International Reserves: Determinants and Influencing Factors

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Abstract

Over the last decade, international reserves have gained the attention of researchers. Central banks of developing economies around the world, have stored large stockpile of foreign reserves. The management of these huge reserves and the associated cost of holding are the major issues faced by the central banks of developing economies. This paper reviews various type of determinants and factors affecting the international reserves.

Keywords: International reserves, hoardings, developing economies, determinants, influencing factors

1. Introduction

Over the past few years, there has been a remarkable increase in International reserves with the central banks of developing economies around the world, especially in the aftermath of East Asian crisis 1997-98. International Reserves held by developing countries have climbed from USD 6,12,253 to USD 58,88,373 by 2011 (Figure 1). The management of these huge reserves and the associated cost of holding are the major issues faced by the central banks of developing economies now.

In developing countries like India international reserves are one of the crucial determinants of BoP. They play a very significant role in the adjustment of exchange rate. Nevertheless, irrespective of all the theoretical justifications, the stock of international reserves of many emerging and developing countries, including India, has increased substantially even after their official announcements about commitment to the flexible exchange rate system (Flood and Marion, 2002).

Over the last decade, the pace of accretion in the India’s stock of international reserve has been so striking that it has registered more than 1000% growth, despite the fact that India has entered into flexible exchange rate system since March 1993 (Ramachandran, 2006). And now it seems convincing to believe that India has surpassed many standard measures of reserve adequacy to rest in a somewhat protected zone. Theoretically, it was believed that under flexible exchange rate system countries will need to keep less stock of international reserves, since central banks were not obligated to defend their parities through frequent interventions.

India’s stock of international reserves has been increasing continuously since the launch of economic reform in 1991. Starting from a stumply level of USD 5,800 million in 1991, the stock of international reserves increased regularly to USD 2,66,988 million by 2007 and reached their highest at USD 2,75,277 million in 2010 (See figure 2). Thereafter, owing the international financial disorder caused by 2008 crisis and strengthening of the US dollar and other international currencies, the stock of reserve declined to USD 2, 47,419 million at the end of 2008 and again touched the height of USD 2, 71,285 million by 2011. This evidently shows that irrespective of all the theoretical justifications, international reserves stock of India like many emerging countries has been constantly increasing during the economic reform period i.e.1991- till date.

Conceptually, a unique definition of foreign reserves is not available as there have been divergence of views in terms of coverage of items, ownership of assets, liquidity aspects and need for a distinction between owned and non-owned reserves. Nevertheless, for policy and operational purposes, most countries have adopted the definition suggested by the 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.

According to Krugman and Obstfeld, Official international reserves (or foreign exchange reserves) are assets held by central banks of respective economies that are used for various transactions such as purchases of foreign goods and assets, or payments of obligations to international organisations.

Foreign exchange reserves are defined as external stock of assets, which is available to the country’s monetary authorities to cover external payment imbalances or to influence the exchange rate of the domestic currency through intervention in exchange market, or for other purposes (IMF, 2000). A country’s reserve consists of gold, foreign currencies, special drawing rights (SDR)
and the reserve position with the International Monetary Fund (IMF).

Historically under the Breton-Woods system, the foreign exchange reserves were used by the central banks across the world to maintain the external value of their respective currencies at a fixed level. With the breakdown of Bretton-Woods system in the early 1970s, countries started adopting a relatively flexible exchange rate system, under which the reserves play only a less important role. Yet, the global exchange reserves have increased from 1.75 to 7.8 percent of world GDP between 1960 and 2002 (Flood and Marion, 2002).

The stock of gross and net international reserves held by central banks is a subset of its net external assets account. In paragraph 6.64, the BPM6 defines reserve assets (gross international reserves) as: “external assets that are readily available to and controlled by the monetary authorities for meeting balance of payments financing needs, for intervention in exchange rate markets to affect the currency exchange rate, and for other related purposes (such as maintaining confidence in the currency and the economy, and serving as a basis for foreign borrowing).”

