Fluctuations in Currency Rate of Great British Pound in Indian Currency Market

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Abstract

Currency market is fundamentally the prime operated markets in the globe. In Indian currency market, the currency dealings are made through banks. There are number of business houses in a country that are having a global presence, though they have to tolerate the currency rate risk of instability in the global trade as the currency rate against Great British Pound has elevated five times approximately in last forty years. Currency market in India has become exceptionally vibrant after globalization in the decade of 1990s. In today's scenario, currency market is one of the major impulsive & liquid in the entire financial marketplace in the world. The currency rate fluctuations in the Great British Pound in terms of Indian National Rupee represent swift and sharp transformation. This research work evaluates impulsive movement of Great British Pound in terms of Indian National Rupee. It studies currency rate movement with daily currency rate of last seven years of Great British Pound and Indian National Rupee.

Keywords: - Currency Market, Fluctuation, Volatility, GBP and INR.

Introduction

Fluctuation in the currency exchange rate is one of the major and typical foreign exchange risks in currency market. It creates ambiguity and uncertainty in the currency rates. Volatility is the measure of risk arises due to fluctuations in the currency rate. It is based on the amount of association between the returns of the pair of currencies.

Volatility is the scattering returns from the mean return. Oscillation in the currency rate between a pair of currencies is one of the considerable aspects of risks. The currency rates may possibly reveal high volatility for the reason like deviation from fundamentals, pointless speculative currency dealings, varying macroeconomic issues, information from domestic country and overseas.

Currency rates excessive fluctuations may unfavorably influence the parts of financial markets possibly will influence the indicators of financial strategies which may lead to financial unsteadiness. Excessive fluctuation in currency rate may adversely affect the foreign operations and genuine overseas investments.

Floating currency rates is the most crucial currency rate systems. It fluctuates with the time. It is complicated to accurately forecast a floating currency rate.

The degree to which a currency rate fluctuates in the due course is termed as volatility. Strength of volatility with which it may affect the international business depends on the level of variability in the currency rate and rate of recurrence of changes in the currency rate. If the scale of a movement in the currency rate is very high or else it moves very regularly then, the currency rate is extremely volatile.

Literature Review

Figlewaski (1981) argued that speculation in the derivatives market is transmitted to the underlying spot markets. The speculation produces a net loss with some speculators gaining (and others loosing), thereby destabilize the market. Uninformed speculative traders increase price volatility by interjecting noise to a market with limited liquidity. The inflow and existence of the speculators in the derivatives market produces estabilization forces, which creates undesirable bubbles.

Stein (1987) developed a model in which prices are determined by the interaction between hedgers and informed speculators. In this model, opening a futures market has two effects; (1) the futures market improves risk sharing and therefore reduces price volatility,

(2) if the speculators observe a noisy but informative signal, the hedgers react to the noise in the speculative trades, producing an increase in volatility. Kumar and Seppi (1992) and Jarrow (1992) studied the impact of currency derivatives on spot market volatility and found that speculative trading executed by big players in the derivatives market increases the volatility in the spot exchange rate. Hence, currency futures trading increases the spot market volatility.

In addition to the critique by Meese and Rogoff (1983a,b), another puzzle quickly emerges, pertaining to the volatility of exchange rates. Marston (1989) notes that the volatility of currencies visibly increases in the '70s, after the end of the fixed exchange rates system of Bretton Woods, while the volatility of the underlying economic factors remains largely unchanged. While he comes to the conclusion that exchange rate returns are excessively volatile in regard to fundamentals, Flood and Rose (1993) conclude that macroeconomic factors can provide only little help in explaining or predicting exchange rate changes. In addition, Schwert (1989) finds some (weak) evidence that equity return volatility helps to explain future macroeconomic volatility, rather than the opposite.

Subsequently, research moves away from economic factors to explain volatility and focuses almost entirely on the new ARCH-type of models and their extensions.

To model volatility based mainly on the information contained in the historical volatility, Engle (1982) develops the autoregressive conditional heteroscedasticity (ARCH) model, which is later extended into the generalized ARCH (GARCH) model by Bollerslev (1986). From there on, a multitude of models with different specifications have been constructed in order to take into account the features observed in the financial markets. Bollerslev et al. (1992) and Palm (1996) provide an extensive overview over the earlier family of GARCH models, while Bauwens et al. (2006) look in particular at the multivariate extensions of the GARCH model.

