CHAPTER II

REVIEW OF LITERATURE

INTERNATIONAL STUDIES ON FOREIGN EXCHANGE RESERVES

In estimating International Reserves Demand for India before 1973, the standard measure used to assess the adequacy of International reserves was the comparisons of ratios, specifically Reserve Import (R/M) ratio was main criteria of adequacy IMF (1953, 1958) and Triffin (1947). More comprehensive studies reserves demand was developed in Post 1973 period Heller and Khan (1978), Edwards (1985).

Frenkel (1974), in his study indicated that demand for International reserves function for those LDC's that have maintained a fixed exchange rate is similar to estimates obtained by other for developed countries. The dynamics of the adjustment of International reserves for these two groups of LDC's is also analysed, and it is found that fixed exchange rate countries tend to correct discrepancies between actual and desired reserves slower than countries that occasionally adjust their exchange rates. Finally, the relationship between the devaluation episodes included in the sample and the reserves holdings is investigated. The results show that the year prior to the devaluation, international reserves in these countries have been on average, 30% below their short-run desired level. The study defined the devaluation countries as those that devaluations of at least 10 per cent.

Frenkel and Jovanovic (1981) attempted to make the rule of thumb criterion little more relevant through adding trend movement and stock adjustment but failed to make it the single most reserves adequacy criterion. Many authors recognized that the excessive accumulation of short-term external debt in comparison with levels of International reserves was a common feature of all recent crises.

Frenkel and Jovanovic (1981b) in their stochastic buffer stock model obtain the optimal reserves by minimizing the sum of the expected value of both components of cost. They viewed that the advantage of using this approach is that they provide an explicit formula for the optimal level of reserves, while most other studies explain only the relative and qualitative nature of the optimal level of international reserves. The formula, in principle, enables to tell whether the actual level of reserves is absolutely larger or smaller than the optimal level.

Batten (1982) conducts an empirical study partly based on Frenkel’s model to determine the demand for foreign reserves under fixed and floating exchange rates. He considers two types of models of central bank behavior. The first model, which he calls the intervention model, assumes that reserves are held only to enable the central bank to intervene in foreign currency markets. He identifies four major determinants of reserve demand: the variability of international payments and receipts, the propensity to import, the opportunity cost of holding reserves and scale variable measuring the size of international transactions. The second model, which he calls the asset- choice model, treats foreign reserves as one type of asset in a central bank’s portfolio held to enable the central bank to conduct domestic monetary policy (Batten, 1982). According to this model, the central bank’s portfolio should include at least these three types of assets: foreign reserves, government securities and claims on commercial banks. It also separates the assets into two categories: committed and uncommitted. Uncommitted assets are defined as that portion of
foreign reserves that are not used in the normal course of conducting monetary policy and are held as a precautionary measure in case of an external shock.

According to Lucas (1982), the demand for foreign exchange reserve depends – through the expectations of the public on the store-of-value services supplied by different currencies on beliefs about a government's ability to withstand future reserve fluctuations, which in turn are determined by the future demand for reserves. According to them, the problem has not yet been solved within the family of stochastic models applied in their research and their results proved that the gross stock of foreign exchange reserves which allows to withstand any stocks in the foreign exchange market has to exceed, at any point of time, the stock of money, of any one country in the fixed rates system.

Edward (1985) identified that the level of reserves should be positively correlated with an increase in both exports and imports. Capital Account Vulnerability increases with financial openness and potential residential based capital flight from the domestic currency. Consequently, reserves should be positively correlated with such variables as the ratio of capital flows to GDP and the ratio of money to GDP (which signals the demand for foreign assets from domestic sources). Exchange rate flexibility is usually important as it reduces the demand for reserves since central banks no longer need a large stock pile of reserves to manage a pegged exchange rate. Because there is a "fear of floating", flexibility is generally measured by the actual volatility of exchange rate. There is an opportunity cost of holding reserves, because the monetary authority swaps high yield domestic assets for low yield foreign ones. It corresponds to the difference between the yield on reserves and the marginal productivity of an alternative investment. He has found that the variable is, however, often insignificant in the empirical literature likely reflecting measurement problems.

Johansen (1988), Johansen and Juselius (1990, 1992) in their research methodology have adopted the vector auto-regression models and the residuals are then used to compute two likelihood ratio (LR) test statistics that can be
used in the determination of the unique co-integrating vectors. The test statistic maximal Eigen value test which computes the null hypothesis that are exactly x co-integrating vectors xt are calculated by asymptotic critical values for these likelihood ratio via numerical simulations (Johansen and Juselius 1990, and Osterwald – Lenum 1992) Engle and Granger (1987) show that in the presence of co-integration there always exists a corresponding error correction representation which implies that changes in the dependent variable are a function of the level of disequilibrium in the co-integrating relationship, captured by the error-correction term as well as changes in other explanatory variables to capture all short term relations among variables.

Dooley, Lizardo and Matheison (1989), updated by Eichengreen and Matheison (2000) examined the determinants of currency composition of reserves for developing countries. They found out that currency composition of reserves is responsive to the currency peg, the identity of the dominant trading partner, and the composition of foreign debt. Thus, the currency composition of reserves appears to evolve only gradually, so that a radical currency reallocation of reserves is not very likely, the dependent variable is the log of total reserves minus gold divided by Nominal GDP (Residual). They consider the import propensity (imports divided by GDP, imp) and Volatility of Export receipts (10-year moving standard Deviation V(x)) as explanatory variables that capture Current Account Vulnerability. In case of Capital Account Vulnerability category, they considered the ratio of short term External debt to GDP (debt) and the ratio of broad money to GDP (M2). The other potential explanatory variables they consider include Exchange rate volatility (12 month moving standard deviation of percentage and Opportunity Cost (interest rate differentials cost), V(ex). Thus according to their study they conclude that the most parsimonious specifications yielding co-integration include the ratio of imports to GDP, the ratio of broad money to GDP (lagged due to potential endogeneity), the volatility of export receipts, and breaks in the co-efficient of imports to GDP as well as the ratio of broad money to GDP in the post-crisis period.
Elbadavi (1990), Ford and Huang (1994), Huang and Shun (1999) and Badinger (2004) the authors have included it as an exogenous variable specifically for short analysis. Another exogenous variable in short analysis is exchange rate volatility. High fluctuation of exchange rate is likely to increase currency risk in the external sector which is lead to higher reserves demand under precautionary motive. Therefore, they have expected positive sign of the co-efficient of this variable. Many economists have specification for the long-run demand for International reserves. They have employed LRYt as reserves minus gold to GDP of the current period, API is import to GDP ratio, LY is Gross domestic product, Pinvy is portfolio investment to GDP in India, cost is opportunity cost of reserves holding and export is last three period export growths. All variables were taken in logarithmic form except the opportunity cost. The study revealed the existence of a long-run relationship among the variables the vector-error correction model captures the short-run relationship between the variables. To find the validity of the variables having same order of integration, the co integration tests having same order of integration, the authors have conducted Augmented Dickey Fuller Tests (1979, 1981). Capture the cost or profit of holding reserves holding, opportunity cost of the holding reserves is induced in the model. However, measurement of the cost is not an early task and in the literature different measures have been used to capture the cost trend (Heller 1996), Kenen and Yadin (1965), Iyoha (1976), Frenkel and Jovanic (1981), Edwards (1985), Coppin (1994), Huang (1995), and Badinger (2004). Considering the limitation in this case, they followed Badinger (2004) and uses interest rate spread in the model. It can be predicted that, this would capture the trend of opportunity cost.

Furman and Stighlitz (1998) and Radelet and Sachs (1998) analyse the importance of this indicator in details. They conclude that the International Reserve Short Term External Debt (R/STED) ratio was one of the determining factors of the Asian crisis in the second half of the 1990s. Therefore a measure comparing reserves and short term external debt could be a relevant measure of risks associated with adverse developments in International capital market.
Furman and Stiglitz (1998) and Radelet and Sachs, (1998), in India, RBI constantly keeps close eye on movement of STED. In half yearly reports of RBI it is considered as an important indicator of reserves adequacy. Therefore, relative size of STED (STED to GDP) is kept in the model. Larger the size of both variables indicates for higher probability of liquidity at risk, therefore in case of precautionary motive of reserves holding the sign of the coefficient should be positive to capital account of balance of payments. In view of the benchmarking adequacy of the International Reserves, India in the traditional logic behind holding reserve has to face an eventuality of Balance of Payment (BOP) crisis. Contemporary literature considers reserve to import (R/M ratio) a proper measure of reserve adequacy and three months prospective level of imports cover became rule of thumb to judgment (Fischer, 2001). This criterion implies .forward import covered by reserves is a guarantee of no hindrance in external trade transaction even in a case of complete cut off from foreign flows.

