Are the Foreign-Currency Official Reserves of Emerging Asia Excessive?

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In this paper, Irina Pechotski examines why countries hold foreign reserves and attempts to find a measure for the optimal level of reserves to hold. She applies this to the case of emerging Asian economies, who have rapidly increased their reserves over the past decade, concluding that the level is likely excessive, which may have helped insulate emerging Asia somewhat from the financial crisis.

Introduction

"There is no such thing as too much foreign reserves."
> (Rhee Yeung Kyun, director-general of the International Department at South Korea's Central Bank)

"It is one thing to save for a rainy day, but one trillion dollars in reserve accumulation is more like building Noah's Ark."
> (Ken Rogoff, former chief economist at IMF)

A development in the world economy which has attracted much attention is the rapid accumulation of foreign reserves in emerging Asia over the last decade. As the initial quotations may already indicate, there are differing attitudes towards holding reserves. It seems that emerging Asia cannot have enough foreign reserves, whereas the rest of the world is concerned and does not want to hold more reserves than necessary. This paper aims to explore the costs and benefits of foreign reserves and tries to analyse whether the level of emerging Asia's foreign reserves is excessive or not.

What are foreign-currency official reserves?

Foreign-currency official reserves are held by almost every country in the world and comprise "convertible foreign exchange, gold, special drawing rights (SDRs), and reserve position at the International Monetary Fund

(IMF)" (Bahmani-Oskooee and Brown, 2002).

They are an important national asset and a tool of the monetary and exchange rate policy. An important characteristic of foreign reserves is that they can be made readily available in order to fulfill the countries' demands. Countries have a need for holding reserves, although they may have different reasons for holding them. Reserves can be a formal backing for the domestic currency in order to provide confidence in the domestic currency. They are also used as a tool of exchange rate and monetary policy, especially in countries with a fixed exchange rate regime. These countries can maintain their fixed exchange rate by buying or selling the domestic currency in order to support the national currency. (Nugée, 2009; IMF, 2004)

Another two reasons often put forward are the mercantilist argument and the precautionary motive for holding reserves. The mercantilist view is that reserves are held for pursuing an export-based strategy. The basic idea behind this concept is the systematic undervaluation of exchange rates in order to promote own exports (Wyplosz, 2007). The precautionary motive regards reserves as a buffer to protect the economy against expensive output contractions, which may be triggered by sudden stops and capital flight (Aizenman and Lee, 2007), therefore reducing the likelihood and depth of a crisis (Edison, 2003).

But as reserves are not only advantageous; countries also incur costs by holding reserves, such as inflation, sterilization costs, opportunity costs, and central bank balance sheet losses (Green and Torgerson, 2007). Buying foreign currency leads to a rise in the monetary base. Therefore, the monetary authorities sterilize the reserve accumulation in order to offset the inflationary impact. By issuing bonds in exchange for currency in circulation, they reduce domestic liquidity (Park and Estrada, 2009). Hence, sterilization costs can be considered the "difference between what the central bank earns on international reserves and what it pays on domestic debt issued to sterilize the reserves" (Green and Torgerson, 2007). Opportunity cost means that the resources invested in foreign reserves could be used for alternative investments with higher returns because foreign reserves are usually held in "high-grade fairly liquid assets with low returns" (Wyplosz, 2007). Finally, the monetary authority has to face costs if a depreciation of the foreign reserves' value occurs. When the exchange rate appreciates and the foreign reserves are measured in domestic currency, the value of the foreign reserves falls (Green and Torgerson, 2007).

However, holding large amounts of foreign reserves does not only bear costs for the country itself, it influences the global economy too. Accumulating a high stockpile of foreign reserves leads to global imbalances that

can cause a global financial crisis such as the current one (Allen and Hong, 2011).

What is Emerging Asia and What Happened There?

In the last decade the world's foreign reserves have increased by an annually compounded rate of about 18% reaching US$10 trillion in 2011 (Figure 1). But an even faster accumulation of foreign reserves can be observed in emerging markets, with an annual growth rate of over 20%, namely from less than US$0.75 trillion to more than US$6 trillion between 2000 and 2010 (Independent Evaluation Office, 2011).

