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IS THE MOVEMENT OF THE INR/USD EXCHANGE RATE AND THE INDIAN STOCK MARKET LINKED? FRESH EVIDENCE

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Abstract. Dollar exchange rate and Indian stock market are leading economic indicators. The present study investigates the relationship between the two economic indicators during the period April 2005 to December 2019. Analysis of Johansen cointegration test reveals that positive long-run cointegrating relationship exists between the variables. The vector error correction mechanism shows that INR/USD exchange rate influences the Indian stock prices negatively in the short-run. The study also observes the presence of bidirectional causality between the variables in the short-run. The variance decomposition analysis further reveals that the Indian stock market is driven to considerable extent by innovations in INR/USD exchange rate. The close relationship that the study found between INR/USD exchange rate and Indian stock market will be an important factor in the decision making of both individual and institutional investors. Furthermore, the study recommends the Indian government to adopt a cautious approach in implementing the foreign currency exchange rate policies

1. Introduction

The effect of foreign exchange rate on stock prices is extensively studied since both the variables are perceived as the leading economic indicators. The portfolio balance approach and the traditional approach provide the theoretical foundations of the linkage between foreign exchange rate and stock prices. Under the portfolio balance approach wealth is the major determinant of foreign exchange rate. Bahmani-Oskooee & Saha (2015) explains that rise in stock prices increases the wealth of people. Increased public wealth increases the demand for money; thereby increasing the interest rates (see Figure 1). Rising interest rates attract foreign capital and as a result the domestic currency appreciates. The theory postulates that stock prices cause the foreign exchange rate to change. On the other hand, the traditional approach is of the view that weak domestic currency increases the competitiveness of domestic firms in the global market. This increases their export earnings and thereby their equity price rises. Thus, the traditional approach hypothesizes that foreign exchange rates influence the stock prices.

Beside the above discussed approaches, review of literature reveals the existence of one additional approach known as the asset market approach. According to the approach there is a very weak or no relationship between foreign currency exchange rate and domestic stock prices. According to Suriani et al. (2015) the weak association between the variables is due to the fact that these variables are influenced by various other factors.

India is an emerging economy which witnessed economic liberalization and globalization since July 1991. Measures like automatic approval for international capital in high priority

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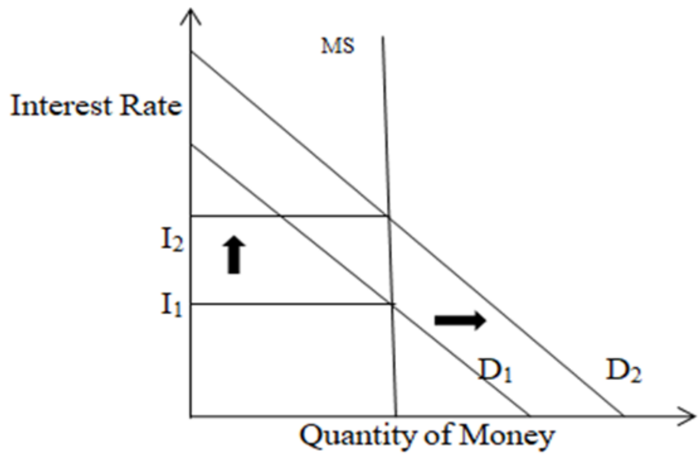

Figure 1. Interest Rate and Demand for Money

Note: MS represents the money supply, I2 represents the interest rate at demand D2 and I1 represents the interest rate at demand D1

industries, disinvestment of government shareholding, import liberalization and convertibility of Indian Rupee affected both Indian stock market and foreign currency exchange rates. All this significant development motivates us to investigate the relationship between INR/USD exchange rate and Indian stock prices post liberalization. Furthermore, on the basis of the aforementioned discussion we expect a positive relationship between INR/USD exchange rate and Indian stock prices under the traditional approach while a negative relationship is expected under the portfolio balance approach. No significant relationship is expected under the asset market approach.

The present study differs from previous study of Mishra (2004), Nath and Samanta (2003) and Bhattacharjee and Das (2020) in two ways: a) the present initiative uses longer time period to investigate the relationship and b) methods like impulse response function, variance decomposition and VEC granger causality approach to unravel a deeper understanding of the linkage between the variables under study.

