

An Empirical study on the Impact of Exchange Rate on Indian Stock Market

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Abstract : The foreign Exchange Market and the stock market are two major pillars of any country's financial system. It is very necessary to understand the relationship between the two markets to decrease the risks involved due to volatility in any of the markets. The paper primarily focuses on determining how the foreign Exchange rates impact on the Indian stock market. The paper in this regard, uses four major currencies to map the Foreign Exchange Market, viz. US Dollar, Great Britain Pound, Euro and Japanese Yen. The impact of fluctuations in Exchange rate is tested on the BSE Sensex, and the NSE Nifty 50. The study uses Augmented Dickey Fuller test to determine the stationarity of the variables, followed by Granger Causality Test to determine the dependence of the variable. The findings of the study suggest that there is a relationship between dollar price movement and the Indian stock market. However, the same does not follow for other currencies.

Index Terms - Foreign Exchange Rates, Stock Market

I. INTRODUCTION

Ever since India has opened up its economy in 1991, it has continuously seen high investments from global players into Indian markets. Indian Stock Market has continuously seen rise in the overall investments from foreign players. The rise in investments from foreign players also suggests that factors impacting the investment decision of such foreign players can have a great impact on the Indian Stock Market. The Exchange rate happens to be one of such major factors that cannot be overlooked upon. Moreover, the exchange rates do have a significant impact on various decisions regarding exports, imports, investment, banking policies, economic institutions, etc. Thus, it can be said that exchange rates have significant implications on economy's business cycle, and various financial markets.

Few of the most prominent currencies include US Dollar, the Euro, Great Britain Pound, and Japanese Yen. The exchange rates of these currencies are recognized as standards, and thus it becomes important to understand implications of each of the currencies before reaching to any conclusions about dependence of stock market on exchange rates. The Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE) are the two biggest stock exchanges in India based on market capitalization. The index of these stock exchanges, i.e. BSE Sensex, and Nifty 50 are indicator of overall movement of Indian Stock market.

II. LITERATURE REVIEW

Suriani, Kumar, Jamil, and Muneer (2015) conducted a study on the impact of Exchange rate on Stock Market. The paper investigated the stock market and exchange rate relationship in Pakistan. KSE-100 index was used as an indicator of Stock Prices, while currency rate of Pak Rupee against US Dollar (Rs/US\$) was used as an indicator of exchange rate exposure. The data was on monthly basis. The duration of the study was from January 2004 to December 2009. The study used Augmented Dickey Fuller test to test if the returns on the variables are stationary or not. Further on Granger Causality test was applied to test the relationship between the two variables. The findings of the study indicated that there exists no relationship between exchange rate and stock price of Pakistan, and that both the variables are independent of each other. In order to conform the results of the study a regression test was also applied, which reflected a similar result. However, the scope of the study is very narrow as the study is based only on one indicator for each of the variables. The researchers are of the final proposition that the two variables are completely independent of each other and do not impact the movement of each other in real time.

Tudor and Popescu-Dutaa (2012) conducted a comprehensive study on the causal relationship between stock returns and exchange rates changes for 13 developed and emerging markets. The study included a total of 13 developed and emerging financial markets considering the market capitalization criterion. The study included a total of 7 developed markets, including Australia, United Kingdom, and United States, whereas the developing markets included numbered to a total of 6, including Brazil, China and India. The time span of the study was from January 1997 to March 2012. The study aimed at testing Granger Cause on the two variables in different markets. The results of the study suggested that the relationship between the two variables were very different for different markets. It suggested that the equity market and the evolution of the exchange rate in Korea were very interactive, as the results depicted two-way Granger cause on the variables under study in Korea. At the same time the results in Brazil and Russia suggested that though the two variables are interrelated, the exchange rate depicts an impact on stock market only after a span of one month. Similarly, the results of each of the study depicted a result that cannot be generalized for the two variables.

Kasman (2003) carried out a research titled “The relationship between Exchange Rate and Stock Prices: A Causality Analysis”. The study used high-frequency data of exchange rates and aggregate stock indices of Turkey. The aggregate stock indices include National 100, Financial Sector Index, Production Sector Index and Service Sector Index, whereas the Exchange rate is reflected in terms of US Dollar. Augmented Dickey Fuller test is run to check if the data is stationary. As the data was stationary, Johansen’s Cointegration test and Granger Causality test was performed to determine the relationship between the variables. The results of the study depicted that there was a two-way causality between the composite index and the exchange rate, whereas a unidirectional causality exists from the exchange rate to the industry sector index.

Patel and Kagalwala (2013) studied the impact of Exchange Rate on Indian Stock Exchanges like BSE and NSE. The paper studied the impact of changes in exchange rate on Indian Stock Exchanges. The Exchange rate was quantified by considering the exchange rate of Indian Rupees to US Dollar. The study used various statistical tools like correlation, regression and anova to measure the impact of exchange rates on Indian Stock Exchanges. The duration of the study was 8 years. The test results indicated that the two variables were independent and that there existed no relationship between exchange rate and the stock exchanges like nifty and Sensex.