Borensztein, 1998; de Mello (1997) has evaluated that Asian Tigers who mostly liberalized capital account as a part of unilateral financial deregulation beyond by huge external surpluses (RBI, 2004) highlighted the importance of foreign investment in Economic development. Furman and Stiglitz and Radelet and Sachs (1998) in their study focused on analyzing the importance of international reserves in greater depth. They came to the conclusion that the international reserves to short-term external debt ratio was one of the determining factors of the Asian crises in the second half of 1990s. A measure comparing reserves and short-term external debt is useful to gauge the risks with adverse developments in International markets.

Frenkel (1998), Heller and Khan (1978) viewed that the larger the scale of the country in question, the larger will be the volume of reserves it would want to hold. The scale of a country has usually been measured by its total imports to total income. With respect to external disturbances, most
authors have assumed that the higher the variability of a country's external payments, the higher the level of reserves.

Salman and Salih (1999) modeled the dynamics of International reserves using a GARCH Specification. The aim is to explain the time variation in reserves holdings during crisis. They used daily data of International reserves of Central bank of Turkey, the exchange rate, the overnight interest rates and Istanbul stock Exchange Index. Their main findings are that the interest rate and the volatility of exchange rate have negative effects on reserves level. They have concluded that this occurs because these factors are indicators of currency crises and as expected, a currency crisis has negative consequences in the balance of payments. Claudio Morana and Andrea Bettratti (2000) in their study on "Central Bank Interventions and Exchange rates" made an analysis with high frequency data, evaluated and estimated the marked-dollar exchange rate for the period 1992-95, the effects of central banks interventions on the foreign exchange market. Estimates on unserved component model that decomposes volatility into stationary parts and non-stationary parts. Stationary components in turn are decomposed into seasonal and non-seasonal intra-day parts. Their results confirm the view that interventions are not particularly effective. The exchange rate moves in the desired direction for only about 50% of the time, and often with a substantial increase in volatility. The model suggests that the two components which are affected the most by interventions are the permanent and stochastic intra-day.

IMF (2000) in their study revealed that short term debt provides a measure of all debt repayments to non-residents over the coming year and as such, constitutes useful information of how fast a country would be to adjust the external sector if it were unable to access external flows. Moreover R/STED ratio also provides a useful indicator of the threshold at which the investors lose confidence (Bird and Rajan, 2003). It is widely recommended that countries should hold reserves for four to five quarters STED in advance. In India, short-term external debt (STED) hasn’t increased since 1990-91,
while foreign currency assets have grown around hundred times. This has made R/STED ratio better in last decade. The ratio reveals that minimum chance of occurrence of currency crisis at the reserves is comparatively very high. Many economists have criticized the criterion about how R/STED ratio is considered only for limited application to ‘External condition’ which widely neglects ‘Internal condition’ De Beaufort Wijnhold and Kepteyn (2001).

**Philip R. Lane and Gian Maria (2001)** in their article "The External Wealth of Nations: measures of foreign assets and liabilities for industrial and developing countries. They opined that although capital flows are closely monitored, the accumulated stocks of foreign assets and liabilities held by various countries, especially in the developing, world, are not known much when estimated about the foreign assets and liabilities and their equity and debt sub-components for a sample of 67 Industrial and Developing countries. It characterized the stylized facts of International Balance sheets and attempted to find out the trends in net foreign positions and shifts in debt equity ratios over time. Finally it has explored the sensitivity of estimated stock positions to the treatment of valuation effects not captured in the Balance of payments.

**Jorge Ivan Canales – Kriljenko (2001)** in his research "Foreign Exchange Intervention in Developing Transition Economies" : Results of a survey explores how foreign exchange intervention can be more effective in developing and Transition Economies, which follow a wide array of exchange rate regimes and have in place many controls on "Capital mobility", "Currency substitution", "dollarization" and the International use of their currencies. When Central banks issuing the major International currencies intervene, they tend to sterilize their foreign exchange interventions to achieve their short-term operating targets of monetary policy, usually short-term interest rates. The Fed sterilizes its foreign exchange. Intervention to keep the amount of bank reserves at levels that are consistent with the established monetary goals. It results suggest that sterilized foreign exchange intervention concluded by these
central banks over the last 20 years well have had an effect on the exchange rate over the short run, but not over the long run.

This variable measures the size of the current account balance in millions of US dollars. Beaufort and Kapteyn (2001) have proposed the use of the variability in the current account, indicating that it is the changes in the current account, not its size that drives reserves. However, this notion has not been proved empirically and variance and current account balance have both been used as explanatory variables.

According to Fischer, (2001) the traditional logic behind holding reserves is to face an eventuality of Balance of payment (BOP) crisis. Contemporary literature considers reserve to import (R/M) ratio a proper measure of reserve adequacy and three months prospective level of imports cover became rule of thumb to judgment.

Beaufort and Kapteyn (2001) point out that the type of exchange rate system influences reserve demand. Frenkel (1983) found evidence that after the collapse of the Bretton Woods agreement the move to floating exchange rates decreased the level of reserves. This follows macroeconomic theory. In a fixed exchange rate scenario market forces will still act to change the real exchange rate. Therefore, the government will have to intervene to keep the nominal peg. As established earlier, the use of foreign reserves is one such method. In a floating exchange rate regime, movements in the exchange should not affect reserves as much. This results because the exchange rate is expected to absorb the macroeconomic shocks. Even if a country wished to keep a managed float, the exchange rate under this type of regime is allowed to vary within certain parameters, so adjustment would not occur quite as often and therefore fewer reserves would be necessary.

Theoretically it is reasonable to assume that there is an opportunity cost related to holding extra reserves. However, it is difficult to predict what this opportunity cost is. First, a benchmark for “necessary” reserves needs to be
developed. Again, the literature does not agree as to what the appropriate benchmark is, so they are mostly arbitrary. Second, once a benchmark is set and excess reserves identified a suitable proxy for opportunity cost needs to be found. Several financial variables have been used in the past, such as interest rates and lending rates. However, these variables tend to be correlated to reserves themselves, therefore yielding few satisfactory results. For the purposes of my research I have left this variable out of my empirical model, but theoretically it should be included. On a side note, several aspects of the Chinese regime that impact the monetary system and reserves are worth mentioning. First of all, this model assumes that the same variables will affect Chinese reserves as Indian reserves, even though China is a centrally planned economy. According to Ford and Huang (1993). Although a centrally planned economy is fundamentally different from a market economy, there is no obvious reason to assume that its reserve holdings should be determined in a different manner.

Aizenman and Marion (2002) develop a good estimation equation to predict the level of reserves over the 1980-1996 period based on the buffer-stock theory developed in the seventies. They found that there are four key factors in predicting the level of foreign reserves. These four key factors are: the size of international transactions, their volatility, the exchange-rate arrangement and political considerations. Their model accounts for 70% of the variation in foreign currency reserves.

According to Flood and Marion (2002) most of the studies suggest that sterilized intervention rarely works and since intervention occurs infrequently, there is still the puzzle of why floaters hold so many reserves. In their analysis there are three trends in the International Economy that could potentially have an important influence on reserve holdings:

(i) increasing capital mobility

(ii) increasing frequency and intensity of currency and financial crises
(iii) increasing number of countries reporting a switch to flexible exchange rates. So, the remarkable question was: How these trends affect Central banks reserve holdings.

**Aizenman and Marion (2002)** investigated the interpretations of the relatively high demand for reserves by countries in emerging Asia and the relatively low demand by some other developing countries (e.g., Latin America). In addition to the variables listed in the literature, they examined the role of political uncertainty and corruption as determinants of reserve holdings. Using a theoretical model, they showed that sovereign risk, costly tax collection to cover fiscal liabilities and less aversion (defined as the tendency of agents in an economy to be more sensitive to reductions in consumption than to increases) lead to a relatively large precautionary demand for International reserves. They further concluded that the recent large build up of International reserves in emerging Asia is motivated by the experience of the Asian crisis. Another popular explanation for the high level of reserves is export competitiveness as a development strategy.

**Blake Lebaron, (2002)** in his analysis, "Technical Trading rules and regime shifts in foreign exchange" has used techniques for assessing past prices to forecast future prices with a long and colourful history since the introduction of floating rates in 1973, the foreign exchange market has become another potential target. In his assessment, Technical analysts who attempt to predict potential trends in pricing using a vast repertoire of tool with colourful names such as channels, tumbles, steps and stumbles have been discredited in the academic literature since their methods are difficult to rigorous tests. Hence, the attempt has been made to settle some of the discrepancies through the use of boot strapping techniques.
The Model attempted by Flood and Marion, (2002) the buffer stock or Inventory Model, has explained the International reserve holdings in emerging markets. The model postulates that a Central bank will choose an initial level of reserve holdings that minimizes its total expected costs. It identified two costs incurred by the Central bank: the opportunity cost of reserves and the adjustment costs that is incurred whenever reserves reach some lower boundary. The opportunity cost of holding reserves is largely determined by the level of reserves in the country and would be the difference between the returns from an alternative investment and the yield of reserves. The adjustment tests is generally interpreted as the output or welfare loss due to costly policy measures that are needed to generate sufficiently large external payments surplus necessary for reserve accumulation in times of actual reserves reaching some lower limit. For the purposes of their convenience and without any loss of generality, they have assumed a lower bound of zero. Furthermore, the two costs are inter-related since a higher stock of reserves reduces the probability of having to adjust and thus reduces the expected cost of adjustment, but the benefit comes at the cost of higher foregone earnings. The study revealed that the Frenkel and Jovanic style reserve demand holds true when applied to the new emerging market Asia.