The outline of the remaining article is as follows: "Literature Review" section highlights the findings of the articles associated with the present study. "Data and Methodology" section explains the variables and econometric tools employed. "Findings of the Study" section provides the empirical results and "Conclusion and Policy Implications" provides the concluding remarks.

Figure 1 Interest Rate and Demand for Money

2. Literature Review

The relationship between exchange rate and US stock prices under the floating exchange rate regime was investigated by Aggarwal 1981 and found a positive relationship between exchange rate and US stock prices. Granger et al. (2000) found positive linkage between exchange rates and stock prices for Japan and Thailand. Lean et al. (2005) applied cointegration test based on OLS (Ordinary Least Square) and granger causality test and revealed that after the 9/11 terrorist attack the stock markets in Japan, Philippines, Korea, Hong Kong, Malaysiaand Indonesia showed weak long-run relationship with foreign currency exchange rates. Erdem et al. (2005) employed EGARCH (Exponential Generalized Autoregressive Conditional Heteroscedasticity) model and found evidence of negative volatility spillover from exchange rate to stock market indices in Istanbul. Yau&Nieh (2009) used monthly observations and employed threshold cointegration test and TECM granger causality test to reveal that in the long-run the stock prices in Taiwan is positively affected by foreign currency exchange rate.

Alagidede et al. (2011) applied three variations of granger causality test and found unidirectional causality between stock prices and exchange rates for UK and Canada while the study documented bidirectional causality between the variables for Switzerland. Furthermore, Lee et al. (2011) observed price spill-over from stock market to foreign exchange market in Thailand, Indonesia, Korea, Malaysia and Taiwan. Liu &Tu (2011) concluded that overbuy and oversell rates of foreign capital affects both the Taiwanese stock market index and the foreign currency exchange rate.UsingJohansen cointegration test Eita (2012) investigated the influence of economic activity, exchange rate, money supply, inflation and interest rate on stock prices in Namibia. The author observed that stock prices are positively influenced by money supply and economic activity while interest rate and inflation negatively affect the Namibian stock market. It was further observed that economic activity, inflation, exchange rate and inflation move the Namibian stock market away from the equilibrium.Parsva& Tang (2017) studied the interaction between exchange rates and stock prices in four Middle-East economies by employing granger causality test developed by Toda & Yamamoto (1995) and Dolado&Lütkepohl (1996). The analysis revealed that exchange rate and stock prices have bidirectional causality in Saudi Arabia, Oman and Iran while they found no causality between the variables in Kuwait. Wickremasinghe (2012), Groenewold& Paterson (2011) and Khan et al. (2013) found no long-run relationship between exchange rates and stock prices for Srilanka, Australia and Pakistan respectively.

In Indian scenario there are few notable studies that examined the linkage between the exchange rate and stock market. For instance, Mishra (2004) examined the inter-linkage between Indian stock market and foreign exchange market from the period April 1992 to March 2002 and found that no short-run predictive causality exists between the variables. However, the variance decomposition provided evidence of the effect of exchange rate on Indian stock market. Nath and Samanta (2003) used data from March 1993 to December 2002 to test the causal link between Indian stock market and forex market. The findings suggested that there was no cointegration between the markets during the studied period. However, predictive causality was observed between stock market and forex market. Contrary to Nath and Sharma (2003) findings, Singh (2015) found a long-run equilibrium relationship between the Indian stock market and foreign exchange rate. In a recent study Bhattacharjee & Das (2020) studied the dynamic relationship between selected macroeconomic variables and Indian stock prices by using Johansen cointegration test, VECM (Vector Error Correction Model), granger causality test and variance decomposition. They observed that exchange rate negatively influence Indian stock prices both in the long-run and short-run. The granger causality test revealed that Indian stock prices and INR/USD exchange rate have bidirectional causality.

From the foregoing discussion, it is clearly apparent that the dynamic nexus between the exchange rates and stock prices is discernible. Nevertheless, it is noteworthy that there is a dearth of a comprehensive econometric model that can effectively unveil the true essence of the relationship that subsists between these variables. Furthermore, the examination of pertinent literature underscores that the association between exchange rates and stock prices is highly sensitive to the study period and the macroeconomic fundamentals that are prevalent within a country. Therefore, the present study endeavors to make a contribution to the empirical literature on this subject by leveraging advanced and contemporary econometric tools in tandem with the latest data. It is envisaged that the consequences of this study will provide valuable insights to both scholars and policymakers alike.