Stavarek (2005) conducted a study on Stock Prices and Exchange rates in the EU and the USA to determine mutual interactions between the two variables. The study was conducted for 9 different countries, wherein the stock prices and exchange rates were tested for any relationship after running tests confirming the stationarity of the time series. The test results revealed very interesting facts, wherein no relationship seemed to have existed between the two variables before 1992. However, after 1992, i.e. from 1993-2003 (period of the study), the results revealed much stronger causality especially in the developed economies. The results suggested a cointegration between the two variables in 4 out of the 9 countries under the study. The study is a clear evidence of changing market trends and relationships amongst various variables over a course of period. Thus, the implications of the study in today’s scenario needs to be retested, and thus suggests a research gap.

III. RESEARCH METHODOLOGY

The research relies mainly on secondary data however; it still offers thorough and accurate answers to the research questions

3.1 Objective of the study:

- To study the impact of Exchange Rates on Indian Stock Market
- To determine the Foreign Exchange rates that must be taken into consideration while making investment decisions in Indian Stock Market

3.2 Hypothesis:

- H0: There is no significant impact of exchange rates on Indian Stock market.
- H1: There is a significant impact of exchange rates on Indian Stock market

3.3 Data collection methods:

The data used in this study is secondary data. The data has been sourced from various indices and exchanges. The study uses exchange rates of US Dollar (USD/INR), Euro (EUR/INR), British Pound (GBP/INR), and Japanese Yen (JPY/INR) to quantify the Exchange rates, on the other hand, the Stock market movements are quantified by closing prices of BSE Sensex and Nifty 50. The daily natural logarithmic returns of the variables are used to test the viability of the data.

3.4 Variables included:

Independent Variable: Exchange Rates represented by USD/INR, EUR/INR, GBP/INR, JPY/INR.

Dependent Variable: Stock Market represented by BSE Sensex and Nifty 50

3.5 Period of study:

Daily values are collected for the period of five years from 2013-2017.

3.6 Tools used for the study:

The study involves determining causality of exchange rate on Indian Stock Market, and therefore it becomes important to check the stationarity of the data, before determining further tests. To check the time series for stationarity (Natural Logarithmic Returns of each of the variables), Augmented Dickey Fuller (ADF) test is applied at level.

If the test results reveal the data to be non-stationary then co-integration test will be applied to check the causality between the variables. However, the ADF test results prove the series to be stationary, so Granger Causality Test is run to check the impact of exchange rates on stock market.

IV. DATA ANALYSIS

The test results of Augmented Dickey Fuller (ADF) test on the returns of the market indicators of Stock market and Exchange rate are as under.

Table 1: ADF test on daily returns of BSE Sensex

Null Hypothesis: SENSEX_R has a unit root Exogenous: Constant Lag Length: 0 (Automatic - based on SIC, maxlag=22)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-31.98881	0.0000
Test critical values:		
1% level	-3.435453	
5% level	-2.863681	
10% level	-2.567960	
*MacKinnon (1996) one-sided p-values.		

The test results reveal that the probability is 0.0000, which is less than 0.05. Hence, the null hypothesis must be rejected at significance level of 5%. So, it can be said that the time series (Daily returns on BSE Sensex) is Stationary.

Table 2: ADF test on daily returns of Nifty 50

Null Hypothesis: NIFTY_R has a unit root Exogenous: Constant Lag Length: 0 (Automatic - based on SIC, maxlag=22)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-31.76173	0.0000
Test critical values:		
1% level	-3.435453	
5% level	-2.863681	
10% level	-2.567960	
*MacKinnon (1996) one-sided p-values.		

The test results reveal that the probability is 0.0000, which is less than 0.05. Hence, the null hypothesis must be rejected at significance level of 5%. So, it can be said that the time series (Daily returns on Nifty 50) is Stationary.

Table 3: ADF test on daily returns of INR/USD exchange rate

Null Hypothesis: INRUSD_R has a unit root Exogenous: Constant Lag Length: 1 (Automatic - based on SIC, maxlag=22)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-28.34816	0.0000
Test critical values:		
1% level	-3.435458	
5% level	-2.863683	
10% level	-2.567961	
*MacKinnon (1996) one-sided p-values.		

The test results reveal that the probability is 0.0000, which is less than 0.05. Hence, the null hypothesis must be rejected at significance level of 5%. So, it can be said that the time series (Daily returns on INR/USD) is Stationary.

