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Exchange Reserves?
The Case of South Korea**

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Abstract

In the 1997 Asian Financial Crisis, South Korea, which had been a very successful economy, was forced to raise interest rates and cut government spending by the IMF. These measures caused great economic distress. Because Asian countries were not well represented in the IMF's governance structure, Korea could not effectively appeal the decision. We argue that what Korea and neighboring countries learned from this experience was that they had to accumulate their own reserves to self-insure against future crises. This self-insurance in East Asia has allowed Korea to navigate the current crisis well. However, the trillions of dollars of foreign exchange reserves accumulated in Asia have contributed to the 'global imbalances' that have played an important role in causing the current crisis. We suggest three possible solutions: reform of IMF governance, increased liquidity through regional risk sharing and foreign exchange swaps, and the Chinese RMB as a reserve currency.

Key words: *foreign exchange reserves, Asian Crisis, IMF, self-insurance.*

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I. Introduction

Countries are often hit by economic shocks of various kinds. One of the most important issues is how this risk can be shared. Originally the International Monetary Fund (IMF) was set up to facilitate this kind of risk sharing. Often, the IMF requires countries to make reforms in exchange for providing loans. Sometimes these reforms are very helpful as in the case of India in the early 1990's. In others they can be very damaging as in the case of South Korea in 1997.

The governance of an international organization such as the IMF is crucial to its success. Under the Bretton Woods Agreement and the implicit agreements that go along with it, the Europeans and U.S. dominate. The Asians have relatively less representation. This caused a significant problem during the Asian Crisis of 1997. Despite being one of the most successful economies in the second half of the twentieth century, the South Koreans were forced to raise interest rates and cut government spending. This caused great economic distress. Because of the under-representation of Asian countries in the IMF's governance structure and staff, there was very little that South Korea could do to appeal against the imposition of these harsh measures. Not surprisingly, the conclusion that they and other Asian countries drew from this experience was that they must never again be put in the situation of having to go to the IMF for help. Instead they and many other Asian countries decided to accumulate trillions of dollars of foreign exchange reserves. These contributed to the 'global imbalances' that have played such an important role in causing the current crisis.

The self-insurance that these reserves allow has been quite effective. South Korea provides a good example. Its foreign exchange reserves have allowed it to navigate the current crisis without resort to the IMF. However, it is extremely costly and inefficient in terms of resource allocation. First, the method requires that reserves be accumulated. One way to do this is a lowering of consumption in the accumulating countries and an increase in consumption in the countries whose assets are being acquired. These self-insurance balances will be long lasting and so represent a real resource cost. Another possibility is that long term debt is issued to finance short term foreign assets. Here the cost is the difference between the long and short term rates. These costs of reserves are the first inefficiency associated with self-insurance. The existence of these reserves vastly increased the amount of credit available, particularly in the U.S. but also in other countries such as Spain and Ireland. This easy availability of credit was a major contributor to the property bubbles that lie at the heart of the crisis that started in 2007. This is the second inefficiency.

Going forward, one of the major tasks is to eliminate the incentives for the Asian countries to self insure with such large quantities of reserves. One method is to reform the IMF. A second method is to increase liquidity provision for the Asian countries by increasing regional risk sharing and currency swaps between central banks. A third is for China to allow the RMB to become a reserve currency along with the dollar and the euro.

II. South Korea in the 1997 Crisis

South Korea has been one of the most successful economies in the world in the second half of the 20th century and the beginning of the 21st century. From 1970-2009 the Korean economy grew at an average rate of 7.35% in real terms. With its high economic growth, the country in the 1990s was known as one of the 'Four Asian Tigers,' together with Hong Kong, Singapore and Taiwan.

During the period 1994-1996, Korea showed steady economic growth: the real GDP rate showed 8.2% growth on average and the unemployment rate remained about 2%. The fiscal position was strong, with a surplus of about 0.4% of GDP, and public debt was below 11% of GDP, of which only about one-fifth was foreign debt.

However, the seeds of the crisis had been sown over many years. Baliño and Ubide (1999) noted that the Korean economy was dominated by large corporations, *chaebols*, which were highly dependent on borrowing, particularly from the banking system. The high leverage ratios and low profitability of the *chaebols* made them vulnerable to any shock to their cash flow.¹ In the financial sector, weak regulatory and supervisory arrangements allowed banks to incur excessive risk without building a capital base to withstand shocks. As the *chaebols* aggressively expanded their business abroad, banks accordingly increased their foreign short-term borrowings and channeled external short-term funds to long-term loans financing investments by domestic corporations.

The crisis, which started with the collapse of the Thai Baht peg in July 1997, and subsequent crash of the Hong Kong stock market

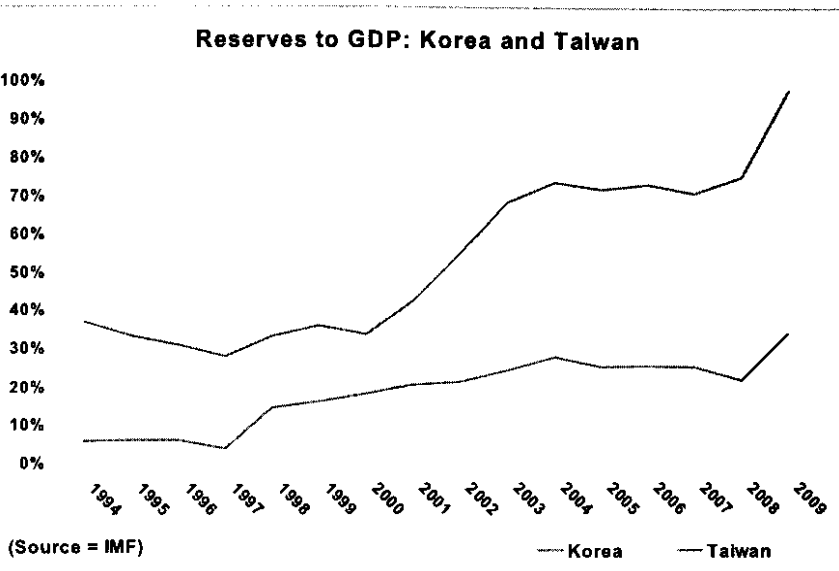
in Oct 1997, was transmitted to the Korean economy. As the situation deteriorated, banks were unable to meet their short-term debts. In response to the banks' request for foreign exchange liquidity, the Bank of Korea disbursed \$20 billion of reserves immediately and almost used up its reserves by the end of 1997. In order to prevent the bankruptcy of the country, Korea had only one choice left: turn to the last resort of lending, the IMF. On Dec 4, 1997, the nation signed a contract with the IMF, pledging to follow the Fund's conditions, and established a \$21 billion arrangement.