In particular, many emerging Asian countries[1] attracted attention. After the Asian crisis in 1997/1998 a high accumulation of foreign reserves was registered there (Figure 1).
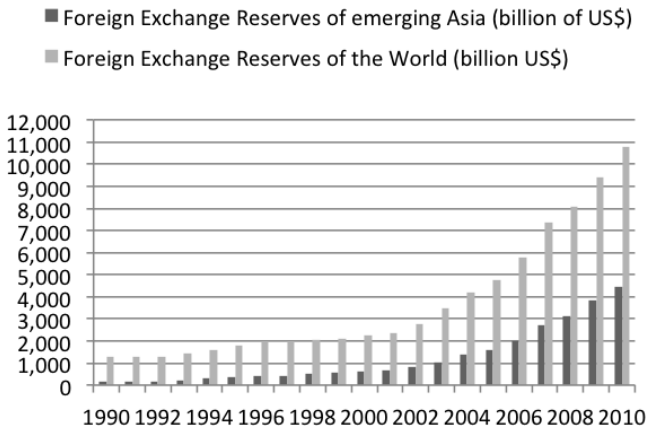

Figure 1: Foreign Exchange Reserves including gold of Emerging Asia and the World, 1990-2010 (billion US$)

(World Bank Data)

China surpassed Japan as the largest reserve holder in the world in 2006 and among the twenty largest foreign reserves holders in the world in 2011, nine are emerging Asian countries: China, Taiwan, India, Korea, Hong Kong, Singapore, Thailand, Malaysia, and Indonesia.

1 Emerging Asia: China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan Province of China, Thailand, and Vietnam as defined in the Regional Economic Outlook, Asia and Pacific (2010)

The Asian crisis hit large parts of Asia very hard. Before the crisis, the term "Asian miracle" was coined for this region of the world, where agriculture-based countries succeeded in turning into rapidly growing industrialised nations with "growth rates several times higher than advanced nations" (Krugman, 1994). But the crisis led to severe reductions in output, currency depreciations, business bankruptcies, political upheavals, and poverty. The IMF intervened with programs of economic stabilization and reforms in order to restore confidence in these countries again. However, these actions were seen as controversial and Stiglitz (2000) even believes "that the efforts of the IMF made the East Asian recession deeper, longer, and harder". Indonesia, South Korea and Thailand were the most affected countries (Bouchet). The costs of the crisis, e.g. in Indonesia, amounted to 55 % of GDP (Feenstra and Taylor, 2008). However, countries like Malaysia, who had forgone the help of the IMF, and economies with a higher level of international reserves like China, survived the East Asian financial crisis better than those with a lower level. Consequently, emerging Asia became distrustful of the IMF and the fundamental belief not to "rely on the IMF in the future even as a last resort lender" (Ito, 2007) was established. The self-insurance argument became crucial in the management of the foreign reserves to these countries.

What is optimal and what is excessive?

Econometric approach

To make a judgment about whether a country has excessive foreign reserves, there must be a concept of optimal reserves. Theoretical and empirical literature dealing with this topic emerged during the 1960s and 1970s. In the last decade a new interest in the topic arose, caused by the observation of the rapid accumulation of foreign reserves in emerging Asia. Many econometric models were developed trying to explain the level of foreign reserves. The determinants of reserve holdings used in these models can be divided into five groups, namely economic size, current account vulnerability, capital account vulnerability, exchange rate flexibility and opportunity cost (Gosselin and Parent, 2005).

Economic size, measured in GDP and GDP per capita, matters as it is assumed that international transactions rise with economic size. The higher the population and the GDP per capita are, the higher the amount of foreign reserves accumulated and needed will be (Edison, 2003). Current account vulnerability represented by trade openness and export volatility means that

a more open economy is more exposed to external shocks and should have more foreign reserves (Gosselin and Parent, 2005). Capital account vulnerability demands more foreign reserves, as with greater financial openness and larger potential for resident-based capital flight from domestic currency crisis, vulnerability rises (Edison, 2003). Exchange rate flexibility can be measured by the volatility of the exchange rate. In a fixed exchange rate regime more foreign reserves are needed because the central bank needs reserve holdings in order to maintain the fixed exchange rate. And a negative correlation can be found between opportunity cost and foreign reserve holdings. The higher the opportunity costs, the lower the foreign reserves will be (Edison, 2003).

Edison (2003) developed an empirical model taking all of these determinants into consideration. At first, she estimates her model by using panel data for 122 emerging markets over the period of 1980 to 1996. As a result, the model can explain the level of foreign reserves depending on economic size, current account vulnerability, and exchange rate flexibility, whereas capital account vulnerability and opportunity cost are not found to be significant determinants.

| Year	Actual	Predicted	Difference
1990	202,14	187,59	14,55
1991	247,31	223,95	23,36
1992	253,36	263,48	-10,12
1993	295,45	312,38	-16,93
1994	371,18	366,86	4,32
1995	420,36	450,85	-30,49
1996	483,11	513,03	-29,92
1997	506,37	564,09	-57,72
1998	569,94	571,68	-1,74
1999	648,23	671,65	-23,42
2000	698,7	819,78	-121,08
2001	775,85	854,95	-79,1
2002	951,62	964,84	-13,22
2003	1217,13	1122,54	94,59
2004	1580,56	1363,65	216,91
2005	1827,08	1599,61	227,47
2006	2222,24	1900,56	321,68
2007	2916,75	2229,78	686,97

Table 2: Actual versus Predicted Nominal Reserves of Emerging Asia and Difference between Actual and Predicted Nominal Reserves, 1990-2007 (billion US$)[2]

2 See Park and Estrada (2009) expanded by the column "Difference"

Park and Estrada (2009) re-estimate Edison's model with panel data for 130 emerging economies from 1980 to 2004. Using this model Park and Estrada compute the predicted levels for emerging Asia's top ten reserve holders[3] and compare them to the actual levels for the period from 1990 to 2007 (Table 2, Figure 2).