As it has often been observed that financial assets behave differently in market downturns than they do in market upturns, with a notable increase in volatility and correlation during downturns, Patton (2006) tests for asymmetric exchange rate interdependence between the German mark and the yen using an extension of the BEKK model, he finds that the mark/dollar and the yen/dollar exchange rates are more correlated when simultaneously depreciating against the dollar than when they are appreciating against the latter. Additionally, in line with the findings of van Dijk et al. (2011), Patton (2006) reports strong evidence for a structural break in the conditional copula with the physical introduction of the euro in January 1999.

Bodart and Reding (2001) show that exchange rates have a significant effect on expected industry stock returns and on their volatility, though the magnitude of this effect is quite small. The study also concludes that the importance of the exchange rate spillovers is influenced by the exchange rate regime, the magnitude, and the direction of exchange rate shocks.

In parallel to the studies examining the influence of macroeconomic variables on the returns of exchange rates, researchers have also paid close attention to the volatility of exchange rates. In one of the first studies on volatilities, Ederington and Lee (1993) find that the scheduled U.S. macroeconomic news announcements are responsible for most of the observed time-of-day and day-of-the-week volatility patterns observed in the foreign exchange market. In a more detailed analysis with a larger set of macroeconomic variables, Andersen and Bollerslev (1998b) confirm the strong announcement effects on the return volatility. The higher volatility observed on certain days of the week is mainly due to a clustering of news releases on such days. Besides the impact of U.S. news announcements, Andersen and Bollerslev (1998b) also document a number of German variables that have a significant impact on the German mark - U.S. dollar exchange rate. Chaboud et al. (2004) find macroeconomic announcements to be immediately followed by higher trading volume and volatility and both remain elevated for a period of time after the announcement.

In 2013, M. Thenmozhi and Abhijeet Chandra in their research titled, "India Volatility Index (India VIX) and Risk Management in the Indian Stock", have examined the asymmetric relationship between the India Volatility Index (India VIX)3 and stock market returns, and demonstrated that Nifty returns were negatively related to the changes in the India VIX levels; in the case of high upward movements in the market, the returns on the two indices tend to move independently. When the market takes a sharp downward turn, the relationship was not as significant for higher quantiles.

This property of the India VIX made it ideal as a risk management tool whereby derivative products based on the volatility index can be used for portfolio insurance against bad declines.

Currency Rate Fluctuation

Currency rate fluctuation is the increase and decrease in a currency rate. One of the most used statistical tools to measure fluctuation is volatility, which may be calculated on an hourly, daily, weekly, monthly or yearly basis. Volatility in currency rate presents a range the currency rate may fluctuate within a particular time period presuming that change in a currency rate follow a normal distribution. In absolute stipulations, the standard deviation of oscillations of currency rates is used to compute volatility of a currency rate.

Currency rate volatility is a gauge to measure the tendency of currencies to increase or decrease in rate, which in turn influence the profitability of foreign currency transactions in foreign exchange market. It is the degree of the scale that these currency rates fluctuate and the pace of repetition of those movements. Currency rates fluctuations affects business dealings between entities from different countries and international investments. Thus, fluctuations in currency rate have a consequence on several business organizations who are involved in doing transactions with two or more countries.

Figure 1.1 exhibits the charts of the annual volatility for the GBP/INR using daily data. It is evident that volatility is not stable. Volatility is, though, statistically recurrent.

This shows that volatility follows a trend. If it is volatile at this time, then it should go on to be volatile.

In the underneath graph we can observe the clustering. Therefore, volatility measures inconsistency, or dispersion about a mean value— it is a measure of the degree of movements in currency rates.

Mechanics of Currency Rate Volatility

A well-known truth about volatility is that when the currency rates moves up (down) volatility normally moves down (up); so it may be concluded that there is an inverse relationship between volatility and the currency rates. This may be observed in the Figure 1.2 [illustrated GBP/INR currency rates against the historical annual volatility since April 2008].