Calvo and Reinhart, and Dooley (2003) reserve accumulation can be used to keep the exchange rate favourable for export growth and it may have positive impact on the domestic employment. Many countries have used reserves for these purposes for instance China and East Asian countries (before 1997) some economists also recognized political reasons behind the mercantile motive especially in the case of China.

Mei-Fin Lin and Jue-Shyan Wang (2003) in their research on "Foreign Exchange Reserves and Inflation: an Empirical study of the Five East Asian Economics empirically evaluated with the time consistency Model developed by Kydland and Prescott to incorporate exchange rate stability in the policy maker's objectives. Through the operations in the Foreign Exchange
market by Central bank, they were able to analyse the relation between Foreign Exchange Reserves and Inflation rate. The Central bank uses foreign exchange reserves as an instrument to sterilize the exchange rate. The main conclusion of their model is that when the foreign exchange reserves increases (or the domestic currency depreciates), the inflation rate will be rising while the exchange rate effect will be strong. On the other hand, the inflation rate will be reduced, when the monetary surprise effect is more powerful and the weight placed on output stability is not large. An equation involves three factors contribute to the growth of output. The first term, called Monetary surprise effect, is standard and it depicts the Aggregate Output is a function of Inflation surprise. The second term we called exchange rate effect, describes the impact of exchange rate on labour market and output. Central bank tends to influence the exchange rate by exchange market operations. The Intervention strategy is described by the Central bank as how it should purchase foreign currency in the foreign exchange market, thus increase foreign exchange reserves, to let foreign currency appreciate (domestic currency); that is $K > 0$ from the expression of foreign exchange intervention strategy that is $St = K FRt$, $K > 0$.

According to the empirical study, this expression of intervention strategy has been adopted by Wonnacoth (1965) and Kohli (2003), Kohli indicates that the foreign exchange reserves is a reasonable proxy for intervention because of the strong correlation between purchases and sales of foreign currency by the Reserve Bank of India and change in Foreign Exchange Reserves for the period between 1993-1999.

**Nunnen Kamp and Pant (2003), Hockman and Saggi (2000)** explored in the WTO forums that the effectiveness of linking liberal capital regime at home with other concern areas (e.g. labour mobility was a bargaining tool.

**Marc-Andrie Goselin and Nicolas Paren, (2003)** in their study on "Levels and Composition of reserves in Emerging Asia" have examined the importance of the level and composition of reserves. They have focused the level of reserve holdings by a few key macro economic factors. Their model
accounts for a positive structural break in the Demand for demand of International reserves. International reserves are scaled against short-term external debt, output or imports. The ratio of reserves to short-term external debt measures the capacity of the country to service its liabilities in the forthcoming year, should external financing conditions deteriorate sharply. The rationale is that if reserves exceed short-term debt the country can be expected to meet its obligations in the coming years and this can avoid spillover problems.

Aizenman, Lee and Rhee, (2004) in their study on the Korean Economy found evidence of a break in the pattern of hoarding of International reserves in the post 1997 period. The authors claim that the self-Insurance motive became stronger following the crisis. More specifically, they have found that trade openness is significant in explaining International reserves before the crisis, but that it loses significance after the crises. They argued that this is consistent with increased relative importance of financial openness. To examine whether increased external financial exposure is a driving factor behind reserve holdings in the post crisis period, they consider foreigner's equity positions and short-term external assets as additional explanatory variables.

The net flow of capital out of a country is equal to domestic saving minus domestic investment; it is also equal to the current account (Higgins and Klitgaard, 2004). For a detailed explanation see extracted research. A current account surplus then translates into net capital inflows into the country. Net capital inflows would strengthen the domestic currency. Under a fixed exchange rate system such capital flows must be counterbalanced to maintain the peg, under a flexible exchange rate system the currency would appreciate. If a country wishes to maintain its fixed exchange rate or just wishes to maintain a weaker currency in order to be more competitive, it has to balance the net capital inflows with capital out-flows. Purchasing foreign reserves is one way to increase capital outflows since domestic resources are used to
purchase foreign currency. From this I hypothesize that the current account will be positively correlated to the level of reserves. As for China, I predict that the current account will have a greater impact on its reserves holdings than the other variables included in the model, since its current account balance is the principal mechanism through which they get the official reserves.

**Kohlscheen and O’Connell (2004)** discussed the role of trade and credit and International reserves. They highlighted a rationale for reserves that relies on the potential provision of liquidity services in the event of a cutoff from short-term credit during debt negotiations. So they have tried to explain why developing countries hold substantial stock of reserves in spite of the fact that their external liabilities carry a considerably higher interest rate. They concluded that international reserves directly affect the bargaining position of debtors during a debt renegotiation. The borrower accumulates reserves to guarantee its liquidity in anticipation of the bargaining power.

**Calafell and Bosque (2004)** pointed out the availability of statistics needed to estimate this indicator appropriately is limited as recording private external debt is not obligatory in many countries and data on short external debt are published with a lag of several months. In addition differences in the methodologies and coverage of external debt statistics in individual countries have comparative analysis for cross country extremely difficult. The recent times, Indian financial sector has received a handsome amount of foreign portfolio investment. This type of investment is volatile in nature and flows could exert back any point of time that would need a sufficient reserves backup, otherwise the economy may face serious financial crisis. Considering the importance of portfolio investment in reserves hoarding, the authors have accommodated the variable in the Demand function. Another sensitive variable of capital account which is a culprit of many external crises in recent times is short term external debt.

**Elviodal Basco, (2004)** had advocated that “Central banks Management of Foreign Exchange Reserves states that whether currency instability results
from officials reserves management as Central banks strive to minimize risk, keep a degree of liquidity degree, Minimize risk, and a good return on their portfolio. In his opinion, the dollar share in official reserves increased at the expense of the Deutsche mark and Yen. The evidence suggests that movements in the exchange rate exert the only influence on reserve currency shares; the long-term interest rate does not have a significant impact on reserves composition. These results confirm the World Gold Council Thesis, according to which Central banks by excess reserves in short-term assets are believed to have optimized their Portfolio return.

**IMF (2000),** in its study made a simple empirical model that incorporates various determinants of reserve holdings. The model is estimated using a large panel data that covers 22 emerging market economies with annual data from 1980 to 1996. In the study, real GDP per capita, the population level, the ratio of imports to GDP, and the volatility of exchange rate are found to be statistically significant determinants of real reserves. Predicted values from this model over the 1997-2002 period revealed that international reserves in Latin America are not excessive, while the Emerging Asian countries have increased more than warranted by the determinants since 2001. The IMF concludes that foreign exchange reserves in emerging Asia have reached a point where some slow down in the rate of accumulation is needed.

**Maurice D. Levi, (2004)** hold the view that the problem of transaction costs is that it creates impediments in the smooth working of markets and are difficult to implement in the electronic age. The second advantage is that RBI has built huge stock of reserves up so that its market interventions command respect. In this background, the policy implies the stance that RBI has taken, after the reforms and devaluation of the early 1990s, a policy of floating exchange rate. The exchange rate is market determined even as RBI keeps buying forex to keep the rupee to flood in. The RBI had largely sterilized domestic liquidity created through reserve accumulation by selling Government bonds.
In view of Kim recognized three broad reasons of Aizenman (2005) arising precautionary demand which means the ability to finance underlying payments imbalances, the ability to finance to provide liquidity in the face of run of the currency and the prevention function of reducing the probability on the currency and also the motive behind promoting export and MDI through reserve accumulation comes under mercantile motive in view of the authors.

Demand for reserves is used for testing the mercantile motive. To test for this motive, Aizenman and Lee (2005) have adopted the moving average method to measure export growth. They have expected a positive sign of the co-efficient of the variable i.e. for mercantile motive of holding reserves of the central bank. Theoretically excess supply of money may affect the reserves flows.

Aizenman and Lee (2005) investigated in their research to examine the interaction between the financial system and the process of foreign exchange reserve accumulation. Based on the micro-foundations of the precautionary demand for reserves along the lines of the Diamond and Dybvig (1983) bank run model also Velasco (1987) argues that foreign exchange reserves can be used to support failing banks and other financial institutions. Hence, they suggested that in their research some financial variables like average non-performing loans, or the number of bank closures, mergers, could have predictive power of reserves.

