# Impact of Foreign Exchange Rates Market on Spot and Futures Markets: An Empirical Study on Indian Nifty Bank NSE Index

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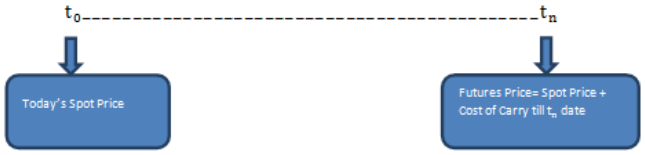
***Abstract-*** *Foreign Exchange rates affects to most of the variables of the economy. In this article an attempt has been made to examine the linkages and impact of the foreign exchange rates on Spot and Futures prices of Nifty Bank NSE Index. The analysis has been carried out with the econometrics techniques such as ADF Test, Co-integration Approach, Variance Decomposition, Granger Causality Test and Ordinary Least Square Regression Model (OLS). The Nifty Bank Index Spot and Futures prices and the foreign exchange rates (USD/INR, EURO/INR, YEN/INR and GBP/INR) have been taken as a sample of the study for a period ranging from June 2005 to January 2018. The results has showed that there is an absence of co-integration between Spot, Futures and Foreign exchange rates markets in most of the instances. The result also showed that there is an impact of Foreign exchange rates with an exception of EURO/INR rates on Spot and Futures Markets of Nifty Bank NSE Index. The outcome of this article will be the significant contribution to the Policy Makers, Spot market and Futures market traders and other investors.*

***Keywords***- Foreign exchange rates market, Spot market, Futures markets, co-integration, OLS

## I. INTRODUCTION

The fruits of the reforms in financial markets of India since 1991 are continued to upsurge towards its peak level. The unstoppable growth in the Stock and other segments of the financial market is the opportunity signal to march towards the progress of country's economy. But this Stock market are also the most sensitive or volatile segment among many other segments of the financial markets. The various financial and economic factors are the main drivers of the volatility in the Stock market. The foreign exchange rates are one of such driver which is responsible to create fluctuation in the cash flows of Stock market.

Along with the Stock Spot prices, the Futures prices of that Stock are also tend to fluctuate due to variability in the foreign exchange rates. The Spot prices of the index are the market forces expressed prices and the Futures prices are the sum of Spot prices plus cost of carrying from $t_0$ date till $t_n$ date.




Where, $t_0$ is the today's price or Current Market Spot price,

$t_n$ is the Futures price which includes today's Spot Prices plus cost of carrying till future date.

This study will examine the effect of foreign exchange rate on the Spot and Futures prices of Nifty Bank NSE Index. This Index Spot and Futures cash flows are more sensitive to Exchange rates like all other Indices of NSE.

The study runs into five sections including introduction, the Objectives and Hypothesis of the study, Methodology and Data collection, Empirical Analysis and last section gives the concluding mark of the study.

## II. REVIEW OF LITERATURE

**(Gulati & Kakhani, 2012),** analysed the Indian Stock market and Foreign exchange market to examine the relationship by taking a Indian BSE SENSEX and NSE NIFTYFIFTY Indices and INR/$ exchange rate. They employed the Granger Causality and Correlation test for a data span of 2004 to 2012. The analysis has shown an absence of relationship between the two selected markets.

**(K. & M., 2012),**by using a Co-integration and Granger Causality test to analyse the relationship between CNX Nifty NSE Index and Exchange rate INR/$ for the sample period April 2001 to March 2011 and reported the existence of bi-directional relationship between the variables.

**(Kumarasamy & P., 2015),** examined the relationship between Indian Stock Market (CNX Nifty) and exchange rate (INR/$). In the selected study period, the existence of correlation between the Nifty returns and exchange rate (INR/$) has been concluded.

**(Koy & Ersan, 2016),**assessed the effect of Exchange rates on Spot and Futures equity index market with reference to Borsa Istanbul Stock market. The analysis has been done with econometrics tools such as VAR Model, Impulse-response functions, Variance Decomposition and Granger Causality test for a data period of Index from January 2011 to December 2014. From the study it has found that an equity market drives the foreign exchange rate market in Turkey.

