Chapter-3

A Conceptual Overview of Foreign Exchange Reserves

3.1. Introduction

There has been a great upsurge in foreign exchange reserves in the recent years benefitting the central banks of developing economies all over the world particularly, in the post East Asian disaster phase of 1997-98. By 2005, the developing countries had increased their hold on the foreign exchange reserve from 30 per cent to 60 per cent. The major challenges presently faced by the central banks of the countries undergoing development is properly managing the huge resources as it involves the cost of holding connected with it.

The foreign exchange reserve of a country can be defined as its “external stock of assets”, which is valuable for the country as it enables the authority in charge of its monetary affairs for paying up any imbalance in external payments due, or for influencing the rate of exchange for domestic currency by getting involved in market exchange activities.

The reserves of a country have different components - gold, foreign currencies, Special Drawing Rights (SDR) and the position of the reserve with the International Monetary Fund (IMF). The Bretton-Woods system stipulated that foreign exchange reserves of Central Banks all over the world maintain the external value of their respective currencies at a fixed level. The Bretton-Woods system broke down during the early 1970s, and countries moved to a relatively flexible exchange rate system, the reserves in the changed scenario played a relatively less important role. However the global exchange reserves have increased from 1.75 to 7.8 per cent of the world GDP between 1960 and 2002.

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This study analyses the demand for foreign exchange reserves of India. India occupies the 6th position in the world in terms of accumulation of foreign exchange reserves. As an emerging economy and like other developing economies, the country has been aggressive in garnering foreign exchange reserves. The economy opened up in 1990-91 and post liberalisation, the foreign exchange reserves showed a significant increase. The all time low which was US$5bn at the end of March 1991 climbed to $141bn in 2004-05. The reserves to GDP ratio was 3.5 per cent in 1991-02 and increased to 20 per cent in 2004-05 (Figure 8). We shall investigate the factors which influence the Reserve bank of India (RBI) to hold a high level of reserves.

The foreign exchange reserves, also referred as Forex are foreign exchange currency and bonds that are held by any central bank and monetary authorities of a country. However, the term in popular usage commonly includes foreign exchange and gold, SDRs and IMF reserve positions. This figure which includes all the items mentioned above is available, however officially it is termed as official international reserves or international reserves (Figure 4).

The assets as depicted above are held by the central bank in the form of US dollars mostly. A smaller portion consists of the Sterling Pound and the Japanese Yen. These total assets are used as a backup to the liabilities, for example the local currency that has been issued by the central bank and the various bank reserves deposited by different banks, the government and other financial institutions with the central bank. Holding of currencies of other countries has a positive impact in terms of keeping the country’s currency stable and reducing of economic shocks. Use of foreign exchange reserves has gained popularity after the decline of the gold standards. During the gold standards era, the term Official international reserves or international reserves consisted of the amount of gold and occasionally silver that the central bank held.

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93 International Monetary Fund Survey, 2005
95 Investors world
International reserves are a country’s “external assets”—including foreign currency deposits and bonds held by central banks and monetary authorities, gold and SDRs. The top 10 holders of international reserves account for nearly two-thirds of the world’s total foreign currency reserves. China, with US$3.3 trillion at the end of 2011, tops the list. Twenty years ago it had only US$18 billion, and ten years ago US$146 billion. Second is Japan with US$1.3 trillion (as of December 2012.) They are the only two countries with reserves above US$1 trillion.  

The foreign currency portion of international reserves (IRs) is held in “reserve currencies”—mostly US dollars, but also euros, UK pounds and Japanese yen. SDRs (“special drawing rights”) are international reserve assets created by the International Monetary Fund (IMF), which member countries can add to their foreign currency reserves and gold reserves to use for payments requiring foreign exchange. The SDR’s value is set daily using a basket of four major currencies: the euro, Japanese yen, pound sterling and US dollar.

Ample IRs allow a government to manipulate exchange rates—usually to stabilize rates and provide a more favorable economic environment or to purchase its domestic currency to protect the country from an attack by speculators. IRs are also an important indicator of a country’s ability to repay foreign debt and are a factor in determining a country’s credit rating.

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96 http://www.gfmag.com/component/content/article/119-economic-data/12374-international-reserves-by-country.html#axzz2YWRUEfj
During economically challenging times, countries whose private capital inflows do not cover their financing needs bridge the gap by drastically reducing their trade deficits or by drawing down IRs. Worsening trade balances can have the same effect. In the course of 2012, for example, India and Indonesia faced precisely this problem and ended up with declining international reserves, by 3 billion and 1.4 billion of US dollars respectively. According to a study from the World Bank, “Falling international reserves and high current account deficits may constrain monetary policy in some middle-income countries (e.g. South Africa and India). To the extent that reserves are being consumed to meet external financing requirements and imports, countries may be forced to keep interest rates high in order to attract foreign capital flows (or deter outflows).”

In fact, the fragile global recovery in 2012, says the World Bank, and related decreasing exports by developing countries, forced some of them to dip into their international reserves to support their currencies. In general, it is believed that reserves are “adequate” if they can cover approximately three months of a country’s imports or all of the external debt maturing over the coming year. According to the same World Bank report, “the proportion of crude oil and industrial commodities exporters where international reserves were less than the critical three months of imports rose from 6.3 per cent to 9.4 per cent between January 2011 and September 2012 and the share of countries with less than five months of import cover rose from 12.5 per cent to 25 per cent. But in the group of non-oil non-commodities dependent countries, the share of countries with less than three months of import cover rose from 14 per cent to 25 per cent in the same period, and those with less than five months of import cover rose from 44.4 per cent of the total to 58.3 per cent.”

Egypt represents one of the most worrisome cases, with international reserves falling from a level at which they could cover more than 7 months of imports in January 2011 to one that would pay for only 3 months of imports in November 2012.

