Relationship between CNX Bank Nifty and Exchange Rate: Evidence from Indian Capital Market

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The Research work is based on the investigation of the relationship between foreign exchange rates and Bank stock index in India from January 2006 to March 2016 using the information of monthly closing price of the NSE Bank Nifty and the nominal Indian currency per US dollar exchange rates. The exchange rate of Indian currency and US Dollar has been consider for the research work, because, US dollar is considered as a strong currency for foreign trade. The Statistical tests are used to investigate the movement of both the series. The research objective is to study the relationships between exchange rate and CNX bank nifty Index by applying the Unit-root Test, Granger Casualty Test and Johnson co integration test. The study also examine the effect of both the time series mutually. The result shows very clearly there is no co integration vector between the CNX bank nifty and exchange rate. Then the Pairwise Granger causality test employed to test the hypothesis of the study and found out that the null hypothesis is rejected. At last the null hypothesis is accepted it mean there is no significant relationship between Exchange rate and CNX bank Nifty.

Keywords: Exchange Rate Fluctuations, Bank Nifty, Stationarity test, ADF test, Johnson Co-integration and Granger causality

INTRODUCTION

A stock Market Index measure the relative value of stocks markets in numerical terms. It calculated the price of selected stocks. It is important method for the investors and financial expert to describe the market and to compare the return. Secondary market are very reactive and they get affected whenever there is any event happen in the world whether it relates to issue like religion, politics, finance, etc. So decision in selecting the stocks for any stakeholder should be very specific. Stockholders should have good knowledge about stock exchanges and its movement in the market. One should also consider the whole stock market before making investing in any stocks because a one mistake in selecting the appropriate stocks can leave a person financial loss.

Bank nifty include the 12 most liquid and large capitalized stock from the various banks which trade on the national stock exchange. It is helpful for investor and market participants a strong benchmark for the captures the capital

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market performance of Indian banking sector. The following banks are registered in bank nifty index.

- State bank of India
- HDFC Bank
- Kodak Mahindra bank
- Axis bank
- Bank of Baroda
- Punjab national bank
- Bank of India
- Canara bank
- Indusind bank
- Yes bank
- Union bank

Nifty Bank Index is calculated by using free float market capitalization method by taking base date of Jan 1, 2000 indexed to base value of 1000, wherein the level of the index rebound total free float market value of the entire stocks in the index related to a specific base market capitalization value. The method also takes into consider the essential changes in the index and vital corporate information such as share splits, rights issue, and initial public offer etc. without affecting the index.

Market Coverage

The Nifty Bank Index cover almost 15.6% of the free float market capitalization of the stocks registered on NSE and 93% of the free float market capitalization of the stocks represent the part of the Banking sector cosmos as on March 31, 2016. The total transactional value for the last six months ending March 2016 of all the Index constituents is approx. 12.5% of the transactional value of entire stocks on the NSE and 88.1% of the transactional value of the stocks consist of the Banking sector cosmos.

Selection yard stick

The Selection of the index set is based on the following yardstick:

- The Companies who occupies the ranked within top 800 based on both average daily turnover and average daily full market capitalization based on the past six months duration data are considered for the selection. The

selected participants should be available for trading in the derivatives class (Stock Futures & Options market) on NSE. Company's trading periodicity should be at least 90% in the past six months.

- The new company who comes after the IPO process will be eligible for the selection in the index, if it satisfy the normal condition of eligibility yard stick for the index for a 3 month duration instead of 6 months periods.

- Companies that are permitted to trade in Future and Option segment are only eligible to be part of the index.

- The Final selection of top 12 companies shall be done based on the free-float market capitalization of the companies.

FIGURE 1 HERE

REVIEW OF LITERATURE

Karmarkar and Kawadia (2000) conducted the research work to examine the relationship between Indian Rupee and US $ exchange rate and Indian stock markets. They consider the five composite indices and five spectral indices were observed over the duration of one year 2000. The results show that exchange rate has high correlation with the movement of stock market.

Apte (2001) examine the relationship between the variation of the stock market and the exchange rate of India by applying the EGARCH specifications on the daily closing USD/INR exchange rate, BSE 30 (Sensex) and NIFTY-50 over the duration 1991 to 2000. The study found that there appears to be a spillover from the foreign exchange market to the share market but not the reverse.

Bhattacharya and Mukherjee (2003) conducted the research in Indian markets by using the data on stock prices and macroeconomic variables in the foreign sector by taking exchange rate and concluded that there is no significant assocationship between stock prices and exchange rates.

Tripathy, (2011) conducted the research to establish relationship between macroeconomic variables and Indian stock market from the duration of January 2005 to February 2011 by using tests such as Ljung-Box Q test, Breusch-Godfrey LM test, Unit root test and Granger causality test. These

test results show the bidirectional relationship in variables like interest rate, exchange rate, foreign market with Indian share market. The study found the significant impact of international market on Indian stock market.