3. Data and Methodology

Data and its sources

The study uses monthly observations from April 2005 to December 2019 to study the interaction between foreign currency exchange rate and Indian stock market. To represent the foreign currency exchange rate we have considered INR/USD exchange rate while BSE SENSEX index and NIFTY 50 index is used as a proxy for Indian stock market. The data relating to

INR/USD exchange rate is obtained from Handbook of Statistics on Indian Economy published periodically by RBI (Reserve Bank of India) while the monthly observations of Indian stock market indices are sourced from yahoo finance.

Econometric Tools and Techniques

The present study employed time series econometrics to achieve the objective of the study. The selection of appropriate econometric tools largely depends on the stationarity status of the time series variables (see Figure 2). If the variables are stationary in level or individually integrated of order 0 then vector autoregressive (VAR) model or ordinary least square (OLS) regression is appropriate. In a situation where all the variables are individually integrated or order 1, the Johansen cointegration is applied to investigate the long-run relationship between the variables. If the variables are integrated of mixed order, that is some of the variables are I(1) while others are I(0) then autoregressive distributed lag (ARDL) model is required to be applied.

The variables, that is, BSE SENSEX index, NIFTY 50 index and INR/USD exchange rate are first transformed into natural log form and are coded as lnSENSEX, lnNIFTY and lnEXR respectively. The Augmented Dickey Fuller (ADF) test is employed to investigate the stationarity status of the variables and to determine the order of integration. It tests the null hypothesis that the time series has unit root and the p-value of more than 0.05 indicates the failure to reject the null hypothesis. The ADF test requires lag length which can be selected on the basis of Akaike information criterion (AIC), Schwarz information criterion (SC) or Hannan-Quinn information criterion (HQ). The ADF test can be executed employing the following equation:

$$\Delta Y_t = \alpha + \pi t + \delta Y_{t-1} + \sum_{i=1}^{m} \beta_i \Delta Y_{t-1} + \varepsilon_t$$

If all the variables are found to be integrated of the same order or I(1), the study can apply the Johansen cointegration test proposed by Johansen (1991) to check whether the variables are cointegrated. Furthermore, to perform the Johansen cointegration test optimal lag length is required and is determined on the basis of AIC, SC and HQ. The Johansen cointegration test is of two types, the trace test and the maximum eigenvalue test. The trace test tests the null hypothesis of r cointegrating vector versus the alternative hypothesis of n cointegrating vectors. The null hypothesis for the maximum eigenvalue test is the same as the null hypothesis for trace test while the alternative hypothesis is r + 1 cointegrating vectors.

Trace statistics and Maximum eigenvalue statistics test the number of cointegrating equation in the system and can be computed by the following equations:

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^{K} \ln(1-\lambda_i)$$

$$\lambda_{\max}(r, r+1) = -T \ln(1-\lambda_i)$$

The presence of at least one cointegrating vector suggests the presence of a long-run cointegrating relationship between the variables and we can eliminate the possibility of using the VAR model and proceed towards estimating the vector error correction model (VECM). The VECM helps us to explore the short-run relationship between the variables. Furthermore, the error correction term (ECT) of the VECM specification reveals the speed at which the short-run disequilibrium converges towards the long-run equilibrium path. According to Sahu&Pandey (2018), the direction of short-run causality can be investigated by using the Granger causality test proposed by Granger (1969) when the variables are not cointegrated. However, in case of cointegrated variables the Block Exogeneity Wald Test is the appropriate test to examine the direction of short-run causality. Finally, the study employs variance decomposition (VDC) analysis and impulse response function (IRF) to further analyze the dynamic relationship between Indian