We do not find evidence of a theoretical consensus among experts on the interaction of stock prices with exchange rates. There are intermediate variables such as wealth, demand for money, interest rates etc., which play a vital role to establish the linkage.
between the stock price and the exchange rates. Dornbusch and Fisher (1980)\textsuperscript{97} in the
flow oriented models of exchange rate determination mentioned that, focuses on
current account or the trade balance in the economy. The model links the currency
movements with international competitiveness and balance of trade positions. This in
turn has a bearing on the real output of the country which in turn affects the position of
the firm. The current and future cash flows of the firm is impacted and this in turn has a
bearing on the stock prices. The impact is all the more prominent in case the firm
borrows in foreign currency or is a heavy importer of inputs.\textsuperscript{98}

Branson(1983)\textsuperscript{99} and Frankel(1979)\textsuperscript{100} point out that the relationship between exchange
rates and stock prices can be explained from a different point of view, namely through
the “stock oriented models”, which lay importance on capital account as the most
important factor determining the dynamics of exchange rate. The fundamental of the
portfolio model is based on the idea that the entire wealth of the agents should be
distributed between domestic and foreign assets, inclusive of their assorted currencies.
Thus the entire demand and supply of assets is evenly balanced by the exchange rate.
There are some negative effects of stock prices logically deduced from exchange rates,
where a rise in the price of domestic stocks directly leads to an increase in people’s
demand for domestic assets. To achieve this, it becomes necessary for people to sell
foreign assets which do not look much appealing to them now. The increasing demand
for domestic stocks leads to an appreciation of the local currency. Therefore, argued in
another way, it can be said, wealth increase as a result of an increase in the price of
domestic assets would encourage investors to demand more and more money, which
again, would increase the domestic interest rate. This increase in interest rate would
further attract foreign investment that will again appreciate the value of domestic
currency.\textsuperscript{101}

Review, 70, p.960–971.
University Press.
\textsuperscript{100} Frankel, J. A. (1979), “On the Mark: a theory of floating exchange rates based on real interest
\textsuperscript{101} Upadhyay A (2007), “Foreign exchange reserves — Is the glass half full or half empty? Friday, Mar
09, Opinion – Forex Industry and Economy – Infrastructure.
Stock prices and exchange shares a structured but surprisingly empirical relationship besides theoretical analysis. Most experiential literatures have explored the relationship between stock prices and exchange rates not in the perspective of the developing countries but on the developed countries. Various studies in the literature review on this area, such as Smith (1992), Solnik (1987)\textsuperscript{102}, Aggarwal (1981)\textsuperscript{103}, Franck and Young (1972), Katephvlaktis et al. (2000), Granger, CWJ. et al. (2000), Abdalla et al. (1997), Apte (2001) have noticed an important relationship between the exchange rates and stock prices, while studies of Soenen and Hennigar (1998), Ajayi, A and Mogoue (1996), Ma and Kao (1990) have claimed to observe a definite relation between the two. However, researches conducted by Bartov and Bodnar (1994), and Franck and Young (1972) observed almost no relationship existing between the stock prices and exchange rates. Many researches such as studies conducted by Morley (2000), Oskooe, BM and Sohrabian (1992), Ibrahim (2000), Kanas, A (2000) etc. on the aspect of causation arrived at mixed results.\textsuperscript{104}

In India, very few studies have been carried out in this area, though current researches have laid a lot of emphasis on the subject of appreciation of rupee against the US dollar. The advent of globalization and liberalization in the financial sector of the Indian economy at the onset of the 1990’s has ushered is massive changes in the structure of the economy. Financial liberalization needs directed credit programs to be abolished, bank competitions to be promoted, interest rates to be freed, financial markets to be deregulated, and increase of liquidity for the development and expansion of the securities market held by the government, capital market, money market, and market for foreign exchange.

3.2. Foreign Exchange Reserves

Foreign exchange reserves (also called Forex reserves) in an excise format denote only the foreign currency deposits and bonds present in the central banks and by the monetary authorities. On the other hand, when spoken in common terms, the phrase


also comprises of foreign exchange and gold, SDRs and IMR reserve positions (Chakrabarti, 2006). This common figure is easily accessible but is more precisely considered to be official international reserves or international reserves (Figure 4).

**Figure 5: Foreign Exchange Reserves in India**

![Graph showing Foreign Exchange Reserves in India](https://www.tradingeconomics.com/)

Foreign Exchange Reserves in India increased to 14760.70 INR Billion in June of 2013 from 14228.40 INR Billion in May of 2013. Foreign Exchange Reserves in India is reported by the Reserve Bank of India. India Foreign Exchange Reserves averaged 4856.84 INR Billion from 1990 until 2013, reaching an all time high of 14760.70 INR Billion in June of 2013 and a record low of 23.86 INR Billion in June of 1991. In India, Foreign Exchange Reserves are the foreign assets held or controlled by the country central bank. The reserves are made of gold or a specific currency. They can also be special drawing rights and marketable securities denominated in foreign currencies like treasury bills, government bonds, corporate bonds and equities and foreign currency loans. This page includes a chart with historical data for India Foreign Exchange Reserves.

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The RBI decided to keep the policy repo rate under the liquidity adjustment facility (LAF) unchanged at 7.25 per cent and to keep the cash reserve ratio of scheduled banks unchanged at 4.0 per cent of their net demand and time liabilities. The Central Bank warned of upward risks to inflation posed by a falling rupee and increases in food prices.

However, under the Bretton Woods System, the US dollar operated as a reserve currency, so it also was included as an element of the country’s approved global reserve assets. During 1944-1968, the US dollar was allowed to be converted into gold through the Federal Reserve System; however post 1968 it was only the central banks which were allowed to convert dollars into gold from authorized gold reserves and post 1973, no person or organisation was allowed to convert dollars into gold from authorized gold reserves. As 1973, all fundamental currencies have not been permitted to be converted into gold from authorized gold reserves. People and organisations now need to purchase gold from private markets, akin to other goods (Mathur, 2007). Even despite US dollars and other currencies not been allowed to convert into gold from authorised gold reserves, they are still permitted to operate as certified global reserves.

In an adaptable exchange rate system, certified global reserve assets permit a central bank to buy the local currency, which is regarded to be a problem for the central bank (as it prints the money itself as IOUs). This act can steady the worth of the domestic currency (Reddy, 2006). Central banks across the globe have at times assisted by purchasing and selling authorized global reserves to try and impact the exchange rates.