Gulati and Kakhani (2012) in their Research work, "Relationship between Share market and foreign exchange market in India" they reviewed the existence of a causal relationship between foreign exchange rates and stock market by using statistical tool Granger causality test and correlation analysis and they concluded that there is no or little impact of exchange rate on Indian stock market (Nifty and Sensex).

(Jyoti & Mahakud, 2012) Conducted a research work to find out the relationship between stock prices, exchange rate and demand for money in India during the period of post liberalization. They apply the Johansen Co-integration test to prove the hypothesis and Granger Causality test. They found that stock prices have negative and significant effect on the money demand and exchange rate found to have negative impact.

Patel Divyang and Nikita (2013) investigated the relationship between exchange rate ($/Rs.) and Indian stock exchange like BSE and NSE etc., by using monthly data and conclude that there is no impact of exchange rate (USD/INR) on Indian secondary market (Nifty and Sensex).

Mohanty & Bhanumurthy (2014) in his research work paper used a monetary model of Inflation and examined the impact of the 'empirically claimed' de facto stable exchange rate regime on inflation period in India. The result found that the impact of exchange rate regime on inflation is not visible in the Indian case.

Sinha & Kohli, 2015) conducted the research work to investigate the impact of exchange rate on three market indices like BSE Sensex index, BSE IT sector index and BSE Oil & Gas sector index for the duration January 2006 to March 2012. They found No significant interactions between foreign exchange rate USD/INR and stock returns. The Economic variables like inflation differential, lending interest rates and current account deficit are found to significantly affect the exchange rate USD/INR.

Singh, Gurmeet (2015) examines the linkages between exchange rate and stock price over the duration January 2007 to March 2014. The National Stock Exchange are taken for the research work. Nifty is used as indicator of stock price. The Johansen's co integration and Granger causality test have been used to establish the long time and short time equilibrium relationship between exchange rate and stock Price. The result found that exchange rate and stock price are co-integrated and, hence, a long time equilibrium relationship exists between them. It is found that the exchange rate and Nifty as indicators of stock price are positively related to each other.

RESEARCH METHODOLOGY

Hypothesis

Null Hypothesis: There is no significant relationship between Exchange rate and CNX bank Nifty

Alternative Hypothesis: There is significant relationship between Exchange rate and CNX bank Nifty

Research Design

The Empirical Research is conducted by using monthly data of CNX Bank Nifty indices and the monthly exchange rate. The time duration of the research is January 2006 to 31 March 2016. A total of 125 observations have been identified for the present analysis. The statistical tools unit root test, causality test and co integration analysis are applied for the analyzing the research result.

Unit Root Test

A unit root is an attribute of processes that educe through time that can cause crunch in statistical inference involving time series models.

A linear stochastic process has a non-stationary if 1 is a root of the process's innate equation. Such a process is non-stationary. If the another roots of the characteristic equation deceit inside the unit circle that is, have an absolute value less than 1 then the first difference of the process will be does not unit root exist.

The unit root test of stationarity is based on the following set up.

$$\Delta y_t = \beta_1 + \beta_2 t + \gamma y_{t-1} + \Sigma\, \alpha_i\, \Delta y_{t-} \,=1 + \varepsilon_t$$

Where the test statistic is known as the $\hat{\tau}$ statistic based on γ

Augmented dicker fuller test

The Augmented Dickey-Fuller (ADF) test is useful for a parametric correction in Dickey-Fuller (DF) test for high degree of correlation by assuming that the series follows an AR process. The ADF concept controls for higher-order correlation by totaling lagged difference terms of the dependent variable to the right-hand side of the regression.

Condition for Unit root:

• If the Absolute test statistics value is less than or equal to critical value than we cannot reject the null hypothesis it indicates the presence of unit root for the time series.

• If the Absolute test statistics value is more than or equal to critical value than we can reject the null hypothesis. it indicates the presence of unit root does not exist for the time series.

Co integration test

Co integration Testing involves the three steps

• Testing the relevant time series for stationarity (unit roots),

• Testing for co-integration,

• Finally Error-Correction Modelling

A non-stationary time series Y t is said to be integrated of order d, [Yt ~ I (d)], if it became stationarity after being differenced d times. To determine the order of integration, unit root tests have been used. The Dickey-Fuller (DF) or Augmented Dickey- Fuller (ADF) tests have most common approach.

Johansen Co Integration test

Co integration techniques is used to assess whether there exists a long run or equilibrium association between non stationary time series variables. The widely used procedure for determining the presence of co integration among a set of non-stationary I (1) variables is the A decision regarding the presence of a long run relationship is based on the value of the test statistic obtained from sample.

