IMPACT OF EXCHANGE RATE FLUCTUATION ON STOCK MARKET VOLATILITY - A STUDY TO PREDICT THE ECONOMIC SCENARIO IN INDIA

Piyali Roy Chowdhury, Anuradha.A

1Research Scholar, Department Management, VIT Business School, Vellore Institute of Technology(VIT), Chennai, India
2Assistant Professor(Sr) Department of Management, VIT Business School, Vellore Institute of Technology(VIT), Chennai, India

ABSTRACT

The impact analysis of macroeconomic variables on stock market is a focus for economists since 19th century. Macroeconomic fundamentals and stock market volatility do play an important role in determining and forecasting the future position of an economy as a whole. In this study, one of the macroeconomic variables, exchange rate, is studied along with Indian Stock Market (BSE Index). The linkage between exchange rate and stock market index is considered as one of the important contributors to predict the growth/business cycle of any economy. This dynamic linkage between exchange rate and stock market has been analyzed considering 15 years of data (from 2010 to 2016) on exchange rate and stock market index related to Indian Economy. A stock index or stock market index is a measurement of the value of a section of the stock market. It is computed from the prices of selected stocks (typically a weighted average). It is a tool used by investors and financial managers to describe the market, and to compare the return on specific investments. The main focus of the researchers is to find out the impact of exchange rate fluctuation on stock market volatility to predict the economic scenario in India.

Keywords— Exchange Rate, Stock Market Index, Volatility, Growth/business cycle.

1. INTRODUCTION

In the context of economic development, Stock market plays a crucial role for every country. Amount of savings an economy has, contributes one of the robust factors for boosting economic growth. The more is the percentage of investment out of savings, the faster an economy reaches to sustainable development for long run. The main purpose of channelizing savings into investment is return. Higher amount of investment leads to higher return and vice versa. This return or profit can again be channelized into further investment to reach the goal of economic development of a country.

International Trade, on the other hand, also facilitates an important role in shaping the structure of an Economy by varying the exchange rate. Two broadly categorized exchange rates- Nominal and real can be taken into account in this regard. While the nominal exchange rate takes into consideration the amount of domestic currency which can be sold to purchase one unit of foreign currency, real exchange rate tells how much domestic goods and services can be exchanged with foreign goods and services. The real exchange rate equation measures (Nominal exchange
rate x domestic price/foreign price). The rise in the exchange rate causes an economy to import more which means revaluation of domestic currency and vice versa.

Taking stock market and exchange rate together, we can say, in stock market, if the interest rate is low, foreign investors sell their assets and they will liquidate their investments. The liquidation of investment gives a sudden or external supply shock of the foreign currency in the determination of equilibrium exchange rate schedule. As there is now more supply of foreign currency at a given demand, the domestic currency gets appreciation and foreign currency faces depreciation or devaluation.

Indian Stock Market stands as one of the most crucial factors for the development of Indian Economy. It is segmented by two categories- Primary Market and Secondary Market. Primary market considers all the new issues of financial securities, whereas, secondary market deals with the publicly traded securities which are already issued in Primary Market. The rapid economic growth since last hundred years resulted the development of stock market in the world as well as in India. The trading of financial securities, in India, has also been done internationally through American Depository Receipt (ADR) and Global Depository Receipt (GDR). The international investment facilitates the movement of foreign exchanges throughout the world.

India, being an open economy, promotes international trade for the development of Indian Economy. Though in the world, India contributes around 3 percent of world trade, there is a vision to be achieved by India in the arena of world trade to make it as 4 percent by 2020. Now days, the amount of International Trade has been drastically fallen in India. The Balance of Trade is negative and it hampers the nominal exchange rate (Rs/$) in India contributing a Rupee devaluation against Dollar. Apart from Balance of trade, there are many reasons for which exchange rate fluctuate. There may be changes in interest rate, business cycle, Government debt, political instability or incorrect speculation in Indian economy which makes the exchange rate vary. If the exchange rate changes, the impact will be perceived in the various sectors of an economy, i.e., in Agricultural sector(Primary), Industrial sector(Secondary) or Services sector(Tertiary). Investment also has a considerable repercussion while looking into the impact of currency fluctuation in Indian Economy. In this paper, the concentration is given on the impact of exchange rate on Indian Stock Market. This exchange rate volatility affects the flow of FDI, FII, ADR, GDR, and hence, the total Indian Stock Market as a whole. The impact of exchange rate fluctuation on Indian Stock Market (S&P BSE Index) is studied here for 15 years (from 2010 to 2016). The study finds out the correlation value between exchange rate and SENSEX as 0.621930928 which specify a dependent relationship of SENSEX on exchange rate.