**(Polisetty, Kumar, & Kurian, 2016),** assessed the influence of exchange rate on BSE SENSEX and NSE Nifty Index. The absence of cause and effect relationship between the selected variables has been noted down in the study.

**(P. Sri Ram, 2017),** an empirical study has been made on the interdependency of index Futures market and exchange rate market. The analysis of CNX Nifty NSE Index has been carried out for a period starting from January 1, 2015 to December 31, 2013. The existence of bi-directional relationship between the foreign exchange market and Stock Cash and Futures market has been reported in the study.

## III. OBJECTIVES AND METHODOLOGY

### OBJECTIVES

The purpose of this study is to give an evidence of whether there exists the relationship and impact of Foreign exchange rates market on Spot and Futures markets of Nifty Bank NSE Index. The causality relationship between these variables will also be examined in this study.

### HYPOTHESIS

The null hypotheses of the study are:

$H_0$: Sample data are non-stationary.

$H_0$: Absence of Co-integration between the selected variables.

$H_0$: There is no Causality relationship between the selected variables.

$H_0$: There is no influence of Foreign exchange rates market on Spot and Futures Market.

The relationship and impact of Foreign exchange rates on Spot and Futures markets has been analysed for a data period starting from June 2005 to January 2018. The daily Spot, Futures (1-Month, 2-Month and 3-Month Futures Contracts) of Nifty Bank Index, and Foreign Exchange rates (USD/INR, EURO/INR, YEN/INR and GBP/INR) has been used as a sample in the study. For the purpose of analysis a log series data has been calculated with;

Returns= Ln ($P_t/P_{t-1}$)

Ln is a natural logarithm series.

$P_t$, is the today's price of Spot, Futures and Foreign exchange rates.

$P_{t-1}$ is the Yesterday's price of Spot, Futures and Foreign exchange rates.

The analysis has been started with Descriptive Statistics to find the Characteristics of the data. To identify the Stationarity property of the data the Stationarity test i.e. under Unit root test ADF test has been used. Having a noted down Stationarity and integrity property, the Co-integration approach has been employed to examine the long run association between the selected markets. To examine the explanatory power of variation of one variable in another variable for a forecasted period Variance Decomposition has been derived from VAR and VECM model. The study had employed Granger Causality test to assess the causality relationship between Spot, Futures and Foreign Exchange markets. To examine the influence of one variable i.e. Foreign exchange rates on Spot and Futures markets of Index the Ordinary Least Square regression Model has been used.

## IV. EMPIRICAL ANALYSIS

Table 1 Descriptive Statistics and Normality Test of the Spot, Futures and Foreign Exchange rates

| | Spot | 1-Month Futures | 2-Month Futures | 3-Month Futures | USD | EURO | GBP | YEN |
|---|---|---|---|---|---|---|---|---|
| Mean | 0.064477 | 0.064707 | 0.032505 | 0.021756 | 0.011989 | 0.012929 | 0.004518 | 0.011926 |
| Standard Deviation | 1.897172 | 1.943923 | 2.469334 | 2.647065 | 0.487009 | 0.645605 | 0.664091 | 0.862549 |
| Skewness | 0.067608 | 0.027745 | -0.194571 | -0.758327 | 0.231553 | 0.017470 | -0.742294 | 0.229227 |
| Kurtosis | 8.263167 | 8.403101 | 23.69562 | 49.26329 | 8.437275 | 6.322354 | 11.22738 | 6.659979 |
| Jarque-Bera | 3617.357 | 3810.153 | 111221.1 | 829093 | 3886.084 | 1440.623 | 9121.148 | 1775.534 |
| Probability | 0.0000** | 0.0000** | 0.0000** | 0.0000** | 0.0000** | 0.0000** | 0.0000** | 0.0000** |
| Observations | 3132 | 3132 | 6230 | 9287 | 3132 | 3132 | 3132 | 3132 |

Note: ** indicate rejected hypotheses at 0.05 level.