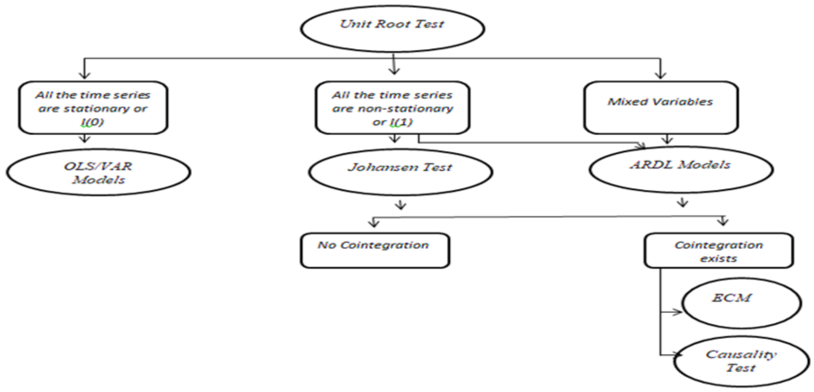

Figure 2. Selection of Appropriate Econometric Tool

Source: Shrestha and Bhatta 2018

stock market indices and INR/USD exchange rate. The variance decomposition indicates the amount of information each variable contributes to the other variables in the autoregression. It determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables.Impulse Response Functions are used to study the effects of shocks or impulses in a VAR or VECM system. It traces out one unit or one standard deviation shock to an endogenous variable and its effects on all the endogenous variables in a VAR or VECM, keeping all other variables and shocks constant.

4. Findings of the Study

Descriptive Statistics, Unit Root Test and Optimal Lag Selection

Table 1. Descriptive Statistics

	BSE SENSEX	NIFTY 50	INR/USD EXCHANGE RATE
Mean	21645.65	6527.362	55.07514
Median	19363.19	5762.750	54.40000
Maximum	41253.74	12168.45	73.70000
Minimum	6154.440	1902.500	39.40000
Std. Dev.	8802.130	2683.121	10.31704
Skewness	0.447415	0.426152	0.118251
Kurtosis	2.290796	2.167926	1.488570
Jarque-Bera	9.614740	10.46342	17.26012
p-value	0.008169	0.005344	0.000179
Coefficient of Variation % (COV)	40.664	41.105	18.733

Jarque-Bera-H0: The variables are normally distributed.

The summary statistics reported in Table 1 reveals that Nifty 50 (COV = 41.105%) is more volatile as compared to BSE SENSEX (COV = 40.664%). Furthermore, the large difference between the maximum and minimum values is an indication of the high volatility of the Indian stock market during the study period. The value of skewness indicates that all the variables are positively skewed while scanning the kurtosis values reveals that the variables follow platykurtic distribution (since the values are less than 3). Finally, the Jarque-Bera test concludes that none of the time series variables are normally distributed.

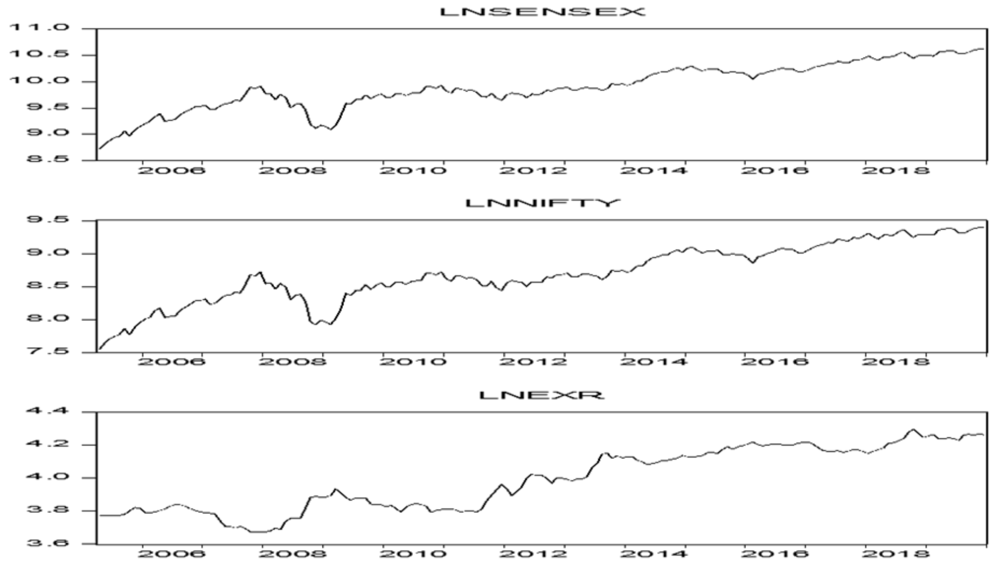

Figure 3. Time Series of the Variables at level (in Logarithm)

Table 2. Augmented Dickey Fuller Test

	lnSENSEX	lnNIFTY	lnEXR
Augmented Dickey-Fuller test statistic			
I(0)	-3.424 (0.4276)	-3.578 (0.3430)	-3.479 (0.3983)
Break Date	February 2009	September 2013	July 2011
I(1)	-13.492 (<0.01)	-14.244 (<0.01)	-9.861 (<0.01)
Break Date	October 2008	October 2008	February 2012
Test Critical Values			
1% level	-4.949	-4.949	-4.949
5% level	-4.443	-4.443	-4.443
10% level	-4.193	-4.193	-4.193

Note: Test equations include trend and lag length is selected on the basis of AIC, break type: Innovational outlier, ln represents the natural log operator, H0: Series has a unit root.