2. REVIEW OF LITERATURE

Purbaya, Yudhi Sadewa (2000) in his analysis “The effect of exchange rate on foreign direct investment” found that depreciation of currency in host country facilitates more FDI if the country is focusing on export primarily and vice versa. Increased FDI cause stock market to be fluctuated and hence the relationship between exchange rate and stock market can be established.

Magda Kandil, Ida Mirzaie (2005) entitled “The Effects of Exchange Rate fluctuation on Output and Prices: Evidence From Developing Countries” examined the decomposition of exchange rate by two parts: Anticipated exchange rate fluctuation and unanticipated exchange rate fluctuation. This study shows anticipated exchange rate fluctuation does not really impact on output growth and price level, whereas unanticipated exchange rate fluctuation has a crucial role in determining the growth of output and prices.

Tomoe Moore, Eric. J. Pentecost (2006) entitled “The Sources of Real Exchange Rate Fluctuations in India” attempted to find out the different sources of exchange rate appreciation by using VAR approach. There are nominal shocks which play an important role in defining nominal exchange rate, but, for the case of real exchange rates, nominal shocks are inapplicable. The study further explores that nominal and real exchange rates are not co integrated, i.e., they are not having any linear relationship in the long run.

Alok Kumar Mishra, Niranjan Swain, et al. (2007), in the article “Volatility Spillover between Stock and Foreign Exchange Markets: Indian Evidence”, discussed about the bidirectional volatility regarding Indian stock market and foreign exchange market. In this study, it was proved
that there is a long term relationship between stock market and foreign exchange market. GARCH model was used to interpret the volatility spillover which is spread over past time periods. Debijiban Mukherjee (2007), in his study “Comparative Analysis of Indian Stock Market with International Markets” analyzed Indian stock markets are integrated with global market. This paper showed the position of Indian stock market with global capital markets. India, as per this research, is low on market capitalization Volume wise, Indian market is small related to global markets.

Debjiban Mukherjee (2007) in his study “Comparative Analysis of Indian Stock Market with International Markets” analyzed Indian stock markets are integrated with global market. This paper showed the position of Indian stock market with global capital markets. India, as per this research, is low on market capitalization Volume wise, Indian market is small related to global markets.

Magda Kandil (2008) in his study “Exchange Rate Fluctuations and the Macro-Economy: Channels of Interaction in Developing and Developed Countries” explored the growth of consumption, investment, imports, exports, overall trade balance for developing and developed countries on account of the effect of currency fluctuation. For developing countries, exchange rate depreciation results with decreased consumption, investment, exports and increase in imports. The trade balance is negative also for this case.

Mr. K.S. Venkateswara Kumar, Prof. V. Rama Devi (2012), in their article “Impact Of International Financial Flows On Indian Stock Markets – An Empirical Study”, analyzed the effect of FDI and FII on Indian Stock market. The analysis shows there is a strong correlation between FDI and SENSEX, FII and SENSEX. It is found that the effect of FDI and FII is positive for Indian stock market. The greater is the inclusion of FDI and FII in Indian stock market, the more investment in share market takes place which enumerates higher return in Indian stock market as a whole.

Deepti Gulati and Monika Kakhani (2012), in their study, “Relationship Between Stock Market and Foreign Exchange Market in India: An Empirical Study”, analyzed two way relationship between stock market and exchange rate. By using Granger Causality Test, it was found that neither SENSEX nor NIFTY has a two way relationship with foreign exchange (Rs/$).