The **Table 1** highlighted the summary statistics of Spot market, Futures markets (1-Month, 2-Month and 3-

Month Futures Contracts) and Foreign Exchange rates markets. The average daily returns of the Spot market of Nifty Bank Index have reported 0.065%. In terms of Futures Market of Nifty Bank Index out of Three Futures Contracts, the Near or 1-Month Futures Contracts have depicted higher mean returns. Similarly in the Foreign Exchange rates markets the highest mean value noticed in EURO/INR (0.012929%).

The standard deviation is the indicator of fluctuation in the Market returns or prices. Amongst the Spot and Futures market, the highest volatility displayed in the 3- month Futures market and in the case of Foreign exchange rates market, the highest volatility reported by YEN/INR. The degrees of symmetry in all three markets are seen to be moderate as the Skewness values falls within a range of +/- 1. The kurtosis shows the conducts of the data. The value of the kurtosis of Spot, Futures and Foreign exchange rates markets lies above three which means that the behaviour of the data follows Leptokurtic curve. Jarque-Bera test has depicted very high values in all three contracts with a significant p-value 0.000000 which states that data are asymmetric and not normally distributed.

Table 2 Stationarity Test (ADF) for Spot and Futures Markets

| Variables | ADF (level)- I(0) | | | ADF (1st Difference)- I(I) | | |
|---|---|---|---|---|---|---|
| | | t-statistics | Prob. | | t-statistics | Prob. |
| Spot | ADF t-stat | 0.561918 | 0.9887 | AFD t-stat | -50.42985 | 0.0001** |
| | Test Critical Values @5% | -2.862265 | | Test Critical Values @5% | -2.862265 | |
| 1-Month Futures | ADF t-stat | 0.554333 | 0.9885 | ADF t-stat | -51.56917 | 0.0001** |
| | Test Critical Values @5% | -2.862265 | | Test Critical Values @5% | -2.862265 | |
| 2-Month Futures | ADF t-stat | 1.276616 | 0.9986 | ADF t-stat | -24.17221 | 0.0000** |
| | Test Critical Values @5% | -2.861811 | | Test Critical Values @5% | -2.861811 | |
| 3-Month Futures | ADF t-stat | 1.489793 | 0.9993 | ADF t-stat | -29.49227 | 0.0000** |
| | Test Critical Values @5% | -2.861659 | | Test Critical Values @5% | -2.861659 | |

Note: ** indicate rejected hypotheses at 0.05 level.

Table 3 Stationarity Test (ADF) for Foreign Exchange rates Markets

| Variables | ADF (level)- I(0) | | | ADF (1st Difference)- I(I) | | |
|---|---|---|---|---|---|---|
| | | t-statistics | Prob. | | t-statistics | Prob. |
| USD | AFD t-stat | -0.710040 | 0.8424 | AFD t-stat | -41.59232 | 0.0000** |
| | Test Critical Values @5% | -2.862264 | | Test Critical Values @5% | -2.862265 | |
| EURO | ADF t-stat | -1.654799 | 0.4543 | ADF t-stat | -55.02828 | 0.0001** |
| | Test Critical Values @5% | -2.862264 | | Test Critical Values @5% | -2.862265 | |
| GBP | ADF t-stat | -1.642275 | 0.4607 | ADF t-stat | -53.92658 | 0.0001** |
| | Test Critical Values @5% | -2.862264 | | Test Critical Values @5% | -2.862265 | |
| YEN | ADF t-stat | -1.519981 | 0.5235 | ADF t-stat | -57.14970 | 0.0001** |
| | Test Critical Values @5% | -2.862264 | | Test Critical Values @5% | -2.862265 | |

Note: ** indicate rejected hypotheses at 0.05 level.

The above **Table 2 and 3** disclosed the Stationarity result of the Spot, Futures and Foreign exchange rates market. The employed ADF test has clearly given the result of non-Stationarity at level and data Stationarity at first difference for all three markets. Thus the data series are co-integrated at order I (I) at level and have no unit rootor Stationarityat first differences.