Next trait of volatility is that it is mean reverting. This means that currency rates eventually go back to the mean currency rate. Thus, currency rate is mean reverting if it is expected to decrease (increase) after striking an upper bound (lowest bound).

In the foreign exchange markets, volatility means that the currency rate will fluctuate in due course. It indicates the range of a return's movement. If the rate of volatility computed is high, it demonstrates that range in the movement in returns is broad. It represents that the currency rate will fluctuate considerably in a specific time period. Therefore, in a currency rates returns, volatility is the deviation of returns from their average currency rate. Say a case in which the currency rate statistics is normally distributed, assuming the mean of currency rate returns to be zero, then five percent volatility indicates that in a time period of one year currency rate returns will be within [- 0.05; + 0.05] with 68.3% probability (1σ); within [- 0.1; + 0.1], with 95.4% probability (2σ), and within [- 0.15; + 0.15], with 99.7% probability (3σ).

Figure 1.1: Annual Volatility of the GBP/INR since April 2008 using Daily Data

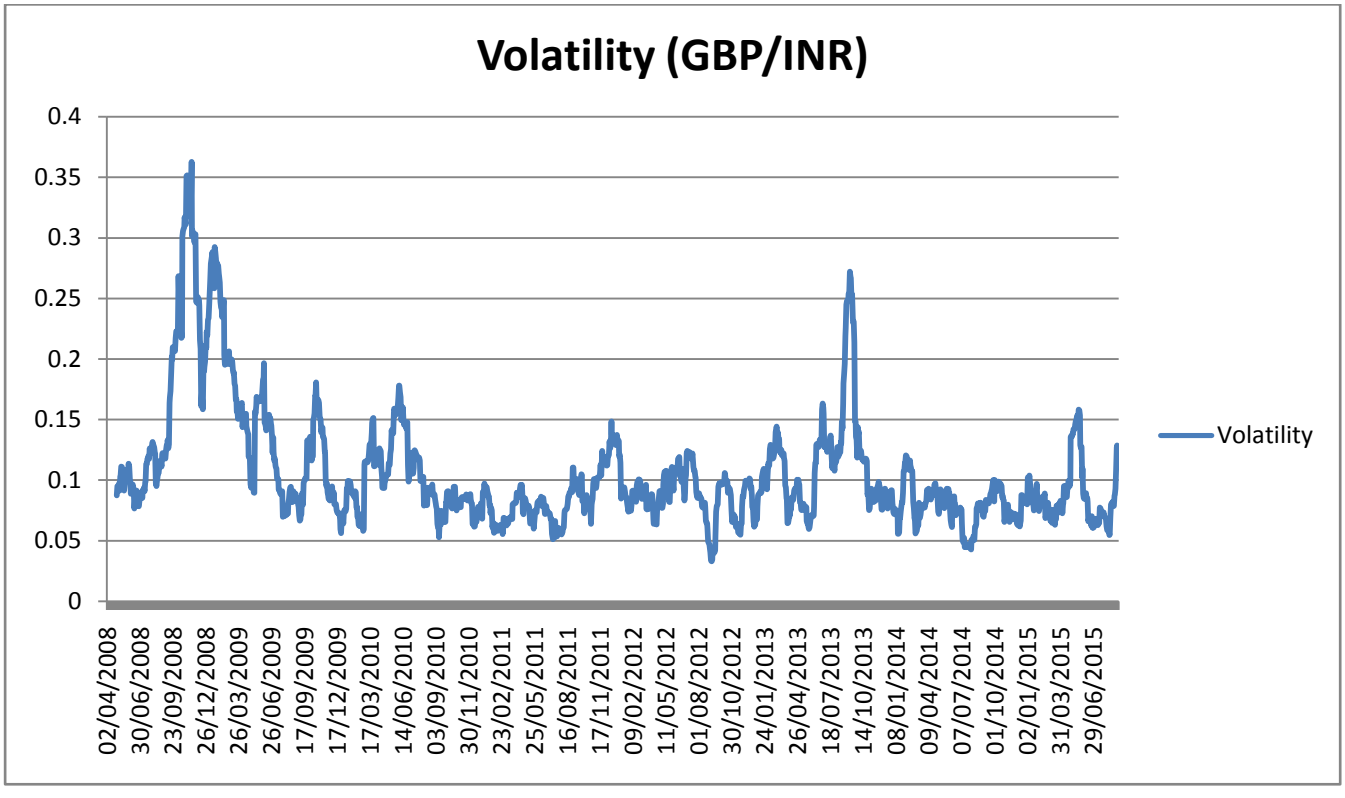
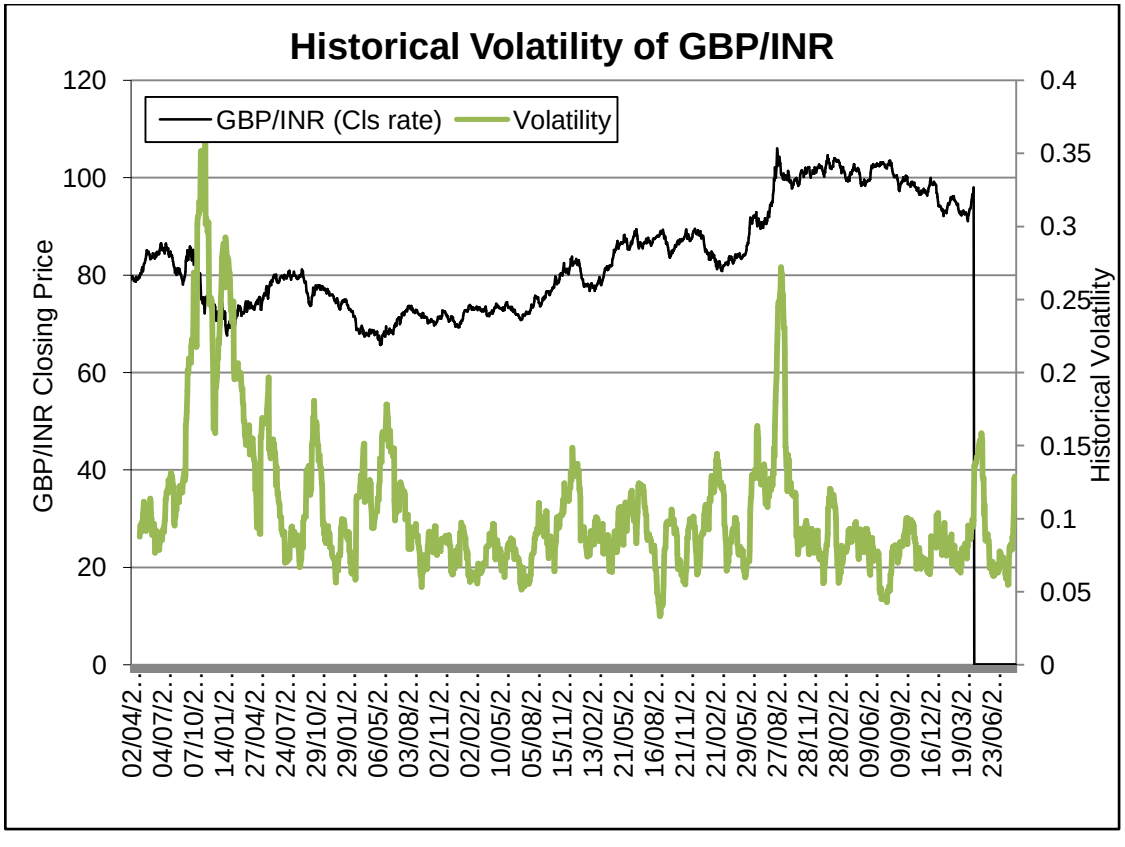


Figure 1.2: GBP/INR Foreign Exchange Rate versus the Historical Annual Volatility Since April 2008 using Daily Data



The Variance (Σ^2)

Volatility is the degree of inconsistency in the returns of the underlying. Risk reveals the possibility that the real return on an investment may not be same as projected return. The variance (**σ^2**) and standard deviation **(σ)** of the distribution of returns are measure of risk.

