

# Dynamic effects of macroeconomic variables on CNX bank using ARDL model

Subbarayan Baranidharan<sup>1</sup> and Selvaraj Vanitha<sup>2</sup>

<sup>1</sup>Ph.D Research Scholar, Department of Commerce and Financial Studies, Bharathidasan University, Tiruchirappalli 620024, Tamilnadu, India.

<sup>2</sup>Assistant Professor, Department of Commerce and Financial Studies, Bharathidasan University, Tiruchirappalli 620024, Tamilnadu, India.

## Abstract

*The study aims to identify dynamic effects of selected macroeconomic variables on CNX Bank's returns. The study used variables namely like exchange rate, foreign exchange reserves, cash reserve ratio, repurchase rate, reverse repo rate, wholesale price index and NSE CNX Bank returns. The research paper used data over the period from 1<sup>st</sup> June 2004 to 31<sup>st</sup> July 2014 for analyzing the short and long run effects of selected macroeconomic variables on CNX Bank returns, using Auto Regressive Distributed Lag (ARDL) model. This study found that there is short run shock on CNX Bank returns from macroeconomic variables but absence of effects in the long run, during the study period and that there are integrated and causal effects of macroeconomic variables on CNX Bank. Overall the study discovered that in short run, exchange rate, CRR, RRR, REPO and WPI movements affect the returns of CNX Bank, especially exchange rate volatility causes CNX Bank returns. This study suggests that investors should concentrate on the selected macroeconomic variables for short term investment decision in CNX Bank. The policy makers, who are concerned with the growth of an economy, should focus on improving the monetary policy for retaining the economic growth of a country.*

**Keywords:** Macroeconomic, Foreign exchange reserve, Exchange rate, Bank, Causality, Volatizing

## 1. Introduction

Overall economy and the stock markets are significant correlated. The stock market index generally indicates the performance of an economy, when the rise in the stock market index has always concomitant with the booming or recession of the stock market. The fluctuation in stock market index is affected not only by the price of the stocks, but also by some other factors

namely, macroeconomic variables and commodity price which have strongly influence on the stock prices. The wealth effect deal with the stock price leads economic activity by really causing the economy. In the last two decades, the relationship between macroeconomic variables and the share returns has been a matter of interest among academics and practitioners.

The existence of numerous literatures on economic growth and macroeconomic variables. Many studies regards to the relationship between

economic growth and financial market development, widely deliberated in literature. In the beginning stage of economic development, financial markets were undeveloped and very small. Financial markets were primarily dominant by banks and other type of financial institutions and intermediaries, during this stage. In the Second stage, financial institutions and intermediaries expanded with capital accrual, the number of refined and more custom-made financial and, the flow of funds and resources accruing to the financial market. In this stage, stock market started developing in terms of both market capitalization and number of listed firms. Further while, the growth of economy continues, financial market and banking system develop. Likewise other financial institutions and intermediaries also develop. In fourth stage, research suggests, the stock market markets seem to develop. The evidence proved that the equity and debt ratio decreased in the first stage but further development of the stock market showed this ratio increased.

The remarkable growth of financial markets during recent decade with the shocking growth in nascent equity markets has revolved the focus of new literature towards the relationship between performance of stock market and growth of an economy (Vector, 2005). Indubitably, stock markets were expected to raise economic growth by increasing the liquidity of financial assets, making global and domestic risk diversification feasible, stimulating wiser investment decisions, and making corporate governance more effective, i.e., resolving institutional problems by swelling the shareholders interest/value. (Caporale et al, 2004). Efficient stock markets provide appropriate monetary policy through repurchase and issuance of government securities in the liquid market, which is a significant step to financial liberalization. Likewise, well-organized and vigorous stock

markets could adapt the pattern of demand for money, and they help to create liquidity that ultimately enhances economic growth. Many empirical studies have been conducted for analyzing the relationship between the macroeconomic variables and equity price. This literature shows that the asset pricing theories do not specify the fundamental of macroeconomic variables that influence equity market. Fama (1981), Hamo (1986), Paul and Mallik (2001), Faff (1988), Chen (1991), Roll and Ross (1980) all argued that there is strong relationship between macroeconomic factors and stock market price, in industrialized countries. Overall the Literature suggests that there is the strong relations between macroeconomic variables and the stock market.