Taiwan, another Tiger in Asia, is an interesting comparison. In contrast to its neighbors with similar size economies that were financially devastated by the crisis, Taiwan was not badly hit by the storm in the region. The real GDP growth rate and unemployment rate in Taiwan were not greatly affected. The real GDP growth rate of Taiwan slightly decreased from 6.6% in 1997 to 4.5% in 1998, while Korea's rate significantly dropped from 4.6% to -6.8%. The unemployment rate in Taiwan remained constant averaging 2.7% in 1997-98 period but Korea's jumped from 2.6% to 7% in the same period. In comparison to Korea, it is true that the structure of Taiwan's economy was different. The economy of Taiwan was more dependent upon China and consisted of small to medium sized businesses, which can partly offset the external shock. In terms of government balance, Taiwan recorded negative numbers from 1994 to 1996, whereas Korea saw positive numbers in the same account.²

1. Baliño and Ubide (1999) indicate that the debt ratio of the *chaebols* exceeded 400% during the 1990s, compared to an average of 150% in the U.S., 210% in Japan and 90% in Taiwan.

2. The government balance (% of GDP) of Taiwan was -3.56%, -4.32%, -4.97% in year 1994, 1995 and 1996, while that of Korea was 0.07%, 0.30%, 0.24% during the same period (IMF).

Figure 1. Reserves to GDP: Korea and Taiwan



However, there was a major difference between the two countries – their holding of reserves. Taiwan held three times more reserves than Korea during 1994-1996. Given that the GDP of Taiwan was half that of Korea in 1997, the reserve to GDP ratio in Taiwan is higher than that of Korea. Korea's reserves to GDP ratio was 5.9% in 1996 and 3.7% in 1997 while Taiwan's was 30.7% in 1996 and 28% in 1997 (Figure 1).

III. The IMF and its Governance

The International Monetary Fund (IMF) was conceived in July 1944 when the representatives of 44 governments met in Bretton Woods, and agreed on a framework for international economic

cooperation. The Fund was formally established in Dec 1945, when the 29 participating countries signed its Articles of Agreement. The institution was created to give confidence to members that the general resources of the Fund would be made temporarily available to them under adequate safeguards. In other words, the IMF was set up to facilitate risk sharing when its member countries were hit by economic shocks and needed to obtain assistance. The Articles also specified that the institution would provide them with the opportunity to make adjustments in their balance of payments without resorting to measures destructive of national or international prosperity.

The governance of an international organization such as the IMF is crucial to its success. From its inception, however, Asian countries were largely underrepresented. Among the 44 delegations in Bretton Woods, there were 12 European countries,³ 19 Central and South American countries⁴ and two East Asian nations (China and the Philippines). Under this representation, it is not surprising that the U.S. and European countries, which initiated the formation of the Fund, made an implicit agreement for their dominance of the Fund.

The lack of balance in the representation of countries has been criticized for a long time and the debate is not over yet. In the Fund, two areas have been main target of the critics: the European and U.S. dominance in top management and unbalanced voting

3. Belgium, Czechoslovakia, France, Greece, Iceland, Luxembourg, the Netherlands, Norway, Poland, U.K., the USSR and Yugoslavia. (<http://external.worldbankimflib.org/Bwf/delegationsBW.htm>). The USSR did not sign the final agreement.

4. Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, the Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela (<http://external.worldbankimflib.org/Bwf/delegationsBW.htm>)

shares among the members.

Historically, senior executive positions have been taken by Europeans and Americans. The Managing Directors⁵, the top of the organization's hierarchy, have been only Europeans and the First Deputy Managing Directors, the second highest position, have been Americans. Even though there is no explicit rule, this role split has been a long tradition in the organization from the time of the Bretton Woods Agreement. Only a few Asians have been allowed to participate in the top management group.

IMF quotas are a pivotal issue in the fund's governance. The quota of the country directly translates into voting power, because the number of votes a country has in the Fund is based primarily on the size of its quota. Negotiations over IMF quotas have traditionally been informed by formulas that involve GDP at current market prices, international reserves, current payments, current receipts and variability of current receipts. According to Truman (2006), the increase in a country's individual quota is based on some combination of its current quota share, which always receives the largest weight, an adjustment to bring some countries closer to their calculated quota shares, and occasional ad hoc adjustments for the countries whose quotas are way out of line. Since the existing quota has been given the largest credit in quota calculation, the countries that were allocated large quotas in the original Bretton Woods Agreement have maintained high voting shares and have exerted a strong influence on the Fund's decisions.

Figure 2. IMF Voting Share and GDP Share 2009

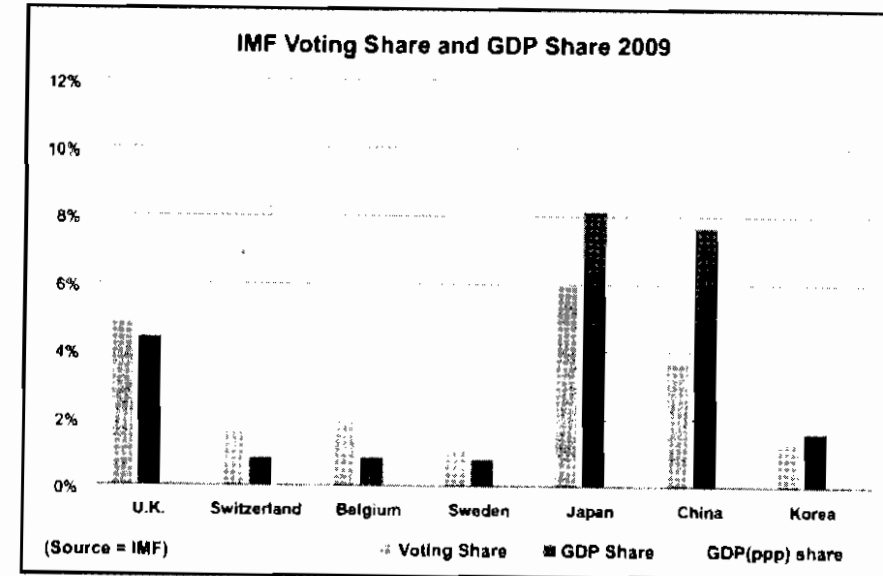


Figure 2 shows a comparison between the voting share of each country in 2009 in the IMF and GDP share. East Asian countries such as Japan, China and Korea have lower voting shares than their GDP shares, whereas European countries such as the U.K., Belgium and Sweden maintain higher voting power than their GDP equivalents. Even after several revisions of the voting shares, Asian countries are still underrepresented in the decision making process of the Fund. The Bretton Woods system has affected the current governance of the IMF for over 60 years and this legacy led to a problem in the Asian Financial Crisis in 1997.

⁵ So far, five Managing Directors have been from France, two from Sweden, and one each from Belgium, the Netherlands, Spain and Germany.