Sringle and Carvert (2005), in their survey on the study of “Composition of Reserve Stocks” revealed that from the stand point of international diversifications, the portfolios of Asian Central banks would reduce capital losses in the event of a reduction in reserve holdings (autonomous or coming from a currency revaluation). These were the signs that central banks are currently losing their appetite for U.S debt, as they appear to be reducing their dollar in favour of the Euro. Hence they concluded that 59 central banks hold 70% of the reserve holdings in Euro while 52% reduced their dollar holdings. They suggested that central banks balance sheets
are confidential precluding any formal analysis of the currency composition of reserves.

Prasad, Rumbough and Wang (2005) in their empirical analysis have taken into consideration the variables like low rapid accumulation of reserves generate inflation, sterilization costs to evaluate the growth rate of reserve accumulation. In their opinion they have highlighted how these different costs is typically better to allow the required adjustment that take place through changes in Nominal exchange rate than through inflation. Their study revealed inflationary dynamics pose serious risks because entrenched particularly in developing economies. Sterilization is costly, being roughly equal to the interest paid on the country’s public debt minus the interest earned on reserves (typically the interest rate on the US Treasury debt). To the extent that domestic interest rates are above the rate of return on the reserve asset the holding of the reserves entails quasi-fiscal costs. Since the IMF, has fixed the cost of sterilizing a reserve accumulation of 10 per cent of GDP required ranging from zero to 1% of GDP, depends on interest spread and the expected exchange rate depreciation. In order to continuously sterilize inflows, the monetary authority has to offer ever-increasing interest rates, which would damper domestic demand. Hence inclusion during 2003 and 2004 combined with cost considerations, ceteris paribus, a slowdown in the speed of accumulation of reserves were likely. Finally in their error-correction model they suggested that to avoid large capital losses, Asian central banks should be very cautious when slowing the rate of reserve accumulation.

Williamson (2006) has pointed out that while India has fulfilled two of the preconditions named by Tarapore Committee, the third one on fiscal discipline is yet to be achieved.

Harvard's Dani Rodrik (2006) analysed and found that how there has been a rapid rise since the early 1990s in foreign reserves held by developing countries. These reserves have climbed to almost 30 per cent of developing countries GDP. Assuming reasonable spreads between the yield of reserve
assets and the cost of foreign borrowing, the income loss to these countries amounts to close to "Eleven per cent of GDP, conditional or existing levels of short-term borrowing. He concludes that the rapid buildup is far from optimal that developing countries on the whole have responded to financial globalization, in a highly unbalanced manner.

Jeanne and Rancierre, (2006) in their study made on indicators to capture the mercantile motive (Aizenman and Lee, 2005) considering the empirical findings and changing nature of India’s external sector. They have considered a set of scale variables for transaction motive, precautionary motive, Mercantile motive, and the sensitive components of capital account and the opportunity cost of holding reserves for overall development of the economy, the study utilizes GDP data, which is a measure of income of the economy. The demand of reserves should grow as the income of the economy increases. Therefore authors have expected positive sign of the co-efficient. In order to capture the transaction payment the authors use import and Average Propensity to Import (API) in the demand function because high correlation between both, they were able to consider only API which is ratio of import to GDP. Since higher API is likely to increase demand of reserves of the economy and vice versa. The authors expected the positive sign of the variable. The components like gold reserve Tranche position in IMF and SDR will indicate the excess reserves as well as the cost of holding the excess reserves. The estimated cost of excess reserves is undoubtedly very high especially for capital scarce economy like India. Therefore it is suggested that the external bank either curtail the size of reserves accumulation or invest the excess reserves for more profitable returns.

In the recent years a few studies have accommodated a large number of variables related Rodrick (2006) estimated the social cost of holding reserves through the spread between the private sectors cost of short-term borrowing abroad and the yield that the central bank earns on its liquid foreign assets. He used three months import till coverage benchmarking of reserves holding and
spread assumed 3 to 7 per cent understanding the difficulties, they have simplified the measurement. The spread between the weighted average of interest rate on central government dated securities and return on reserves in taken as cost of every unit of US$ reserves holding. Rodrick has been criticized on the grounds that the measuring excess reserves not only cost of holding but should involve ‘Liquidity at Risk’ components that makes more appropriate in current scenario. However R/M 3 ratio is not a good indicator of reserve adequacy where demand for and supply of money was stable and financial markets were strong. Considering the advantages and disadvantages in these indicators, it is suggested they should be used simultaneously (Calvo and Mendoza 1996 and Berg and Patilo, 1999). In the Indian case all three indicators inform for negligible level of occurrence of currency crisis in the near future of excess reserves holding by central bank.

After estimating the excess reserves in India it would be worthy to measure the cost of holding them Reserve Bank of India has been taking extra precaution in deploying or investing the reserve to measure the fiscal cost of International reserves for 100 countries. His attempt is significant step in estimating the cost especially for developing economies because their holdings have been growing sharply in recent years. However, Hauner (2006) encountered with several limitations in that process (lack of data especially on sterilization cost, composition of different currencies in reserves.

Few of the studies concentrated on measuring monetary disequilibrium in India. They have desired monetary disequilibrium data for Indian economy, which is used in reserves demand function. The study revealed that the normalized co-integration equation exhibits long-run determinants of reserves LY that is taken as an indicator of economic growth has positive relationship with reserves holding. The result almost follows theory as income of the economy increases, more reserves holding are required. API (Average Propensity to Import) is found negatively related with reserve demand in India.
The result is similar with Huang (1995) for China, Badinger (2004) for Austria and Je Jo (2007) for South Korea. The reason of opposite sign is the variable is a proxy for the marginal propensity to import in the model, which should have negative effect on reserves under the Keynesian open economy model. Furthermore, imports may not reflect indirect transactional requirement for reserves but the opposite flows of goods and money in and out of the country. Other variable which was found significant was export growth which is in the model to capture mercantile motive positive sign of the variable indicate that in India reserves holding is related to government’s mercantile motive.

Variables for cost of reserves holding, portfolio investment and short-term external debt were not found significant. The standard diagnostic tests for the significance of the regression of T-test, LM test, Jarque-Bera and White test indicate that the model is correctly specified and residual is properly behaved in the model. The VECM explains the short run variation in the Indian International reserve movements. The result explains that most of variables are significant. Following the same trend as in the long run, income indicator has negative impact on reserves holding in the short run too. Indicators for precautionary reserves holding were found significant in the short-run too. Foreign Portfolio investment flows positively affect reserves holding implies higher investment in Indian financial sector forced the RBI to keep higher reserves back-up. Same way, STED also positively correlated with reserves demand. Both of the results indicated that RBI has been taking ‘Liquidity at Risk’ very seriously and adjusting reserves holding according to the size of risk. Furthermore, results also confirm that motives of reserves holding are precautionary. Result of exchange rate volatility also correlates the finding. Higher (lower) volatility increases (decreases) the currency risk, therefore under precautionary motive reserves, piling should grow (shrink) in these circumstances. This is very much true for Indian case. The indicator for mercantile motive was significant at this stage, which indicates RBI has been
keeping both objectives of technical reserves hoarding. Opportunity cost of reserves holding were not found significant implied changing cost is not considered in reserves holdings. In India central bank neglect this factor. This makes sense because under precautionary motive the cost should not be a determinant of reserves demand. Money Disequilibrium result is as per expectation and has negative indication showed excess demand for (supply of) money leads to an increase (decreases) in reserves. The result revealed that the central bank measures to correct the money market disequilibrium by changing rate of the interest rate and domestic credit and doesn’t leave correction completely on the market forces (induced reserve flows) to restore the equilibrium.

Several studies on Key Stylized facts regarding the accumulation of international reserves in emerging Asia revealed that International Reserves deflated by GDP in selected Asian emerging market economies. Reserves show an upward trend even after economic size is taken into account. Increasing openness to International trade is a key factor behind this tendency. Reserves increased significantly in economies with limited exchange rate flexibility and those with managed floating exchange rates. Several indications have been used to evaluate whether reserve holdings are sufficient. Scaled against short-term external debt, output or imports, international reserves in emerging Asia have increased markedly.