Variance and standard deviation are statistical methods, which are used to compute risk. If the fluctuation in currency rate is high, it indicates a larger dispersion and if the fluctuation in currency rate is low, it indicates a less significant dispersion. Thus, we may say that currency rate of very risky currency fluctuates more vibrantly as compared to less risky currency. Thus, variance (σ2) and standard deviation (σ) are absolute measure of dispersion, and, coefficient of variation is a relative measure of dispersion, i.e., risk. The level of fluctuation in currency rate can be calculated by considering the real historical currency rates. These rates are exercised to calculate the variance in currency rate or the standard deviation of currency rate. Variance is measured by computing the deviation between a particular currency rates from its mean rate. Variance is measured by the following equation:

$$\left[\sigma^2 = \frac{\Sigma(X-\mu)^2}{N} \right] \qquad (1.1)$$

$$\left[\sigma = \sqrt{\frac{\Sigma(X-\mu)^2}{N}} \right] \qquad (1.2)$$

Where,

σ^2 = Variance
σ = Standard Deviation
X = value of foreign exchange rate
μ = Arithmetic mean of foreign exchange rate
N = Number of observed foreign exchange rates

Historical Volatility Estimation

Daily currency rate fluctuations are concluded in a currency market of the country. The natural log (ln) of the ratio (Rt) of a foreign exchange rate (S) from the current day (t) to the previous day (t-1) is calculated as follows:

$$R_t = \ln\left[\frac{S_t}{S_{t-1}}\right] \qquad (1.3)$$

Then average of daily fluctuations over a specific period of time is computed and then mean for them (R_m) is computed:

$$\frac{R_m = \Sigma R_t}{\frac{n}{n}} \qquad (1.4)$$

The historical volatility (σ) is the "mean variance" from the mean (the "standard deviation"), and is computed as:

$$\sigma = \sqrt{\frac{\Sigma (R_t - R_m)^2}{n - 1}} \qquad (1.5)$$

To obtain annualize volatility this approximation is to be balanced with an annualisation factor m (number of intervals per annum)

$$\sigma_{annual} = \sigma \sqrt{m} \qquad (1.6)$$

For daily data m = 252; for weekly data m = 52; and for monthly data m = 12.

Conclusion

Equation (1.5) is the standard deviation of the sampled data of foreign exchange rate R_t. Table 1.1 demonstrates historical volatility estimation. It exhibits daily exchange rates of GBP/INR in series for 1 month (March 2015) i.e., 21 exchange-trading days. The mean for the log relatives R_m is –0.00150279 and the standard deviation is 0.004612722. Annualized historical volatility is 7.32224692 percent.

In this study currency, rate volatility for the Indian foreign exchange market in reference to the GBP/INR is being examined. From the result of inference for volatility of the currency rates in the study, it is evident that the currency rates between GBP/INR are tremendously volatile in nature. Volatility clustering is obviously apparent in all the stages and among all the currency rates.

Table 1.1: Historical volatility for GBP/INR during March 2015

Date	GBP/INR (Closing Exchange Rate)	R_t	R_t^2
27/02/2015	95.4235	-0.008536817	
02/03/2015	95.2658	-0.00165400	0.00000274
03/03/2015	95.1388	-0.00133400	0.00000178
04/03/2015	94.9649	-0.00182953	0.00000335
05/03/2015	94.7142	-0.00264341	0.00000699
09/03/2015	94.3936	-0.00339066	0.00001150
10/03/2015	94.549	0.00164494	0.00000271
11/03/2015	94.6006	0.00054560	0.00000030
12/03/2015	93.5682	-0.01097324	0.00012041
13/03/2015	93.1639	-0.00433027	0.00001875
16/03/2015	92.825	-0.00364431	0.00001328
17/03/2015	92.991	0.00178671	0.00000319
18/03/2015	92.46	-0.00572660	0.00003279
19/03/2015	92.9945	0.00576423	0.00003323
20/03/2015	92.2636	-0.00789065	0.00006226
23/03/2015	93.0207	0.00817235	0.00006679
24/03/2015	92.9312	-0.00096261	0.00000093
25/03/2015	92.6463	-0.00307042	0.00000943
26/03/2015	93.2634	0.00663873	0.00004407
27/03/2015	92.9525	-0.00333914	0.00001115
30/03/2015	92.9437	-0.00009468	0.00000001
31/03/2015	92.4591	-0.00522755	0.00002733
	Mean	-0.00150279	0.00002252
	Standard Deviation	0.004612722	
	Annual Volatility σ	7.32224692	

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