IV. The Wrong Medicine

In exchange for a cash infusion, the IMF prescribed two policies for Korea: high interest rates and tight fiscal policy.⁶ Following the disbursement contract, the IMF drove Korea to increase interest rates sharply, and implement a tight fiscal policy.⁷ For instance, money market rates climbed from 11% in mid 1997 to 25% in early 1998. Due to the highly leveraged finance structure in the corporate sector, the impact was quickly felt. The debt service burden in corporations intensified as the average lending rate rose and subsequently, many firms faced bankruptcy. In January 1998, compared to mid 1997, the average daily number of corporate insolvencies more than tripled and the % age of dishonored bills rapidly escalated.⁸ With a decline in asset prices and increase in default risk, the credit market significantly contracted, and more firms found it difficult to obtain loans. In particular, SMEs (small and medium sized enterprises) were hit harder by the credit squeeze: they relied more on bank credit financing and had few choices of alternative financing.⁹

6. "Monetary policy to be tightened immediately to restore the market and contain inflationary impact of recent Won depreciation. Money market rate will be maintained at a high level as needed to stabilize markets", "For 1998, fiscal policy will remain tight. Additional fiscal measures of about 1-1/2% of GDP will be put in place to achieve balance or small surplus" (IMF Press Release 97-55, December 1997).

7. On December 22, 1997, the statutory ceiling on interest rate was raised from 25% per annum to 40% and call rates reached 32% on December 26 from 12% in early Dec 1997. Other market interest rates also increased sharply during this period. The average bank lending and deposit rates climbed from 12% before the crisis to 18% and the overdraft lending rate jumped 13% age points to 37%.

8. Baliño and Ubide (1999) showed that the daily number of insolvencies increased from 10 in mid 1997 to 30 in Jan 1998. The % age of dishonored bills grew to 2.3% from 0.2% range before the crisis.

9. SMEs accounted for 73% of the total corporate financing by domestic money

Due to tight government spending throughout Q1 of 1998, the recession was made even more severe and accordingly, the overall economy was significantly disrupted. Real GDP recorded negative growth (-6%) in 1998 and the unemployment rate rose from its 2% average level to 9% at the beginning of 1999. After a brief spike in early 1998, inflation was subdued owing to weak domestic demand. Even though many people suffered from bankruptcy and job loss, the government could not offer an additional social safety net because its spending was restricted by the agreement with the IMF.

There has been a long debate about whether the IMF used appropriate measures in the Asian Crisis.¹⁰ Some, who defended the Fund, said that it was necessary to increase interest rates in order to stabilize the foreign exchange market and prevent capital flight. However, the high interest rate policy was kept for five months in Korea, which was too long, and it consequently inflicted unnecessary pain on the economy.¹¹ At that time, the IMF brought the same formula that they had used for the debt crisis in Latin America in the 1980s: high interest rates and tight government

banks while large companies only comprised 27% (IMF Korea Country Report, 2000).

10. The IMF partially acknowledged its fault on Korea. Also, Hubert Neiss, the director of the Asian Pacific Department in 1997, reflected on the Fund's policy on Korea: "The depth of the recession was not recognized at the beginning of the crisis, and the fiscal relaxation required to mitigate the decline of GDP - especially in view of the need to initially maintain high interest rates - came, therefore, too late. Interest rates were initially raised only hesitatingly and then kept high a bit too long. This aggravated foreign exchange market turmoil first and the recession later" (public speech in Korea, 2007).

11. Duk Koo Chung wrote in his book *The Record of the Financial Crisis* (2007): "From the beginning of 1998, Korean representatives constantly persuaded the IMF's officials to lower interest rates. However, we heard the same response: 'We need more time to see the market stability in Korea'. Meantime, innumerable firms fell down with bankruptcy and people were kicked out from their work force. Kids were abandoned by their parents and the suicide rates rapidly increased."

spending. Unlike South America, the public debt level was much lower in South Korea (below 11% of GDP), which eliminated the necessity to restrict government spending. Given the high corporate leverage ratio in Korea, it was clear that the economy would be devastated if the authority raised interest rates. In the middle of negotiations, however, the Fund did not fully investigate the country nor did it sufficiently take into account the differences between the Korean economy and South American economies. Even worse, the Fund replaced the Korean specialist in the organization a few weeks before the crisis and spent only a few days to reach the terms for the agreement.¹²

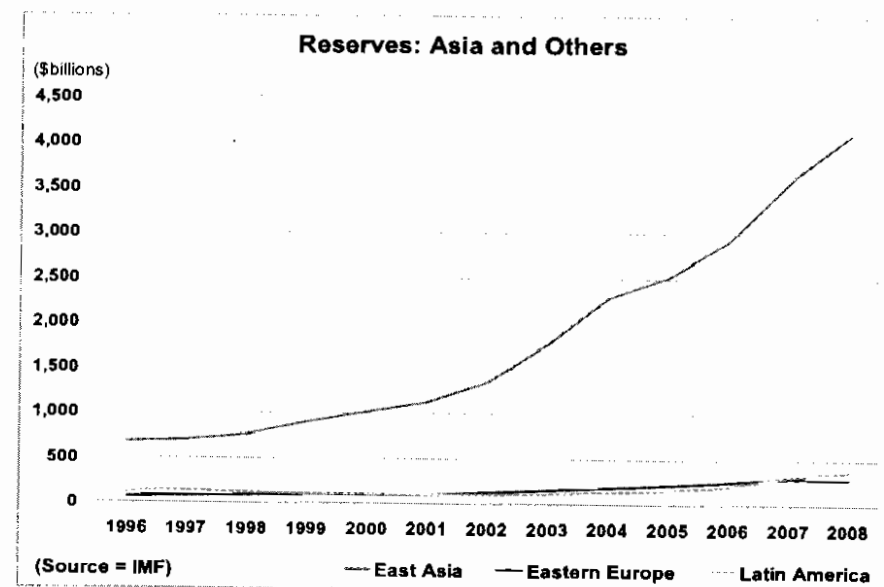
It is informative to see how the U.S. and Europe dealt with the current crisis. Interestingly, they adopted the exact opposite approach to what the IMF did in Asia: the U.S. and Europe lowered their interest rates and disbursed trillions of dollars and euros of bailout money into the market. As explained below, Korea navigated the current crisis well with low interest rates and high government spending.

V. Reserves as Self-Insurance

The Asian countries, which went through tough times under the policies imposed by the IMF, learned an important lesson: they would have to accumulate foreign exchange reserves to deal with the future crisis without turning to the IMF.¹³ Given these

countries' experience, neighboring countries, such as China, learned the same lesson.

Figure 3. Reserves: Asia and Others



As seen in Figure 3, all East Asian countries in total have accumulated trillions of dollars of reserves after 1997, whereas Eastern European and Latin American nations have kept roughly the same level of reserves¹⁴. Even though Asian economies grew faster than those of Eastern Europe and Latin America, it is still surprising to see the rise of reserves in Asia.