JALIL, Abdul (2008) he is study on “the optimal demand for foreign exchange reserves in Pakistan” Using monthly data on foreign exchange reserves from June 1995 through June 2005, we find that in line with other country-specific studies the opportunity cost of holding reserves played a greater role than reserve volatility in determining the level of reserves in Pakistan. Our finding is in contrast with the hypothesis of increased capital mobility that is commonly set forth in explaining the precautionary motive for reserve holdings. As also pointed by Ramachandran (2004), this result could perhaps be attributed to the fact that capital outflow in Pakistan (as also in
India) is not as free as capital inflow and a large part of the recent reserve accumulation is due to non-debt reserve inflows. In line with the findings of country-studies on India and Brazil, we find that opportunity cost played a greater role than reserve volatility in determining the level of reserves in Pakistan, but not to the predominant effect as in India. This result is in contrast with the hypothesis of increased capital mobility that is commonly set forth in explaining the precautionary motive for reserve holdings. As also pointed by Ramachandran (2004), this could be perhaps attributed to the fact that capital outflow in Pakistan as in India, is not as free as capital inflow and a large part of the recent reserve accumulation is due to non-debt reserve inflows.

**Kathryn M. E. Dominguez (2011)** he is study on “Foreign Reserve Management During the Global Financial Crisis” their foreign currency reserves during the global financial crisis. Evidence based on changes in reserve stocks suggests that many governments, even those with high levels of pre-crisis reserves, were reluctant to use them during the crisis. As a consequence, a number of recent studies of cross-country experiences during the crisis find little evidence of a positive role for reserves in macroeconomic crisis-management. This paper examines whether this assessment of the non-role of reserves during the crisis is justified. While the reserve stock data indicates stable reserve levels for many countries during the crisis, distinguishing passive reserve changes due to interest income and valuations changes on existing assets, from the active purchases and sales of assets, indicates that many emerging economies actively depleted reserves. Further, the data indicate that countries whose pre-crisis reserves were in excess of what can be explained by standard models of reserve accumulation were the most likely to use their reserves during the crisis. The analysis in this paper indicates that reserves played a role in macroeconomic crisis management during the global economic crisis. Although reserve stocks for many countries remained stable during the crisis, when we strip out the passive changes due to interest income and valuation changes, we find that many emerging economies actively depleted reserves. Further, the data indicate that countries whose pre-
crisis reserves were in excess of what can be explained by standard models of reserve accumulation were the most likely to use their reserves during the crisis. The construction of active reserve management data used in this paper was made possible by a new initiative at the IMF which requires subscribing countries to provide detailed monthly information on the asset composition of their foreign reserve portfolios. Unfortunately at this point only 68 countries have agreed to provide this data, severely limiting the sample of countries that are included in the empirical analysis. It is for this reason that two major reserve accumulating countries, China and Saudi Arabia, are conspicuously missing. Neither of these countries are SDDS subscribers. The results in this paper are therefore subject to the caveat that they do not take into account the behavior of these two important reserve accumulating countries.

Umeora Chinweobo Emmanuel (2013) is study on “Accumulation of External Reserves and Effects on Exchange Rates and Inflation in Nigeria” find out the effects of holding Foreign Exchange reserves on Exchange Rates in Nigeria. It is also to find out the effect of such reserves on inflation in Nigeria. Two hypotheses are proposed for the study. Hypothesis I has Null (H0) Hypothesis that foreign exchange reserves do not have significant effect on foreign exchange rate. There is the Hypothesis II where Null (H0) hypothesis is that foreign exchange reserves do not have significant effects on inflation in Nigeria. Secondary time series data are collated from CBN Statistical Bulletin. Simple linear regression was run for two models with Minitab 14 for windows. The regression equation shows that there is a negative relationship between Foreign Exchange rate leading to the rejection of first null hypothesis and accepting H1. The Second regression equation shows that inflation has positive relationship with foreign reserves. This means also rejecting second null hypothesis and accepting the second alternative hypothesis. Government is advised to ensure optimal management of the nations external reserves. Other causes such as Money Supply (M2) are suspected to be responsible for causing inflation in Nigeria. This study has shown that accumulation of reserves is essential for the economy of Nigeria which tends to confirm finding of earlier
researchers. Moreover, real life situations in developing countries show that there has been astronomical increase in their hoarding of reserves. Volatility of exchange rate can be tackled by holding of reserves. The notion is heavily dependent on imports so that our a priori thinking is that external reserves are essential for us. The Rule of Greespan- Guidotti advocates this and he states that countries with vulnerability of capital account crisis should hold reserves equal to external debts of short maturity of one year. Most of such debts most likely relate to trade debts and short borrowings especially from IMF to make up deficits in Current Account. General apriori suggest accumulation of external reserves have been linked to inflation most of which is imported inflation. Apriori knowledge agrees with the study of Mei-Yin Lin and Jue-Shyan Wang whose study was on effect of Foreign Exchange Reserves on inflation on five East Asian Economies (Japan, Hong Kong, South Korea, Singapore and Taiwan). However, this study agrees with Usman and Ibrahim (2010) that reserves do not have causative impact on inflation in Nigeria. Other factors especially Money Supply (M2) are fingered as one of the main causes (Usman & Ibrahim, 2010). However this study is silent on this as Money Supply (M2) is not one of the factors brought into the study.

**INDIAN STUDIES ON FOREIGN EXCHANGE RESERVES**

The debate on the possible influence of exchange rate on trade series has been receiving considerable attention in India, particularly in the 1990s, with the initiation of the "Stabilisation, and structural Adjustment". Policies, of which, exchange rate management has a significant part. Therefore among the debates during the 1990s studies such as Ghosh (1992), Sarkar (1992), (1994a), (1995), (1997), Joshi and Little (1993), Nag and Upadhya (1994) are worth analyzing to have an understanding of the variables having emerging relationship.

**Sarkar (1992)** while analyzing the association of exchange rate with Current Account deficit during the period (1971-90), with the aid of a simple regression concluded that devaluation/depreciation has had no favourable effect
on the dollar value and volume of export. On the value and volume of Export, the study also did not find any contradictory consequence due to devaluation depreciation. The results therefore indicate the devaluation/depreciation did not have any desired impact on the Trade Balance.

Swami K. D., (1993) in his paper mirrored the changes in the Exchange rate Regime since 1995. He has observed that the advantages and disadvantages of each regime to LDCs, the LDC pegging practices and reasons for transition from 'fixed' or 'pegged' exchange rates to 'Managed' or independently floating currencies. Hence, based on the removal of exchange restrictions through the abolition of foreign exchange Budgeting in March 1993 constituted the first major step towards Current Account Convertibility which was the major principle according to Government of India 1993, Economic Reforms, New Delhi, Ministry of Finance on the Unification of Exchange Rate. He finally indicated that above system announced by RBI have released a number of invisible transactions.

Based on the research made by Sarkar (1994), Nag and Upadhyya (1994) using monthly data for the years (1979 to 1993) reevaluate the relationship. According to them, the Individual series (such as Export, Import, Balance of Trade, REER, NEER etc.) may not show this correlation if the earlier period innovations in them may start getting correlated from a latter period. In their view the presence of cointegration is mere a statement of correlation about the innovation processes of two random walk process in the bivariate case. Hence, the above mentioned discussion on the relationship between exchange rate and trade variables empirically in the Indian context extended that the movements in real exchange rate do not influence the dollar values of Export and Import. Sarkar (1994), made his analysis for the period (1971-91) using unit root tests and co-integration techniques. In his view, 'time series' never revealed the deterministic trends between Export and Import, but display "random walk with an upward drift". This suggests that trend growth of export and import for the period under consideration can be traced to "random
events". In fact, real and nominal effective exchange rate also followed a "random walk" with a drift suggesting depreciation in Indian currency. Finally he has concluded based on cointegration results do not have any meaningful association either with export or with the balance of Trade or Balance of Payments Behaviour.

The purpose of the present study is to investigate the empirical relationship persisting in India between foreign sector macroeconomic aggregates, namely exchange rate, foreign exchange reserves and trade balance, and stock prices in the Bombay Stock Exchange (BSE) using monthly data that span from 1990-91 to 2000-01. Specifically, in this study we test for market informational efficiency in BSE, by testing the existence of a long – run causal relationship between macroeconomic aggregates and stock prices using Granger non – causality test recently proposed by Toda and Yamamoto (1995). Among the three forms of market efficiency, namely the weakly efficient, semi-strong and strongly efficient, we consider the semi-strong form relevant to the Indian context. The hypothesis states that all publicly available information is reflected in stock prices. The rest of the paper is organized as follows. A survey of the existing literature including empirical evidences on the nature of the causal relationship between macroeconomic aggregates and stock prices is conducted in Section II. Section III discusses the methodology to be employed and presents the variables and data descriptions. Section IV reports the empirical results followed by conclusion in Section V.

Rao (1997), has estimated in his study that how BOP crisis in a country mainly originates from the short-term debt dynamics, where flexible exchange rate allows speculators to get rid of the domestic currency in exchange of the central bank’s foreign exchange reserve in crisis situation, resulting.

