risk. Interestingly, there was a big contrast among offshore fund, intentionally taking FX risk, and overseas fund domiciled in our jurisdiction, hedging the FX risk. These FX hedging demands were almost absorbed by commercial banks. Securities firms were limited to playing the role of receiving these OTC FX hedging demands because of low credit ratings and small capital base.

Thus, commercial banks have to rebalance their FX positions because they are placed in a net-long FX position as soon as they buy the dollar forward exchange contracts from exporters and the mutual fund. That is, banks must sell the dollar spot exchange contracts as much as they buy the dollar forward exchange contracts to offset their net-long position (*i.e.*, buying contracts exceeding contracts sold). Apparently, this is why banks swap markets to borrow the dollar spot exchange. In this market, domestic banks take a CRS (currency swap) receive position to fund the dollar spot exchange and at the same time supply the agreed KRW amount and give a floating US dollar rate. Foreign banks must also take a CRS pay position in this market, where they supply the agreed US dollar amount and give the fixed CRS rate.

The problem is that domestic banks tend to borrow USD with short-term maturity to make the funding cost cheaper. In short, banks buy the long-term dollar forward exchange contracts from shipbuilders, while they borrow their dollars in short-term contracts, taking a roll-over risk. This is the fundamental reason why currency mismatch under financial stress occurs.

V. Micro-level Reform Issues for Financial Stability

A. Setting the Agenda: From Bank Liquidity to Currency Liquidity

Bank liquidity risk means mismatch risk between the bank's liabilities and assets in terms of maturity. Thus, measuring and managing bank liquidity risk is as important as capital/solvency risk management. However, prior to the current financial crisis, this risk did not receive adequate attention, either in Korea or in the global scale, because all debates about bank regulation were dominated by the design of the Basel II capital adequacy standard. Basel II, which defines the amount a capital bank should hold to cover its risks, also does not cover liquidity risks. Unlike the capital adequacy rule, there is no globally

accepted regulatory standard for liquidity. There are considerable differences between the regulatory frameworks in different countries.

Nonetheless, the liquidity shortage of a bank affects not only the bank but also the small depositors, who can hardly be expected to monitor the activity of a bank. A liquidity crisis in one bank spreads quickly to other banks through financial linkage. A traditional approach for liquidity management is to manage liquidity ratios. These are designed in such a way that liquid assets maintain a particular proportion to liquid liabilities. Otherwise, another rule is to manage the durations of assets and liabilities. The current financial turbulence has reminded regulatory authorities of the need to make a new guideline for efficient liquidity risk management.

The Financial Stability Forum (FSF) (2008) suggests a guideline for supervisory authorities to cover the following areas: first, identify and measure all types of liquidity risk, including those caused by off-balance sheet exposures; second, conduct liquidity stress tests to capture the systemic impacts of the funding plans of a bank; third, monitor cross-border flows and management of liquidity risk in foreign currency; and fourth, reinforce reporting and market discipline to promote better management of liquidity risk. Since the announcement of the FSF, many regulatory agencies, such as the FSS of England and the BIS, have prepared the guidelines for liquidity risk management customized for each country. The FSS of Korea has announced the draft of the guidelines recently. In this regard, we should bear in mind that advanced countries and emerging market economies have different points of interest from each other. Emerging market economies have special interests on cross-border flows and liquidity risk management of the foreign currency, not of the local currency.

In an open economy where there is no key currency such as the dollar, external shocks are inclined to accompany currency liquidity crisis, heavily pushing a home currency down. As witnessed in the current crisis, currency crisis in emerging markets are apt to begin to spread as foreign investors flee one country after another, endangering the squeeze in currency liquidity. Thus, for emerging market economies, the key task against external shocks is to manage properly the balance of payment in a national dimension, as well as the foreign assets and liabilities in a corporate dimension. In particular, the level of and trend in short-term foreign liability are core interests to be managed and monitored.

However, although this global crisis has provided a number of im-

portant lessons on currency liquidity, this problem has not yet been chosen as a major agenda in the discussion around the globe on which reform options for the post-crisis financial system architecture must be taken. This is partly because this issue is relevant only to the emerging market economies including Korea. Advanced countries such as the US and the EU have never experienced currency liquidity problems. As a result, it will not be easy to find this problem in a policy recommendation from BIS and FSF (BIS 2008, FSF 2008). This also reflects the situation that emerging market economies have little influence in setting up new agendas for post-crisis regulatory reforms. In contrast, as mentioned above, there have been many recommendations concerning the liquidity holdings of banks, which are proven to be insufficient amidst current financial crisis. As in the area of capital, the Financial Stability Board (FSB) and the Basel Committee are working very hard towards an internationally coordinated liquidity standard for banks.