There are two main viewpoints on the huge reserves in East Asia: 'the self-insurance motive' and 'the Asian mercantilist view'.

¹² Blustein confirmed these facts in his book *The Chastening: Inside The Crisis That Rocked The Global Financial System And Humbled The IMF (2003)*.

¹³ KyungWook Huh, The Vice Minister, Ministry of Finance in Korea said: "We will never, ever, turn back to the IMF in the future. We suffered too much due

to the IMF's policy. Koreans would never allow the government to receive even a penny from the Fund" (July, 2009, Interview).

¹⁴ China, Hong Kong, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Taiwan, Thailand.

The first interpretation is that these countries have built up a huge amount of reserves as a result of precautionary demand, reflecting the desire for self-insurance against future sudden restrictions in their ability to borrow funds from other countries. For countries whose currencies are less liquid and capital market access is less than assured, reserves can reduce both the risk and impact of current account shocks or capital account crises. This contrasts with advanced economies with highly liquid floating currencies and stable financial market access in domestic currency that are less motivated to hold large reserves. Some argue that East Asia's hoarding of reserves is a result of this perspective, because the magnitude and speed of increase in reserves of East Asia accelerated after 1997. The 'Asian Mercantilist view', which is advanced by Dooley, Folkerts-Landau, and Garber (2003), suggests that reserve accumulation is triggered by concerns about export competitiveness. Under this analysis, the Asian countries, particularly China, wanted to promote export growth by preventing or slowing appreciation of their currencies and as a result, foreign currency reserves have been accumulated in their accounts.

Between these extremes, Aizenman and Lee (2007) find that variables associated with trade openness and exposure to financial crises are both statistically and economically important in explaining reserves, while variables associated with the mercantilist view are statistically significant but economically insignificant. They conclude that precautionary demand is consistent with high levels of reserves in East Asia.

The 1997 Asian Financial Crisis led most affected countries to go through tough adjustments and hindered domestic economic growth for several years. Caprio and Klingebiel (2003) estimate the fiscal cost of the banking crisis at 55% of GDP in Indonesia, above 40% in

Thailand, and 20% in Malaysia and Korea. Wolf (2009) demonstrates that investment rates of East Asian developing countries other than China fell by about 10% of GDP between 1997 and 1998 and never subsequently recovered. From the calibrations in Jeanne and Rancière (2006) and Jeanne (2007), the average probability of crisis is 10%, equal to the unconditional frequency of sudden stops in access to international markets in a sample of emerging economies during 1975-2003. Given the painful costs of the Asian Crisis and the high probability of crisis, it is plausible that reserve accumulation across East Asia was driven by precautionary motives, reflecting the trade-off between mitigating potential costs of crises and bearing the opportunity cost of holding liquid assets.

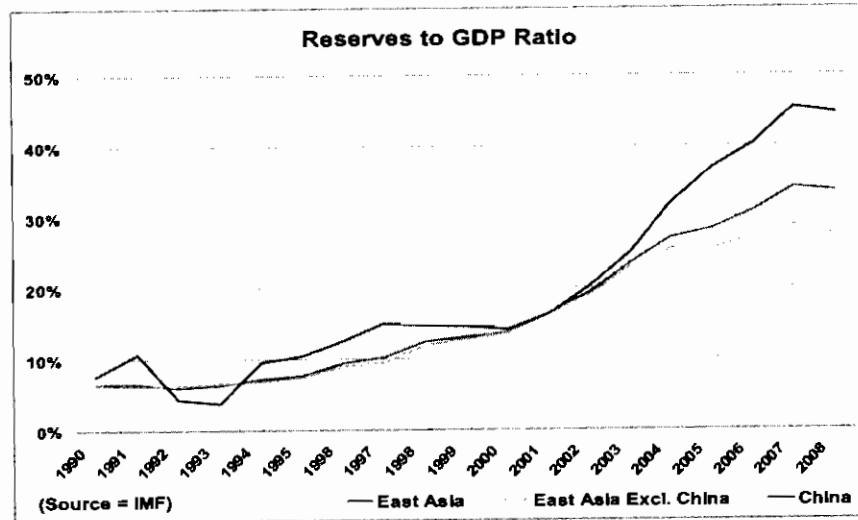
In the case of South Korea, the empirical evidence supports the self-insurance explanation for the rise of reserves. From 1997 to 2007, the reserves in South Korea grew more than ten times.¹⁵ Before the Asian Financial Crisis, its reserves were lower than most of its Asian competitors – Taiwan, Singapore, Hong Kong, Thailand and Malaysia – but in 2007 the country's holding was the sixth highest in the world.¹⁶ Korea partially owes its huge reserves to a surplus in the current account – the cumulative surplus is \$157 billion from 1997-2007. Contrary to the Asian Mercantilist view, however, the Korean Won actually appreciated over time during this period.¹⁷ In addition, the Korean government has acknowledged that it had a self-insurance motive with its saving.¹⁸

¹⁵ We used the data from 2007 because it is the highest level of reserves before the current crisis in Korea.

¹⁶ As of Dec 2009, China, Japan, Russia, Taiwan, India, Korea, Hong Kong, Brazil, Germany and Singapore (from highest to lowest) are the top ten countries holding the largest reserves (excluding the Eurozone).

¹⁷ In 2000-2003, Korean Won per 1 USD on average was 1214 Won but, in 2004-2007, Won per USD was 1013 Won (Bank of Korea website).

Figure 4. Reserves to GDP Ratio



The same phenomenon in the rest of East Asia is also explained better with a self-insurance view. Since the 1997 crisis, the rate of increase in reserves surpassed the same rate of GDP. In Figure 4, reserves to GDP ratio was below 10% before 1997 in Asia but, at the end of 2007, it climbed up to 35%. Some may argue that this increase is mainly due to the reserves accumulation in China. Figure 4 also shows the same number excluding China, which depicts almost the same movement in the period. Regarding the fact that the current account surplus in Asia has been a constant trend since 1990, the sudden increase in reserves since 1997 can be interpreted as a deliberate attempt at self-insurance.

18. Huh, Vice Minister of the Ministry of Finance, said: "The family who had big fire in their house would reasonably need fire insurance. From 1997's experience we learned that the national humiliation and pain under IMF's rule was not the thing which we can bear any more. We conclude that, in the short-run, holding reserves would be the best precautionary measures against the financial shock" (July, 2009 interview).

VI. South Korea in the Current Crisis

At the beginning of 2008, South Korea had an ample amount of reserves, \$264 billion, amounting to one quarter of its annual GDP. The country was ready to liquidate the assets whenever this was needed. It did not take very long for the country to make use of the savings. In the aftermath of Lehman Brothers' collapse, foreign investors, who held 40% of stock,¹⁹ pulled back their money and consequently, the exchange rate and the stock market were both disrupted.²⁰ From their memories of 1997, people feared that the nightmare would recur. However, Korea had enough money in hand to extinguish the fire this time.