Rest of the paper is organised as follows: Section 2 discusses reasons to hold the International reserves, section 3 presents briefly the determinants of international reserves whereas section 4 presents influencing factors and section 5 concludes.

Section 2

2. Reasons to keep International Reserves

The motivations for any country to hold reserves have always been liquidity and insurance; a hedge against the unpredictable financial shocks. The IMF definition clearly states that foreign reserves serve foremost for:

- Financing foreign payment imbalances and
- Maintaining a set exchange rate level.

Each country faces constant demands for foreign payments on demand for trade purposes, necessitating a reserve to accumulate and disburse foreign payments. Foreign trade and domestic policy also often lead to the accumulation of foreign debt which is serviced through international reserves. Normally, the debtor country manages to generate a revenue stream with which to settle its obligations. Unreasonable economic policies or shock falls in foreign revenue can cause payment difficulties. Reserves then become a source of liquidity. Foreign reserve amounts and composition also affect exchange rate volatility. All exchange policy classification stress that entirely free floating exchange rates are rare exceptions across the world. Even countries internationally acknowledged to have floating exchange rates own reserves.

We can identify different types of reasons for the economy to hold stocks of International reserves. Most countries have held foreign exchange reserves in support of exchange rate policy. Most often reserves are used to intervene directly in foreign exchange markets to influence exchange rates. Also the country need to hold reserves simply because investors believe that countries should have reserves, irrespective of whether reserves actually contribute to economic efficiency and growth potential.

2.1. Intervention to foreign exchange market

Financial system stability is one of the Bank’s prime policy interests, and most accept the rationale for a public policy interest in the subject. International reserves are used to boost stability and confidence in financial markets, since reserves are among the foremost indicators monitored by international ratings agencies. Underlying the public policy interest in financial system stability are two understandings: that financial markets are probably inherently more vulnerable to shocks and crises than other markets; and that significant social and/or externality costs can occur when the normal functioning of financial markets breaks down. They can reduce vulnerability to external factors and safeguard against crises. Based on these considerations, the authority engages in supervision and regulation of the international reserves.

2.2. Exchange rate stability

International reserves act as an exchange rate instrument helping cut fluctuations in the exchange rates of the national currency against foreign currencies. Fixing the exchange rate or targeting a constant exchange rate has a long pedigree as a route for achieving price level stability. Such an approach is, however, inconsistent with current thinking about the best policy with respect to exchange rate management. While a fixed or targeted exchange rate option cannot be entirely discounted as an option for the future, it should be noted that one of the emerging lessons from worldwide experience over the 1990s (including in Asia) is that fixed and targeted exchange rate arrangements are fragile and potentially highly costly in economic terms.

2.3. Maintenance of foreign trade transactions

The economies have liquidity requirement in respect of its own foreign exchange business, the great bulk of which is associated with the management of residual official foreign currency borrowings and foreign currency assets. Usually, the country will continue to be able to purchase foreign currency through private sector institutions but, in the context of dysfunctional foreign exchange markets discussed above, this is not guaranteed. Hence it becomes compulsory to keep international reserves.

2.4. Operations in foreign exchange market for domestic liquidity management

Foreign exchange reserves act as a monetary policy instrument. Just as the exchange rate can be influenced by central bank operations in domestic financial markets, local interest rates can be influenced by operations in the foreign currency markets. In principle, financial system liquidity management and monetary policy operations might efficiently be implemented via transactions in foreign exchange markets. They act as a liquidity buffer in case of an international financial market crash.

In short, nations hold international reserves for several reasons: to smooth out temporary fluctuations in external payment imbalances, to neutralize speculative attacks on currencies, for boosting international confidence on domestic economy, for prestige and as collateral for international borrowing (see Bahmani-Oskooee and Brown, 2002). International reserve can also be employed to keep the exchange rate favourable for export growth and more FDI inflows, which may finally lead to higher economic growth and more employment in the country.
Section 3

3. Determinants of International Reserves

Determinants of international reserves have been abundantly debated in the literature since the pioneering work of Heller (1966). They are grouped into two broad categories, mercantilist motives and the precautionary concerns (Aizenman and Lee, 2007). The mercantilist argument suggests that countries hoard international reserves to limit appreciation in order to defend their trade competitiveness (Dooley et al., 2003). The precautionary view on the other hand sees international reserves hoarding as insurance against unstable balance-of-payments (Bird and Rajan, 2003).

