A Study of Costs and Risks of Holding Foreign Exchange Reserves

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Abstract:
There have been a lot of research in the field of foreign exchange reserves and many studies have suggested that a developing country should hold adequate level of reserves. This level of adequacy leads us to the question whether countries, mainly developing economies are able to employ the adequate measures of holding foreign exchange reserves. In this paper, we basically focus on the risks and costs of holding foreign exchange reserves which are in excess of adequate or optimum level of foreign exchange reserves. By minimising these risks and costs, a country should be able to hold only that level of reserves, which is adequate or what we call is optimum.

Keywords: *Cost & risks, Economics, FER*

1. Introduction

Foreign exchange reserves are basically reserve assets which are held by a central bank in foreign currencies, to back its liabilities on their own issued currency and also to influence its monetary policy. In simple words, it basically means the foreign assets like foreign currencies, gold, special drawing rights, reserve tranche positionheld by a central bank of a country. Most countries in the world have adopted the definition suggested by International Monetary Fund (Balance of Payments Manual, and Guidelines on Foreign Exchange Reserve Management, 2001), which defines reserves as "external assets that are readily available to and controlled by monetary authorities for direct financing of external payments imbalances, for indirectly regulating the magnitudes of such imbalances through intervention in exchange markets to affect the currency exchange rate, and/or for other purposes."

Almost all countries in the world, regardless of the size of their economy, hold significant amount foreign exchange reserves. More than half of all foreign exchange reserves in the world are held in U.S. dollars, the most traded global currency. The British pound sterling (GBP), the Eurozone's euro (EUR), the Chinese yuan (CNY) and the Japanese yen (JPY) are also common foreign exchange currencies.Currently, China holds the world's largest foreign exchange reserves, with more than 3.5 trillion of assets held in foreign currencies (mostly the dollar).

Excess reserves basically means holding foreign exchange reserves which are beyond the optimum benchmarks of reserves or we can say they are in excess of adequate levels of holding reserves. Holding reserves may sound good, but do holding excess reserves bring in more economic stability or do they create certain risks for the economy? Let's get back to our basic economics where we studied about marginal returns and marginal costs. Every commodity' equilibrium price is determined at a level where its marginal cost is equal to its marginal benefit or marginal revenue. Similarly foreign exchange reserves are like commodities for a domestic economy, hence the marginal social benefits of

holding foreign exchange reserves should be compared with the marginal social costs of holding reserves. As we know that in economics, after a certain level, marginal revenue declines and becomes equal to marginal cost, similarly in case of foreign exchange reserves, its marginal revenue will rise till a certain point and then it will fall and at some point will become equal to its social marginal cost, which determines the optimum level of foreign exchange reserves. The benefits of holding foreign exchange reserves are like it helps in paying of our import bills, paying off a government's external debt and it is also used in maintain the liquidity in a country.

2. Conceptual Framework

In India, the Reserve Bank of India Act 1934 contains the enabling provisions for the RBI to act as the custodian of foreign reserves and manage them with the defined objectives. The term 'reserves' refer to both foreign reserves held in the form gold assets in the Banking Department and foreign securities held by the Issue Department and domestic reserves in the form of bank reserves (Dr. Y.V. Reddy, India's Foreign Exchange Reserves- policy, status and issues). It is to be noted here that the foreign currency and the securities held by the public including the banks and corporate bodies are not accounted in official reserves holdings. So, it can be said that it is the RBI which lays down the rules or norms in its Act of 1934 regarding what constitutes forex reserves and who is its custodian. RBI operates within the policy framework agreed upon with the Government of India.

3. Review of Literature

This section comprises the review of various literatures and these are as follows:

1. Green and Torgerson (2007) in their occasional paper examined the motivations and costs of foreign exchange reserve accumulation among the world's largest emerging market holders of reserves. Their analysis mainly suggests that net marginal return to additional reserves is low, if not extremely negative, yielding scant support for the proposition that the largest reserve holders were holding foreign exchange reserves exclusively for precautionary purposes and their policy was not about the allocation of existing reserves, but about further reserve accumulation. They focused on the emerging market economies (China, Taiwan, South Korea, Russia, India, Mexico and Malaysia) considering them on the basis of determinants of foreign exchange reserves or finding out how adequately they maintained reserves based on the determinants. It was found that the seven economies match up to the Greenspan Guidotti threshold for reserves/short term debt. All hold several multiples of their short term debt in reserves, with China far ahead of the rest at more than eleven times short term debt.Coverage of money supply (M2), showed a similar picture. It was advised that India, Mexico and Russia should perhaps be measured against the low end of the 5-20% benchmark range as countries with the flexible exchange rate. The third determinant which is trade based, i.e., import coverage was regarded as less relevant for economies with capital market access. Even so, none of the top reserve holders demonstrate vulnerability. Mexico had the lowest import coverage ratio at 3.8 months. Every other economy was well beyond four months of import coverage. The comparisons presented thus far involve benchmarks against single statistics. Green and Torgerson considered a different approach wherein they included a full range of fundamentals by estimating the demand for reserves in multivariate setting. Their estimate of such a measure captures the relative weight put on various sources of vulnerability. This approach does not indicate divergence from appropriate levels of reserves, as countries may have followed suboptimal reserve policies in the past. However, under the assumption that countries generally hold adequate reserves relative to the fundamentals, the estimates can be used to determine whether out of sample reserve levels are adequate.
2. Sahu (2015) basically placed his work on determining and maintaining the adequate level of reserves. He measured the level of India's foreign exchange reserves in terms of the criterias(discussed in conceptual framework). The study period of his research was from 2001-02 to 2014-15 (December). He emphasized on the level of foreign exchange reserves that India maintained during the period of study and it revealed that import coverage ratio far exceeds the international benchmark of 3 months. This measure of import coverage showed that India's yearly