Granger Causality Test

Granger causality test is useful to determine whether past values of a variable helps to predict changes in another variable. To use Granger Casualty test consider a bivariate VAR model in Xt and Yt with p lags in pair variables:

$Yt = \alpha iYt{-}i + \beta iXt{-}i + \varepsilon 1 tpi{=}1 \ pi{=}1$

$Xt = \lambda iXt{-}i + \delta iYt{-}i + \varepsilon 2t$

Causality can be unidirectional from X to Y (X==> Y) when the estimated coefficients of lagged X are statistically different from zero in the model or can be vice versa i.e. unidirectional from Y to X (Y==> X) or Feedback /bi Directional causality X Y when the causation is both ways.

ANALYSIS AND INTERPRETATION

Unit Root Test to check on the stationarity of the series.

Both series for the period were log transformed and applied for the ADF test. The test results are summarized and presented in table No:1 below.

TABLE 1 HERE

Since calculated value of the test statistic t is less than its critical value (3.44), the null hypothesis is accepted, which means for both the series EXR and CNX Bank Nifty, unit root exists and they are non- stationary at their levels. If we consider the p value than we can interpret that p value is more than 0.5% level so we cannot reject the null hypothesis it mean the unit root exist and it is non stationary.

At this stage their first differences were taken and applied the unit root tests and the Results are given in table No: 2

TABLE 2 HERE

From the Table no: 2 we take the ADF test at their first difference and found that the calculated |t| > the critical value -2.86 and hence, the null hypothesis rejected at 5% significance level i.e., unit root does not exist.

Co-integration Test on Exchange rate and CNX Bank Nifty

As the next process is use the Johansen's Co-integration test to check the long run equilibrium relationship, if any, between CNX Bank Nifty and exchange rates, and the test results are as given in table No 3.

Hypothesis:

Null Hypothesis: There is no co integration between variable Exchange rate and CNX Bank Nifty

Alternative Hypothesis: There is no co integration between variable Exchange rate and CNX Bank Nifty

TABLE 3 HERE

According to the results of the Johansen's Co-integration test as given in Table No 3 above, Maximal Eigen statistic (λmax) of 8.551437 is less than the 5 % critical value of 14.26460 and the trace test statistic (λtrace) of 8.749797 is less than the critical value of 15.49471. The null hypothesis of no co integration (ie. r = 0) is rejected. If we consider the p value than we can say that the p value is 38.90% it is more than 5 % level so we cannot reject the null hypothesis. This means that there is no co integration between two variable.

Granger Causality Test

The Association ship of the short run between the variables was determined by testing the causality between them. Granger Causality technique was applied for the same. Causality is lag- dependent. It may be bi- directional, uni-directional and at some lags causality may be absent. For this purpose software support was taken by Using Eviews.9 software.

TABLE NO 4

The results of Granger-causality test between Exchange rates and stock price (CNX bank nifty) are shown in the Table No 4.The Null hypothesis is close price do not Granger because exchange rate is rejected at 5% level of significance. The second null hypothesis Exchange rate does not granger cause close price can be rejected because it p value 2.03% is less than 5% level of significance.

CONCLUSION

The research work is based on investigating the relationship between the exchange rate and CNX Bank (NIFTY). At the first step ADF unit root test is conducted to check the stationarity of all the variables and it observed out they are non-stationary at their levels, but it converted into stationary at the 1st difference. Thus the series are integrated of order I (1). The second step is Johansen co integration test to check whether exchange rate and CNX Bank NIFTY Index is co integrated. The result shows very clearly there is no co integration vector between the CNX bank nifty and exchange rate. Then the Pairwise Granger causality test is applied to test the statement of the study and conclude that the null hypothesis is rejected. At last the null hypothesis is accepted it mean there is no significant relationship between Exchange rate and CNX bank Nifty.

REFERENCES

Yamini Karmakar and G. Kawadia, (2002). "*The Relationship between Stock Index and Exchange Rate Empirical Evidance Based on Indian Stock Market*", Applied Finance, 8(2), 51-56.

Apte, P., (2001). The interrelationship between stock markets and the foreign exchange market. Prajnan, 30: 17-29.

Bhattacharya, B. & Mukherjee, J. (2003*). Causal Relationship between Stock Market and Exchange Rate*. Foreign Exchange Reserves and Value of Trade Balance: A Case Study for India, Paper presented at the Fifth Annual Conference on Money and Finance in the Indian Economy, January 2003.

Tripathy, Naliniprava (2011) "*Causal Relationship between Macro-Economic Indicators and Stock Market in India*" *Asian Journal of Finance & Accounting*, Vol. 3(1): 208-226.

Gulati& kakhani, Relationship between Stock Market and Foreign Exchange Market in India: An Empirical Study, *Pacific Business Review International 5*(5), Nov 2012.