Table 4 Cointegration Test for Spot, Futures and Foreign Exchange Rates Markets

**Table 4 (a) Cointegration result of Spot and Foreign Exchange Rates**

| Unrestricted Cointegration Rank Test (Trace) | | | | |
|---|---|---|---|---|
| **No. of CE(s)** | **Eigenvalue** | **Trace Statistic** | **0.05 Critical Value** | **Prob.**** |
| None | 0.002891 | 24.27498 | 69.81889 | 1.0000 |
| At most 1 | 0.002308 | 15.21781 | 47.85613 | 0.9998 |
| At most 2 | 0.001780 | 7.990776 | 29.79707 | 0.9970 |
| At most 3 | 0.000750 | 2.418583 | 15.49471 | 0.9871 |
| At most 4 | 2.33E-05 | 0.072899 | 3.841466 | 0.7871 |
| Trace test indicates no Cointegration at the 0.05 level | | | | |
| * denotes rejection of the hypothesis at the 0.05 level | | | | |

**Table 4 (b) Cointegration result of 1-Month Futures and Foreign Exchange Rates**

| Unrestricted Cointegration Rank Test (Trace) | | | | |
|---|---|---|---|---|
| **No. of CE(s)** | **Eigenvalue** | **Trace Statistic** | **0.05 Critical Value** | **Prob.**** |
| None | 0.002910 | 24.34380 | 69.81889 | 1.0000 |
| At most 1 | 0.002294 | 15.22728 | 47.85613 | 0.9998 |
| At most 2 | 0.001800 | 8.042697 | 29.79707 | 0.9968 |
| At most 3 | 0.000750 | 2.406379 | 15.49471 | 0.9874 |
| At most 4 | 1.87E-05 | 0.058443 | 3.841466 | 0.8090 |
| Trace test indicates no Cointegration at the 0.05 level | | | | |
| * denotes rejection of the hypothesis at the 0.05 level | | | | |

**Table 4 (c) Cointegration results of 2-Month Futures and Foreign Exchange Rates**

| Unrestricted Cointegration Rank Test (Trace) | | | | |
|---|---|---|---|---|
| **No. of CE(s)** | **Eigenvalue** | **Trace Statistic** | **0.05 Critical Value** | **Prob.**** |
| None | 0.002564 | 46.21001 | 69.81889 | 0.7900 |
| At most 1 | 0.002237 | 30.22885 | 47.85613 | 0.7073 |
| At most 2 | 0.001948 | 16.28389 | 29.79707 | 0.6922 |
| At most 3 | 0.000663 | 4.145476 | 15.49471 | 0.8914 |
| At most 4 | 2.39E-06 | 0.014870 | 3.841466 | 0.9028 |
| Trace test indicates no Cointegration at the 0.05 level | | | | |
| * denotes rejection of the hypothesis at the 0.05 level | | | | |

**Table 4 (d) Cointegration results of 3-Month Futures and Foreign Exchange Rates**

| Unrestricted Cointegration Rank Test (Trace) | | | | |
|---|---|---|---|---|
| **No. of CE(s)** | **Eigenvalue** | **Trace Statistic** | **0.05 Critical Value** | **Prob.**** |
| None * | 0.003245 | 84.72467 | 69.81889 | 0.0021** |
| At most 1 * | 0.002877 | 54.55009 | 47.85613 | 0.0103** |
| At most 2 | 0.002265 | 27.80222 | 29.79707 | 0.0835 |
| At most 3 | 0.000718 | 6.755118 | 15.49471 | 0.6063 |
| At most 4 | 9.50E-06 | 0.088169 | 3.841466 | 0.7665 |
| Trace test indicates 2 Cointegrating equations at the 0.05 level | | | | |
| * denotes rejection of the hypothesis at the 0.05 level | | | | |

Note: ** indicates rejection of hypotheses at 5% level

The Johansen's co-integration test supported further to examine the existence of long-run co-integration between the variables. The **Table 4** has reported under the Trace Test, theco-integration results of Spot and Foreign exchange market and Futures and Foreign exchange markets. The result has shown an absence of co-integration or long run relationship between Spot and Foreign exchange rates markets which has supported by rejecting null hypotheses at 0.05 level. Further the 1- Month and 2-Month Futures markets and Foreign

exchange markets are not co-integrated are also reported by Trace co-integration test.Thus from the above table only 3-Month Futures markets are having a long run relationship with Foreign exchange market(obtained, 2 co-integrating equation at the 0.05 level).