In this sense, Korea is fortunate to have become the next co-chair country of the G-20 meeting and a member of the steering committee under FSB, which has a significant role in selecting and coordinating global regulatory issues. Reportedly, Korea had a leading role in raising and adopting the currency liquidity problem of the emerging countries at the recently held second general meeting of FSB. Foreign currency money markets must be overseen more strictly to reduce volatility in the exchange rate of emerging markets to develop more sophisticated and harmonized regulatory tools with the cooperation of international agencies. Korea proposed this problem, in which the emerging markets economies have common interests, be treated as a common agenda at the Committee on Global Financial System under BIS.

B. Reform Measures

Considering the current debates on this problem, Korea is about to seize a big chance to initiate the discussion on currency liquidity regulation, representing the concern of emerging market economies in building a crisis-resilient financial system. This paper suggests several measures to alleviate the currency mismatch problems. The first is about short-term measures, for which the tightening of currency liquidity management and the optimal hedge ratio as a sophisticated investment strategy are suggested. The second is about long-term measures, for which the enlargement of the core dollar liabilities of banks and the internationalization of KRW are recommended.

a) Two Short-Term Measures

• *From Over-Hedge to Optimal Hedge Strategy*

Due to the introduction of the flexible exchange rate system in 1997 and the spreading of overseas investments by domestic investors since 2007, the hedging demand against currency risk has sharply increased. Thus, this need has led to a structural excess supply in FX markets, which in turn has increased the pressure on KRW appreciation, especially since 2006. From 2006-2007, the average hedge ratio of all shipbuilders amounted to 54%, whereas that of overseas investment fund by domestic investor became as high as 80%. This means some of these demands were too speculative to enjoy the capital gain from currency risk through over-hedge contracts, exceeding 100% of the principal amounts exposed to currency risk.

There is no norm on what the optimal hedge ratio is because it depends on the attitude of the investors on financial risk, the historical correlation between FX, and the price of investment securities. However, from the perspective of an asset manager, there is a rule of thumb on whether it should hedge currency risk or not. According to Campbell *et al.* (2007), foreign bond investment must hedge currency risk because the returns from bond investment and from holdings of foreign currency are independent of each other. Meanwhile, hedging the currency risk from foreign equity investment depends on the correlation of return between equity and currency. If returns from equity are positively correlated with returns from exchange rate, mere exposure to currency risk is a superior strategy to hedging the risk in terms of total return. During the last financial turmoil, the equity return and exchange rate of KRW against major foreign currencies moved each other toward opposite directions, resulting in huge losses of overseas fund investment that hedged currency risk.

As far as hedge ratio is concerned, the regulatory authority has little room for intervention because investors are in charge of deciding whether to hedge or not. Rather than direct regulation, imposing a stricter disclosure rule on the cost of the investor from hedging or another potential risk from hedging will help the rational judgment of the investor. Regulatory intervention can be made indirectly through the prudential regulation of banks, a counterparty receiving hedge the demand of foreign currencies. If the regulatory authority can set the ceiling of currency-related derivative contracts by a counterparty, then the excessive supply phenomenon in the forward exchange market can be alleviated.

• *Tightening Currency Liquidity Management and Covering the Branches of Foreign Banks*

Based on the two episodes of foreign currency liquidity crises in Korea, currency mismatch occurs when financial firms maximize their profits without risk management, chasing to lower their funding cost through short-term loans and to raise their rate of return through long-term investments. Such failure has justified the strictness of the Financial Supervisory Service (FSS) in the oversight of FX businesses of banks. By far, FSS has supervised the currency liquidity using a variety of advanced financial indicators. Foreign currency liquidity ratio, 1-month gap ratio, and 7-day gap ratio are among these indicators, as were also suggested by international organizations, such as the IMF and the Financial Soundness Assessment Program. Ironically, however, all these indicators were in the normal range during the 2008 currency liquidity crisis.

If such was the case, then what went wrong? This paper raises at least three problems that must be addressed in managing currency liquidity. The first is about the coverage of currency liquidity regulation. In principle, currency liquidity regulation should be applied to every bank operating within domestic jurisdiction to maximize the policy effects and remove the regulatory arbitrage. By far, however, domestic branches of foreign banks have been free from this kind of currency liquidity regulation, the reason for which has not been exactly determined yet. Such asymmetric regulation between two groups, which provide big favors to domestic branches of foreign banks, however, has a negative repercussion on the soundness of FX money market as well as domestic branches of foreign banks.