Foreign exchange makes its way into a nation in type of investments, payments for exports, advances and mutual help between other things. It is used as making the import payments, paying of the interest, paying back the advances and repatriation of investments and earnings. Advanced nations in contrast have forex reserves which are lower. The cause for not having bigger reserves is in the fact that their currencies frequently act as their reserve currencies themselves and thus remain extremely liquid, so the protective reason is not very high for them. Additionally, the export industry in such economies is not based on the exchange rates in such economies. Thus they have
no need to administer their exchange rates so as to back their local sectors (Manu Gupta, 2009)\textsuperscript{106}.

Definition related to forex reserves is yet to attain. However, there are diversified views about the coverage of items, assets’ ownership, and aspects of liquidity and need demands related towards distinction among the non-owned and owned reserves. In reference to operations and policies many are following definition offered by International Monetary Fund (Balance of Payments Manual, and Guidelines on Foreign Exchange Reserve Management, 2001). The definition declares external assets being readily available towards the process of controlling through monetary authorities for direct sort of finance related to external payments that imbalances, under indirect regulating magnitudes where imbalances by intervention get noted within exchange markets by affecting currency exchange rate and/or other purposes.

Standard approach noted for the measurement of international reserves notes unencumbered assets of international reserve assets under monetary authority. However, foreign currency along with the matter of securities by public added by banks as well as corporate bodies never relied over definition of any sort of official holdings for the international reserves.

In reference to India, Act 1934 passed by RBI offers enabling provisions towards Reserve Bank in order to act as custodian noted for the foreign reserves, added by the provision to manage reserves through defined objectives.

The stature to remain as custodian of foreign reserves gets enshrined remains of great importance. The ‘reserves’ is for foreign reserves as gold assets in Banking Department and also as foreign securities noted by Issue Department, added by domestic reserves as ‘bank reserves’. Composition as happens in foreign reserves is about the a minimum reserve system and thus the instruments as well as securities of the reserves of respective country can get deployed under relevant Sections and Acts of RBI.

In India, to sum up, forex reserves constitutes of custodian aspects and the way the same must get deployed get noted in Statute, and for extremely conservative fashion in management domain of reserves is relevantly of concern. In terms of substantive instance, RBI as the custodian as well as manager for the forex reserves, along with the practice to operate within overall policy structure as per Indian Government.

**Why to hold Forex Reserves?**

There can be three determined motives for holding Forex Reserves and they are - transaction motive, speculative motive and precautionary motive. International trade increases the value of currency flow that gets assumed to be handled through private banks, which are driven by transaction motive. In the same way, speculative motive is for individual/corporates. However, Central bank reserves, remains as the last resort for the stock of foreign currency in terms of unpredictable flows that remains consistent with precautionary motive for the act to hold foreign assets. Precautionary motive towards the holding of notable foreign currency, as the demand for money, can turn up positively towards cost and wealth for the unplanned deficit, added by negative return meant for alternative assets.

Policy perspective considers clearer aspects for the benefit of the country by economic scale through transaction reserves, yet sub serve precautionary motive in terms of keeping official reserves under ‘war chest’ format. Moreover, forex reserves turns up as the tools to maintain exchange rate, and enable absorption related to the international money as well as capital flows. Official reserves remain under precautionary as well as transaction motives as per the aggregate national interests, in terms of attaining balance between supply and demand of foreign currencies. In reference to intervention, and he act to preserve confidence within the ability of the country to carry out external transactions.

Reserve assets, in reference to monetary authority as custodian, or sovereign Government, remain as the principal aspect. As for monetary authority, holding motives might not deviate from aims of monetary policy, whereas for the Government, the aims of holding reserves can cross monetary authorities. Therefore, aims of holding reserve assets can influence can reconcile aims of monetary authority in terms of being
the custodian and Government as the principal. However, some instances are there when reserves remain convenient way for Government mode of services and goods, servicing foreign currency debt, insurance made against emergencies, and source of income.

3.2.1. Components of Foreign Exchange Reserves

At present, the foreign exchange reserves stand at a robust $285.5 billion. RBI’s gold reserves post the buying, make up around $17.71 billion (or 6.2 per cent) of the entire foreign exchange reserves, indicating an increase from the earlier $10.3 billion (3.7 per cent) currently. The share of gold by worth of international foreign exchange reserves stands at approximately 10 per cent. This is not unexpectedly equivalent to what if frequently stated to be the correct quantity of gold and merely 5 per cent less than what the European Central Bank choose their gold assets to be in terms of ratios when it was set up; the latest instance of a central bank determining on the share of gold (Stiglitz, 2002)\(^{107}\). The foreign exchange reserves of RBI include foreign currency assets, gold, special drawing rights (SDRs) a global reserve currency floated by IMF and funds invested with IMF. The largest portion of these assets is in the shape of foreign currency reserves ($268.3 billion). The other elements of the reserves include SDRs at $5.267 billion and funds kept with IMF at $1.589 billion. The largest forex reserves globally are held by China; the other nations creating large forex reserves include India, Korea and Brazil (Figure 5). (Ramakumar and Chavan, 2007)\(^{108}\)


On October 23, in its weekly statistical supplement, it was asserted by the central bank that the assets increased to $285.520 billion. According to the central bank, modifications in the foreign currency assets, articulated in the context of dollar, encompass the impact the increase or decrease of other currencies maintained in its reserves like the euro, pound sterling and yen. The forex reserves encompass India's Reserve Tranche position in the International Monetary Fund, according to the central bank (Table 2). (Narasimhan, 2007)\textsuperscript{109}

\textbf{Inflows of Foreign Exchange into Reserves: Major Sources}

Foreign exchange reserves has got foreign currency assets (or FCA), Special Drawing Rights (or SDRs) and gold that get disseminated as per Weekly Statistical Supplement

(or WSS) towards RBI Bulletin got valuation changes noted from exchange rates. Foreign exchange reserves flows in BoP statistics, yet exclude variation in terms of gold and FCA changes and SDRs changes. Elements like imports, exports, portfolio investment, foreign direct investment, external assistance, external commercial borrowings, etc. get noted as self-explanatory, than some items, as banking capital, investment income and ‘other capital’ demanding for further elaboration. The Banking Capital has got assets and determined authorized dealers, deposits of NRI and movement in accordance with foreign central banks as well as international institutions such as World Bank, ADB, IDA, IFC, etc. led by RBI. There are ‘Other Capital’ that get noted as residual item and got delayed exports receipts, raised funds and programmes held abroad by all the Indian corporate, whereby its subscriptions towards quota payments, international institutions is for IMF. It is noted that delayed export receipts lags and leads between goods’ physical shipment led by customs and fund receipt by banking channel.