The perusal of Figure 3 indicates that the variables may have unit root property and hence unit root test is required to be applied. The results of the ADF test with structural break are reported in Table 2. From Table 2 we can clearly observe that the test statistic of lnSENSEX, lnNIFTY and lnEXR at level, that is I(0), is less negative than the critical values at 1% level, 5% level and 10% level. Therefore, we can conclude that all the time series have unit roots and are non-stationary at level. When we perform the ADF test at first-difference, that is I(1), we obtain ADF test statistics which are more negative than the test critical values at 1% level. Thus, it can be said that all the variables are integrated of the same order, that is I(1). The structural breakpoint for lnSENSEX at I(0) and I(1) coincides with the fall in export due to weak global markets and the economic slowdown triggered by the 2008 subprime crisis respectively. The structural breakpoint for lnNIFTY at I(0) and I(1) coincides with the announcement of Mr.NarendraModi's name as the prime ministerial candidate of BharatiyaJanata Party (BJP) for the 2014 LokSabha election and the economic slowdown triggered by the 2008 subprime crisis respectively. The structural breakpoint for lnEXR at I(0) and I(1) coincides with the depreciation of Asian currency (including India) against USD and subsequent massive inflow of foreign direct investment (FDI) in India.

After determining their order of integration we proceed to determine the optimal lag length for the VAR model. Table 3 reports the lag selection criteria for both SENSEX-EXR model and NIFTY-EXR model. In both the model AIC suggests an optimal lag length of 7 months while SC and HQ suggests an optimal lag length of 2 months. For further analysis we will consider a lag length of 2 months. It should be noted that selecting a higher lag order can lead to over parameterization.

Table 3. Lag Selection

	SENSEX-EXR Model			NIFTY-EXR Model		
Lag	AIC	SC	HQ	AIC	SC	HQ
0	-0.650300	-0.613260	-0.635269	-0.652053	-0.615013	-0.637022
1	-8.032215	-7.921095	-7.987120	-7.996989	-7.885868	-7.951894
2	-8.141612	-7.956411*	-8.066454*	-8.120586	-7.935385*	-8.045428*
3	-8.122849	-7.863567	-8.017627	-8.100837	-7.841555	-7.995615
4	-8.103171	-7.769809	-7.967887	-8.071485	-7.738123	-7.936201
5	-8.121331	-7.713889	-7.955983	-8.091179	-7.683737	-7.925831
6	-8.197570	-7.716047	-8.002159	-8.165794	-7.684271	-7.970383
7	-8.224562*	-7.668959	-7.999088	-8.187553*	-7.631950	-7.962079
8	-8.192339	-7.562655	-7.936801	-8.156488	-7.526805	-7.900951

* indicates lag order selected by the criterion

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Johansen Cointegration Test, VECM and Block Exogeneity Wald Tests

Table 4. Johansen Cointegration Test (Trace Statistic)

	H0	H1	Eigenvalue	Trace Statistic	5% Critical value	p-value
lnSENSEX-lnEXR Model						
	r = 0	r = 1	0.090516	16.73213	15.49471	0.0324
	$r \leq 1$	r = 2	0.001283	0.223437	3.841466	0.6364
lnNIFTY-lnEXR Model						
	r = 0	r = 1	0.088527	16.35093	15.49471	0.0371
	$r \leq 1$	r = 2	0.001277	0.222360	3.841466	0.6372

Table 5. Johansen Cointegration Test (Max-Eigen Statistic)

	H0	H1	Eigenvalue	Max-Eigen Statistic	5% Critical value	p-value
lnSENSEX-lnEXR Model						
	r = 0	r = 1	0.090516	16.50870	14.26460	0.0217
	$r \leq 1$	r = 2	0.001283	0.223437	3.841466	0.6364
lnNIFTY-lnEXR Model						
	r = 0	r = 1	0.088527	16.12857	14.26460	0.0251
	$r \leq 1$	r = 2	0.001277	0.222360	3.841466	0.6372