Thus, these asymmetric regulations should be corrected. Financial authorities should note that regulatory arbitrage from asymmetric regulation can cause a foreign bank-dependent currency market structure and even deepen it. The loose regulation can broaden the rooms to speculate and arbitrage in FX money markets. In this sense, applying a regulation on currency liquidity to all banks operating in domestic jurisdiction is one of the basic and essential policy tasks to prevent the same crisis from happening in the future. Financial authorities should promulgate a policy road map to narrow the regulatory gap between domestic players and foreign players as soon as possible.

However, financial regulatory authorities are hesitant about imposing stricter regulations on domestic branches of foreign banks, weighing the costs against the benefit derived from stricter regulations. Above

TABLE 2
SHORT-TERM EXTERNAL DEBT IN KOREA
(UNIT: YEAR-END BASIS, USD IN BILLIONS, %)

	2006	2007	2008	2009. 1Q
Total external debt	260	382	381	369
Short-term external debt	114	160	151	148
(Domestic bank)	44	55	45	38
(Domestic Branch of Foreign bank)	52	79	68	65
Short-term external debt ratio*	43.7	41.9	39.4	40.1

Note: *Ratio of short-term debt over total external debt.

Source: The Bank of Korea.

all, domestic branches of foreign banks have played dominant roles in domestic FX market, serving as a key supply channel meeting the domestic demands for dollar currency. The size of their short-term external debt is much larger than that of domestic banks (Table 2). These dollar-denominated funds are invested into domestic financial markets in the form of fixed income products through swap markets, including FX swap and CRS. Their holding of the Korean debt is estimated at KRW 49 trillion as of the end of September 2009, including about KRW 42 trillion of treasury bonds (Lee 2009).

Under this market condition of heavy dependence on foreign banks (and their local branches), regulating foreign bank branches more strictly can result in a shortage of dollar supply and even a significant disturbance in the domestic financial market. That is, a shortage in dollar supply can change the dollar-denominated short-term money markets into a supplier's market and raise the funding cost of domestic firms. This can also make it difficult for foreign investors to access the domestic fixed income market. Fixed income market will shrink sharply, and the interest rate will rise.

Another relevant side effect is that domestic branch of foreign banks have a fragile capital structure in terms of liquidity. As shown in Table 3, they have little external claims but much external debt. The ratio of their external debts over external claims reached 6.3 in 2008, much higher than that of domestic banks, which is lower than 2.0. This means that they are exposed to high liquidity risk, which is very vulnerable to an unexpected price shock. Thus, when the situation turns uncertain (*e.g.*, the collapse of Lehman Brothers), they must act quickly to defend their vulnerability. In the wake of the 2009 financial

TABLE 3
BANKS' EXTERNAL BALANCE IN KOREA
(UNIT: USD IN BILLIONS, MULTIPLE)

		2001	2003	2005	2007	2008
Domestic bank	Net Claim	-4	-10	-16	-45	-28
	Debt/claim	1.1	1.3	1.4	1.7	1.4
Domestic Branch of Foreign bank	Net Claim	-6	-14	-15	-71	-61
	Debt/claim	1.8	2.7	2.4	6.6	6.3

Source: The Bank of Korea.

crisis, these foreign banks repatriated (or pulled out) dollars quickly to pay debts amid global deleveraging. According to the Bank of Korea, the net dollar outflow through the branches of foreign banks stood at USD 24.4 billion for a year since the start of the crisis in September 2008 (Lee 2009). The amount, which is the largest on record, accounted for about 67% of the total dollar outflow through banks in Korea (Lee 2009).

Considering the overall costs and benefits from a symmetric regulation, the policy for correction must be gradual and incremental to obtain a balance between market stability and efficiency. Setting the regulatory agenda in order, policy steps to reduce over-hedging demands can be instantaneously applicable to domestic branches of foreign as well as domestic banks. Position ceilings by counterparties and OTC (over-the-counter) currency derivatives can help reduce over-hedging incentives between counterparties. After reducing speculative demands through position ceilings, further steps can be taken to correct the asymmetry. One alternative is a restriction on short-term funding, which can put a bottom in long-term funding ratio. Regulations such as liquidity ratio or gap ratio can be longer challenges ahead because the domestic branches of foreign banks are inclined to have smaller foreign assets than foreign liability due to the nature of their business model.