Table 5 Variance Decomposition for Spot, Futures and Foreign Exchange Rates Markets

**Table 5 (a) Variance Decomposition of Spot and Foreign Exchange rates**

| Period | S.E. | LN_1_M_S | LN_EURO | LN_GBP | LN_USD | LN_YEN |
|---|---|---|---|---|---|---|
| 1 | 1.882107 | 100.0000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 2 | 1.897380 | 99.95636 | 0.000156 | 0.015920 | 0.022354 | 0.005212 |
| 3 | 1.900632 | 99.64473 | 0.081723 | 0.044096 | 0.221693 | 0.007759 |
| 4 | 1.900692 | 99.64218 | 0.083033 | 0.044897 | 0.222124 | 0.007769 |
| 5 | 1.900696 | 99.64187 | 0.083035 | 0.044901 | 0.222284 | 0.007914 |
| 6 | 1.900696 | 99.64186 | 0.083041 | 0.044903 | 0.222284 | 0.007914 |
| 7 | 1.900696 | 99.64186 | 0.083041 | 0.044903 | 0.222285 | 0.007914 |
| 8 | 1.900696 | 99.64186 | 0.083041 | 0.044903 | 0.222285 | 0.007914 |
| 9 | 1.900696 | 99.64186 | 0.083041 | 0.044903 | 0.222285 | 0.007914 |
| 10 | 1.900696 | 99.64186 | 0.083041 | 0.044903 | 0.222285 | 0.007914 |

**Table 5 (b) Variance Decomposition of 1-Month Futures and Foreign Exchange rates**

| Period | S.E. | LN_1_M_F | LN_EURO | LN_GBP | LN_USD | LN_YEN |
|---|---|---|---|---|---|---|
| 1 | 1.933562 | 100.0000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 2 | 1.944505 | 99.89148 | 0.000570 | 0.023858 | 0.063410 | 0.020684 |
| 3 | 1.947515 | 99.59485 | 0.082230 | 0.069731 | 0.230112 | 0.023081 |
| 4 | 1.947550 | 99.59265 | 0.083484 | 0.070628 | 0.230147 | 0.023091 |
| 5 | 1.947552 | 99.59246 | 0.083485 | 0.070642 | 0.230174 | 0.023241 |
| 6 | 1.947552 | 99.59245 | 0.083490 | 0.070645 | 0.230174 | 0.023241 |
| 7 | 1.947552 | 99.59245 | 0.083490 | 0.070645 | 0.230174 | 0.023241 |
| 8 | 1.947552 | 99.59245 | 0.083490 | 0.070645 | 0.230174 | 0.023241 |
| 9 | 1.947552 | 99.59245 | 0.083490 | 0.070645 | 0.230174 | 0.023241 |
| 10 | 1.947552 | 99.59245 | 0.083490 | 0.070645 | 0.230174 | 0.023241 |

**Table 5 (c) Variance Decomposition of 2-Month Futures and Foreign Exchange rates**

| Period | S.E. | LN_2_M_F | LN_EURO | LN_GBP | LN_USD | LN_YEN |
|---|---|---|---|---|---|---|
| 1 | 2.464331 | 100.0000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 2 | 2.466281 | 99.91125 | 0.013507 | 0.030183 | 0.030004 | 0.015060 |
| 3 | 2.471663 | 99.53932 | 0.099474 | 0.060601 | 0.265429 | 0.035179 |
| 4 | 2.471684 | 99.53770 | 0.099768 | 0.060647 | 0.266623 | 0.035260 |
| 5 | 2.471699 | 99.53668 | 0.099849 | 0.060852 | 0.267198 | 0.035425 |
| 6 | 2.471700 | 99.53665 | 0.099852 | 0.060852 | 0.267213 | 0.035430 |
| 7 | 2.471700 | 99.53665 | 0.099853 | 0.060852 | 0.267215 | 0.035431 |
| 8 | 2.471700 | 99.53665 | 0.099853 | 0.060852 | 0.267215 | 0.035431 |
| 9 | 2.471700 | 99.53665 | 0.099853 | 0.060852 | 0.267215 | 0.035431 |
| 10 | 2.471700 | 99.53665 | 0.099853 | 0.060852 | 0.267215 | 0.035431 |