import coverage ratio was highest in 2003-04 and lowest in 2012-13. In terms of monthly import coverage in 2003-04 was 16.5 months, whereas in 2012-13 it was 6.5 months. India's ratio of foreign exchange reserve to import in all years was higher than 25% (standard benchmark) and in the first seven years forex reserves were higher than imports. This measure showed that India's forex reserves were adequate, but import is not the only factor determining the adequate level of forex reserves.The universally accepted ratio for covering short term external debt is 1, meaning that foreign exchange reserve should cover 100% of the country's short term debt and it should not fall below 100%. In India, it was found that this ratio was always more than 1, meaning India's forex reserve was always sufficient during the study period. Kapteyn (2001), suggested reserves equivalent to 5%-20% of M2, depending on the exchange rate regime, as an appropriate buffer. India maintains market determined exchange rate and it was found that ratio of foreign exchange reserve to broad money (M2) was always more than 10%.Countering evidence was found when Sahu combined all the three determinants and it showed the trend of foreign exchange reserve gap. Gap was estimated by taking the difference between estimated foreign exchange reserves by taking sum of year end imports, short term external debt and broad money and actual foreign exchange reserve holdings excluding gold reserves. This gap gradually increased from financial year 2001-01 till 2012-13, afterwards the trend reversed and gap started declining.

3. Dash and Narayanan (2011) attempted to identify the key determinants of foreign exchange reserves in India using Johansen (1995) Maximum Likelihood Vector Error Correction Model (VECM) on monthly as well as annual data for reserves, imports and nominal exchange rate. They captured the short term dynamics and their approach began with a careful understanding of time series properties of the data. The variables included in their empirical model were imports, rupee-dollar bilateral nominal exchange rate, opportunity cost (call-money rate) and capital flows in levels.It was suggested that there exists a long run relationship among imports, reserves and exchange rate and the monthly data estimations showed that the exchange rate shock exerts a permanent effect on reserves, both on level and volatility. The results from estimations using annual data broadly replicated the results from estimation based on monthly data.
4. Mohanty and Turner (2006) stressed on the sterilization process, wherein they argue that effective sterilization can bring good results to a country. However, ineffective sterilization may hamper the growth of the economy and may also bring macroeconomic instability. They brought forward the issue that sterilized intervention is more effective in influencing the exchange rate in emerging market economies. The question explored here was that "how prolonged reserve accumulation poses risks for the domestic economy that could eventually discourage further intervention?" They said that financing of the prolonged and substantial accumulation of foreign exchange reserves has implications for the balance sheets of the central bank, the banking system and, indeed, the private sector. Balance sheet effects might reduce the effectiveness of sterilization, with possible inflationary implications. Potential problems include the high costs of intervention, unsustainable increases in credit and asset prices, and an increasingly inefficient financial system. Many countries accumulating reserves over the past few years have faced conditions of substantial excess capacity of reserves and low inflation, which meant that policy rates could be eased in the face of upward pressure on the currency. In turn they found that reserve accumulation did not create any dilemma policymakers faced in earlier high inflation episodes when they had to choose between inflation objective and their exchange rate objective.They argued that capital inflows- particularly portfolio inflows, have often been seen as temporary (perhaps justifying intervention). Moreover, there's a tendency among investors and currency traders to identify persistent current account surpluses with an appreciation of the long run equilibrium exchange rate, resisting from this may cause even larger inflows of capital, creating a vicious circle of increased appreciation and yet more intervention.
5. Sen (2005) in his article basically looked at the volatility that comes with the inflow of foreign capital or we can say through the accumulation of excess reserves. He pointed out mainly on the two types of inflows- FDI (Foreign Direct Investment) and FII (Foreign Institutional Investment). FDI adds to the productive capacity of a country and it also facilitates the transfer of technology and is not volatile. On the other hand, there are other flows like FII and NRI deposits. These flows