3.2.2. Demand for Foreign Exchange Reserves

Grubel (1971)\textsuperscript{110} pointed out that, since the 1960s there has been a great surge in researches carried out to estimate the demand for foreign exchange reserves. According to Clark (1970)\textsuperscript{111} and Edwards (1983)\textsuperscript{112}, there are two approaches to explain the demand for foreign exchange reserves, the first of which indicates that foreign exchange reserves movements are influenced by the difference of actual foreign exchange reserve held by a nation and the necessary foreign exchange reserve amount the country holds.

\begin{footnotesize}
\end{footnotesize}
Table 3: Movement in Foreign Exchange Reserves.

<table>
<thead>
<tr>
<th>Date</th>
<th>FCA</th>
<th>SDR</th>
<th>Gold</th>
<th>RTP</th>
<th>Forex Reserves</th>
</tr>
</thead>
<tbody>
<tr>
<td>31-Mar-12</td>
<td>260,069</td>
<td>4,469 (2885)</td>
<td>27,023</td>
<td>2,836</td>
<td>294,398</td>
</tr>
<tr>
<td>30-Apr-12</td>
<td>260,839</td>
<td>4,474 (2885)</td>
<td>26,618</td>
<td>2,915</td>
<td>294,846</td>
</tr>
<tr>
<td>31-May-12</td>
<td>253,237</td>
<td>4,358 (2886)</td>
<td>25,585</td>
<td>2,839</td>
<td>286,019</td>
</tr>
<tr>
<td>30-Jun-12</td>
<td>256,703</td>
<td>4,379 (2886)</td>
<td>25,760</td>
<td>2,895</td>
<td>289,736</td>
</tr>
<tr>
<td>31-Jul-12</td>
<td>256,573</td>
<td>4,353 (2886)</td>
<td>25,715</td>
<td>2,135</td>
<td>288,775</td>
</tr>
<tr>
<td>31-Aug-12</td>
<td>257,620</td>
<td>4,393 (2886)</td>
<td>26,239</td>
<td>2,209</td>
<td>290,462</td>
</tr>
<tr>
<td>30-Sep-12</td>
<td>259,958</td>
<td>4,451 (2886)</td>
<td>28,133</td>
<td>2,270</td>
<td>294,812</td>
</tr>
</tbody>
</table>

Notes:
1. FCA (Foreign Currency Assets): FCAs are maintained as a multi-currency portfolio comprising major currencies, such as, US dollar, Euro, Pound sterling, Japanese yen, etc. and are valued in terms of US dollars.
2. FCA excludes investments amounting to US$ 790 million in foreign currency denominated bonds issued by IIFC (UK) since July 05, 2012.
3. SDR (Special Drawing Rights): Values in SDR have been indicated in parentheses.
4. RTP refers to the Reserve Tranche Position in the IMF.

Source: www.rbi.org.in/dbe

The reserves stood at US$ 294.4 billion as at end-March, 2012. During the half year under review, it came down to US$ 286.0 billion at the end of May 2012 after which it followed upward trend and increased to US$ 294.8 billion at the end of September 2012.

Although both US dollar and Euro are intervention currencies and the Foreign Currency Assets (FCA) are maintained in major currencies like US dollar, Euro, Pound Sterling, Japanese Yen etc., the foreign exchange reserves are denominated and expressed in US dollar only. Movements in the FCA occur mainly on account of purchases and sales of foreign exchange by the RBI in the foreign exchange market in
India, income arising out of the deployment of the foreign exchange reserves, external aid receipts of the Central Government and the effects of revaluation of the assets.

Adequacy of reserves has emerged as an important parameter in gauging the ability to absorb external shocks. With the changing profile of capital flows, the traditional approach of assessing reserve adequacy in terms of import cover has been broadened to include a number of parameters which take into account the size, composition and risk profiles of various types of capital flows as well as the types of external shocks to which the economy is vulnerable.

In the recent period, assessment of reserve adequacy has been influenced by the introduction of new measures. One such measure requires that the usable foreign exchange reserves should exceed scheduled amortisation of foreign currency debts (assuming no rollovers) during the following year. At the end of September 2012, the import cover improved marginally to 7.2 months from 7.1 months at end-March 2012. The ratio of short-term debt\(^1\) to the foreign exchange reserves which was 26.6 per cent at end-March 2012 increased to 28.7 per cent at end-September 2012. The ratio of volatile capital flows (defined to include cumulative portfolio inflows and short-term debt) to the reserves increased from 79.9 per cent as at end-March 2012 to 83.9 per cent as at end-September 2012.

The second approach is a monetary approach based on monetary movements pertaining to balance of payments, and indicates that the variance in foreign exchange reserve holdings is connected to the in-equilibrium in the money market at home. Hence, an excess demand for money will raise the foreign exchange reserves when the domestic credit is invariable, while an excess supply in the money market will reduce the foreign exchange reserves. Therefore in the views of Edwards (1984)\(^1\), foreign exchange reserves of a country equate the residual monetary holding by the government of that country. The hypothesis laid down by research studies influenced by this approach stated that disequilibrium in the money market influences the demand for the foreign

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exchange reserve in the short run, which found supportive evidence in the works of Ford and Huang (1994)\textsuperscript{114} and Badinger (2004)\textsuperscript{115}.

An understanding between the two points of view would be possible if a steady demand for foreign exchange reserves arise in the market, though it’s requirement cannot be considered as steady anymore. So, Edwards (1984)\textsuperscript{116} and Frenkel (1974)\textsuperscript{117} opinionated that an alteration in the credit level in the domestic sphere would partly be dependent on the “relationship between the actual and the desired level of foreign exchange reserves.