Table 6. VECM

LnSENSEX-lnEXR Model Δ(lnSENSEXt)			LnNIFTY-lnEXR Model Δ(lnNIFTYt)		
Regressors	Coefficient and t-statistic	p-value	Regressors	Coefficient and t-statistic	p-value
ECT	-0.0787* (-4.0547)	0.0001	ECT	-0.0799* (-4.0186)	0.0001
Δ(lnSENSEXt-1)	-0.0032 (-0.0402)	0.9679	Δ(lnNIFTYt-1)	-0.0522 (-0.6402)	0.5225
Δ(lnSENSEXt-2)	-0.0650 (-0.7899)	0.4301	Δ(lnNIFTYt-2)	-0.0881 (-1.0606)	0.2896
Δ(lnEXRt-1)	-0.6833** (-2.4109)	0.0164	Δ(lnEXRt-1)	-0.7885* (-2.7054)	0.0072
Δ(lnEXRt-2)	-0.0122 (-0.0440)	0.9648	Δ(lnEXRt-2)	-0.0040 (-0.0142)	0.9886
C	0.0127** (2.5786)	0.0103	C	0.0134* (2.6773)	0.0078

Δ represents the first difference of the variable
*significant at 1% level, **significant at 5% level and ***significant at 10% level
t-statistic in brackets

Table 7. Block Exogeneity Wald Tests (Short-run causality)

Model	Dependent Variable	Independent Variable	Chi-sq	p-value	Result
lnSENSEX-lnEXR	Δ(lnSENSEX)	Δ(lnEXR)	5.9357	0.0514	Causality Exist
	Δ(lnEXR)	Δ(lnSENSEX)	9.7932	0.0075	Causality Exist
LnNIFTY-lnEXR	Δ(lnNIFTY)	Δ(lnEXR)	7.4229	0.0244	Causality Exist
	Δ(lnEXR)	Δ(lnNIFTY)	10.4696	0.0053	Causality Exist

The Johansen cointegration test involves the estimation of Trace statistic and Max-Eigen statistic and the results are summarized in Table 4 and Table 5. From the tables we can observe that both trace statistic and max-eigen statistic indicates the presence of at least one cointegrating vector between the Indian stock market and INR/USD exchange rate which indicates the presence of long-run cointegrating relationship between the variables. We normalized the cointegrating vectors, obtained from the lnSENSEX-lnEXR model and lnNIFTY-lnEXR model, with respect to the coefficients of lnSENSEX and lnNIFTY and report the following long-run cointegrating relationships:

$$lnSENSEX = 2.135 + 1.945 lnEXR_{(\text{t-statistic}=6.381)},$$
$$lnNIFTY = 0.796 + 1.980 lnEXR_{(\text{t-statistic}=6.453)}.$$

The equations suggest that exchange rate (lnEXR) and Indian stock market (lnSENSEX and lnNIFTY) are positively related. In other words, the aforementioned long-run cointegrating relationships suggest that the Indian stock market indices and INR/USD exchange rate move together in the same direction. The result obtained from the Johansen cointegration test is consistent with the findings of Granger et al. (2000) and Yau&Nieh (2009).

Since we found the variables to be cointegrated, we performed VECM (reported in Table 6) to determine the short-run coefficients. In both lnSENSEX-lnEXR Model and lnNIFTY-lnEXR model, only Δ(lnEXRt-1) is found to have a significant negative relationship with Δ(lnSENSEXt) and Δ(lnNIFTYt). The error correction term in both the models is negative and statistically significant at 1% level and suggests that about 8% of the short-run disequilibrium is adjusted each month. Table 6 reports the output of block exogeneity Wald Tests. The results show that bidirectional causality exists between lnSENSEX and lnEXR and lnNIFTY and lnEXR.