EPW (1997), Rao (1997), in late 1990s in their discussion, perhaps motivated by the success of the Asian tigers towards capital Account convertibility was initiated in India. The Tarapore Committee appointed to facilitate that objective (May 1997) recommended introduction of capital
account convertibility by 1999-2000 in a phased manner, after strengthening macroeconomic scenario through fulfillment of three conditions

1. Fiscal consolidation

2. Achieving a mandated inflation target and

3. Ensuring a strengthened financial sector However, the rationale of capital account convertibility and its suitability for India was heavily criticized at the point.

Agarwal (1998) in his study on the capital account convertibility has argued that capital account convertibility is neither necessary nor sufficient for a foreign exchange crisis. Moreover, financial stability is not guaranteed by either capital account convertibility or by capital controls (Vasudevan 2006). A number of studies also indicate that easing capital inflow, can significantly inhibit the growth process of a country (Stiglitz, (2006), Padinger (2006), Conzalves and Leixeira (2006) and India may not be immune to the process Chakraborty and Guha (2006).

Wong and Carranza (1999), have opined the open macro-economic theory predicts that if capital controls are withdrawn by a country, the resulting capital movement may affect its current account through various channels, depending on the exchange rate, capital inflow causes real exchange rate to appreciate, thereby changing relative prices of the goods and consequently making exports relatively and imports relatively cheaper. As a result, current account balance worsens. On the other hand, in case of fixed exchange rate, capital inflow leads to increase in domestic interest rate, eventually raising domestic price level and again ultimately aroening current account balance as in the case of flexible exchange rate regime the collapse of the exchange rate.

Rangarajan (2000) in his argument has supported a free capital regime in which India must can take full advantage of the global changes in capital flows and attract not only those but also high quantity investment which has
strong links to the domestic economy. Export orientation and advanced technology. Subsequently wise after East Asian Crisis (1997) India modified its stance on this issue and supported the argument on capital controls by citing ground realities on technology transfer concerns, as reflected from its subsequent submission to WTO group on Trade and Investment.

B. M. Jani (2000), in his analysis, "Risk Management in Foreign Exchange Markets" stresses that the financial liberalization policy of India aims at management of exchange rates as well as foreign exchange reserves so as to meet the goal of macro-economic stability.

Puspha Tarafdor (2000), in his observations how the position of foreign exchange markets has risen fastly, in terms of the number of participants and the volume of the forex business transacted still lack depth. There is a lack of integration between the money market and forex markets and between the local markets and overseas markets. In his opinion, the only solution available is to adopt the following prerequisites:

1. The Macro Economic stability should be accomplished on a substantial basis
2. The country should have sustainable exchange reserves of the order of at last $30 billion

Akash Gupta and Rahul Agarwal (2001) in their study on "How should Emerging Economies Manage their Foreign Exchange Reserves?" analytically calculated the minimal necessary level of International reserves based on bench marks proposed by Wijnholds and Kaptyn, as well as a discussion of cost of reserves holdings. The countries of the Asia now account for 70 per cent of the global foreign exchange reserves compared to only 30 per cent in 1990 and 21 per cent in the early 1970s. Thus they explore how Asia has emerged as the balancing wheel of global finance.
Research finally has come out with certain steps that Central bank in the developing countries can take for an effective Reserve Management. Chakraborty (2001) through co-integration test could prove that there exists a co-integration between foreign currency assets and money supply and between nominal effective exchange rate and exports, even after controlling for private capital flows. The Granger Causality Test shows unidirectional causality from private capital flows to nominal effective exchange rates - both trade-based and export-based-, which raises concern about the RBI strategy in the foreign exchange market. Finally, instability in the trend of foreign currency assets could be partially explained by the instability in private capital flows with some lagged effect.

C. Rangarajan (2002), in his opinion on the study of "External payment issues and Exchange Rate Management" stated that the dealings between the RBI and Ads became more streamlined as the latter are given more powers to implement LERMS. The new exchange rate system had advantages as well as disadvantages. The exports had the advantages of converting 60 per cent of their foreign exchange earnings at market rate unlike in the earlier system where they had to get 100 per cent of their foreign exchange earnings at official rate.

Gopalsamy, (2003) in his presentation "Liberalisation of Foreign Exchange and New Industrial Policy" viewed that Reserve Bank of India undertakes the responsibility to maintain the stability of the external value of the rupee. This task has many dimensions such as administering the foreign exchange control, choosing the exchange rate system fixing or managing exchange reserves and negotiating with the monetary authorities of the Sterling Area, Asian Clearing Union and other currencies and with the International Financial Institutions such as International Monetary Fund World Bank and Asian Development Bank. Hence he has found out that RBI as the custodian of
the Forex reserves is vested with the responsibility of managing the investment and utilizing the reserves in a most beneficial way to the country.

**Kohli (2003)** examined how capital flows have an effect on a range of economic variables such as exchange rates, interest rates of foreign exchange reserves, domestic monetary condition and financial system in India during the period 1986 to 2001. She has examined how capital inflows induce real exchange rate appreciation, stock market and real estate boom real accumulation and monetary expansion as well as effects on production and consumption. She investigated the impact on capital flows upon the domestic financial sector in India. Inflows of foreign capital have a significant impact on domestic money supply and stock market liquidity and volatility. The study revealed that there is a correlation between portfolio flows and stock market indicators suggesting that market prices are not unaffected by capital inflows. She also concludes that the difference between net capital inflows and current account deficit has been positive in India.

**Bird and Rajan (2003)** recommended that countries should hold reserves for four to five quarters in advance. In India, short-term external debt has not increased since 1990-91, while foreign currency assets (FCA) have grown around hundred times. This has made the ratio of reserves to short-term external debt to improve in last decade. The high ratio reveals that minimum chance of occurrence of currency crisis.

**Ramakrishen S. Rajan, (2003)** has observed in his study 'International Reserve Holdings by developing countries "Why and how much?" opines that Rapid Reserve depletion has been one of the defining features of currency crisis and reserve levels ex ante showed up a significant variable in many studies examining the predictability of crisis. Significantly Industrial Countries are able to borrow overseas in domestic currencies, but many developing countries are unable to do so, leading to an accumulation of foreign currency debt liabilities that are primarily dollar denominated and un-hedged (i.e.,
liability) (dollarisation). Hence he concludes his findings from his attempt; many developing countries are besieged by an acute "fear of floating".

In view of the Bird and Rajan (2003), the reserves to import cover ratio is that it failed to take into trade growth in the account. Bird and Rajan (2003) recognized another significant deficiency with R/STED ratio is that it failed to reflect the dynamic of currency crisis. They have argued that an indicator should be considered in such a way that it allows sufficient one to policy makers to take appropriate steps once it realized and the R/STED ratio does not have this characteristics. In certain circumstances the Ratio of reserves to broad money is a relevant indicator. A low and declining ratio works as an early warning signal of currency crisis. In case of India, this indicator also confirms that the probability of financial and currency crisis has gone down significantly in recent years and reserves holding is more that the required limit.

Usha Thorat (2003), Gradual Liberalization (2004), to watch debt inflow has suggested that in view favouring up off foreign exchange reserves, the country would achieve higher economic growth simultaneously while favouring Foreign Direct Investment and Portfolio Investment inflows, the RBI would be cautious on short-term debt inflows mainly through NRI deposits with banks. If there is no limit on holding forex reserves, it is equal to the country’s GDP she evaluated that India with High forex reserves has helped the country absorb shocks of $5.5 billion outflow of accounts. The RBI has various measures to manage the excess liquidity in the system. As the economy grows, higher reserves would be absorbed automatically. As the Economy grows, Imports and forex requirement arise. The RBI's allowing reserves to pile up incomes amidst signs of economic revival and surge in imports. Thus she concluded, while encouraging forex reserves to build-up the RBI ensured reduction in debt inflows and increase in Foreign Direct Investment and Foreign Institutional Investment inflows. The RBI has directed banks to be careful on short-term debt inflows. The RBI has reduced interest rates cap on
NRI deposits to LIBOR plus one per cent in order to discourage inflow of such short-term debts. Hence she has clearly opined that a completely floating exchange rate means no capital control referring to the situation in the U.S., India has been pursuing a policy of gradual liberalization with the prudent risk management market development and reforms.