## 2. Literature review

Ehsan Borna and Mansour Garaz (2014) investigated the Effects of Gold and Oil World Price and Exchange Rate on the Total Index of Tehran Sock Exchange Using ARDL Method. This study identified that there was positive and substantial effect in OPEC world price and gold price in long run in the stock exchange of Tehran. Error correction model results exhibit the short run adjusting speed towards long run balance. Mohammad salahuddin (2010) explored the relationship between economic growth and its determinants with special focus on the stock market development in Pakistan. This study discovered a positive relationship between economic growth and efficient stock market both in short run and long run while financial instability and inflation had negative effects on economic growth. It concluded that stock market liquidity had significant positive effect on growth. Muhammad Shahbaz et al (2008) identified exist a very strong relationship between economic growth and stock market

development. In long run presence of bilateral causality but in short run, there exist one way causality from stock market development to economic growth. Mazharual H. Kazi (2008) reported long and short run relationship between security market price and macroeconomic variables. This paper pointed to future direction around suitability of contemporary technique that is more efficient than traditional methods for analyzing asset pricing and its returns in securities market. Serife Ozlen and Ugur Ergun (2012) found that exchange rate and interest rate were highly significant factors of stock return movements of companies from different sector. Javad Sedeghi et al (2013) investigated the relationship between selected macroeconomic variables on Tehran stock exchange. The results explored that no significant relation between both the exchange rate and the oil price on Tehran market during study period. Michael Adusei (2014) studied the nexus between inflation and stock market returns and found that there was a negative significant relationship between inflation and stock market in short run while a positive significant in long run. Causality results proved that inflation drives stock market returns in long run. Mahmoud Khalid Almsafr and Ayman Abdalmajeed Alsmadi (2013) investigated the effects of MURABAH and interest rate on the global crisis 2008. The study concluded that interest rate was highly affected the macroeconomic Murabahah, than other variables. Sabariah Nordin et al (2014) examined the impact of commodity (Palm oil) price in influencing the performance of the Malaysian stock market. The study revealed that the selected macroeconomic variables were significantly influencing the performance of Malaysian stock market both in long run and short run. The study suggested to policy marker on which variables to focus on when they want to effect the stock market returns. Walliullah (2010) analysed the

relationship between selected macroeconomic variables and stock price and financial liberalization in Pakistan. The study identified that financial market has positively influenced while financial liberalization and reforms had strong effect on the on KSE index.

### **3. Objectives of this study**

1. To analyse the impact of macroeconomic variables on CNX Bank returns.
2. To examine the long run and short run relationship between CNX Bank returns and macroeconomic variables by using ARDL model
3. To test the causal relationship between selected macroeconomic variables and CNX Bank returns.

### **4. Hypothesizes of this study**

Based on the objectives; following hypothesize are propounded:

- $H_0$ : There is no impact of macroeconomic variables on CNX Bank returns.
- $H_1$ : There is no significant long run and short run relationship between the CNX Bank return and selected macroeconomic variables
- $H_2$ : There is no causal relationship between selected macroeconomic variables and CNX Bank returns.

### **5. Research methodology**

#### ***5.1 Selection of the sample***

In Indian stock market has got impact from various economic variables, among the various economic variables, the study is confined only selected major key active variables, which can influence the CNX Bank returns.

The following criteria were considered for selecting the sample.

- Among the key active economic variables Cash Reserve Ratio, Foreign Exchange Reserve, Nominal Effective Exchange Rate, Real Effective Exchange Rate, Repurchase Rate, Reverse Repo Rate and Wholesale Price Index.