**Table 5 (c) Variance Decomposition of 3-Month Futures and Foreign Exchange rates**

| Period | S.E. | LN_3_M_F | LN_EURO | LN_GBP | LN_USD | LN_YEN |
|---|---|---|---|---|---|---|
| 1 | 3.009084 | 100.0000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 2 | 3.202641 | 98.34294 | 0.211669 | 0.354196 | 0.966899 | 0.124301 |
| 3 | 3.436595 | 96.71384 | 0.244553 | 0.593994 | 2.315960 | 0.131658 |
| 4 | 3.847030 | 94.60736 | 0.449207 | 1.083732 | 3.586702 | 0.272995 |
| 5 | 4.091413 | 94.09758 | 0.500998 | 1.208090 | 3.900017 | 0.293310 |
| 6 | 4.336521 | 93.58778 | 0.514130 | 1.298574 | 4.296697 | 0.302819 |
| 7 | 4.593285 | 93.08961 | 0.560350 | 1.405606 | 4.615559 | 0.328879 |
| 8 | 4.818271 | 92.72858 | 0.587551 | 1.484801 | 4.856627 | 0.342436 |
| 9 | 5.036385 | 92.42390 | 0.604539 | 1.546350 | 5.072638 | 0.352575 |
| 10 | 5.248754 | 92.16011 | 0.625577 | 1.602178 | 5.248036 | 0.364100 |

Variance Decomposition Function used to depict the dynamic interaction between Spot, Futures and Foreign Exchange rates markets. The analysis in the **Table 5** has shown that the most of the Variance Decomposition in the case of Spot and Futures markets of Nifty Bank Index has been explained by its own nature and that of foreign exchange rates plays a minor role in explaining variance decomposition in Spot and Foreign exchange markets.

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Note: ** indicate rejected hypotheses at 0.05 level.

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Table 7 Causality Test of Futures and Foreign Exchange rates Markets

| Variables | Null hypotheses | F-Statistics | Prob. |
|---|---|---|---|
| One Month Futures Market and Foreign Exchange Rate Market | LN_EURO/INR does not granger cause to LN_1-Month Futures | 1.28363 | 0.2772 |
| | LN_1-Month Futures does not granger cause to LN_EURO/INR | 36.4736 | 2.E-16** |
| | LN_GBP/INR does not granger cause to LN_1-Month Futures | 2.19047 | 0.1120 |
| | LN_1-Month Futures does not granger cause to LN_GBP/INR | 27.5456 | 1.E-12** |
| | LN_USD/INR does not granger cause to LN_1-Month Futures | 1.54647 | 0.2132 |
| | LN_1-Month Futures does not granger cause to LN_USD/INR | 81.8963 | 2.E-35** |
| | LN_YEN/INR does not granger cause to LN_1-Month Futures | 0.78958 | 0.4541 |
| | LN_1-Month Futures does not granger cause to LN_YEN/INR | 78.5487 | 5.E-34** |
| Two Month Futures Market and Foreign Exchange Rate Market | LN_EURO/INR does not granger cause to LN_2-Month Futures | 2.99821 | 0.0499** |
| | LN_2-Month Futures does not granger cause to LN_EURO/INR | 26.4350 | 4.E-12** |
| | LN_GBP/INR does not granger cause to LN_2-Month Futures | 4.33307 | 0.0132** |
| | LN_2-Month Futures does not granger cause to LN_GBP/INR | 17.7920 | 2.E-08** |
| | LN_USD/INR does not granger cause to LN_2-Month Futures | 3.69148 | 0.0250** |
| | LN_2-Month Futures does not granger cause to LN_USD/INR | 67.2683 | 1.E-29** |
| | LN_YEN/INR does not granger cause to LN_2-Month Futures | 1.47946 | 0.2278 |
| | LN_2-Month Futures does not granger cause to LN_YEN/INR | 71.6881 | 1.E-29** |
| Three Month Futures Market and Foreign Exchange Rate Market | LN_EURO/INR does not granger cause to LN_3-Month Futures | 2.67416 | 0.2278 |
| | LN_3-Month Futures does not granger cause to LN_EURO/INR | 17.6289 | 2.E-31** |
| | LN_GBP/INR does not granger cause to LN_3-Month Futures | 3.35474 | 0.0350** |
| | LN_3-Month Futures does not granger cause to LN_GBP/INR | 14.3959 | 6.E-07** |
| | LN_USD/INR does not granger cause to LN_3-Month Futures | 6.99666 | 0.0009** |
| | LN_3-Month Futures does not granger cause to LN_USD/INR | 46.4915 | 8.E-21** |
| | LN_YEN/INR does not granger cause to LN_3-Month Futures | 5.71117 | 0.0033** |
| | LN_3-Month Futures does not granger cause to LN_YEN/INR | 56.4204 | 4.E-25** |