In comparison with the crisis in 1997, the cause of the current crisis was different. Ten years ago, highly leveraged conglomerates in Korea incurred excessive foreign borrowings, while banks had low capital bases. After several reforms initiated by the government in the corporate and financial sectors, the leverage ratio of the top 40 companies went down to the 100% level at the end of 2007. During 2005-2007, real GDP grew steadily at 4.75% on average, and the unemployment rate stayed at 3.5%, far below the average of OECD members.²¹ In the same period, the Korean government's financial position remained strong, with a surplus of 2.3% of GDP.

In both cases, the external debt including short-term borrowings rapidly increased before the crises. Figure 5 shows that both the

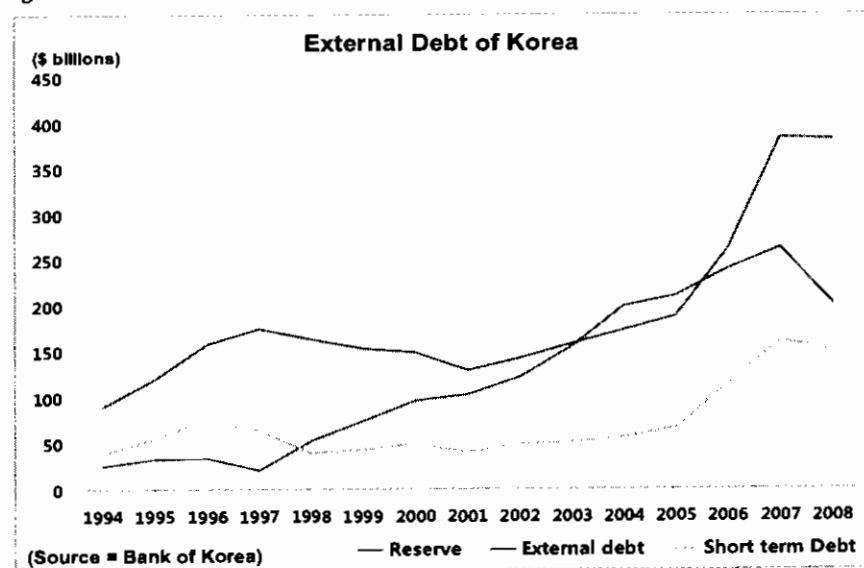
19. The holding is calculated in market cap.

20. The Korean Won, which valued 1010 Won per dollar in May depreciated to 1468 Won by the end of Oct. During the same period, KOSPI, the primary index in the Korean stock market, was halved from 1884, its peak of the year, to 939.

21. During 2005-2007, the average unemployment rate of the OECD members was 6.27%.

external debt and the short-term borrowings climbed during 2005-2007, as it did before the Asian Financial Crisis. However, the composition of external debts was not the same. In the period of 2005-2007, the external debt grew mainly due to foreign currency hedge demand driven by export companies and private sector investment in foreign stock markets. In 1995-1997, the foreign borrowings went up because companies were generally dependent upon excessive leverages and banks favored short-term debt which caused maturity mismatch at the time of the crisis. Most of all, reserves in 2005-2007 far exceeded overall short-term borrowing, whereas reserves in 1995-1997 were around half of short-term debts.

Figure 5. External Debt of Korea



Throughout the year in 2008, reserves in Korea rapidly dropped from \$262 billion to \$201 billion. In particular, \$40 billion was spent after September to stabilize the market. The government used

reserves mainly in two ways: first, to intervene directly in the foreign exchange market and to supply dollars to banks. In addition, the holding of reserves helped the Korean government come to terms with the U.S. for establishing a \$30 billion swap line.²²

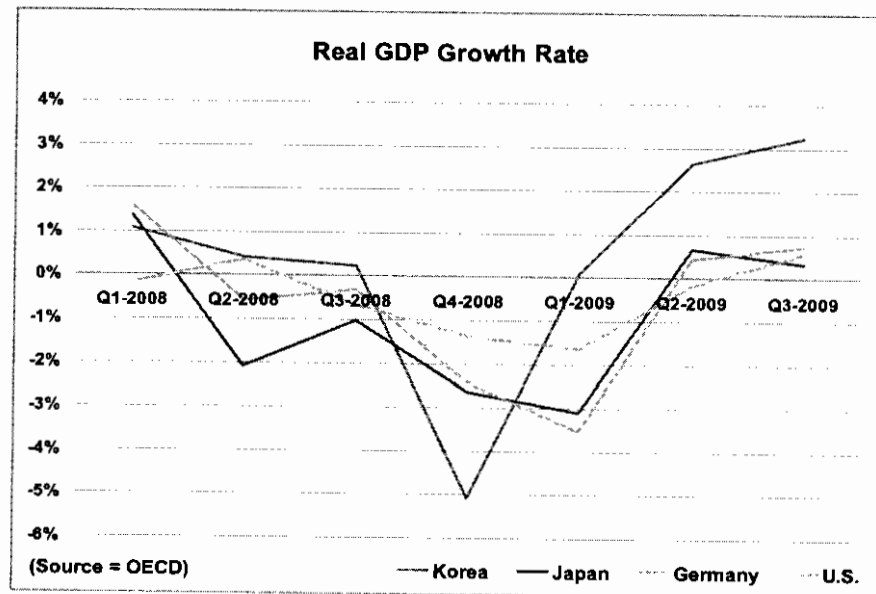
Without the IMF's intervention, the government of Korea made its own decisions this time. Contrary to the high interest rates and tight fiscal policy mandated by the IMF in 1997-98, the opposite was implemented in 2008-09: low interest rates and expansion in government spending. As a result, the weaker Won exchange rate against the dollar enhanced price competitiveness in exports. According to the government's estimate, the current account surplus was the highest recorded in the first half of 2009 (\$21 billion).

The liquidity supply allowed by the reserves, accompanied by the appropriate economic policy, allowed the country to navigate the global financial turmoil well. Among OECD members, Korea indicated the highest GDP growth in the first and second quarters in 2009. Figure 6 shows the real GDP growth rate of Korea and of major OECD countries. In comparison with other trade-oriented economies such as Germany and Japan, Korea showed a much faster recovery.

From its experience of crises with and without reserves, Korea learned that reserves worked well for the country's insurance. Furthermore, the country was able to keep its political and economic independence. Consequently, the government is accumulating reserves again. At the end of 2009, Korea again reached the level of reserves before the crisis, \$269.9 billion.

²² The agreement mitigated distress in the foreign exchange market. On the day of the announcement of the currency swap, the Korean Won appreciated from 1427 Won to 1250 Won per dollar.