## 6. Empirical results

The present paper results are following sequence order, at first, descriptive analysis for simple summaries of sample and followed by ADF test for testing stationarity, lag order selection criteria test for select the lag of further model and examine the long run relationship and short

Table 1: Description of Variables

| Acronyms | Construction of Variables  |
|----------|--|
| CNX Bank | Natural logarithm of the Index of CNX Bank value weight average of the month end closing price                     |
| CRR      | Natural logarithm of the monthly average of Cash Reserve Ratio   |
| FXR      | Natural logarithm of the monthly average of Foreign Exchange Reserve   |
| REER     | Natural logarithm of the index of Real Effective Exchange Rate in monthly average of the Indian rupee              |
| NEER     | Natural logarithm of the monthly average of Nominal Effective Exchange Rate in monthly average of the Indian rupee |
| REPO     | Natural logarithm of the monthly average of Repurchase Rate  |
| RRR      | Natural logarithm of the monthly average of Reverse Repo Rate  |
| WPI      | Natural logarithm of the monthly average of Wholesale Price Index  |

Source of Data: [www.nseindia.com](http://www.nseindia.com), [www.rbi.org.in](http://www.rbi.org.in)

### 5.2 Period of the study

The period of study covers from 1<sup>st</sup> June 2004 to 31<sup>st</sup> July 2014 and the data collected based on monthly data.

### 5.3 Source of the data

The present study is fully based on secondary data and the data collected from National Stock Exchange (official website [www.nseindia.com](http://www.nseindia.com)) and Handbook of statistics on Indian economy, [www.rbi.org.in](http://www.rbi.org.in).

### 5.4 Tools used for research

1. Augmented Dickey Fuller (ADF) - Unit Root Test
2. ADRL Model
3. Granger Causality Test

run relationship by using ARDL model and finally, test the causal relationship between variables.

### 6.1 Descriptive statistics

In Table 2 exhibits that CNX Bank mean returns at 7442.096 recorded highly positive and negative mean returns were recorded by REER, The Skewness of the variables were all negatively skewed and longer tail towards left, except CNX Bank returns at 0.031057. In kurtosis, all the variables' values are more than 3, which represent the peak distribution of sample and it indicating Leptokurtic, except CNX Bank returns at 1.676766 indicate flatter distribution of sample namely is called Platykurtic.

Table 2: Descriptive Statistics

|             | CNX BANK | CRR      | FXR      | NEER     | REER     | REPO     | RRR      | WPI      |
|-------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Mean        | 7442.096 | 4.42E-05 | 0.010829 | -0.0027  | -0.00081 | 0.00272  | 0.003985 | 0.005254 |
| Median      | 7201.393 | 0        | 0.008318 | -0.00222 | 0.000517 | 0        | 0        | 0.00487  |
| Maximum     | 12799.94 | 0.090909 | 0.083359 | 0.037724 | 0.040322 | 0.133333 | 0.2      | 0.025786 |
| Minimum     | 2282.618 | -0.33333 | -0.07972 | -0.05585 | -0.05377 | -0.15385 | -0.2     | -0.01891 |
| Std. Dev.   | 3083.187 | 0.044451 | 0.028268 | 0.017327 | 0.017495 | 0.035794 | 0.042983 | 0.006752 |
| Skewness    | 0.031057 | -3.98399 | -0.20975 | -0.38819 | -0.33163 | -0.97774 | -0.62182 | -0.17238 |
| Kurtosis    | 1.676766 | 31.74331 | 3.749212 | 3.290156 | 3.519307 | 9.652035 | 12.97687 | 4.696654 |
| Jarque-Bera | 7.896624 | 4003.501 | 3.317875 | 3.091345 | 3.193192 | 216.3307 | 454.8806 | 13.48872 |

Source: from [www.nseindia.com](http://www.nseindia.com), [www.rbi.org](http://www.rbi.org) and computed in Eviews 7

### 6.2 ADF test and Phillips-Perron test

In economic time series data should be stationary at same level order to estimate the long run relationship between the selected variables. Augmented dickey fuller (ADF) and Phillip Perron (PP) test is used for checking the stationary at significant level, in below table displayed the data were stationary without considering the trend and constant at all variables expect FXR and REPO, then taking the first level difference to became stationary of order one I(1) and the results reveals that FXR and REPO were integrated at first order level so results suggested that to use the ARDL model.

### 6.3 Lag order selection criteria

In lag selection criteria is helped to select the lag length. The lag is selected based on least negative value and AIC -37.62204\* recorded high negative value. As per the AIC value, 8 as selected a lag value which was clearly shown in Table 4.

### 6.4 Correlation test

Table 5 shows that REER and NEER has recorded **0.937716** as high positive correlated which indicates that both variables moved into positive direction. FXR, REER, NEER and CRR have recorded high negative correlation with CNX Bank return. While RRR and CRR also recorded -0.00236 has high negative correlated.