Suhail Palakkod (2012), in his research article “Integration of Capital, Commodity and Currency Markets: A Study on Volatility Spillover” integrated capital, commodity and currency markets and proved that there is volatility spillover starting from currency market to commodity market, but commodity market has no spillover effects. Using AR(1)-GARCH(1,1) approach, it was found that the coefficients are insignificant in case of commodity markets. It can be by and large concluded that degree of correlation between capital market and foreign exchange rate is high in case of lagged values of the variables.

Vandana Kotai (2013), in her analysis entitled “An Empirical Study on Currency volatility in Foreign Exchange Market”, examined the behavior of the five international currency markets (INR/USD, JPY/USD, EURO/USD, GBP/USD, and CNY/USD). In her study, the stability of these currency pairs is examined and position of INR/USD in global market is analyzed. This study shows that Indian currency is relatively volatile than other currencies due to internal and external shocks to Indian Economy. It also facilitates the idea to invest in Indian market by investors because of volatility of Indian Rupees.

Models like GARCH(1,1), VECM, VAR were used to determine the dynamic relationship between stock market and exchange rate. N. S. Nataraja, Ganesh Let al. (2014), in their paper, “Dynamic Linkages Between Cnxbank Nifty and Exchange Rates: Evidence From Indian Market” studied the normality of the Indian stock market and foreign exchange data and measured the dynamic link between Cnxbank NIFTY data and foreign exchange rate. The result shows there is no causal relationship between these two variables and they are negatively correlated.

Sharad Nath Bhattacharya, J. K. Das (2014) in their analysis “Macroeconomic Factors and Stock Market Returns: A Study in Indian Context” explored thirteen macroeconomic factors which explain the growth of Indian economy. This study consolidates the thirteen variables into three factors by using Factor Analysis. The first factor (F1) combines IIP, M3, FII inflow, export, foreign exchange reserve, WPI, gold and crude prices. The second factor (F2) combines call money rates, long term interest rates and Treasury bill rates. The third factor (F3) combines the global index and exchange rates (Rupee vs US dollar). Then these three factors are analyzed with regression analysis taking SENSEX, NIFTY, CNX500, and BSE500 as dependent variables and the three factors as independent. The study concludes with a negative relationship between exchange rate and stock market overall.

3. OBJECTIVE

In these above studies, focus was given to stock market and currency market as whole. In the study of Deepti Gulati and Monika Kakhani (2012), it was analyzed that the relationship of exchange rate and SENSEX is negative by showing a graphical analysis for the period 2004-
Overall, the past studies concentrated on analyzing macroeconomic factors and Indian investment through different channels as a whole. The objective of this study are, hence, as follows:

a. To know the relationship of exchange rate and SENSEX from the period 2010-2016 by using correlation analysis.
b. To know the impact of currency fluctuation on SENSEX.
c. To discuss about the best possible solution an investor can implement in Indian stock market.

I. METHODOLOGY

The data, Currency exchange rate, is in terms of Rupees, whereas, BSE SENSEX Index is in terms of points. To make these two data into equal unit of measurement, we have normalized the data. Normalization allows data of two different units of measurement to compare easily and to get relevant results. We have transformed the original data of Currency value and BSE Index ranging from 2010 – 2016. To create this normalization, we have used the formula as,

\[
X_{\text{new}} = \frac{X - X_{\text{min}}}{X_{\text{max}} - X_{\text{min}}}
\]

Where, \(X_{\text{new}}\) is the new variable created after normalization.

\(X\) is a particular value in the series of data for Currency value as well as BSE Index.

\(X_{\text{min}}\) is the minimum value of a particular series in consideration.

\(X_{\text{max}}\) is the maximum value of a particular series in consideration.

After we have applied normalization of data, we have analyzed the impact of normalized currency value on normalized BSE Index. In this regard, we have done regression analysis with these two sets of transformed variables.