Figure 2 shows that in the period from 1990 to 2002, the actual foreign reserves match the predicted values, although there are several years where the predictions even surpass the actual figures. The highest negative deviation can be found in 2000, where the prediction overestimates the foreign reserves in emerging Asia about US$120 billion. From 2003, however, the gap between actual and predicted foreign reserves grows rapidly (Park & Estrada, 2009). There is also a trend of increasing foreign reserves in the predictions. But whereas the predictions grow by 19 % on average from 2003 on, the actual reserves grow by 25 %. In 2003 the gap is US$95 billion and four years later it amounts to US$687 billion. That makes an increase of 623 % in four years.

Figure 2: Actual versus Predicted Reserves of Emerging Asia, 1990-2007 (billion US$) [4]
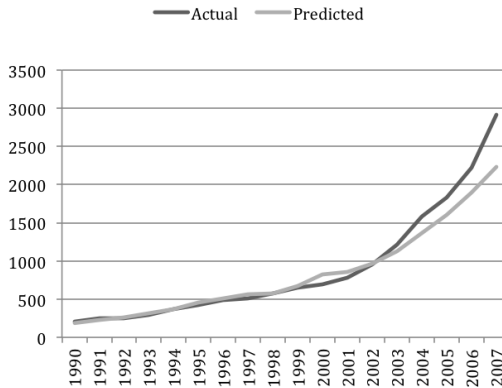
According to this model, it can be stated that the foreign reserves in emerging Asia are excessive as they are clearly above the levels that are predicted considering economic fundamentals.

However, there is also other literature which say that the foreign reserves are not excessive, but rather fit to the predictions and the strategy of

3 Note that these countries are the same as defined who is emerging Asia except for Vietnam.
4 See Park and Estrada (2009)

self-insurance. For example, Ruiz-Arranz and Zavadjil (2008), applying the model of Jeanne from 2007, state that the foreign reserves in this region of the world are in line with what can be predicted by "a simple model of optimal reserves applied to specific country and regional characteristics" (Ruiz-Arranz, Zavadjil, 2008). But nevertheless, they find that foreign reserve levels are close to the optimal level and therefore a slowdown in the accumulation is desirable.

Rules of Thumb

Another measure of the adequacy of foreign reserves are the so called "rules of thumb" like the reserves to import ratio or the reserves to short-term debt ratio. These ratios also support the judgment of excessive foreign reserves in emerging Asia. Although these measures "are based on general economic intuition rather than derived rigorously from formal theory" (Park and Estrada, 2009), they are often used in order to analyse the adequacy of foreign reserves.

Figure 4: Reserves to Import Ratio in Emerging Asia, 1990-201, (number of months)
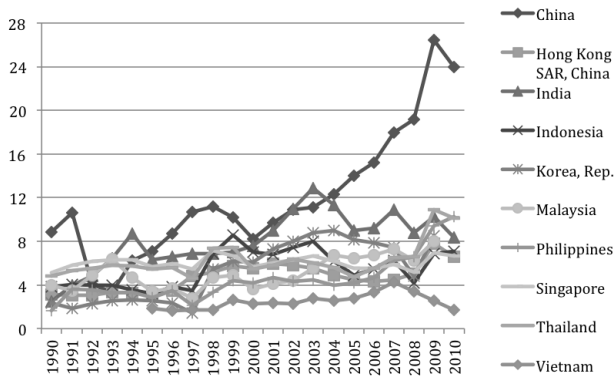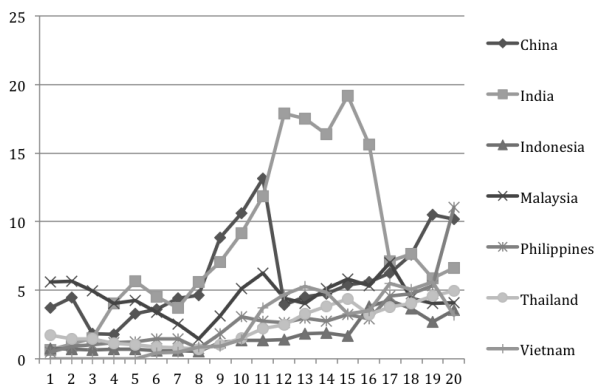

(World Bank Data)

The reserves to import ratio (Figure 4) measures the number of months a country is able to finance in case that all money inflows like export revenues and external financing stop. It serves as a proxy for a country's current account vulnerability. In general, a three or four month benchmark is seen as adequate (Gosselin and Parent, 2005). Although this ratio and its benchmark

are criticized in terms of a lack of significance and empirical evidence, the IMF has been using this ratio as a measure for the adequacy of reserves since 1950.