Table 3: Unit root test

|          | ADF test    | Phillips-Perron test | Critical values |          |           |            |
|----------|-------------|----------------------|-----------------|----------|-----------|------------|
|          | t-Statistic | t-Statistic          | 1% level        | 5% level | 10% level | Stationary |
| CNX Bank | -7.91959    | -7.81889             | -4.04693        | -3.45276 | -3.15191  | I(0)       |
| CRR      | -8.52798    | -8.53013             | -4.04607        | -3.45236 | -3.15167  | I(0)       |
| FXR      | -8.16951    | -7.99483             | -4.04607        | -3.45236 | -3.15167  | I(1)       |
| NEER     | -7.99528    | -7.7962              | -4.04607        | -3.45236 | -3.15167  | I(0)       |
| REER     | -8.28129    | -8.17371             | -4.04607        | -3.45236 | -3.15167  | I(0)       |
| REPO     | -17.64      | -6.92295             | -4.04693        | -3.45276 | -3.15191  | I(1)       |
| RRR      | -4.39441    | -8.41059             | -4.04693        | -3.45276 | -3.15191  | I(0)       |
| WPI      | -7.86427    | -8.03903             | -4.04607        | -3.45236 | -3.15167  | I(0)       |

Source: from [www.nseindia.com](http://www.nseindia.com), [www.rbi.org](http://www.rbi.org) and computed in Eviews 7

Table 4. Lag order selection criteria

| VAR Lag Order Selection Criteria  |          |           |           |                   |            |            |
|---|----------|-----------|-----------|-------------------|------------|------------|
| Endogenous variables: D(CRR) D(FXR) D(NEER) D(REER) D(REPO) D(RRR) D(WPI) |          |           |           |                   |            |            |
| Exogenous variables: C (CNXBANK)  |          |           |           |                   |            |            |
| Lag   | LogL     | LR        | FPE       | AIC               | SC         | HQ         |
| 0   | 1702.529 | NA        | 3.62E-24  | -34.1117          | -33.7447   | -33.9632   |
| 1   | 1841.925 | 253.447   | 5.84E-25  | -35.9379          | -34.28643* | -35.26970* |
| 2   | 1914.878 | 122.3264  | 3.66E-25  | -36.4218          | -33.4859   | -35.2339   |
| 3   | 1975.867 | 93.63949  | 2.99E-25  | -36.664           | -32.4436   | -34.9564   |
| 4   | 2054.256 | 109.2691  | 1.78E-25  | -37.2577          | -31.7529   | -35.0304   |
| 5   | 2112.537 | 72.99904* | 1.68e-25* | -37.4452          | -30.656    | -34.6983   |
| 6   | 2158.985 | 51.60864  | 2.16E-25  | -37.3936          | -29.3199   | -34.127    |
| 7   | 2212.399 | 51.79569  | 2.67E-25  | -37.4828          | -28.1247   | -33.6965   |
| 8   | 2268.291 | 46.29387  | 3.58E-25  | <b>-37.62204*</b> | -26.9794   | -33.316    |

\* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Source: from [www.nseindia.com](http://www.nseindia.com), [www.rbi.org](http://www.rbi.org) and computed in Eviews 7

Table 5. Correlation Test

|         | CNXBANK  | CRR      | FXR      | NEER            | REER     | REPO     | RRR      | WPI |
|---------|----------|----------|----------|-----------------|----------|----------|----------|-----|
| CNXBANK | 1        |          |          |                 |          |          |          |     |
| CRR     | -0.10811 | 1        |          |                 |          |          |          |     |
| FXR     | -0.01935 | 0.250413 | 1        |                 |          |          |          |     |
| NEER    | -0.09299 | 0.111821 | -0.39164 | 1               |          |          |          |     |
| REER    | -0.03325 | 0.101812 | -0.40413 | <b>0.937716</b> | 1        |          |          |     |
| REPO    | 0.194481 | 0.264722 | 0.090337 | 0.055535        | 0.158869 | 1        |          |     |
| RRR     | 0.183489 | -0.00236 | 0.015572 | 0.069685        | 0.14141  | 0.805959 | 1        |     |
| WPI     | 0.193779 | 0.090711 | 0.014893 | -0.09499        | 0.205459 | 0.391614 | 0.246579 | 1   |