The following specification from Aizenman and Lee’s (2007) can be used to investigate factors determining international reserves:

\[ R = \beta_i + \beta_1 \text{EXGrowth}_t + \beta_2 \text{PLDev}_{t-1} + \beta_3 \text{KAcc}_t + \beta_4 \text{Debt}_t + \beta_5 \text{Pop}_t + \beta_6 \text{Open}_t + \beta_7 \text{TOT}_t + \epsilon_t \]

Where, EXGrowth, PLDev, KAcc, Debt, Pop, Open, TOT denotes higher export growth rates, Price Level Deviation, capital account liberalization, log of the ratio of short-term external debt to Gross Domestic Product, Population size, log of ratio of imports to GDP, log of the terms of trade respectively.

Several conclusions emerge from the specification. First, the holding of foreign reserves motivated by mercantilist concerns is positively correlated with higher export growth rates (variable EXGrowth) and with the deviation of the real exchange rate from its equilibrium value (Price Level Deviation noted PLDev). The latter observation captures the idea that international reserves are hoarded to manipulate the exchange rate.

Second, the holding of reserves motivated by precautionary concerns is positively correlated with the degree of capital account liberalization (KAcc) and the log of the ratio of short-term external debt to Gross Domestic Product (Debt).

Third, the reserves stock is positively correlated with a country’s population because reserves increase as the number of international transactions increases. In addition, reserves accumulation is positively correlated with the log of ratio of imports to GDP (Open). Last, the log of the terms of trade (ToTit) is positively correlated with reserves if countries absorb their fluctuations through reserve holdings.

Various models have been developed to measure the determinants of foreign reserves. The most widely used of these models in the literature is the “buffer stock model”. The model implies that the authorities demand reserves as a buffer to curb fluctuations in external payment imbalances. The traditional and most prominent factor considered in determining foreign reserves adequacy is the ratio of foreign reserves to imports (import adequacy).

Frenkeland Jovanovic (1981) states that most of the rules for a country’s demand for foreign exchange reserves consider real variables, such as imports, exports, foreign debt, severity of possible trade shocks and monetary policy considerations. Similarly, Shcherbakov (2002) states that, there are some common indicators that are used to determine international reserves for an economy. These indicators include: import adequacy, debt adequacy and monetary adequacy.

All the determinants are found to be statistically significant in the model. In particular, economic size and real effective exchange rate are positively related to international reserves, while balance of payments and the opportunity cost of holding reserves have negative impacts on international reserves.

Section 4

4. Factors influencing International Reserves

Recent studies have used a number of factors to influence international reserves holding. In their study, Chin-Hong et al. (2011) empirically examined five explanatory variables to investigate their impacts on the international reserves holding in Malaysia. These variables include economic size, real effective exchange rate, openness, balance of payments and the opportunity cost of reserves holding. They employed the following econometric model for their study:

\[ \text{IRGDP} = \beta_0 + \beta_1 \text{LGDP} + \beta_2 \text{LREER} + \beta_3 \text{BOPGDP} + \beta_4 \text{LMMR} + \epsilon \]

Where IRGDP, LGDP, LREER, BOPGDP, LMMR and \( \epsilon \) are the ratio of international reserves to GDP, natural logarithm of GDP, natural logarithm of real effective exchange rate, ratio of overall balance of payments to GDP, natural logarithm of money market rate and error term respectively. They concluded that all the variables are found to be statistically significant in the model. In particular, economic size and real effective exchange rate are positively related to international reserves, while balance of payments and the opportunity cost of holding reserves have negative impacts on international reserves.