Clark’s (1970)\textsuperscript{118} theory of existent relationship between foreign exchange reserves and the cost of adjustment within an economy, strives to establish that the advantage of foreign exchange reserve lies only in evasion of the adjustment costs. The reason being, Foreign exchange reserves aid in designing the domestic strategy and objectives of a nation when there is a transitory decline in it’s Balance of Payment. This anomaly related to Balance of payments is either resorted by financing through the foreign exchange reserves or is removed by making internal economic adjustments through suitable governmental policies. In Clark’s opinion, the effect of implementing the two policies in a country would be distinctly different, as a higher level of foreign exchange holding as a safeguard would surely reduce the domestic investment made the government, but the income level would also be reduced. On the other hand if there is a preference for internal adjustment at high speed, there would be a high level of income variability. Hence, the best way of optimizing a country’s welfare is by striking a balance between maintaining the foreign exchange reserve and controlling the rate of internal economic speed adjustment.


\textsuperscript{118} International Monetary Fund (2003), “Are Foreign Exchange Reserves in Asia too high?”, World Economic Outlook Chapter II, p.78-92.
Of the few recent research studies in the field of foreign exchange reserve, a study conducted by Aizenman and Marion (2003)\textsuperscript{10} is worth mentioning. Their cross country study conducted on 122 developing countries during the period 1980-96 measured the equation of foreign exchange reserve demand through a set of variables such as- real per capita GDP, a country’s population, volatility of actual export receipts, per centage share of import to GDP and amount of instability of the Real Effective Exchange Rate of the foreign exchange reserves.

The outcome of the above analysis reflects that over 88 per centage of disparity in foreign exchange reserves can be explained by the above mentioned variables. The demand for foreign exchange reserve in developing countries, particularly in the phase of post East Asian crisis, can be explained by specific features of countries that are developing. These features are- restricted access to worldwide capital market, expensive tax collection modes and the comparatively inelastic fiscal plans.

In 2003, IMF categorically analysed the foreign exchange reserves demand in the period 1980-96 for 122 countries, where the hypothesis of the study emphasised that the foreign exchange reserves of a country is likely to differ because of the economic size, vulnerability of the present account, weakness of the capital account, flexibility of the exchange rate and the opportunity cost. Results of this study revealed that other than weakness of the capital account and opportunity cost measure, all expounding variables with considerable clarity explain the movements of the foreign exchange reserve, where 90 per cent of the differences in foreign exchange reserves are explained by the above mentioned factors.\textsuperscript{11}

The Buffer Stock Model propagated by Frenkel and Jovanovic\textsuperscript{12} has been used to analyse the effect of foreign exchange reserve variability and opportunity cost on demand. This paper has covered a large span of time and has used a much broader set of explanatory variables besides using modern techniques of econometrics, and has contributed to the existing literature on the subject by lending estimates of the foreign exchange reserve demand function for India.\textsuperscript{119}

3.2.3. Foreign Exchange Reserves in India

The external industrial strategy of India till 1991 was extremely restricted which was chiefly planned to protect the inadequate FER for crucial imports (petroleum goods and food grains), limit the mobility of capital and dissuade transnational firms from commencing operations in India (Wyplosz, 2007). The extrinsic industrial policy after 1991, though continuing in its mode, has moved to encouraging exports rather than substituting imports with FER adequacy as a crucial factor.

The fallout of the methods initiated to liberalise the inflow of capital has resulted in the increase of India’s FER (chiefly foreign currency assets) to US$140 billion at end-March 2005 from US$6 billion at the end-March 1991. The speeding trend was initially witnessed during 1993, as documented by the increase in the foreign currency assets, when India espoused the market-dependent system of exchange rates and then in 2001, when the current account depicted an excess after a continuous shortfall post 1978. The FER surpassed 15 months of imports, in March 2005, in contradiction of two weeks in June 1991 (Rodrik, 2006). The significant development in FER has resulted in a sudden reduction in the proportion of short-term debt to reserves to 5 per cent in 2005 from 147 per cent in 1991. In terms of maintain FER, India is rated to be fifth across the globe in 2004 (Figure 6).

The inflows of foreign investment (more portfolio than direct) and banking capital, including deposits by non-resident Indians were the chief sources of increase in the FER in India. The foreign direct investment was around US$5 billion in 2004-05, out of the entire investment US$12 billion. The chief input was mainly by the computer services and software exports, chiefly banking, financial, and insurance in the current account; their contribution rose to US$17 billion in 2004-05 from US$1 billion in 1995-96. Additionally, the inward remittances from people employed overseas, chiefly from Western Europe and the United States, were nearly two times to touch a figure of US$21 billion from US$8 billion during the same time.

### Table 4: Foreign Currency Assets

<table>
<thead>
<tr>
<th>Description</th>
<th>As on March 31, 2012</th>
<th>As on September 30, 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign Currency Assets *</td>
<td>260,069</td>
<td>259,958</td>
</tr>
<tr>
<td>(a) Securities</td>
<td>140,271</td>
<td>153,621</td>
</tr>
<tr>
<td>(b) Deposits with other central banks, BIS &amp; IMF</td>
<td>114,276</td>
<td>100,413</td>
</tr>
<tr>
<td>(c) Deposits with foreign commercial banks / funds placed with EAMs</td>
<td>5,522</td>
<td>5,924</td>
</tr>
</tbody>
</table>

* FCA excludes investments amounting to US$ 790 million in foreign currency denominated bonds issued by IIFC (UK) since July 05, 2012.

The foreign currency assets are invested in multi-currency, multi-asset portfolios as per the existing norms which are similar to the best international practices followed in this regard. As at end-September 2012, out of the total foreign currency assets of US$ 260 billion, US$ 153.6 billion was invested in securities, US$ 100.4 billion was deposited with other central banks, BIS and the IMF and remaining US$ 5.9 billion comprised deposits with foreign commercial banks and funds placed with the External Asset Managers (EAMs).

**Figure 7**: Foreign Exchange Reserves – Trend in Selected Countries

Total foreign exchange holdings worldwide went from approximately US$3 trillion in 2003 to nearly US$11 trillion by the end of 2012.
Over the last decade, countries in the developing world have been growing their foreign exchange reserves at an impressive rate, expanding them several times over. If, in 2003, Advanced economies held almost 50% more reserves than Emerging and Developing economies (with US$1.8 trillion to US$1.3 trillion), by 2012 this relationship had more than flipped, with Emerging and Developing economies controlling nearly double the reserves of Advanced economies (US$7.2 trillion to US$3.7 trillion).