**Basabi Bhattacharya and Jaydeep Mukherjee (2004),** he is study on “causal relationship between stock market and exchange rate, foreign exchange reserves and value of trade balance: a case study for India” This paper investigates the nature of the causal relationship between stock prices and macroeconomic aggregates in the foreign sector in India. By applying the techniques of unit–root tests, cointegration and the long–run Granger non–causality test recently proposed by Toda and Yamamoto (1995), we test the causal relationships between the BSE Sensitive Index and the three macroeconomic variables, viz., exchange rate, foreign exchange reserves and value of trade balance using monthly data for the period 1990-91 to 2000-01. The results suggest that there is no causal linkage between stock prices and the three variables under consideration. The efficient market hypothesis (EMH) was formalized by Fama (1970). The hypothesis suggests that changes in the macroeconomic variables in the cannot be used as a trading rule by investors to earn consistently abnormal profits in the stock market. In an efficient market, current as well as past information on the growth of these variables are fully reflected in asset prices so that investors are unable to formulate some profitable trading rule using the available information. The main objective of the present paper is to determine the lead and lag relationships between the Indian stock market and three key macroeconomic variables relating to the foreign sector. We endeavor to investigate the question: Can the Indian stock market act as a barometer for the Indian economy. This is of course an empirical question. To test this hypothesis, we employ the methodology of Granger non-causality recently proposed by Toda and Yamamoto (1995) for the sample period April 1990 to March 2001. In this study, the BSE Sensitive Index was used as a proxy for the Indian stock market. The three important
macroeconomic variables included in the study are real effective exchange rate, foreign exchange reserves and trade balance. The results suggest that there is no causal linkage between stock prices and the three variables under consideration. The Sensitive Index of the Bombay Stock Exchange has already incorporated all past information on exchange rate, foreign exchange reserves and trade balance. The analysis reveals interesting results in the context of the Indian stock market, particularly with respect to exchange rate, foreign exchange reserves and trade balance. These results must be explained in the light of the following developments. First, most of the earlier studies that analysed the nature of the causal relationship between macroeconomic aggregates and stock prices have employed the traditional Granger – causality test. Since it is now recognized that the conventional procedure may be inadequate, conclusions based on such an approach may yield misleading inferences. So we have employed the recently developed long–run Granger non–causality test proposed by Toda and Yamamoto (1995) in our study. Secondly, although our data set is from April 1990, the full–fledged financial sector reforms in India have come to operate only after 1995. Further, for a sufficient period of time the financial sector in India has remained dominated by the banking sector through which the changes in foreign exchange primarily operate. In this context, the relationship between exchange rate and stock prices that we obtained in our result is not very surprising. Last but not the least, stock market in India is still in a transitory phase. If this result is also arrived at for subsequent periods, then it may be concluded that Indian stock market is approaching towards informational efficiency at least with respect to three macroeconomic variables, viz. exchange rate, foreign exchange reserves and trade balance.

Sunil Sondhi (2004), in his article on the challenges to an emerging power has examined India's winning strategies with how as India emerged dramatically in recent years. Even though India being the World's most populous country has radically liberalized its economy and gone from producing simple exports to become a World Leader in Software Export
exports in which India has accumulated foreign Exchange Reserves of over $102 billion up from a mere $2 billion in 1991. Hence in his views India's emergence as a major economic power was a big leap forward.

**Ashima Goyal (2004)** has examined how was the depreciation, what were the changes occurred due to the RBI's non-intervention. The question where will be the rupee tomorrow and in the near future? To answer this question according to him, we need to adequately know what forces affect demand and supply of foreign exchange and how these are expected to change. Hence he concludes that in India, RBI has an added advantage over the market because of the absence of full capital account convertibility, but there are quantitative restrictions of various kinds on forex exposures which are allowed to different kinds of transactions and this gives the bank additional levers of control.

**Sinha**, in his article, “Exchange Reserves and Exchange Rates some thoughts” expressed that a high level of reserves arising out of a substantial surplus in the current account of the country’s balance of payments means a high level of national saving. In his observations, the authorities must have an appropriate regulatory mechanism to ensure that the regulatory mechanism to ensure that the instruments are of a reason by long-term nature. Accumulation of reserves is not an end in itself. Reserves are meant to take care of periods of overall balance of payments defection account of cyclical and other factors. High and low levels of exchange reserves should be based on objective criteria. Hence he finally concludes his observations that countries which depend upon very low items of exports are likely to face serious imbalances.

**Nirvikar Singh and Srinivasan, T.N. (2004)** in their empirical analysis on "Foreign capital, Inflation, sterilization, crowding out and Growth" revealed how much of the policy debate on India's fiscal deficits, exchange rate management and reserve management policies is either model free or uses adhoc models. In order to understand some of the puzzles in India's current macro economic situation, in their view, a coherent temporal model is required
to estimate both the private and public savings investment behaviour specified, growth, Government deficits and other macroeconomic variables whether are in equilibrium. Hence their goal was to promote some theoretical and empirical, analysis for fiscal deficit, exchange rate management and reserve management policies.

Lakshmi K. (2004), in her paper analysed, whether India add more Gold to its Foreign Exchange Reserves? and sources of Accretion of Indian foreign exchange reserves from the view point of it if India should increase its gold holdings. She has evaluated that source of accretion to the foreign exchange reserves is mainly the capital flows and is portfolios more recently. In her opinion the share of the gold in the total foreign exchange reserves is very high in the US and in the Europe. But the Asian Economics hold a very low proportion of their foreign exchange reserves in gold. Central banks of many of the countries are considering the re-engineering of their foreign reserves. Hence, given the lost and the volatility of the capital flows which is the main source of accretion, India needs to decide on the composition of its foreign exchange reserves.

Shoba Ahuja (2004) in her study ascertained whether the corporate sector has demonstrated the ability to generate net foreign exchange earnings from exports. While analyzing export performance, except for traditional exports, a large number of diversified exportables made by corporates, experience a net flow of foreign exchange. At the disaggregated level, the ownership pattern shows that while the Indian Corporate sector has achieved a significant reduction in net foreign exchange spending in the Post-liberalisation Period, the same cannot be said about the foreign and government sectors. The reasons put forth by her are that large corporates display a lackluster export performance is because exports are not perceived as a viable business proportion. Thus she concludes that the profitability of exports does not compare favourably with sales in the domestic market but continue to be
burdened by cumbersome procedures and infrastructure bottlenecks which raise the transaction costs.

Ajay Kumar (2004) in his study on "Exchange Rate behaviour in Developing Countries with special reference to India” witnessed that developing countries has undergone unprecedented developments both in the foreign exchange market and domestic money market. In his analysis, the developments in the foreign exchange and money market have far reaching consequences for the financial sector, Trade, Industry and Commerce. The results proved that particularly in India, movements in the exchange rate basically reflect variations in demand and supply of foreign exchange.

María Romero (2004), he is study on “Comparative Study: Factors that Affect Foreign Currency Reserves in China and India” Since the Asian financial crisis in 1997, the world has seen foreign currency reserves hold- ings in Asian countries skyrocket. China and India rank as second and fifth in foreign currency reserve holdings in the world, respectively. Together, the Asian emerging countries comprise approximate- ly 40% of all world foreign currency holdings (Aizenman, 2003). The amount of reserves being held is one of the highest in history. Because of this, it is interesting to examine the factors that are driving this increase in reserves. From the summary statistics it can be seen that both countries have relatively large standard deviations for their reserves, suggesting that reserves from this sample have been growing over time. Although the large standard deviation is consistent with the trend observed since the collapse of the Bretton Woods agreement, this steady increase in reserves is not what theory predicted. As mentioned in the literature review, it was thought that high capital mobility and exchange rate flexibility would reduce the amount of reserves over time. The mean reflects the magnitude of the holdings. In China’s case, the mean for reserves is roughly eighty-four bil- lion dollars. For India it is a modest (in comparison with China) eleven billion dollars. As mentioned in the introduction, these
high levels of reserves have placed China and India as second and fifth largest reserve holders in the world, respectively.

In India, Ramachandran (2004) has attempted to estimate demand function for international reserves, by using GARCH Model. The results suggested that the opportunity cost impacted reserve demand much stronger than reserve volatility. He found that the reserve demand in India is predominantly determined by opportunity cost that reserve volatility, a result that is in contrast to the overall evidence of the emerging market economies. In India, Ramachandran (2004, 2006) and Srinivasan (2007) tried to estimate the reserves funding using weekly data. The study has attempted to accommodate the factors in the reserves demand function motivated from recent development in the literature the study covered both precautionary and mercantile motive components in the model. The authors have employed the co-integration and Vector Error Correction Model (VECM) Techniques for estimation of long-run and short term relationship of variables respectively.

Debis Chakraborty and Anup Greha, in their exploratory results, “Should India opt for full capital account convertibility?” has debated that a potential capital flight in case of an economic crisis simultaneously exposes the country to greater volatility (especially in the case of developing countries). In view of the author the recent debate in India on full convertibility of the rupee on capital account has drawn mixed reactions. To explore the potential impacts of introducing Capital Account Convertibility in India (CAC), the author has estimated the potential impact of a once-for-all positive shock in India’s capital account balance on its current account balance through Vector Auto Regression (VAR) through analysis. To understand the key variables taken by the author was six key macro economic variables like Budget deficit, Interest rate, differentiate Foreign Exchange Reserve, real exchange rate etc., Hence he has come out with the enumeration that before the reforms in early nineties, exchange rate of rupee was not market determined and various categories of capital account transactions (e.g., FDI, Portfolio and Equity Investment,
External commercial Borrowing, Non Resident deposits, short-term credit and outward investment) were subject to restrictions. Hence he has pointed out that a concern over a capital control regime becomes a debated topic during the years 1980-2003, following the financial liberalization in India. Foreign Direct Investment and External Commercial Borrowing were not volatile, whereas the Portfolio inflows were volatile.