Table 8. Variance Decomposition of lnSENSEX and lnEXR

	Period	S.E.	lnSENSEX (%)	lnEXR (%)
VDC of lnSENSEX				
	1	0.059469	100.0000	0.000000
	6	0.120504	98.86117	1.138828
	12	0.137002	94.51754	5.482460
	24	0.161332	71.19641	28.80359
	36	0.189661	51.58517	48.41483
	48	0.217128	39.61517	60.38483
VDC of lnEXR				
	1	0.017753	17.16215	82.83785
	6	0.053469	17.20255	82.79745
	12	0.071305	13.38326	86.61674
	24	0.093167	9.569483	90.43052
	36	0.109121	7.596853	92.40315
	48	0.122630	6.397802	93.60220

Table 9. Variance Decomposition of lnNIFTY and lnEXR

	Period	S.E.	lnNIFTY (%)	lnEXR (%)
VDC of lnNIFTY				
	1	0.060518	100.0000	0.000000
	6	0.118352	98.45646	1.543537
	12	0.134096	94.69652	5.303483
	24	0.157096	72.37670	27.62330
	36	0.183810	52.90775	47.09225
	48	0.209759	40.76139	59.23861
VDC of lnEXR				
	1	0.017705	18.13662	81.86338
	6	0.053055	17.93277	82.06723
	12	0.070105	13.91110	86.08890
	24	0.090412	9.826635	90.17336
	36	0.105074	7.700364	92.29964
	48	0.117499	6.395230	93.60477

Table 8 and Table 9 report the output of VDC. In Table 7 it can be observed that a substantial proportion of the lnSENSEX and lnNIFTY forecast error variance can be explained by the innovations in lnEXR. About 29% to 60% of the lnSENSEX forecast error variance can be explained by lnEXR after 24 to 48 months while 27.62% to 59.23% of the lnNIFTY forecast error variance can be explained by lnEXR after 24 to 48 months.