Empirical research works on foreign reserves (e.g. Landell-Mills, 1989; Lane and Burke, 2001) established a relatively stable long-run demand for reserves based on a limited set of explanatory variables such as gross domestic products (GDP), Gosselin and Nicolas (2005) grouped the influencing factors of reserve holdings in five categories: economic size, current account vulnerability, capital account vulnerability, exchange rate flexibility, and opportunity cost. In the long run, central banks will increase their reserves in response to a greater exposure to external shocks. Thus, the level of foreign reserves could be positively correlated with an increase in both exports and imports. Capital account vulnerability increases with financial openness and potential for resident-based capital flight from the domestic currency. Consequently, reserves could be positively correlated with some variables like the ratio of capital flows to GDP. Exchange rate flexibility is usually important.

Charles (2012), in his study about factors impacting international reserves presented the following model

\[ \text{LExtr} = \gamma_0 + \gamma_1 \text{LGDP} + \gamma_2 \text{LExhr} + \gamma_3 \text{LTrade} + \gamma_4 \text{LInfr} + \epsilon \]
Where \( \text{Extr} \) is external reserves; \( \text{GDP} \) is gross domestic product; \( \text{Trade} \) is the level of trade captured by the sum of import and export as a ratio of \( \text{GDP} \); \( \text{Exhr} \) is the exchange rate (in US$); \( \gamma_i \) are parameters, while \( \varepsilon \) is an error term. He finds the factors that affect the level of foreign reserves are \( \text{GDP}, \text{level of trade openness, exchange rate and inflation} \). The levels of \( \text{GDP} \) and \( \text{trade openness} \) were found to exhibit positive impacts on foreign reserves, supporting the self-insurance theoretical base of foreign reserves. Whereas the level of foreign capital inflow and inflation had a negative relationship with foreign reserves.

India Economic Survey (2004) identified three main factors that predicated the nation’s reserve holding which include: import adequacy—the number of months of imports that it can finance; its ability to cover external payment obligations—captured by the ratio of reserve to external and short-term debt; and monetary adequacy—measured by ratio of reserve to broad money and reserve money. Demand for liquidity is one of the factors influencing international reserves.

Section 5

5. Conclusion

International Reserves held by developing countries including India have increased with a fast pace during last decade. Any economy always hold reserves for liquidity and insurance against unpredicted financial and economic shocks. The IMF clearly states that foreign reserves serve foremost for financing foreign payment imbalances and maintaining a set exchange rate level. Unreasonable economic policies or shock falls in foreign revenue can cause payment difficulties. Reserves then become a source of liquidity. Generally the countries hold international reserves for variables such as: Intervention to foreign exchange market, Exchange rate stability, Maintenance of foreign trade transactions etc. Empirical research studies on foreign reserves established a relatively stable long-run relationship among the factors affecting foreign exchange reserves. The researchers grouped the influencing factors of reserve holdings in five categories i.e. economic size, current account vulnerability, capital account vulnerability, exchange rate flexibility, and opportunity cost. Other factors influencing these reserves are import adequacy, demand for liquidity, level of trade openness, exchange rate and inflation. The levels of \( \text{GDP} \) and \( \text{trade openness} \) were found to exhibit positive impacts on foreign reserves, supporting the self-insurance theoretical base of foreign reserves.
Figure 2: India’s international Reserves in the post-reform era

Source: World Bank and RBI

INDIA’S INTERNATIONAL RESERVES

<table>
<thead>
<tr>
<th>Year</th>
<th>US$ in Million</th>
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<tbody>
<tr>
<td>1991</td>
<td>5,800</td>
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<tr>
<td>1996</td>
<td>24,110</td>
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<tr>
<td>2000</td>
<td>37,902</td>
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<tr>
<td>2005</td>
<td>131,924</td>
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<td>2006</td>
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<td>2007</td>
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<td>2008</td>
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<tr>
<td>2009</td>
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<td>2010</td>
<td>275,277</td>
</tr>
<tr>
<td>2011</td>
<td>271,285</td>
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References:


[14] Prabheesh. K. et al. (2009), Modeling India’s Demand for International Reserves