Figure 4 shows that most countries have accumulated foreign reserves above the benchmark. Although some of the countries do not meet the benchmark even before the Asian crisis a wide gap arises afterwards. China and India in particular have the most striking reserve to import ratios, as they have the largest deviation from the benchmark. India has its peak in 2003 with approximately 13 months and China has had a steadily increasing ratio since 2000, with a peak in 2009 of 25 months.

The reserves to short-term external debt ratio (Figure 5) is also known as the Greenspan-Guidotti rule. In 1990 Alan Greenspan and Pablo Guidotti developed it, saying that countries should be able to serve at least all their external short-term debt without additional foreign borrowing for up to one year (Cifarelli and Paladino, 2008). It was also empirically supported by Bussière and Mulder (1999), and Jeanne and Rancière (2005) show the close relation of this ratio to the likelihood and depth of crises. The benchmark of this ratio is one, where foreign reserves equal short-term debt. (Edison, 2003)

Figure 5: Ratio of Foreign Exchange Reserves to Short-Term External Debt in Emerging Asia, 1990-2009

(World Bank Data)

So a benchmark above one shows that the country is able to serve its debt and can face the risk of a financial crisis, while a ratio below one can hint at a vulnerable capital account (Polterovich and Popov, 2003).

Figure 5 indicates that most countries are well above the Greenspan-Guidotti rule. The majority already had a higher benchmark before the Asian crisis. But after the crisis there were significant increases. India and China stand out again. China has its peak in 2000 with a ratio of 14 and India in 2004 with 19.

Current development

The global financial crisis hit emerging Asia hard, although it is far from the epicentre of the crisis. Emerging Asia, excluding China and India, lost 15 % of GDP on a seasonally adjusted annualised basis (IMF, 2009). As already examined, an important reason for holding reserves in emerging Asia is the self-insurance argument that has become crucial since the Asian crisis. If this were true, the global financial crisis could be seen as the "ultimate vindication for that strategy" (Dominguez, Hashimoto and Ito, 2011). Although they were able to recover faster from the crisis and experienced higher growth rates after the crisis again (Didier, Hevia and Schmuckler, 2011), there are beliefs that the reserves did not play an important role as a buffer in the crisis (Dominguez, Hashimoto and Ito, 2011). Looking at the development of the reserves, it can be concluded that the reserves were hardly used. There is no evidence of depletion. Only in India, Indonesia and Korea can reductions in their holdings from 2007 to 2008 be observed. In the other countries and in these three countries after 2008, a further increase is observable.

But nevertheless, Frankel and Saravelos (2010) find countries with higher foreign reserve holdings to have suffered less during the crisis. And De Gregorio (2011) concludes that the recent crisis showed that the reserves played "a rather deterrent role, in the sense that the sole act of having them reduces financial vulnerability", and not in the actual sense of the self-insurance motive, where foreign reserves act as a buffer stock of liquidity during times of sudden stops.

Conclusion

The examination of the adequacy of foreign reserves in emerging Asia proves to be a difficult and contentious topic. Edison's econometric analysis based on some economic fundamentals shows that the foreign reserves of emerging Asia are well above an adequate level. An informal investigation with some often cited "rules of thumb" concludes the same. But nevertheless this cannot be a definitive conclusion as Edison's model is just one among many models and as the "rules of thumb" have low empirical support. The problem is that there is no universally valid model determining the optimal level of reserves

for every country. Different models make different approaches with different assumptions.

What most economists agree on is the rapid accumulation of foreign reserves in emerging Asia, which has never happened to such an extent in any other region of the world before, and that the self-insurance argument is the most important explanation for the build-up. After the painful experience during the Asian crisis and with on-going financial integration, emerging Asian countries want to rely only on themselves, in terms of staying liquid during a crisis. So they accept the cost associated with holding reserves in order to prevent incurring the costs of a crisis.

But the costs of holding reserves are high not only for the country holding them, but also for the world, causing global imbalances which can result in a crisis such as the current one. The global financial crisis, which also spread to emerging Asia, showed that emerging Asian countries did not use their stockpile of foreign reserves; instead the accumulation went on. These countries survived the crisis better and recovered faster. But the question remains whether this was due to the foreign reserves and in particular, whether it was due to these high levels of foreign reserves. Would a lower level of reserves not have had the same deterrent effect?

Hence, foreign reserves can be both a curse and a blessing, as they can both cause and smooth a crisis. As long as no adequate level of foreign reserves can be determined, the discussion will go on.

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