The **Table 6 and 7** denoted the outcome of causality relationship between Spot, Futures and Foreign Exchange rates markets. From the **Table 6** the hypotheses LN_EURO, LN_GBP, LN_USD/INR, LN_YEN/INR does not Granger Cause LN_1_M_S has been accepted and LN_1_M_S does not Granger Cause LN_EURO/INR, LN_GBP/INR, LN_USD/INR, LN_YEN/INRhas been rejected at 0.05 level which means that there flows an unidirectional causality from Spot to foreign exchange rates markets. In the case of Futures and Foreign Exchange rates markets in **Table 7**, there is a unidirectional causality between 1-Month Futures and Foreign exchange rates and for 2- Month and 3-Month Futures and Foreign exchange rates there is a flow of Bi-directional causality except YEN/INR does not granger cause to 2-Month Futures and EURO/INR does not granger cause to 3-Month Futures market.

**Table 8 OLS Regression Output of Spot and Foreign Exchange rates Markets**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.000792 | 0.000319 | 2.483260 | 0.0131** |
| LN_EURO | -0.011070 | 0.064624 | -0.171293 | 0.8640 |
| LN_GBP | 0.177689 | 0.062388 | 2.848137 | 0.0044** |
| LN_USD | -0.941586 | 0.085651 | -10.99333 | 0.0000** |
| LN_YEN | -0.346568 | 0.047447 | -7.304371 | 0.0000** |
| R-squared | 0.115905 | Akaike info criterion | | -5.212051 |
| Adjusted R-squared | 0.114774 | Durbin-Watson stat | | 1.922925 |

Note: All compiled analytical work is the Author's Source.

From the **Table 8,** we rejected the null hypothesis at 0.05 levels and accepted the hypothesis of having an impact of Foreign exchange rates (except EURO/INR) on Spot market of Nifty Bank NSE Index. From the **Table 9** the impact of Foreign exchange rates on Futures Market is seen to be

significant (except EURO/INR does not have influence to 1-Month and 2-Month Nifty Bank Index futures).