Another alternative is to change the regulatory criterion and develop more sophisticated tools for currency liquidity of banks. Korea fell into a currency liquidity crisis despite sound liquidity indicators because all these indicators were overseen on an end-of-period basis by the FSS. The oversight of the FSS on an end-of-period basis has never contributed to reducing the volatility of FX market. On the contrary, it has led

to a periodic disturbance in the FX market by causing an excess FX demand every month-end. Thus, the criterion of FSS in managing currency liquidity must be changed from an end-of-period basis to a period-average basis.

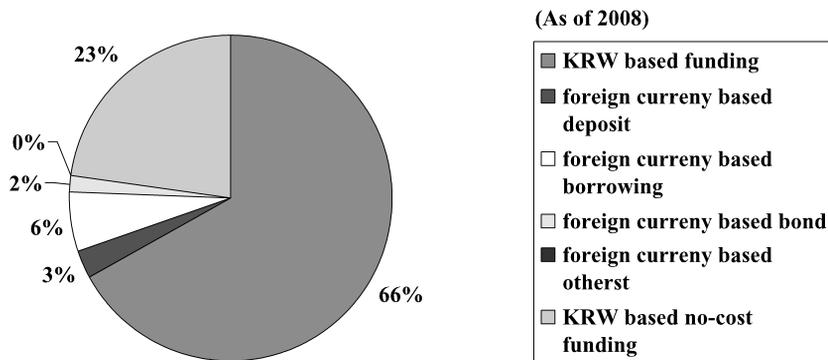
Next, the FSS must drill the regulatory tools more sophisticatedly with reference to the methodology of the new liquidity management guidelines suggested by BIS. That is, new BIS guidelines must be applied to the currency liquidity management. The stress test based on an adverse scenario analysis must be adopted. The scenarios include massive loss of confidence from depositors, disruption of secured funding, and loss of liquidity on business lines of the securities markets.

A direct regulation must then be introduced to put a ceiling on the holdings of foreign assets. The FSS can put minimum requirements on the ratio of foreign liquid asset over the total foreign asset. A core funding ratio, such as foreign loan to foreign deposit, can help not only in reducing currency mismatch but also in increasing the core funding base, which is relatively stable even in times of financial turmoil. Most developed countries have not used this core funding ratio (*e.g.*, loan-to-deposit ratio) as a regulatory tool so far. Due to the current financial crisis, global investors have realized its importance and have even raised the possibility of a Korean currency crisis, criticizing Korea to have a too high loan-to-deposit ratio. In this regard, a core funding ratio on foreign asset and liabilities can be an effective regulatory tool for currency liquidity management.

b) Longer Term Measures

- *Supply Side: Enlarging the Dollar Deposits Base through Overseas Business*

The weakest point of the Korean FX market is that it has no stable dollar-denominated debt-financing enough to accede to massive hedging demands. Deposit-type debt is the most stable debt that is relatively free from liquidity squeeze. As mentioned before, liquidity cannot always be obtained, which reassures the importance of retail deposits with a relatively stable funding source. Nevertheless, in Korea, deposits on a foreign currency basis are only as small as about 3% (Figure 3). Thus, the greater portion of foreign currency that clients demand should rely on FX swaps, short-term loan, repo transactions, and so on, types of funding that eventually depend heavily on liquidity conditions in the market. After experiencing the collapse in the functioning of the FX swap market, especially in the case of Lehman Brothers, obtaining



Source: Financial Supervisory Service.

FIGURE 3
FUNDING SOURCES OF DOMESTIC BANKS

funds in foreign currency has become difficult.

In this regard, more proactive steps to enlarge the deposits based on a foreign currency basis are needed to stabilize the FX markets. In this setup, banks will have no need to borrow short-term dollar-denominated funds from foreigners if domestic banks have many dollar-based deposits enough to offset the extra position caused by buying forward exchange contracts from shipbuilders.

The shortage of dollar-denominated deposits in Korea seems closely related to the fact that banks have failed to take the dollar-denominated debt deposit from the locals and also failed in the financial globalization that enables domestic banks to collect dollar-based deposits from foreigners. By far, domestic banks have been very passive in setting up overseas subsidiaries or acquiring overseas financial firms. As a result, we experienced a vicious cycle in the FX market in which banks, depending entirely on overnight loans from foreign banks to accede to massive domestic hedging demands, again fell into a foreign currency liquidity risk. The stability of the FX market in financial turbulence can be achieved by a more proactive strategy of banks to expand overseas.