are highly volatile as suggested by his study. There was some evidence that RBI deliberately intervened to keep the real effective exchange rate constant, especially in the initial stages of the inflows when the flow was viewed as temporary. This purchase of foreign exchange reserves raises the monetary base but RBI neutralized (sterilized) through a contractionary open market operation, i.e., via the sale of government bonds. It was also found that costs associated with this sterilization lied in the government bonds (carrying a high rate of interest compared to that of foreign exchange). Thus, he concluded that as forex reserves rises, so do costs of holding them.

4. Motives for Holding Foreign Exchange Reserves

A country holds reserves for maintaining liquidity and safety. By liquidity and safety, we mean a country should possess certain enough amounts of foreign reserves to meet their day to day operations like trading and also to ensure their safety in times of crises. Holding enough or what we call is optimum level of reserves helps a country to be self-reliant and have a self-sufficiency to meet their payment obligations, side by side creating a vulnerability which means sensitivity to the stock of reserves, i.e., if reserve level falls beyond optimum level, a country should become alert on accumulation of reserves otherwise their currency would appreciate and their GDP would be affected which may lead to a situation of crises. Apart from self-reliance, self-sufficiency and vulnerability, there is one more thing called 'buffer', which acts a shock absorber in times of crises and helps in bringing economic stability in the country for which certain costs are to be paid like sterilization costs, losses in central bank's balance sheet etc. which will be discussed later on.For meeting with the requirements of a country in 'times of crises' like for food import, petroleum import etc. for example, let say suddenly OPEC countries might decide to raise the prices. So, as petroleum products are a necessity and we cannot give up on its consumption, we have to finance it through our holdings of foreign reserves. The quantum and timing of export earnings do not coincide with the inflow of foreign exchange reserves from various times of exports. Moreover, all international transactions are credit transactions. So, in order to 'finance our imports', we need to sacrifice some of our reserve holdings.

5. Criteria for Determining Adequate Level of Foreign Exchange Reserves

Country circumstances vary and there is no precise level of reserves that are universally considered either sufficient or optimal. Advanced economies with highly liquid, floating currencies and stable financial market access in domestic currency tend to derive very insignificant value from holding precautionary reserves. On the other hand, countries where currencies are less liquid and having very unstable financial markets tend to hold high level of reserves as it may reduce both the risk and impact of current account shocks and capital account crises. Efforts have been made by economists to present an optimizing framework for maintaining appropriate level of foreign exchange reserves. There are various viewpoints regarding this, like one view point suggests that optimum level of reserves is that level where marginal social costs equal marginal social benefit. Another viewpoint suggests, the level of reserves where marginal productivity of reserves plus interest earned on reserve assets equals the marginal productivity of real resources. In simple terms, foreign exchange reserves are said to be adequate when the level of foreign exchange reserves ensures sustainable balance of payments and macroeconomic adjustment resulting from external price shocks or reversals in short term foreign capital flows.

In order to determine the appropriate or optimal level of reserves, certain determinants or indicators that have been suggested by economists and academicians. These are as follows:

1. Trade based indicator- Under this measure certain months of import bills is covered by reserves, i.e., a number of months a country can continue to support its current level of imports if all other inflows and outflows cease. Reserves covering three months of imports has been conventionally regarded as adequate and considered as a useful indicator for predicting future international payments obligations. This measure is suitable for low income countries that are vulnerable to current account shocks and do not have significant access to capital markets.

2. Debt-based indicator- The famous Greenspan-Guidotti rule, named after Alan Greenspan and Pablo Guidotti, is a debt based indicator of determining the adequate level of reserves. They said that developing countries should amass their reserves equal to all external debt coming due within the next year, i.e., all short term debts. According to this rule, reserves equal to one year short term debt is considered healthy and in simpler way it means to maintain a level of reserves that meets the short term debt with remaining maturity.
3. Money-based indicator- Kamnisky (1999) employed the monetary aggregates and he measured foreign exchange reserve adequacy level as the ratio of foreign exchange reserves to broad money or what we call as base money (M2). The Net Foreign Exchange Assets (NFEA) to currency ratio is also a money based indicator and it helps in predicting the the sustainability of reserve flows in a country. Money based indicators are useful for countries that face a high risk of capital flight, i.e., it is a good predictor of crises.