Table 4: ADF test on daily returns of INR/EUR exchange rate

Null Hypothesis: INREUR_R has a unit root Exogenous: Constant Lag Length: 0 (Automatic - based on SIC, maxlag=22)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-36.06425	0.0000
Test critical values:	1% level	-3.435453
	5% level	-2.863681
	10% level	-2.567960
*MacKinnon (1996) one-sided p-values.		

The test results reveal that the probability is 0.0000, which is less than 0.05. Hence, the null hypothesis must be rejected at significance level of 5%. So, it can be said that the time series (Daily returns on INR/EUR) is Stationary.

Table 5: ADF test on daily returns of INR/GBP exchange rate

Null Hypothesis: INRGBP_R has a unit root Exogenous: Constant Lag Length: 0 (Automatic - based on SIC, maxlag=22)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-34.64918	0.0000
Test critical values:	1% level	-3.435453
	5% level	-2.863681
	10% level	-2.567960
*MacKinnon (1996) one-sided p-values.		

The test results reveal that the probability is 0.0000, which is less than 0.05. Hence, the null hypothesis must be rejected at significance level of 5%. So, it can be said that the time series (Daily returns on INR/GBP) is Stationary.

Table 6: ADF test on daily returns of INR/JPY exchange rate

Null Hypothesis: INRJPY_R has a unit root Exogenous: Constant Lag Length: 0 (Automatic - based on SIC, maxlag=22)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-34.98656	0.0000
Test critical values:	1% level	-3.435453
	5% level	-2.863681
	10% level	-2.567960
*MacKinnon (1996) one-sided p-values.		

The test results reveal that the probability is 0.0000, which is less than 0.05. Hence, the null hypothesis must be rejected at significance level of 5%. So, it can be said that the time series (Daily returns on INR/JPY) is Stationary.

Since all the time series are stationary, Granger Causality Test is applied to test the causality of each of the exchange rate on BSE Sensex and Nifty 50.

Table 7: Granger Causality Test Results

Pairwise Granger Causality Tests			
Sample: 1/01/2013 12/29/2017			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
NIFTY_R does not Granger Cause INREUR_R	1229	5.91493	0.0028
INREUR_R does not Granger Cause NIFTY_R		2.69921	0.0677
SENSEX_R does not Granger Cause INREUR_R	1229	5.75468	0.0033
INREUR_R does not Granger Cause SENSEX_R		2.72321	0.0661
NIFTY_R does not Granger Cause INRGBP_R	1229	3.86577	0.0212
INRGBP_R does not Granger Cause NIFTY_R		0.48682	0.6147
SENSEX_R does not Granger Cause INRGBP_R	1229	3.26722	0.0384
INRGBP_R does not Granger Cause SENSEX_R		0.32908	0.7197
NIFTY_R does not Granger Cause INRJPY_R	1229	1.13984	0.3202
INRJPY_R does not Granger Cause NIFTY_R		2.15871	0.1159
SENSEX_R does not Granger Cause INRJPY_R	1229	0.97149	0.3788
INRJPY_R does not Granger Cause SENSEX_R		2.06088	0.1278
NIFTY_R does not Granger Cause INRUSD_R	1229	2.72468	0.0660
INRUSD_R does not Granger Cause NIFTY_R		8.07382	0.0003
SENSEX_R does not Granger Cause INRUSD_R	1229	2.25373	0.1054
INRUSD_R does not Granger Cause SENSEX_R		7.34887	0.0007

V. FINDINGS OF THE STUDY

The relationship between the exchange rate and the stock market movement helps interpret the market shocks and reduce the risk of investment decisions made by individuals and companies. The Granger Causality test results reveal that Exchange rate of the US Dollar against INR granger causes both BSE Sensex and Nifty 50. However, the impact of the exchange rates of the Euro, Great Britain Pound and Japanese Yen is not significant enough on either BSE Sensex or Nifty 50. Thus, US Dollar must be given due importance while making investment decisions in Indian Stock Market. Further on an investor should look into the Euro for any major happenings involving it. Though the test results didn't provide enough probability to reject the null hypothesis stating Euro Granger Causes BSE Sensex or Nifty 50, the result is considerate enough for an investor to pay attention for any major happenings affecting the Exchange rate of Euro.

VI. CONCLUSION

The results of the study clearly depict that the movement in the Exchange rate of US Dollar has a significant impact on the movement of Indian Stock Market. The Exchange rate movements of Japanese Yen and Great Britain Pound do not reveal a subsequent movement on Indian Stock Market and thus can be avoided while making investment decisions. However, an avid investor should not completely avoid the exchange rate movements of the Euro, as any major shocks on the exchange rate of Euro has a further impact on Indian Stock Market. Thus, it can be concluded that an investor should majorly keep a track of price movements of US Dollar on regular basis, followed by the Euro for any major shocks. Japanese Yen and Great Britain Pound can be ignored for making investment decisions in Indian stock market as they do not show major impact on the Indian Stock Market.

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