• *Demand Side: Internationalization of the KRW*

The internationalization of the KRW is an important agenda to stabilize the FX market. KRW trading volumes in global financial market are too small in light of our opened capital market and enlarged FX

TABLE 4
COMPOSITION OF SETTLEMENT CURRENCY FOR KOREAN EXPORTS
(UNIT: %)

	USD	EURO	YEN	KRW	YUAN	OTHERS
2002	85.0	5.5	5.4	0.4	0.002	3.7
2003	83.6	6.5	5.6	0.4	0.002	3.9
2004	82.3	7.3	5.6	0.4	0.002	4.3
2005	79.1	8.4	5.6	0.5	0.003	6.4
2006	79.6	8.8	5.0	0.6	0.002	6.0
2007	77.2	9.6	4.8	0.7	0.003	7.7
2008	81.6	7.6	4.7	0.8	0.005	5.2

Source: Ministry of Knowledge Economy.

demands. Currently, over 80% of Korean exports are settled by the USD, and the portion of the KRW out of the settlement currency is below 1% (Table 4). This is in contrast with Japan's case in which about 40% of Japanese exports were settled by the Japanese yen in 2008. Korea is in a leading position of exporting major items, such as semiconductors, shipbuilding, automobiles, mobile phones, and others, which can strengthen its bargaining power to determine the settlement currency. More proactive steps to internationalize the KRW can help stabilize the FX market by reducing hedging demand itself.

VI. Summary and Concluding Remarks

This paper takes a structuralist macroeconomics perspective to interpret the two recent financial crises in Korea and suggests a new policy framework and reform measures to build a crisis-resilient macro-financial system in Korea.

According to the so-called "Frenkel-Neftci" cycle (Taylor 1998), the crises originate from two kinds of expected spread, namely, interest spread and capital gain spread, which initially motivate foreign capital coming into emerging economies. A sudden change in expected return, such as exchange rate devaluation, real estate price collapse, and/or stock market crash, can then result in huge capital outflows in a very short period and in a currency crisis. In the case of the 1997 financial crisis, the spread was mainly from the interest and the associated huge amount of capital inflows, such as the yen carriage trade. In the case of the 2008 financial crisis, the spreads opened because of the

following: first, high interest rate policy by the Korean government aimed to suppress real estate price increase; second, the expectation about exchange rate appreciation; and third, stock market returns after recovering the crisis. The subprime crisis then produced the sudden change in expectation of the market participants. The credit crunch in the international capital markets and the possibility of exchange rate depreciation by the Korean government to promote exports led to the huge capital outflows.

To establish a crisis-resilient macro-financial system, this paper suggests a new macro policy framework that can be described as "an intermediate system" with full capital mobility but with an explicit option of Tobin taxes, flexible BBC (basket, band, crawl) exchange rate system, and relative independence in monetary policy making with a new balance between interest rates and exchange rate targeting. With regard to specific macro-level measures, fees on short term financial flow (or Tobin tax) and reserve requirement are both suggested. Tobin tax imposes a small tax on all FX transactions, thereby discouraging the buying and selling of FX for very short-term purposes with speculative motives while not burdening long-term capital movements. Some reserve requirement policies require foreign investors to place some of the fund in a bank for a period of time. As the fund can be used for investment after a specified period of time, the long run capitals are not hindered to flow. The other capital controls that Epstein examined are considered inappropriate for capital controls in Korea because they are quantity based, thereby incurring higher costs.

At the micro-level, the key task against external shocks is to manage foreign assets and liabilities in corporate and bank dimensions well. In particular, the level of and trend in short-term foreign liability are core interests to be managed and monitored. However, this problem has not yet been chosen as a major agenda in global discussions that consider reform options for the post-crisis financial system architecture because advanced countries, such as the US and the EU, have never experienced currency liquidity problems with their currencies as international key currencies. This paper suggests several measures to alleviate currency mismatch problems.

As short-term measures, the tightening of currency liquidity management is suggested, covering not only domestic banks but also Korean branches of foreign banks, and the optimal hedge ratio as a sophisticated investment strategy. For example, a minimum requirement in the ratio of foreign liquid asset over total foreign asset is suggested.

Core funding ratio, such as foreign loan to foreign deposit, is also recommended because it helps not only reduce currency mismatch but also increase the core funding base, which is relatively stable even in times of financial turmoil. Long-term measures include the enlargement of core dollar deposits of banks and the internationalization of the KRW.