Source from [www.nseindia.com](http://www.nseindia.com), [www.rbi.org](http://www.rbi.org) and computed in Eviews 7

### 6.5 ARDL bound test

The regression result shown in Table 6. Adjusted R square value represents the 55 percent selected economic variables significantly influencing the CNX Bank returns and Durbin Watson stat is 1.910225 which is close to 2, which implies there is an proof of positive relation among the selected variables and it indicate that better fit model.

The Consequence of the short-run dynamic coefficients is given in Table 6. The short run

analysis, the coefficients on the lagged error-correction term is at 1% significant level, which assures the result of the bounds test for cointegration. The estimated value of ECT is - 0.59058 which enfold that the speed of adjustment to equilibrium after a shock is high. Almost 59 percent of equilibrium from the previous year's effect converges in short run relationship. The result of regression under the ARDL approach revealed that the model is fitted very well and this model is significant.

Table 6: Estimate short run coefficients using the ARDL - VECM

| Dependent Variable: D(CNXBANK) |             |            |             |        |
|--------------------------------|-------------|------------|-------------|--------|
| Variable                       | Coefficient | Std. Error | t-Statistic | Prob.  |
| C                              | 57.63156    | 60.1827    | 0.95761     | 0.3422 |
| D(CNXBANK(-1))                 | 0.772831    | 0.2593     | 2.980447    | 0.0042 |
| D(CNXBANK(-2))                 | -0.37921    | 0.182576   | -2.07699    | 0.0422 |
| D(CNXBANK(-3))                 | 0.355763    | 0.175043   | 2.032436    | 0.0466 |
| D(CNXBANK(-4))                 | -0.31685    | 0.178207   | -1.77799    | 0.0806 |
| D(CNXBANK(-5))                 | 0.030726    | 0.151652   | 0.202607    | 0.8401 |
| D(CRR(-1))                     | -775.515    | 2085.246   | -0.37191    | 0.7113 |
| D(CRR(-2))                     | 2656.249    | 2444.186   | 1.086762    | 0.2816 |
| D(CRR(-3))                     | 784.8931    | 2488.506   | 0.315407    | 0.7536 |
| D(CRR(-4))                     | 4243.232    | 2340.203   | 1.813185    | 0.0749 |
| D(CRR(-5))                     | 4012.706    | 1857.566   | 2.160196    | 0.0348 |
| D(FXR(-1))                     | 1835.173    | 2563.454   | 0.715899    | 0.4769 |
| D(FXR(-2))                     | 4942.677    | 4132.544   | 1.196037    | 0.2365 |
| D(FXR(-3))                     | 4122.145    | 4393.526   | 0.938232    | 0.352  |
| D(FXR(-4))                     | 1018.741    | 4066.242   | 0.250536    | 0.803  |
| D(FXR(-5))                     | 5948.776    | 3497.394   | 1.700917    | 0.0942 |
| D(NEER(-1))                    | 73682.68    | 21311.1    | 3.45748     | 0.001  |
| D(NEER(-2))                    | -6764.83    | 33085.26   | -0.20447    | 0.8387 |
| D(NEER(-3))                    | -40386.1    | 30207.08   | -1.33698    | 0.1864 |
| D(NEER(-4))                    | -1618.26    | 27600.42   | -0.05863    | 0.9534 |
| D(NEER(-5))                    | -4104.41    | 21173.14   | -0.19385    | 0.847  |
| D(REER(-1))                    | -66515.1    | 20951.22   | -3.17476    | 0.0024 |
| D(REER(-2))                    | 13816.78    | 32357.13   | 0.427009    | 0.6709 |
| D(REER(-3))                    | 37240.74    | 29397.79   | 1.266787    | 0.2102 |
| D(REER(-4))                    | 14733.29    | 27420.11   | 0.537317    | 0.5931 |
| D(REER(-5))                    | 6418.147    | 21790.23   | 0.294542    | 0.7694 |
| D(REPO(-1))                    | 118.743     | 3747.452   | 0.031686    | 0.9748 |
| D(REPO(-2))                    | 3187.515    | 3934.619   | 0.81012     | 0.4211 |