**Table 9 OLS Regression Output of Futures and Foreign Exchange rates Markets**

| 1-M Futures and Foreign Exchange Rates | | | | |
|---|---|---|---|---|
| **Variable** | **Coefficient** | **Std. Error** | **t-Statistic** | **Prob.** |
| C | 0.000792 | 0.000329 | 2.404519 | 0.0163** |
| LN_EURO | -0.012817 | 0.066668 | -0.192256 | 0.8476 |
| LN_GBP | 0.177036 | 0.064361 | 2.750693 | 0.0060** |
| LN_USD | -0.939510 | 0.088359 | -10.63286 | 0.0000** |
| LN_YEN | -0.320046 | 0.048947 | -6.538623 | 0.0000** |
| R-squared | 0.103820 | Akaike info criterion | | -5.149788 |
| Adjusted R-squared | 0.102674 | Durbin-Watson stat | | 1.973296 |
| 2-M Futures and Foreign Exchange Rates | | | | |
| **Variable** | **Coefficient** | **Std. Error** | **t-Statistic** | **Prob.** |
| C | 0.000416 | 0.000285 | 1.458451 | 0.1448 |
| LN_EURO | 0.112217 | 0.048756 | 2.301616 | 0.0214** |
| LN_GBP | 0.162922 | 0.047732 | 3.413297 | 0.0006** |
| LN_USD | -1.431477 | 0.063029 | -22.71128 | 0.0000** |
| LN_YEN | -0.264331 | 0.036348 | -7.272202 | 0.0000** |
| R-squared | 0.168680 | Akaike info criterion | | -4.747863 |
| Adjusted R-squared | 0.168146 | Durbin-Watson stat | | 2.099306 |
| 3-M Futures and Foreign Exchange Rates | | | | |
| **Variable** | **Coefficient** | **Std. Error** | **t-Statistic** | **Prob.** |
| C | 0.000282 | 0.000250 | 1.131895 | 0.2577 |
| LN_EURO | 0.023159 | 0.040893 | 0.566336 | 0.5712 |
| LN_GBP | 0.283082 | 0.039384 | 7.187760 | 0.0000** |
| LN_USD | -1.499951 | 0.051417 | -29.17250 | 0.0000** |
| LN_YEN | -0.237620 | 0.030356 | -7.827727 | 0.0000** |
| R-squared | 0.175136 | Akaike info criterion | | -4.617128 |
| Adjusted R-squared | 0.174781 | Durbin-Watson stat | | 2.063150 |

The coefficient result from the table showed that for every 1% change in Foreign exchange rates values, it creates changes around +/-1 to1.50 in Spot and Futures values of Nifty Bank Index. The reliability quota R-Squared showed that only11.47% of variation in Spot prices has been explained by Foreign exchange rates. And foreign exchange rates had explained around 10.38%, 16.87% and 17.51 % of Variation in 1-Month, 2-Month and 3-Month Futures. So it means that majority of the reliability or variation in the Spot and Future market are caused through other factors.

## V. CONCLUSION

A number of researcher and academicians had examined the Stock markets and Foreign exchange rates linkages and impact. But there is a scope left to make a study on Spot, Futures and Foreign exchange rates markets. This article has examined the impact of Foreign exchange rates on Spot and Futures markets of Nifty Bank NSE Index. The findings of the study imply that (1) the co-integration result is insignificant between Spot and Foreign exchange rates markets. The absence of co-integration has also found between Futures markets and Foreign exchange rates markets (except 3-Month Futures and Foreign exchange rates markets are significantly co-integrated). (2) The maximum extend of Variance Decomposition in Spot and a Futures market has been explained by its own nature and that of Foreign exchange rates play's a minor role in explaining Variance decomposition. (3) There flows a unidirectional causality relationship from Spot markets to Foreign exchange rates markets. Similarly there is a unidirectional causality flow from 1-Month Futures to Foreign exchange rates markets and Bi-directional causality relationship flow between 2-Month, 3-Month Futures markets and Foreign exchange rates markets except YEN/INR and EURO/INR does not granger cause to 2-Month and 3-Month Futures markets. (4) From regression output the findings displayed that exchange rates except EURO/INR have an impact on Spot market. Similarly Exchange rates also influencing to1-Month, 2-Month and 3-Month Futures markets (except EURO/INR exchange rate do not have influence to 1-Month and 3-Month Future markets). This analytical result has been supported by previously conducted studies by**(P. Sri Ram, 2017)**and**(Koy & Ersan, 2016)**. The outcome of this study will be the significant implications to the Policy Makers, Spot and Futures markets traders and other investors.

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