One might think that if we put in place various micro-regulations on the financial sectors, such macro measures like Tobin Tax or alternative exchange rates scheme would not be necessary. Such notion is true only if we are able to install the perfect regulation scheme, removing all the possibilities for financial arbitrages and sufficiently reducing risks. However, this seems impossible. For example, although the deregulation of Korean branches of foreign banks is one of the most apparent examples of asymmetric regulations and regulation loop holes, regulatory authorities are not taking any clear-cut actions. Moreover, although many new regulatory indicators are introduced, we are not sure how precisely they can serve as early warning signals, given the existing loop holes. As noted, many indicators showed no warning signals at all in 2008. Such situation calls for additional or macro-economic measures for anti-crisis stability.

An obvious candidate is forming active capital account management policies, including controls on short-term flow (*e.g.*, Tobin Taxes), which has now emerged as a new policy consensus at least in Europe, although it is still now much welcomed by the US. While the Obama administration propose a bank levy, late-comer countries without vehicle currencies need to propose fees on short term financial flows because their problem have been more of currency crises whereas it was a banking crisis in the US. The recent experiences of Brazil in 2009 in imposing a fee on short-term flow led to a sudden 10% drop in stock prices. While some consider this as an excessive cost (penalty) of acting alone without international coordination, others also consider that Brazil has succeeded in stabilizing financial flows and exchange rates; hence, a 10% reduction of stock price is not that bad a cost. If a 10% reduction of stock prices can keep a country safe from a bubble and a possible crisis later on, then many countries will be willing to take the risk, given the huge and long lasting cost of a crisis. A similar logic can justify the costs of more regulations as long as they can reduce substantially the possibility of a crisis (Stiglitz Forthcoming 2010).

A justification for an intermediate system proposed in this paper can be made in view of the fact that preventing the “two kinds of spreads”

from happening in a standard (orthodox) open macroeconomic policy setting is not easy. It is similar to the trilemma where full capital mobility, floating exchange rates, and monetary authority cannot co-exist. As analyzed in Section 2.3, the two crises erupted because we could not easily manage the two spreads. For example, closing the interest spread under full capital mobility was in conflict with the domestic policy priority on cracking down on real estate bubbles. Closing the exchange rate spread is not easy under full capital mobility because some ranges of exchange rates are hardly acceptable in terms of their impacts on the real economy and trade. Although a large amount of foreign reserves definitely help, it is very costly (earning a too low rate of return) and tends to increase domestic money supply and inflationary pressure, leading to other bubbles.

The discussion in Section 3.1 suggests that using interest rates to close the two spreads is contradictory because raising interests to curb asset bubbles tend to open the other spread of interest differentials. Thus, the more active use of exchange rate is a possibly better option to close the two spreads together, as shown by the successful case of Singapore. Thus, although Korea may not be able to adopt a macro policy regime with exclusive focus on exchange rates and giving up control over interest rates fully, it needs a new balance between them. A new balance means that the Bank of Korea should put equal weight on maintaining the value of Korean currency by adjusting interest rates and exchange rates. The Bank should always be concerned about whether the exchange rates are moving closely equilibrium rates or not as equally as it is concerned about interest rates. Furthermore, it should not allow the KRW to be overvalued or undervalued excessively because such situation would open the spreads and invite currency attacks. For example, in the mid-2000s, when the KRW faced strong pressure to appreciate due to the strong performance of the Korean economy, the government tried to restrain it to defend competitiveness in trade. Such stance led to massive inflow of hot money because it opened the spread for real interest differentials. The point is that the new system may not use exchange rates as a means to trade policy but rather use them as a means to monetary policy.

If such new policy regime with more weight on exchange rates is not sufficient, we can still use another policy tool: fees on capital flows. Some fees on short-term capital flows can reduce the spread or gains from such flows without resorting to exchange rate appreciation. The recent IMF staff position paper (Ostry *et al.* 2010) has acknowledged

the necessity of capital control as a tool responding to the transient surge of in-flows. A key conclusion is that if the economy is operating near potential, the level of reserves is adequate, the exchange rate is not undervalued, and the flows are likely to be transitory, then the use of capital controls, in addition to both prudential and macroeconomic policy, is justified as part of the policy toolkit to manage in-flows. Thus, depending upon the situation, the Korean government should now consider using the temporary capital flow fees as a possible policy option and make this known publicly and internationally. The Brazilian experience indicates that Tobin tax can be used as a short-term macroeconomic policy tool by varying the rates of fees.