6. Costs and Risks of Holding Foreign Exchange Reserves

In the previous discussion, we discussed about the determinants of reserves or about what should be the adequate level of reserves. Now here, we will be talking about the costs and risks of holding excess reserves. What are excess reserves? Reserves are often an expensive insurance mechanism, with its cost coming from many different sources and it is often very difficult to quantify their sources. The costs that may arise because of holding excess reserves are as follows:

1. Sterilization costs- Sterilization basically neutralizes the inflationary monetary impact of reserve accumulation by offsetting the associated increase in money supply with a domestic money market operation, typically domestic debt issuance (Russel Green and Tom Toregerson, Are High Foreign Exchange Reserves n emerging markets a blessing or a burden?). Sterilization involves controlling domestic currency appreciation which may result in inflationary pressures and can hamper a country's growth. Sterilizing reserve accumulation can be quite regarded as a good tool for controlling inflation in a country, however fully sterilizing reserve accumulation can be challenging. There are basically three challenges which can limit or hamper the usefulness produced by sterilization. These are:
   - The fiscal costs of intervention- It represents the difference between what the central bank earns on international reserves and what it pays on the domestic debt issued to sterilize the reserves.
   - Future monetary imbalances- The long term effectiveness of sterilized intervention depends upon the tools used for sterilization and on which sector it ends up. Large scale reserve accumulation typically raises the underlying liquidity position of the banking system and this can be partly neutralized by selling long term government bonds to banks which in turn will be sold by banks to non-banks usually households and corporates. This will reasonably complete sterilization.
   - Financial sector imbalances- Sterilized intervention to prevent a rise in exchange rate can affect macroeconomic and financial imbalances like increased bank lending resulting from partial or ineffective sterilization could finance excessive investment in certain sectors such as property markets and may lead to the formation of property bubbles.
2. Opportunity costs- The resources or funds that are used to purchase foreign exchange reserves could be used for several other purposes, like a government could pay off its sovereign short term external debt, since the interest cost of a given amount of short term external debt likely exceeds the earnings on an equivalent amount of reserves. Another purpose for utilizing the resources instead of acquiring reserves could be reserves spend by government on investment projects, with the constraint that reserves cannot be converted back into local currency if authorities wish to avoid an impact on the exchange rate. For example, reserves could be used to purchase medical supplies and equipment from a foreign country.
3. Central bank balance sheet risk- Foreign exchange reserves are just like any other foreign currency asset, which can lose its value in local terms if the exchange rate appreciates. As long as interest margins and cash flows remain positive, it may be feasible for central banks to operate with negative capital for a considerable period. However, leaving itself undercapitalized could in time

jeopardize the central bank's credibility and ability to target price stability, to intermediate government foreign borrowing, to act as lender of last resort, or to maintain a domestic payments system (Russel Green and Tom Torgerson, Are High Foreign Exchange Reserves in emerging markets a blessing or a burden?).

4. Other costs- Reserve accumulation may render a false sense of security, delaying necessary reforms. While reserves may provide some protection against external crises, otherwise unsustainable policies cause undesirable distortions even when they do not end in crises. Large fiscal deficits, for instance, may crowd out private sector investments or create debt overhang problems. And these vulnerabilities, if allowed to grow too large, may overwhelm the insulating effect of reserves and surprise a country previously considered secure (Russel Green and Tom Torgerson, Are High Foreign Exchange Reserves in emerging markets a blessing or a burden?).

7. Conclusion

Maintaining adequate or optimal level of reserves ensures avoidance of unnecessary high costs of sterilization and central bank balance sheet risks. Acquiring reserves may look quite attractive and may be easy, but acquiring such high levels that leads to excess holding may hamper the growth of a country as these resources have very few uses. Therefore in order to avoid certain costs, a country should maintain optimal levels of reserves. Holding excess reserves may lead to a huge inflow of funds in an economy leading to increase in money supply which in turn will lead to an inflationary situation. In order to avoid such inflationary scenario, governments or central banks often intervene in the foreign exchange markets to control their currency to appreciate. This is basically done through sterilization which has high fiscal costs and may also lead to certain future imbalances in a country. Also, as reviewed through various studies, we found that the major source of foreign exchange reserves is through Foreign Portfolio Investments (FPI) and Non-Resident Deposits (NRDs). These sources of reserves seem to be the most volatile capital as it is temporary in nature. On the other hand Foreign Direct Investments (FDI) is still a better source of foreign exchange reserves as they are more stable. FPIs and NRDs may drastically affect a country's BOP (Balance of payments) and can also lead to macroeconomic imbalances. It is because of this reason that most of the developing and emerging economies do not allow for full capital account convertibility. Accumulating reserves at a very high level also hinders the working of the government and monetary authorities as they have to make tradeoff between their exchange rate policy and monetary policy, so it can be said that accumulation of high reserves affects the monetary policies of a country. So, at last we conclude that a country should adopt certain criteria for determining the adequate level of foreign exchange reserves keeping in mind the risks and costs of holding them.

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