Figure 6. Real GDP Growth Rate



VII. Inefficiencies Caused by Large Holdings of Reserves

On an individual country level basis, the acquisition of reserves has been a significant success. However, it is costly and inefficient in terms of resource allocation. There are at least two inefficiencies associated with holding large reserves. First, the method requires a lowering of consumption in the accumulating countries and an increase in consumption in the countries whose assets are being acquired. The self-insurance reserves will be long lasting and so represent a real one-time resource flow. The countries acquiring the reserves are poor relative to the U.S., which is the main consuming country. Secondly, the existence of these reserves vastly increased

the amount of credit available, particularly in the U.S. but also in other countries. This credit led to property bubbles as we have argued above.

The cost of reserves has been debated over the years particularly after the Asian crisis. Regarding the opportunity cost and the contraction of domestic consumption, accompanied with national savings, some argue that reserves are expensive assets to hold. Others disagree with this view because they take other effects into account, such as the potential cost of the financial crisis that may be avoided and the spread for external borrowing which is lowered by reserves.

Rodrik (2006) calculates that the social costs of reserves amount to 1% of GDP for developing nations as a whole. Regarding central banks holding their reserves mostly in the form of low-yielding short-term U.S. Treasury securities, Rodrik reports each dollar of reserves that a country invests in these assets comes at an opportunity cost that equals the cost of external borrowing for that economy. Summers (2006) sees countries with excessive reserves earn almost zero return measured in domestic terms, whereas they can benefit from a return of 6% if they invest either domestically in infrastructure or in fully diversified long-term global assets. Summers calculated the opportunity cost of these reserves comes to 1.85% of their combined GDP, aggregating the ten leading holders of large reserves.

In Korea, the direct cost of reserves was 0.1-0.2% of GDP during 2005-2007,²³ excluding fair value adjustment of securities held by

23. This cost of reserves is calculated as follows: Profit(Interest earned on securities+ Profits on sales of securities)-Cost(Interest paid on Monetary Stabilization Fund+ Interest paid on securities+ Interest paid on Foreign Currency Equalization Fund). Korea as a nation recorded a loss of 1,000 to 1,900 billion Won during 2005-2007. The numbers were acquired from the

the Bank of Korea and ignoring the opportunity cost of reserves.²⁴ This resource can be directed to other sectors in the economy, such as education and social welfare. If the opportunity cost of crowding out private investment is included in this calibration, as some have argued should be done, the social cost of holding reserves is even more significant.

However, the majority of Koreans, including decision-makers, believe the direct and indirect costs are easily offset by the benefit of preventing a severe financial crisis. Korea's reserves amounted to 20-25% of its annual GDP during 2005-2008, when total public expenditure in the same period came to 23.3% of GDP. It is sometimes argued that the optimal level of reserves is the sum of a country's short-term external debt and three months of imports.²⁵ The level of reserves in Korea clearly exceeds this level. Notwithstanding the inefficiency of the resource utilization, the speed of accumulating reserves is likely to be continued or even accelerated within the next few years.

Secondly, political constraints on buying large amounts of equity mean that most of these investments were in the form of debt securities. This easy availability of credit was a major contributor to the property bubbles that lie at the heart of the crisis that started in 2007. It is the second inefficiency associated with large reserves.

Why the excessive credit flowed to the U.S. and Europe has been the topic of intense discussion. The 'Savings Glut view', explaining the phenomenon with a supply side push from the developing

world, is advanced by Bernanke (2005). The Asian countries increased reserves through the expedient of issuing debt to their citizens, thereby mobilizing domestic saving, and then using the proceeds to buy U.S. Treasury securities and other assets. This shift by developing nations, together with the high saving propensities of Germany and Japan, has resulted in a 'Savings Glut', which boosted equity value and helped to increase home values in the U.S. Summers (2006) also notes that three elements – a capital flow from emerging markets to industrial countries, huge accumulation of reserves and expected negative returns on reserves – constituted the capital flows paradox. As a consequence of this paradox, he explains that the current account deficit is growing in the U.S. and investment in the U.S. is tilted towards real estate and the non-traded goods sector.

In response to this view, Shin (2009) suggests that the holding of U.S. debt securities is explained by the momentum of rapidly growing balance sheets in the residential mortgage sector which searches for funding sources. The greater risk-taking capacity of the shadow banking system leads to an increased demand for new assets to fill the expanding balance sheets and an increase in leverage. Among the new sources of funding will be foreign investors, including the central banks in Asia. One problem with this view is that reserves are back to where they were before the crisis despite the fact that U.S. banks have deleveraged. There is not much demand from them any more but reserves are already back where they were and are continuing to grow.

The abundant reserves in East Asia, which were spurred by the IMF's unbalanced governance and inappropriate economic policy, flowed to the U.S. where there was great demand for credit. Due to political constraints, much of these reserves were invested in the

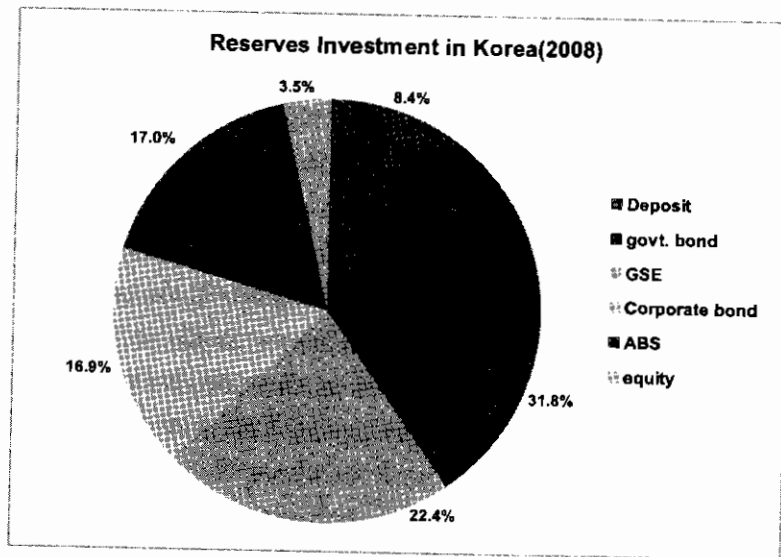
Bank of Korea database and the Ministry of Finance website.

²⁴ The cost of reserves is accordingly 0.22, 0.21 and 0.11 % of GDP in 2005, 2006 and 2007.

²⁵ This is called the Greenspan-Guidotti rule.

form of debt securities. Attempts to buy equities by Asian countries were often not allowed. In August 2005, China National Offshore Oil Company Ltd. (CNOOC) announced that it had withdrawn its acquisition offer for Unocal Oil Company, a U.S. oil company, due to political opposition. In the U.S., some viewed the proposed merger as a threat to American security. In June 2009, Chinalco, a state-owned Aluminum corporation in China, failed to acquire an 18% stake in Rio Tinto, the world's third-largest mining company in Australia, after it confronted opposition, reflecting fears of giving China direct access to natural resources.