(Received 11 October 2009; Revised 16 April 2010)

References

- Bhagwati, J. "The Capital Myth: The Difference between Trade in Widgets and Dollars." *Foreign Affairs* 77 (No. 3 1998): 7-12.
- BIS. Principles for Sound Liquidity Management and Supervision. September, 2008.
- Campbell, J., Medeiros, K., and Viceira, L. Global Currency Hedging. NBER WP1 3088, 2007.
- Chow, H.-K. "Singapore's Exchange Rate Policy: Some Implementation Issues." *Singapore Economic Review* 52 (No. 3 2007): 445-58.
- Chung, D.-K., and Eichengreen, B. *Fostering Monetary and Financial Cooperation in East Asia*. World Scientific, 2009.
- Eatwell, J., and Taylor, L. *Global Finance at Risk*. New York: The New Press, 2000.
- Edison, H., Klein, M. W., Ricci, L., and Slok, T. Global Account Liberalization and Economic Performance: Survey and Synthesis. NBER Working Paper No. 9100, 2002.
- Edwards, Sebastian. Capital Mobility and Economic Performance: Are Emerging Economies Different? NBER Working Paper No. 8076, 2001a.
- _____. Capital Controls, Capital Control Flow Contractions, and Economic Vulnerability. NBER Working Paper No. 12852, 2001b.
- Eichengreen, B. *Taming Capital Flows*. World Development, 1999.
- _____. *Capital Account Liberalization: What do the Cross Country Studies Tell Us?* University of California, Berkeley, 2001.

- Epstein, G. Should Financial Flows be Regulated? Yes. DESA Working Paper No. 77, 2009.
- Epstein, G., Grabel, I., and Jomo, K. S. Capital Management Techniques in Developing Countries: An Assessment of Experiences from the 1990's and Lessons for the Future. Working Paper Series 56, Political Economy and Research Institute, 2003.
- Ferrari-Filho, F., and Paula, L. "Exchange Rate Regime Proposal for Emerging Countries: A Keynesian Perspective." *Journal of Post Keynesian Economics* 31 (No. 2 2008): 227-48.
- Fisher, S. *Capital Account Liberalization and the Role of the IMF*. Princeton Essays in International Finance No. 207, Princeton: International Finance Section, 1998.
- FSF. Strengthening Liquidity Standards. December, 2008.
- Glick, Reuven, Guo, Xueyan, and Hutchison, Michael. "Currency Crises, Capital Account Liberalization, and Selection Bias." *Review of Economics and Statistics* 88 (No. 4 2006): 698-714.
- Grenville, S. *Exchange Rate Regimes for Emerging Countries*. Reserve Bank of Australia Bulletin, November, 2000.
- Grilli, Vittorio, and Milesi-Ferreti, Gian Maria. "Economic Effects and Structural Determinants of Capital Controls." *IMF Staff Papers* 42 (No. 3 1995): 517-51.
- Kang, H. "Fluctuations in Real Estate Prices and Monetary Policy Counter Measures." *Monthly Bulletin*, Bank of Korea 60 (No. 7 July 2006): 23-60 (in Korean).
- Keynes, J. M. *The General Theory of Employment, Interest and Money*. London: Macmillan, 1936.
- Kim, K.-H. "Structural Changes in the Housing Market and Government Policy: Before and After the Outbreak of the Asian Currency Crisis of 1997." *Kyong Je Hak Yon Gu* 55 (No. 4 2007): 369-99 (in Korean).
- _____. National Land and Real Estate. Presentation at 'The Korean Economy 60 Years' Conference, 2008.
- Kim, K., Kim, B.-K., and Suh, Y. Opening to Capital Flows and Implications from Korea. IMER Working Paper, Bank of Korea, 2009.
- Kim, K., and Song, C. Foreign Exchange Liberalization and Its Implications: The Case of the Korean Won. HKMA Conference on Currency Internationalization: International Experiences and Implication for the Renminbi, Hong Kong, October 15-16, 2007.
- Kindleberger, C. P. *A Financial History of Western Europe*. London:

- George Allen & Unwin, 1984.
- Klein, M., and Olivei, G. Capital Account Liberalization, Financial Depth and Economic Growth. NBER Working Paper 7384, 1999.
- Kong, C., and Han, Y. "Analysis of the Different Impacts of Interest Rates and Exchange Rates across Business Cycles." *Monthly Bulletin*, Bank of Korea 63 (March 2009): 23-49 (in Korean).
- Kose, M. A., Prasad, E. S., Rogoff, K., and Wei, S. J. Financial Globalization: A Reappraisal. IMF Working Paper WP/06/189, 2006.
- Kraay, A. In Search of the Macroeconomic Effects of Capital Account Liberalization. World Bank Working Paper, 1998.
- Lane, P. R., and Milesi-Ferretti, G. M. "The External Wealth of Nations Mark II Revised and Extended Estimates of Foreign Assets and Liabilities." *Journal of International Economics* 73 (No. 2 2007): 223-50.
- Lee, S.-Y. *Controversy Persists over Foreign Bank Control*. Korea Times, Section 6, December 30, 2009.
- Lee, T. "On Overseas Investment of Korea and Foreign Domestic Investment." *Foreign Exchange International Financial Review*, Bank of Korea 7 (June 2006): 95-114 (in Korean).
- Magud, N., and Reinhart, C. Capital Controls: An Evaluation. NBER Working Paper, 2006.
- Malovic, M. Exchange Rate Regimes and Monetary Policies in Emerging Markets: A Showdown for Few Theoretical Misconceptions. CSGG Discussion Paper No. 42, 2007.
- O'Donnell, B. Financial Openness and Economic Performance. Unpublished, Trinity College Dublin, 2001.
- Ostry, Jonathan D., Ghosh, Atish R., Habermeier, Karl, Chamon, Marcos, Qureshi, Mahvash S., and Reinhardt, Dennis B. S. Capital Inflows: The Role of Controls. IMF Staff Position Notes, SPN/10/04, February 19, 2010.
- Park, C., and Kim, A. "An Analysis of the Relation between the Korea-US Policy Rate Gap and KRW/USD Exchange Rate." *Monthly Bulletin*, Bank of Korea (February 2008): 50-80 (in Korean).
- Quinn, D. "The Correlation of Change in International Financial Regulation." *American Political Science Review* 91 (No. 3 1997): 531-51.
- Reinhart, C., and Rogoff, K. "The Aftermath of Financial Crises." *American Economic Review* 99 (No. 2 2009): 446-72.

- Rodrik, D. "Who Needs Capital Account Convertibility?" *Essays in International Finance* (No. 207 May 1998): 55-65.
- Rodrik, D., and Subramanian, A. "Why did Financial Globalization Disappear?" *IMF Staff Papers* 56 (No. 1 March 2009): 112-38.
- Rogoff, K. "Monetary Models of Dollar/Yen/Euro Nominal Exchange Rates: Dead or Undead?" *Economic Journal* 109 (No. 459 1999): F655-69.
- Ryou, S., and Park, S. "An Analysis of the Efficiency and Stability of Korea's Foreign Exchange and Swap Market." *Monthly Bulletin*, Bank of Korea 62 (October 2008): 54-92 (in Korean).
- Stiglitz, J. E. "Capital Market Liberalization, Economic Growth, and Instability." *World Development* 28 (No. 6 2000): 1075-86.
- _____. "Global Crisis and a Crisis-resilient Macro-financial System." *Seoul Journal of Economics* 2010, Forthcoming.
- Summers, L. H. "International Financial Crises: Causes, Prevention and Cures." *American Economic Review* 90 (No. 2 2000): 1-16.
- Taylor, L. "Capital Market Crises: Liberalization, Fixed Exchange Rate, and Market-Driven Destabilization." *Cambridge Journal of Economics* 22 (No. 6 1998): 663-76.
- UN Commission (Led by Stiglitz). *Report of the Expert on Reform of International Monetary and Financial System*. New York: United Nations, 2009.
- UNCTAD. *Trade and Development Report 2009*. New York: United Nations, 2009.
- Wang, Y. K. Flexible BBC Exchange Rate System and Exchange Rate Cooperation in East Asia. KIEP Working Paper 08-03, 2008.
- Williamson, J. *Crawling Bands or Monitoring Bands: How to Manage Exchange Rates in a World of Capital Mobility*. Institute for International Economics, 1999.
- Wilson, P. "Monetary Policy in Singapore: A BBC Approach." In W. Chia and H. Sing, (eds.), *Singapore and Asian in Globalized World*. Singapore: World Scientific, 2009.
- Yang, Y., and Lee, H.-L. "An Analysis of the Attractions of Arbitrage Transactions and of Domestic Bond Investment by Foreigners and Korean Branches of Foreign Banks." *Monthly Bulletin*, Bank of Korea (August 2008): 55-89 (in Korean).
- Yoon, S., and Bae, J. "Analysis of Factors Affecting Inflows and Outflows of Foreign Capital for Stock Investment." *Monthly Bulletin*, Bank of Korea 61 (No. 9 September 2007): 23-56 (in Korean).