Kumari J, Mahakud. Relationship between Stock Prices, Exchange Rate and the Demand for Money in India. Economics, Management, and Financial Markets 2012; 7(3):31-52.

Patel Divyang and Kagalwala Nikita (2013). The Impact of Exchange Rate on Indian Stock Exchanges like BSE & NSE ,*International journal of scientific research*, 2(10), 1-2 .

Mohanty B, Bhanumurthy NR. Exchange Rate Regimes and Inflation: Evidence from India. International Economic Journal. 2014; 28(2):311-332, 22.

Sinha P, Kohli D. Modeling Exchange Rate Dynamics in India Using Stock Market Indices and Macroeconomic Variables. Amity Global Business Review. 2015; 10:5-18.

Singh Gurmeet. The Relationship between Exchange Rate and Stock Price in India: An Empirical Study. *IUP Journal of Financial Risk Management* 2015; 12(2):18- 29.
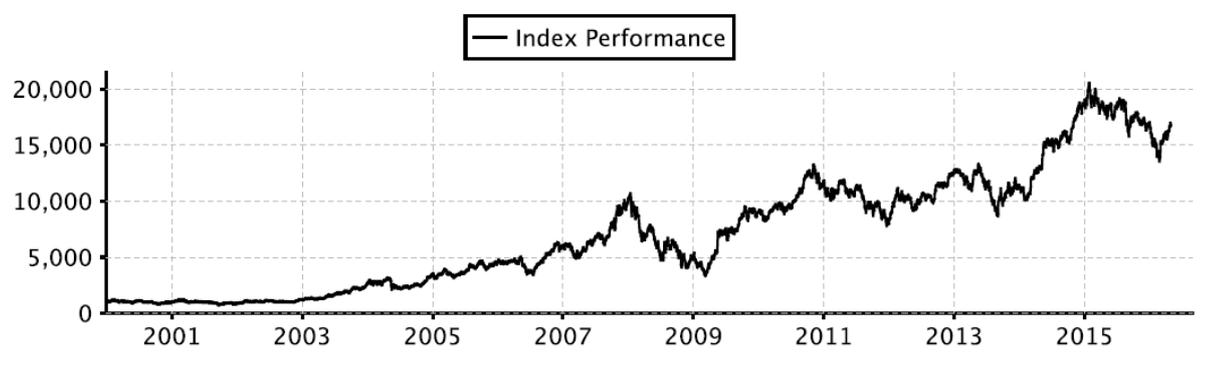
APPENDIX

Nifty Bank Index performance

Figure No 1: Nifty Bank Index performance

Source: IISL Nifty Index report

Table No 1: Unit Root test at Level (Trend and Intercept)

Period	Variable	No of observation	ADF test	Critical value at 5%	Probability value
Level	Exchange rate CNX Bank Nifty	121	-2.446310 -2.543127	-3.447383 -3.447383	0.3542 0.3072

Table No 2: Unit Root test at difference 1 (Intercept)

Period	Variable	No of observation	ADF test	Critical value at 5%	Probability value
Difference 1	Exchange rate CNX bank Nifty	121	-8.686125 -9.777596	-2.885450 -2.885450	0.0000

Table No: 3 Johansen's Co-integration Test Result

Johansen Cointegration Test

Date: 05/29/16   Time: 16:49
Sample (adjusted): 2006M04 2016M03
Included observations: 120 after adjustments
Trend assumption: Linear deterministic trend
Series: EXCHANGE_RATE CLOSE_PRICE
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.068782	8.749797	15.49471	0.3890
At most 1	0.001652	0.198360	3.841466	0.6560

Trace test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.068782	8.551437	14.26460	0.3254
At most 1	0.001652	0.198360	3.841466	0.6560

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

EXCHANGE_R	CLOSE_PRICE
-0.184500	0.000357
0.072410	0.000124

Unrestricted Adjustment Coefficients (alpha):

D(EXCHANGE_	0.149872	0.036143
D(CLOSE_PRI	-223.2767	3.392989

1 Cointegrating Equation(s):   Log likelihood   -1139.147

Normalized cointegrating coefficients (standard error in parentheses)

EXCHANGE_R	CLOSE_PRICE
1.000000	-0.001936
	(0.00046)

Adjustment coefficients (standard error in parentheses)

D(EXCHANGE_	-0.027652
	(0.01808)
D(CLOSE_PRI	41.19464
	(14.2695)

Table No 4: Granger causality test

Pairwise Granger Causality Tests Date: 05/26/16 Time: 15:05 Sample: 2006M01 2016M03 Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
CLOSE_PRICE does not Granger Cause EXCHANGE_RATE	121	6.15796	0.0029
EXCHANGE_RATE does not Granger Cause CLOSE_PRICE		4.02902	0.0203