4. ANALYSIS AND INTERPRETATION

The data are explained in two different ways, graphically and mathematically. The two normalized dataset are plotted against the time period and the result shows that they both have increasing trends with them in long term. Figure – 1 shows that as Rupee has faced depreciation against dollar, SENSEX values also have become higher over 16 years. In contrast with the long term results, in the short term, they have a negative correlation with each other and if currency depreciates, SENSEX actually falls.

![Figure - 1](image-url)
The interpretation behind this is that if there is depreciation of rupee against dollar, price level increases. Investors sell their financial assets because of higher profit in the situation of price hike. The mass selling of financial assets lead to a fall in SENSEX value at a particular point of time. For long run, the result is opposite showing a positive correlation between them. For long term investors in India, it is profitable to keep their assets and not to sell frequently because if Rupee depreciates against dollar, there will be higher exports. Export oriented promotion leads to change the economic scenario of developing country, like India. Increased export will call for more production, more employment, less current account deficit, increase in percentage of GDP. Competitiveness and quality of production will also improve. This actually contributes to higher level of National income, savings and Investment. The increased investment will amount to higher value of SENSEX. Hence, in short run, the correlation between currency value and SENSEX may be negative, but, in due course of time, the correlation is positive. The graphical analysis of these two data has again been mathematically explained in the next part.

5. RESULTS AND DISCUSSION

Null (H₀) Hypothesis, here, is defined as there is no dependence of SENSEX on currency value. Whereas, Alternative (H₁) Hypothesis is defined as, there is a dependence of SENSEX on currency value.

There result is as follows:

Table 1: Summary of Output

<table>
<thead>
<tr>
<th>SUMMARY OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression Statistics</td>
</tr>
<tr>
<td>Multiple R 0.78862597</td>
</tr>
<tr>
<td>R Square 0.62193093</td>
</tr>
<tr>
<td>Adjusted R Square 0.61726341</td>
</tr>
<tr>
<td>Standard Error 0.19118336</td>
</tr>
<tr>
<td>Observations 83</td>
</tr>
</tbody>
</table>

Table 2: ANOVA:

<table>
<thead>
<tr>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Significance F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression 1 4.870306 4.870306 133.247 8.67E-19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual 81 2.960637 0.036551</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total 82</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Coefficients | Intercept | Standard Error | t-Stat | P-value | Lower 95% | Upper 95% |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>X Variable 1</td>
<td>0.723770562</td>
<td>0.062701</td>
<td>11.54325</td>
<td>#</td>
<td>0.599015689</td>
<td>0.848525</td>
</tr>
</tbody>
</table>

With the transformed data, this model can explain 62% of the actual scenario. The coefficients are positive which ensures that the estimated regression line has a positive intercept and it is a positively sloped linear equation. Here, two coefficients are statistically significant. It can be confirmed through the p value of the respective coefficients.

As p value, in both the cases, is significant, i.e., they are less than 0.05, we reject Null hypothesis and accept alternative hypothesis stating that there is an impact of currency value on SENSEX. It is a positive effect which says that, as Rupee gets depreciated against dollar; stock market goes up and vice versa.

6. CONCLUSION

The analysis has given an importance on analyzing two time series data after taking the normalized value of two variables. The study suggests to the Indian stock investors to invest in Indian stock market for long run to get higher return and to avoid the short term fluctuation in the...
stock market. One of the reasons of short term fluctuation in stock market is currency value. As suggested by Purbaya,Yudhi Sadewa (2000), currency depreciation will definitely bring FDI flows in host country if host country is a primary exporter. FDI along with FII will then account for increased investment in stock market. For developing economy, if technological constraints are associated with a country, the economy faces higher amount of FDI inflows with currency depreciation. But if technological advances are there for an economy, currency depreciation will lead to less FDI inflows. Country like India, has very less exposure with technological advancement. Hence, when there is currency depreciation, it always attracts FDI to promote exports in the economy. Penetration of FDI into stock market eventually augments SENSEX in India to rise in long run.

REFERENCES


[16] www.investopedia.com

[17] www.xe.com