During the Great Recession of 2007-2009 global reserves dropped from a peak of almost $7.5 trillion in mid-2008 to just under $7 trillion by February 2009, primarily as countries tried to manage currency depreciation and used reserves to fund stimulus packages. By the end of the first quarter of 2009, foreign reserves had once again begun to rise—and that trend continued in 2011 and 2012.

The sufficiency of reserves conventionally is ascertained by the months of import cover (stock of reserves to volume of imports), with three or four months considered to be sufficient. This way totally presumes a time period to productively surmount a short-run jolt in extrinsic payments.

On the other hand, in the instance of South East Asian nations, the predicaments of 1997 remained for a longer time duration and the import cover for some months was not sufficient to grasp the jolt. Several transitions in the global fiscal markets post 1997 have resulted to novel ways to maintain sufficient reserves. The chief technique amongst these include the Guidotti directive, which despite being altered as years have passed, persistently emphasises that the liquid reserves need to be retained adequately to fulfil extrinsic duties for nearly a year despite any extrinsic help. The Graph 4 displays the cross-nation contrast of few primary sufficiency determinants. The reserves in India are humble in contrast to those of other nations in context to sufficiency ratios with the exception being the import cover.

3.2.4. Measures of Adequacy Level of Forex Reserves in India

The Indian approach to determining adequacy of forex reserves has been evolving over the past few years, especially since the pioneering Report of the High Level Committee on Balance of Payments, culminating in Governor Jalan’s exposition of the
combination of global uncertainties, domestic economy and national security considerations in determining liquidity at risk and thus assessing reserve adequacy. It is appropriate to submit stylized facts in relation to some of the indicators of reserve-adequacy described here without making any particular judgment about adequacy.

The foreign exchange reserves include three items; gold, SDRs and foreign currency assets. As on May 3, 2002, out of the US $ 55.6 billion of total reserves, foreign currency assets account the major share at US $ 52.5 billion. Gold accounts for about US $ 3 billion. In July 1991, as a part of reserve management policy, and as a means of raising resources, the RBI temporarily pledged gold to raise loans. The gold holdings thus have played a crucial role of reserve management at a time of external crisis. Since then, Gold has played passive role in reserve management.

The level of foreign exchange reserves has steadily increased from US$ 5.8 billion as at end-March, 1991 to US$ 54.1 billion as at end-March 2002 and further to US$ 55.6 billion as at May 3, 2002. The traditional measure of trade based indicator of reserve adequacy, i.e., the import cover (defined as the twelve times the ratio of reserves to merchandise imports) which shrank to 3 weeks of imports by the end of December 1990, has improved to about 11.5 months as at end-March 2002.

In terms of money-based indicators, the proportion of net foreign exchange assets of RBI (NFA) to currency with the public has sharply increased from 15 per cent in 1991 to 109 per cent as at end-March 2002. The proportion of NFA to broad money (M3) has increased by more than six fold; from 3 per cent to 18 per cent.

The net IIP as at end-September 2012 was negative at US$ 271.5 billion, implying that our external liabilities are more than the external assets. The net IIP as at end-September 2011 and end-March 2012 was US$ (-) 202.4 billion and US$ (-) 248.4 billion respectively.

The High Level Committee on Balance of Payments, which was chaired by Dr. C. Rangarajan, erstwhile Governor of the Reserve Bank of India, had suggested that, while determining the adequacy of reserves, due attention should be paid to payment
obligations, in addition to the traditional measure of import cover of 3 to 4 months. In 1997, the Report of Committee on Capital Account Convertibility under the chairmanship of Shri S.S. Tarapore, erstwhile Deputy Governor of the Reserve Bank of India suggested alternative measures of adequacy of reserves which, in addition to trade-based indicators, also included money-based and debt-based indicators.

Similar views have been held by the Committee on Fuller Capital Account Convertibility (Chairman: Shri S.S. Tarapore, July 2006). In the recent period, assessment of reserve adequacy has been influenced by the introduction of new measures. One such measure requires that the usable foreign exchange reserves should exceed scheduled amortisation of foreign currency debts (assuming no rollovers) during the following year. At the end of September 2012, the import cover improved marginally to 7.2 months from 7.1 months at end-March 2012. The ratio of short-term debt\textsuperscript{1} to the foreign exchange reserves which was 26.6 per cent at end-March 2012 increased to 28.7 per cent at end-September 2012. The ratio of volatile capital flows (defined to include cumulative portfolio inflows and short-term debt) to the reserves increased from 79.9 per cent as at end-March 2012 to 83.9 per cent as at end-September 2012.

Majority of the individuals agree that the GDP development could be strongly influenced by enhancing the infrastructure in India; this would also be essential and a sensible strategy to finance the same. Currently, there are crucial monetary issues which have been experienced in the infrastructure sector – continuous loss of earning endeavours with tariff frameworks which could not be sustained and subsidy plans which were not lucid. Several institutions offering infrastructure facilities in regards to monetary facets, are not credit worthy, do not have transparent financial and accounting systems and they have restricted treasury administration techniques. The extant labour regulations are limited, are slow in solving any disputes, are not lucid and do not have the public expose on account of emphasised directives, commands and instructions. Thus, there are worries and matters which need to be kept in mind prior to using FER to fund infrastructure growth. (Bartlett and Samantha, 2000)\textsuperscript{122}

\begin{footnotesize}
\textsuperscript{122} Bartlett, Christopher A and Samantha Ghoshal, “Going Global-Lessons from late Movers”, Harward business Review, March- April 2000
\end{footnotesize}
Table 5: International Investment Position of India (IIP) (Sep 2012)

<table>
<thead>
<tr>
<th>Item</th>
<th>September 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Total External Assets</td>
<td>441.7</td>
</tr>
<tr>
<td>1. Direct Investment Abroad</td>
<td>115.8</td>
</tr>
<tr>
<td>2. Portfolio Investment</td>
<td>1.5</td>
</tr>
<tr>
<td>3. Other Investments</td>
<td>29.7</td>
</tr>
<tr>
<td>4. Foreign Exchange Reserves</td>
<td>294.8</td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Total External Liabilities</td>
<td>713.2</td>
</tr>
<tr>
<td>1. Direct Investment in India</td>
<td>230.0</td>
</tr>
<tr>
<td>2. Portfolio Investment</td>
<td>165.3</td>
</tr>
<tr>
<td>3. Other Investments</td>
<td>317.9</td>
</tr>
<tr>
<td>Net IIP (A-B)@</td>
<td>(-) 271.5</td>
</tr>
</tbody>
</table>

P: Provisional.
@ Difference, if any, is due to rounding off.