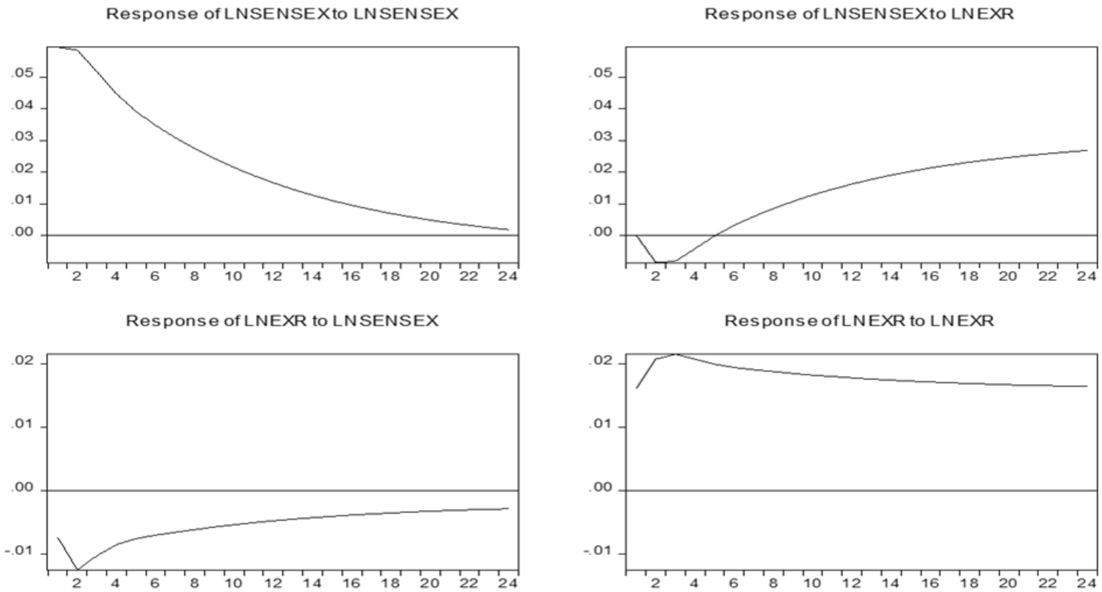

Figure 4. Impulse Responses of lnSENSEX and lnEXR

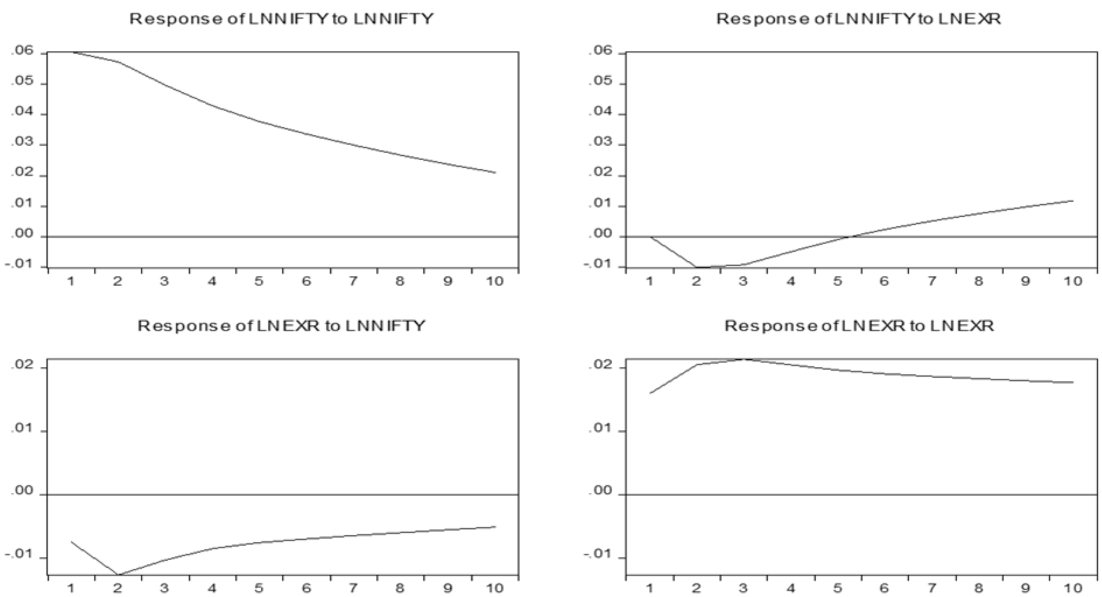

Figure 5. Impulse Responses of lnNIFTY and lnEXR

The impulse responses of the Indian stock market indices and INR/USD exchange rate is reported in Figure 4 and Figure 5. We documented that both lnSENSEX and lnNIFTY reacts positively to innovations in lnEXR which is in line with the long-run cointegrating relationship obtained from the Johansen cointegration test. We also observed positive response of lnEXR to innovations in lnSENSEX and lnNIFTY which suggests that bidirectional causality exists between lnSENSEX and lnEXR and lnNIFTY and lnEXR.

5. Conclusion and Policy Implications

The present article investigates the dynamic relationship between the Indian stock market and INR/USD exchange rate covering the period from April 2005 to December 2019. To achieve the primary objective of the study, we employed various econometric tools namely, ADF test, Johansen cointegration test, VECM, block exogeneitywald test, variance decomposition and impulse response function. The results of the ADF test revealed that all the variables are integrated of order 1 or I(1). The Johansen cointegration test revealed that the Indian stock market indices (lnSENSEX and lnNIFTY) are individually cointegrated with INR/USD exchange rate. This finding contradicts the finding of Nath & Samanta (2003) but in line with the finding of Singh (2015). The long-run cointegrating relationship between the Indian stock market indices and INR/USD exchange rate is found to be positive which supports the traditional approach advocated by Dornbusch& Fischer (1980). The long-run relationship suggests that increasing INR/USD exchange rate (depreciation of INR against USD) increases the competitiveness of the Indian firms in the global market. This increases the exports of the Indian firms which is good news for the firms' profitability and their equity prices.

The output of VECM revealed that the exchange rate is negatively related to Indian stock market indices in the short-run. The block exogeneity Wald test shows that there is bidirectional causality between Indian stock market indices and INR/USD exchange rate in the short-run. The analysis of VDC revealed that INR/USD exchange rate explains significant proportions of the forecast error variance of Indian stock market indices. Furthermore, the impulse responses of Indian stock market indices react positively to the innovations in INR/USD exchange rate.

The long-run and the short-run relationships between Indian stock market indices and the INR/USD exchange rate that the study documented will help the policy-makers to stimulate the Indian stock market by adjusting the INR/USD exchange rate. The close relation that the study found between the INR/USD exchange rate and Indian stock market will also be an important factor in the decision making of both individual and institutional investors. Furthermore, based on the findings of the present study we can safely conclude that the policy-makers will be able to predict any currency crisis by closely observing the Indian stock market performance. Finally, the study recommends the Indian government to adopt a cautious approach in implementing the foreign currency exchange rate policies. The study has few limitations. First, the period of the study is limited and could have been extended. Second, the present study investigated the effect of INR/USD exchange rate only on sensitivity indices. Future endeavours should focus on investigating the impact of INR/USD exchange rate on different sectoral indices, overall Indian stock market capitalization and stock market turnover to get a holistic idea of how the exchange rate affects the performance of the Indian stock market.

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