Figure 7. Reserves Investment in Korea (2008)

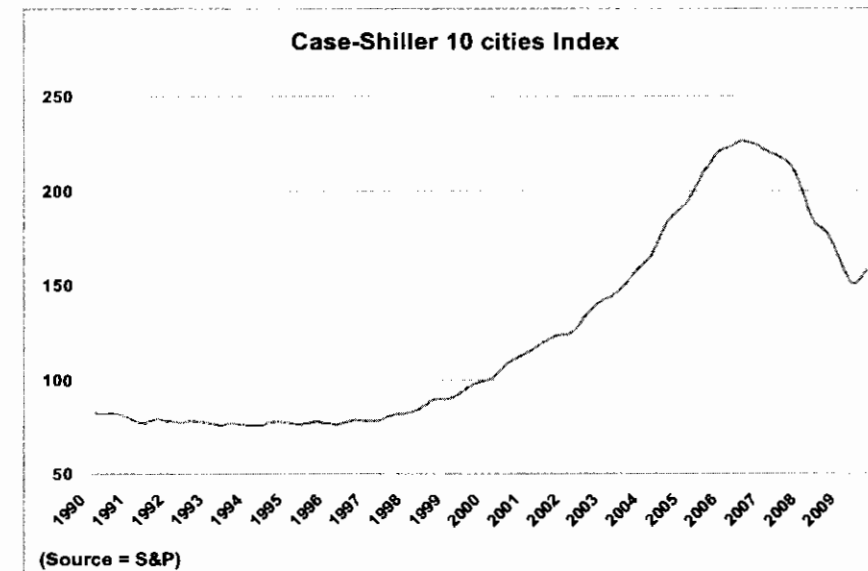


Source: Bank of Korea

Moreover, the countries which hold reserves for a precautionary demand need to keep reserves in the form of secure assets which can be easily liquidated. For this reason, most reserves held by

Asian countries are invested in debt securities. As Figure 7 demonstrates, more than half of reserves in Korea were invested in government bills or GSE (Government Sponsored Enterprise) backed securities. Only 3.5% of total reserves were invested in equity.

Figure 8. Case-Shiller 10 Cities Index



This capital inflow into U.S. debt securities helped to drive down lending standards and led to an excessive supply of credit especially to the housing sector. As seen in Figure 8, it is unlikely to be a coincidence that housing prices in the U.S. started to increase sharply after the Asian Financial Crisis. It can be argued that the root cause of what happened can be traced back to the IMF. We will discuss how we might solve this problem in the next section.

VIII. Fixing the Problem

Going forward, we suggest three possible solutions to eliminate the incentives for the Asian countries to self-insure with large quantities of reserves. These are 1) reforming the IMF; 2) expanding regional arrangements and foreign currency swaps between central banks, and; 3) allowing an additional reserve currency.

Amidst the mounting criticism toward the IMF and in particular its policies on developing countries, members and outside observers have voiced the need to reform the organization. There was an evaluation that the IMF's guidelines for the troubled Asian nations did not embrace differences in the Asian countries. Emerging economies also do not trust the IMF because they do not think they have enough say in it. The insurance function of the Fund has been diminishing since developing countries were dissatisfied with the Fund's policies (Kupur & Webb, 2007).

In order to reform the organization, the governance of the IMF needs to be changed. There have been reforms but these have not gone far enough. When Dominique Strauss Kahn resigned as Managing Director in the summer of 2011 he was replaced by another European, Christine Lagarde, despite assurances by European countries that things would be different going forward. The new First Deputy Managing Director was again an American. Even after the reforms, European countries taken together still have around 30% of the votes and the U.S. has around 17%. Truman (2006) advocates the convergence of the U.S. and EU quota shares to 18% total each. This convergence would free up 13 to 16% of today's quotas for reallocation to other members and accordingly, more quotas could be allocated to China and the

developing world.

According to a report led by Trevor Manuel, South Africa's finance minister, the voting threshold on critical decisions should be lowered from the current number, 85%, to 70-75% because the existing ceiling amounts to a veto for the U.S., with its 17% voting share. The committee also recommends that the selection of the Managing Director should occur through a transparent, open and merit-based system. Additionally, a new lending source which is more easily accessible for borrowers with less strict conditions, the FCL (Flexible Credit Line) should be carefully implemented.

The reforms adopted so far have not gone far enough. They have not prevented the resumption of the acquisition of foreign exchange reserves by many Asian countries. Much bolder reforms are required to achieve this end.

Secondly, we believe regional arrangements and foreign exchange currency swaps between central banks need to be strengthened and made available to more countries. The Chiang Mai Initiative (CMI) should be a good start for regional cooperation in East Asia. On May 3rd 2009, 'ASEAN + 3 (China, Japan and Korea)' reached agreement on major components of the CMI, including each individual country's contribution, borrowing accessibility and surveillance. These countries launched the CMI in March 2010 and agreed to provide total fund amounts of \$120 billion. The CMI is designed to fulfill two objectives: to address short-term liquidity difficulties in the region and to supplement existing international financial arrangements. If this initiative is well managed and expanded by Asian countries, the need for individual country insurance will be lessened.

Foreign exchange safety nets consisting of swap agreements between central banks can be another important substitute for self-

insurance. One of the major problems in the 1997 Asian Crisis was currency mismatch. As discussed above, banks and firms in Korea, as well as the other East Asian countries involved in the crisis had borrowed in foreign currencies, particularly dollars. When the crisis hit, the banks and firms found that they were unable to borrow.

During the current crisis the major central banks agreed on foreign exchange swaps and this made a considerable difference in easing the international aspects of the crisis compared to 1997. Allen and Moessner (2010) describe the problems raised by banks lending in a low interest rate foreign currency and funding these loans in various ways. The largest currency specific liquidity shortage was 400 billion U.S. dollars in the Eurozone. The second largest was a \$90 billion worth of yen shortfall in the U.K., the next largest \$70 billion worth of euros in the U.S., and after that \$30 billion worth of Swiss francs in the Eurozone.

As the crisis progressed banks found it more and more difficult to fund these shortfalls. The international wholesale deposit market dried up for many banks and became difficult for many others. The solution to this problem was swaps between central banks. Allen and Moessner (2010) provide a description of how these were implemented. They document how the swap system worked. There were four overlapping networks:

- The Fed network to supply U.S. dollars
- The ECB network to supply Euros
- The Swiss Franc network
- The Latin American and Asian networks

These swap networks involved considerable overlap as shown in Graph 7.1 in Allen and Moessner (2010). As they were organized

between central banks the credit risk borne was sovereign rather than commercial. The receiving central bank would then pass on the foreign currency to firms and financial institutions so that they bore the commercial credit risk. Some of the swaps between central banks were collateralized with the currency of the counterparty central bank. These swaps considerably eased foreign exchange problems during the crisis and are widely regarded as having been successful.