Source: [http://www.rbi.org.in](http://www.rbi.org.in)

Table 6: Import Cover of Foreign Exchange Reserves

<table>
<thead>
<tr>
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<th></th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
<td>3181.1</td>
</tr>
<tr>
<td>2</td>
<td>Japan</td>
<td>1326.1</td>
</tr>
<tr>
<td>3</td>
<td>Russia</td>
<td>499.5</td>
</tr>
<tr>
<td>4</td>
<td>Brazil</td>
<td>352.0</td>
</tr>
<tr>
<td>5</td>
<td>Switzerland</td>
<td>340.6</td>
</tr>
<tr>
<td>6</td>
<td>India</td>
<td>296.7</td>
</tr>
<tr>
<td>7</td>
<td>China P R Hong Kong</td>
<td>285.5</td>
</tr>
<tr>
<td>8</td>
<td>Germany</td>
<td>262.3</td>
</tr>
<tr>
<td>9</td>
<td>Singapore</td>
<td>237.7</td>
</tr>
<tr>
<td>10</td>
<td>France</td>
<td>233.6</td>
</tr>
</tbody>
</table>

Source: IMF except for China.
India’s foreign currency reserves fell to about seven months of import cover at the end of March 2012 from eight and a half months at the end of September 2011, according to a Reserve Bank of India report.

Forex reserves were $294.4 billion as on March 30, 2012, from $311.5 billion at the end of September. Reserves were at a record high of $320.4 billion on October 28. The latest data, as of August 3, show reserves at $289.2 billion.

“The main reasons for (the) decline in foreign exchange reserves were intervention in the domestic foreign exchange market and the effect of revaluation,” RBI said.

India’s ratio of short-term debt to forex reserves rose to 26.6 per cent at the end of March from 23 per cent last September, the central bank added in its half-yearly foreign exchange reserves management report.

It is presumed that this reverse flow will not last forever. Ultimately, a crucial element of reserves may be receptive to economic and political expansion in India, particularly the deposits of non-resident Indians and foreign portfolio investments which include greater than fifty per cent of the yearly inflows (Jalan, 1996).123

Another worry is correlated to the quantity and quality of inflows. India, in its endeavour to gather reserves and also to internationalise, has been backed by input of foreign firms by liberalizing investment directives in different monetary actions, including banking and insurance (Child and David, 2001).124 Consequently, India was able to draw additional foreign portfolio investment (unsettled amount at US$44 billion as on as at end March – 2004) in contrast to foreign direct investment (unsettled amount at US$39 billion as on at end – March 31, 2004). Since foreign portfolio investment is regarded to be less secure in contrast to foreign direct investment, with a rise in the quantity of FER, it may become essential to espouse a careful method in context to capital inflows, particularly inflows from tax shelters, to guarantee fiscal industry constancy. (Ojha, 2002)125

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124 Child, John and David K. Tse, China’s Transition and its Implications for International Business”, Journal of International Business studies, Volume 32 Number 2001
Third, if the chief aim to gather FER is the protective reason with liquidity as the chief aspect of investment, then it may not be apt to employ reserves for funding infrastructure. Infrastructure ventures in India typically generate low earnings due to low consumer prices, unproductive technology, and outdated labour regulations. Actually, several infrastructure ventures functioning in India generate negative earnings. For instance, the performance of the electricity boards persists to be depressing irrespective of the restructuring of the power industry.\textsuperscript{126}

Fourth, a few of the crucial worries are connected to the political economy facet of a federal framework. The provincial governments may also demand such extra-budgetary assets for immediate public work ventures which they manage. In that actuality, careful administration of the common government funds, both federal and provincial, could then become tough, as was the latest experience of some nations in Latin America, particularly Argentina. Even in India, with the initiation of restructuring in 1991 and intensification of budgetary limitations, the state government assurances harshly increased to 8 per cent in 2001 from 4 per cent of GDP in 1996, wherein critical ways were commenced to curtail the increase. Furthermore, in a multi-party coalition democracy, a soft-budget plan, despite being creative, is vulnerable to be misused. For instance a remarkable example is the plan of ad hoc Treasury bills which was started harmlessly in 1955 in India was consistently exploited till 1997. Additionally, the faith of the markets could be impacted negatively if FER funded ventures are postponed or given up for monetary or political causes.

Last but not the least, unplanned utilisation of FER to fund infrastructure as recommended in the Union Budget, could impede the functions of the fiscal strategy and lead to increase in the public debt.

As emphasised in the extant material available, monetary engineering which overlooks the financial basics cannot result in a robust economic development. The utilisation of FER for infrastructure would broaden the money supply (foreign currency assets would be sold for Indian rupees) usually needing sterilization by the RBI to even out the price level. It is costly to indulge in sterilization, as the government rupee bonds distributed

to deal with the surplus finances have to be serviced at the interest rates extant in the markets. The supply of distributed bonds raises the local debt – circulation of which would be utilised to fund infrastructure initially. The chronological cycle of employing FER, sterilization, and circulation of bonds results in making the local fiscal administration even tricky.

3.3. Significance of holding Forex Reserves

Forex reserves are held possibly with any of the three specific intentions- transaction, speculation, and precaution. The currency flows induced by international trade are handled by private banks with the intention of transaction. The corporate or individual aims for forex reserve with the intention of speculation and the reserves of the central bank are driven primarily with the intention of caution, as the last resort of stocking foreign currency for managing any unpredictable flow of foreign currency in the market. In the precautionary objective, demand for money relates positively to wealth generation, always prepared to cover up any unplanned deficit in the economy. It relates negatively in the return for alternative assets.

From the aspect of policy, India gains through economies of scale by accumulating transaction reserves, while through the precautionary motive ensures that official reserves are maintained as a ‘war treasury’. An official reserve in a country, balance the demand and supply for foreign currency, helps in intervention, and maintains self-reliance in the country it carries out external transaction. For the monetary authority, reserve assets acts as the custodian, while for the government of a nation, it acts as the principal. However, though the objectives of holding the reserves may not go astray from monetary policy objectives, the government’s intention of holding the reserves may cross the boundaries of the monetary authorities. In some instances, it has been observed that the reserves serve as a useful mechanism when the government has to purchase goods and services, insurance against an emergency, smoothening out foreign currency debt of government and as an income source.