M. Ramachandran (2005), in his article "On the upsurge of foreign exchange reserves in India" evaluated the volatility of reserve increment and opportunity cost of reserve holding play prime role in models of reserve demand. The incremental reserve produces bias in co-efficient estimates and instability in reserve demand function. When volatility is measured as rolling standard deviation of reserve increment, a model based volatility measure estimates bias, but does not provide evidence to support the claim that high cross-border capital flows significantly impact reserve demand. The asymmetric control over capital flows and asymmetric intervention in favour of strengthening export competitiveness in an era of persistent capital inflows seem to be responsible for large stock pile of reserves.

According to the Desh Gupta, Milind Sathye (2005) in their article "Financial Developments in India: should India introduce capital account convertibility, was to examine whether India has reached a stage of financial development when full capital account convertibility could be introduced. Capital account convertibility is the freedom to convert local financial assets into foreign financial assets and vice versa at market determined rates of exchange (Tarapore Committee, 1997). Capital Account Convertibility is associated with changes of ownership domestic financial liabilities, assets and liabilities and embodies the creation and liquidation of claims on or by the rest of the world. It also includes the imposition of Monetary / Fiscal measures relating to foreign exchange transactions, which are of a prudential nature (Reserve Bank of India, 2000). The issue is important, because until the Asian crises of 1997-98, there was a growing consensus that free global financial
flows were positive for all and more so for the developing countries. Until 1991, the Indian economy was subject to a high degree of financial repression and National and International controls. It was feared that lifting of all controls and thus making rupee fully convertible could expose India to stock and contagion such as those experienced by Asian countries. At the same time, lack of full capital convertibility on capital account was impediment for free flow of capital resources. Hence in their view India ranks next to China to attract foreign Direct Investment and has to weigh the Pros and Cons in taking a decision about full convertibility of its currency.

Agarwal Ramgopal (2006) in his study evaluated the productive surplus balance of a few Asian states which currently hold the world's largest foreign exchange reserves. In his opinion India which carries a high opportunity lost has not achieved its surplus productivity. He has suggested that setting up Asian Economics and financial mechanisms (such as Reserve Bank of Asia can plough back this bounty into infrastructure build-up which could help rapidly overcome the continent (and the World's) poverty.

The old debate on the need to go for capital account convertibility has been revisited at times in recent period (The Hindu, March 2006), one major argument being the steady growth of India’s capital account surplus from US$ 10.7 billion in 2002-03 to US$ 24.7 billion in 2005-06 (Economic Survey 2006-07). It has been argued that provided the preconditions recommended by Tarapore Committee are met, Indian could gradually more towards full convertibility (Jadhav 2003), Anderson 2003, RBI 2004) and Equity outflows are not likely to pose any major problems for the economy (Virmani, 2001). The Tarapore Committee II has recently recommended a set of policies on external data and foreign Institutional investment for achieving full convertibility which favoured a gradual increase in overall external commercial debt ceiling (Economic Survey 2006-07). Reserve Bank of India benchmarking of reserves adequacy the study made an attempt to measure the excess reserves bidding in India also measures the cost of holding them.
**Gehendra Purush Dhakal (2007)** has evaluated how the growth in monetary reserves over the last decade, in particular since 2002, has prompted calls from many commentators to revisit the possibilities of using foreign reserves for financing development. It is paradoxical that some economies maintain a huge pool of reserves while they are actively liberalizing their trade regime in order to attract more foreign direct investment.

**Ramachandran M and Naveen Srinivasan (2007)** in their article have made empirical evidence on how external transactions have had a moderate impact on reserve demand in recent years. Instead, asymmetric exchange rate intervention triggered, perhaps, by concerns about India's export competitiveness seemed to have contributed to large stockpile of reserves.

**Sengupta (2007)** argued in his study that capital account convertibility is arguable favorable to improved macro-economic management, as higher degree of capital account openness generates lower inflation rates.

**Shromon Das (2008),** in his article on "What contributes to India's foreign exchange reserves?" has agreed that India's foreign exchange reserves have been growing at a rapid pace is well known. India's total foreign exchange reserves stood at US$ 305 bn. He has authentically seen how RBI publishes a data on "Sources of Accretion to foreign exchange reserves in India, which are the main components to our forex reserves, along with their values. The data proves how the components have undergone the maximum change in the capital account, owing largely to net portfolio inflows. The foreign exchange reserves have increased by an amount of 76bn US$ for the period, which is inclusive of the valuation gain (which reflects the appreciation of major currencies against the US dollar).

**Zafar Ahmad Sultan(2011)** he is study on “Foreign Exchange Reserves and India’s Import Demand: A Cointegration and Vector Error Correction Analysis” investigates the aggregate import demand function for India using Johansen’s cointegration method. The result shows that there is a
long run equilibrium relationship between real imports, real income, relative price of imports and real foreign exchange reserves. In the long run, import is found to be elastic with respect to income, and inelastic with respect to relative price and foreign reserves. In the short run also, we find a significant relationship between import, income, relative price and foreign exchange reserves. However in the short run, import is found to be inelastic with respect to all of these variables. The evidence suggests that depreciation may not give desirable results for the economy as far as containing the import bill is concerned. The promotion of export would be a better option to take care of problem of trade deficits. India’s import has increased at a rapid rate. The period has also witnessed a high rate of growth of the economy and comfortable level of foreign exchange reserves. In the light of this, the paper intended to examine the determinants of India’s merchandise import, both in long run and in the short run, applying Johansen’s cointegration and vector error correction method. To examine the demand function for imports, foreign exchange reserves, in addition to income and relative prices of import, has also been included in the model to estimate its importance in determining the import volume. The main results of the study can be summarized as follows. The cointegration result shows that there is long run equilibrium relationship between India’s real import, real income, relative price of import and the foreign exchange reserves signifying the relevance of including foreign exchange reserves in the model. Analyzing the size of the coefficients, we find that the domestic income turns out to be the most important factor determining the volume of import in the long run as well as in the short run. The empirical estimate shows that long run import is elastic with respect to income and inelastic with respect to relative price of import and foreign reserves. This implies that the import volume would grow at faster rate than the growth in income of the country and would deteriorate the trade balance of the country if the growth in income is not accompanied by growth in exports. Foreign exchange reserves turns out to be statistically significant factor affecting import demand both in the short run as well as in the long run. However its economic
impact is relatively small in particular to the size of estimated income elasticity but close to price elasticity. Nevertheless, it constitutes an important determinant of import, and omitting such an important variable may cause misspecification of the model and may lead to overemphasizing the influence of the variables included in the model. With respect to price also, India’s import is found to be significantly related to, both in the long run and in the short run. However, the low coefficient implies that India’s import is non-competitive in nature and import substitution industrialization (ISI) strategy has not been able to successfully provide the domestic substitutes to these products to compete with these imports. Since the price elasticity is very low and even less than the range of -0.5 to -1.0 as suggested by Heien (1968), even depreciation may not be an effective policy to reduce the trade deficits. This is also evident from the fact that despite the continuous depreciation of the rupee since the reform period, the trade deficits continues to rise. Recognizing the nature of imports, controlling import without providing adequate domestic substitutes may not be desirable as it may have an adverse impact on the growth of economy. Hence promoting export through appropriate measures would be the better remedy to take care of the problem of trade deficits in future.

Umanath Kumarasamy (2012), he is study on “does foreign exchange reserve affect external commercial borrowings – Indian pragmatic indication” A central bank of the country that controls foreign exchange reserves by implementing the policies and procedures, which results the valuations of currency. In a supple polices on exchanges rates the valuation activities prompting involuntarily, due course the supply and demand of the foreign currencies are adjusted by bought and sold. External Commercial Borrowings (ECB) also not exempted from that, objectively study attempt to prove it. By using the various statistical tools, the research found and strongly believes that both the time series, Fx Reserves and External Commercial Borrowings had mutual relationship during the elected study period. ECBs have emerged as a predecessor in the credit market and have progressively adding gigantic
eminence in the Indian market. External commercial Borrowings have been an excellent way for India to raise business finance. Concluding this study with meeting the objective had in introduction by through the statistical applications results. Jarque-Bera Normality test results posed questions on the stationarity of the two series. Hence subsequently, stationarity of the two series was checked with ADF test. Then, the coefficient of correlation between the two variables was computed. Those statistics yielded the results; non-normal distribution on the variables, non-stationarity and stationarity among Fx Reserves and ECBs respectively and positive relationship between both the variables during the elected study period. That is, fx reserve having impact on external commercial borrowings.