Making these swaps permanent was an important part of Korea's agenda when it was President of the G20 in 2010. The push for this has been continued under the French G20 Presidency in 2011. We believe it is important for reducing countries' incentives to self insure.

A third possibility for reducing global foreign exchange reserves is for China to turn its RMB into a global reserve currency. At the end of June 2011, China held about \$3.2 trillion in foreign exchange reserves. This was by the far largest amount of any country and constituted about one third of global foreign exchange reserves at that time. The U.S. has very little in the way of foreign exchange reserves relative to its GDP (around \$150 billion according to the IMF); similarly for the Eurozone (about \$900 billion). The first advantage of the RMB becoming a reserve currency is that China would no longer have a need for such large reserves.

In addition to reducing China's own needs for foreign exchange reserves, a third global reserve currency would help other countries, particularly those in Asia, to diversify and hedge the foreign exchange risk of their reserves. This would potentially reduce the need for such large reserves in many countries.

In response to the current crisis, which stemmed from the U.S. financial markets, the emerging world called for a new reserve

currency. In July 2009, as part of the build-up to the G-8 summit, China, Russia and India raised the need to examine the dollar's place in the global financial architecture. Among these nations, China is more outspoken in challenging the dollar's dominance.²⁶ In 2009, the country allowed selected firms in China to trade in RMB with businesses in Hong Kong, Macau and ASEAN countries. The People's Bank of China also came to terms with Korea, Argentina, Belarus, Indonesia and Malaysia for the currency swap agreement, making the RMB available for these countries to use.

In addition to encouraging the use of the RMB in international trade, China has also allowed the issue of RMB bonds in Hong Kong by international companies. Although this market is still small, it is growing fast.

To achieve the goal of having the RMB become a reserve currency, China needs to eliminate its capital controls and free its foreign exchange market. This seems unlikely to happen soon. A fully convertible RMB is still many years away.

IX. Concluding Remarks

Many people have argued that global imbalances played an important role in causing the financial crisis. The combination of low interest rates set by the U.S. Federal Reserve and other central

banks and the easy availability of credit resulting from global imbalances caused a housing bubble in the U.S. and a number of other countries. The bursting of this bubble caused the start of the crisis. In this paper, we have looked at the causes of global imbalances and in particular large foreign exchange reserves by considering South Korea. We have argued that the lack of Asian influence and representation in the senior ranks of the IMF meant that it pursued bad policies in the 1997 Asian crisis. One of the few countries to avoid having to seek outside help in 1997 was Taiwan thanks to its large foreign exchange reserves. The lesson many Asian countries drew was that being independent of the IMF was highly desirable and the way to do this was to acquire foreign exchange reserves. This led to a significant increase in Asian central bank reserves.

The strategy of building up reserves has turned out to be a success. Korea came through the crisis better than most countries. With the exception of Japan, the rest of East Asia has also done quite well. In the case of Japan, the combination of a strong currency and a trade orientation in many industries led to a bad outcome. The lesson that most East Asian countries seem to have drawn from the current crisis is that more reserves are desirable. The problem of large foreign exchange reserves is therefore likely to persist at least in the short term.

As mentioned above, a third of global foreign exchange reserves are held by China. Initially, China may also have been driven by a desire not to be beholden to western dominated institutions. It is arguably the most underrepresented country at the IMF, for example. However, over time it can be argued that China has discovered that it is extremely advantageous to have enormous foreign exchange reserves. The U.S. now treats China with much

²⁶ Zhou Xiaochuan, the governor of the People's Bank of China argued in March 2009 that the dollar's reserve-currency status let the U.S. borrow cheaply, causing the country's credit and housing bubbles to persist for longer than they otherwise would have. Instead, he proposed that the world should replace the dollar with a global reserve currency the SDR (Special Drawing Rights). Under his plan, the amount of SDRs would be increased and the basket expanded to include other currencies, notably the RMB.

more respect than previously. The U.S. knows that if China were to start shifting its reserves out of the dollar in large quantities, the U.S. economy would be badly damaged. In recent years, China has significantly increased its military capability. Its large foreign exchange reserves provide an alternative way of influencing other countries and in particular the U.S.

Although reform of the IMF would be desirable, it seems likely that the extent of reform required to make global imbalances unnecessary will not occur. Regional agreements are also helpful but these are unlikely to be sufficient to persuade countries to do away with their reserves. The most likely development in the medium term is that China's currency, the RMB, will become fully convertible and join the dollar and the euro as the third global reserve currency. This will eliminate the need for China to hold foreign exchange reserves and will go a long way toward solving the global imbalances problem.

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References

Aizenman, J. & Lee, J. (2007). International Reserves: Precautionary versus Mercantilist Views, Theory and Evidence. *Open Economies Review* 18, 191-214.

Allen, W. & Moessner, R. (2010). Central Bank Cooperation and International Liquidity in the Financial Crisis of 2008-9. Bank for IS Working Paper 310.

Baliño, T. & Ubide, A. (1999). The Korean Financial Crisis of 1997 -

A Strategy of Financial Sector Reform. IMF working paper 99/28, 1-66.

Bernanke, B. (2005). The Global Saving Glut and the U.S. Current Account Deficit. Sandridge Lecture.

Caprio, G., & Klingebiel, D. (2003). Episodes of Systemic and Borderline Financial Crises. World Bank Discussion Paper 428, 31-49.

Dooley, M. P., Folkerts-Landau, D. & Garber, P. (2003). An Essay on the Revived Bretton Woods System. NBER Working Paper 9971.

Jeanne, O. & Rancière, R. (2006). The Optimal Level of International Reserves for Emerging Market Countries: Formulas and Applications. IMF Research Department.

Jeanne O. (2007). International Reserves in Emerging Market Countries: Too Much of a Good Thing? *Brookings Papers on Economic Activity*, Spring, 1-55.

Kapur, D. & Webb, R. (2007). Beyond the IMF. G-24 Discussion Paper 43.

Rodrik, D. (2006). The Social Cost of Foreign Exchange Reserves. NBER Working Paper 11952.

Shin, H. (2009). Leverage, Securitization and Global Imbalance, Hong Kong Institute for Monetary Research. Occasional Paper 5, 2-33.

Summers, L. H. (2006). Reflections on Global Account Imbalances and Emerging Markets Reserve Accumulations, L. K. Jha Memorial Lecture. Reserve Bank of India.

Truman, E. M. (2006). Reforming the IMF for the 21st Century. Washington D.C.: Institute for International Economics,

Wolf, M. (2009). *Fixing Global Finance*. Baltimore: The Johns Hopkins University Press.