The prominent policy objectives regarding forex reserves in India are as follows:
(a) maintenance of confidence in monetary and exchange rate policies, (b) enhancement of intervening capacity to intervene in forex markets, (c) reducing external vulnerability by maintaining foreign currency liquidity for absorbing shocks in crisis including national disasters or emergencies; (d) generating confidence in the markets particularly for credit rating agencies assuring that obligations would be dealt with, which will reduce the cost of forex resources accessible to general participants in the market.(e) enhancing the level of comfort of the participants in the market by indicating that domestic currency are supported by external assets.

Formally, reserve management in India is found in the RBI Act, where the preamble reads out ‘to use the currency system to the country’s advantage and with a view to securing monetary stability’, where monetary stability would mean internal as well as external stability, which implies stable exchange rate as the overall objective of the reserve management policy. Internal stability means, reserve management cannot be secluded from “domestic macroeconomic stability and economic growth.” The phrase ‘to use the currency system to the country’s advantage’ implies maximization of the country’s gains as a whole or economy in general. Reserve management, provides considerable flexibility to reserve management practice, but also assures a dynamic view of the country needs, and best way to meet them.

3.4. Evolution of Reserve Management Policy in India

A conventional method determined India’s manner of reserve handling till the balance of payments problem which emerged in 1991. This method involved the maintenance of a proper degree of importing items. This can be understood with regard to imports present for certain months in terms of reserve. For instance the Annual Report 1990-1991 of the Reserve Bank of India said that the quantum of imports had reduced to just 21 worth of imports till December end 1990 and the concentration on imports was the key worry until 1993-94. This method of reserve handling which was a constituent of the exchange range handling and also outside area regulations experiences sweeping changes when the High Level Committee on Balance of Payments recommendations were applied
The researcher was the member secretary for this committee which highlighted a cohesive outlook on matters and also suggested some measures with regard to foreign exchange quantities to be held. Some of the pertinent issues which were raised:

Normally the custom was to think of the desired amount of reserves to be a fraction of the yearly revenues from imported items— for instance reserves to be able to pay for imports of three or four months, Still this method was not satisfactory if there are many dealings to be carried out and if there are monetary commitments in other areas along with imports. Hence obligations could emerge either for looking into short duration payment needs or fulfilling moderation duration payment of money owed to others including the interest and the principal amounts. The Committee had suggested that the forex reserve goals ought to be determined in a manner that enough currency exists to finance the imports of at least or a very minimum of three months.

According to the opinion of the Committee, the aspects which have to be thought about in fixing the desired quantum of resources include: the requirement of making sure a certain degree of faith in the global economic and trade based groups regarding the ability of the nation to take care of its commitments and sustain trade and economic movements, the requirement of looking into season based issue for all balance of payments dealings with regard to the potential lack of certainty in the rainy season in India; the degree of forex required to curb the speculation urges or predicting behaviour amongst stakeholders in the forex domain; and the ability to sustain reserves to ensure that the price of liquidating is very less.

When the market influenced exchange rate which was mentioned in the Reserve Bank of India’s 1995-96 Annual Report, was introduced, a transformation in the handling reserves was needed and the focus on being able to cover imports was needed to be combined with the aim of reducing the uncertainties associated with the exchange rate which mirrored the basis market conditions.

Given the context of currency problems in East Asian nations and given the nation’s witnessing of uncertain cross country money movement, the RBI’s 1997-98 annual report emphasised the requirement to look into a range of other aspects. The report also highlight the movement in the design of rise and falls in paying and receiving at the time of exchange market ambiguities and reinforced that in addition to extent of
reserves, the nature of reserves was also significant. Stressing on this aspect, the Report pointed out the unlimited reserve advantages (described in terms of reserve advantages minus liabilities such as future liabilities, credit payments to domestic players, assurances and other commitments) has to be made availed to people for taking care of numerous goals given to reserves.

As a component of the practical handling of outside commitments, the RBI method is to reduce future commitments as a part of total reserves and the concentration on practical handling i.e. curbing future commitments and establishing thresholds was emphasised in the Annual Report of the Reserve Bank of India 1998-99

In its 1999-2000 Annual Report, the Reserve Bank of India said that the larger method of handling the country’s forex reserves was a reflection of transforming constituents of the balance of payments and the liquidation hazards linked with a host of movements and other needs and the highlighting of liquidity hazards is important. The idea for reserve handling is based on a variety of evident aspects and other problems such as the extent of the present account lack and limited duration commitments (such as present repaying imperatives on long duration borrowings), the potential variation in portfolio investing and other kinds of capital movements, the unexpected problems for balance of payments owing to outside disruptions and shifts in the amount of forex earnings sent home by NRIs.

At the time of concentrating on practical handling of forex reserves a few years ago, the Reserve Bank of India’s Annual Report of 2000-01 looked at the liquidity hazard linked with varied kinds of movements. The report said that the transforming nature capital movements, the conventional method of testing reserve sufficiency with regard to import covering has been widened to factor in a host of aspects which look at the extent, constituents and hazard nature of different kinds of capital movements and also the extent, constituents and the hazard nature of different kinds to which the economy tends to be susceptible.

RBI Governor Jalan's statement on the financial and credit regulations (April 29, 2002) gives a very current and holistic outlook on the way of handling reserves and this particular sentence is important: an adequately large degree of reserves is needed to
make sure that in case of sustained volatility, the reserves should be able to take care of liquidation hazards for all accounts for a relatively long period of time. If we take these aspects into calculations, the country’s forex reserves will be in a good condition.

We have to go on to make sure that with the exception of short term differences in the level of reserves, the extent of reserves in the long term matches the development of the economy, the extent of hazard accounted money movement and country safety needs. This will give us more safety with regard to adverse or unexpected happenings which could take place without notice.

This outline indicates the growing issues and also a complete transformation in India’s method of handling reserves. The movement takes place from one issue to a host or several issues method. Also, the issue of reserve handling is premised on a variety of aspects, some which cannot be quantified and also weights do transform with time.