|                    |          |                    |          |          |
|--------------------|----------|--------------------|----------|----------|
| D(REPO(-3))        | -2366.7  | 4425.57            | -0.53478 | 0.5948   |
| D(REPO(-4))        | -6014.06 | 4269.166           | -1.40872 | 0.1642   |
| D(REPO(-5))        | -896.706 | 4350.551           | -0.20611 | 0.8374   |
| D(RRR(-1))         | -22.0775 | 2929.427           | -0.00754 | 0.994    |
| D(RRR(-2))         | 142.6939 | 3539.776           | 0.040312 | 0.968    |
| D(RRR(-3))         | 2098.05  | 3754.122           | 0.558866 | 0.5784   |
| D(RRR(-4))         | 6160.898 | 3635.233           | 1.694774 | 0.0954   |
| D(RRR(-5))         | 2568.081 | 3414.323           | 0.75215  | 0.455    |
| D(WPI(-1))         | 26572.73 | 20603.26           | 1.289734 | 0.2022   |
| D(WPI(-2))         | -17354.1 | 23839.27           | -0.72796 | 0.4695   |
| D(WPI(-3))         | -23601.8 | 23876.09           | -0.98851 | 0.3269   |
| D(WPI(-4))         | -2376.11 | 22573.55           | -0.10526 | 0.9165   |
| D(WPI(-5))         | -9147.26 | 18643.06           | -0.49065 | 0.6255   |
| ECT(-1)            | -0.59058 | 0.283338           | -2.08435 | 0.0415   |
| R-squared          | 0.550605 | Durbin-Watson stat |          | 1.910225 |
| Adjusted R-squared | 0.238314 | F-statistic        |          | 1.763115 |
| S.E. of regression | 541.1521 | Prob(F-statistic)  |          | 0.022743 |

Source: from [www.rbi.org](http://www.rbi.org) and computed in Eviews 7

### 6.6 The wald test

The Wald test result shown in the Table 7, F-statistic (1.61076) and the bound test K=1. Table CI (iii) of Pesaran et al. (2001), there is no linear trend which includes ECT. F-Statistics (1.61076) is lower than the upper bound critical value (5.73) at .05 % significance level. The null hypothesis is accepted “There is no short run association between CNX Bank returns and selected

macroeconomic variables,” during the study period

### 6.7 Diagnostic test

In serial correction (Breusch-Godfrey test), probability value of F-stat value (0.79) is higher than the 5% significant levels, which reveal that there is no serial correlation in long run association. The result is shown in Table 8.

Table 7. Wald Test

| Wald Test: Short run Association   |          |          |             |
|--|----------|----------|-------------|
| Test Statistic   | Value    | Df       | Probability |
| F-statistic  | 1.61076  | (35, 59) | 0.0524      |
| Chi-square   | 56.37659 | 35       | 0.0125      |
| Null Hypothesis:   |          |          |             |
| C(7)=C(8)=C(9)=C(10)=C(11)=C(12)=C(13)=C(14)=C(15)=C(16)=C(17)=C(18)=C(19)=C(20)=C(21)=C(22)=C(23)=C(24)=C(25)=C(26)=C(27)=C(28)=C(29)=C(30)=C(31)=C(32)=C(33)=C(34)=C(35)=C(36)=C(37)=C(38)=C(39)=C(40)=C(41)=0 |          |          |             |

Source: from [www.rbi.org](http://www.rbi.org) and computed in Eviews 7

**Table 8. Estimation of Serial correlation Test**

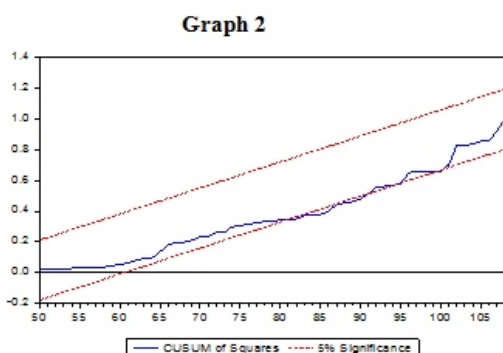
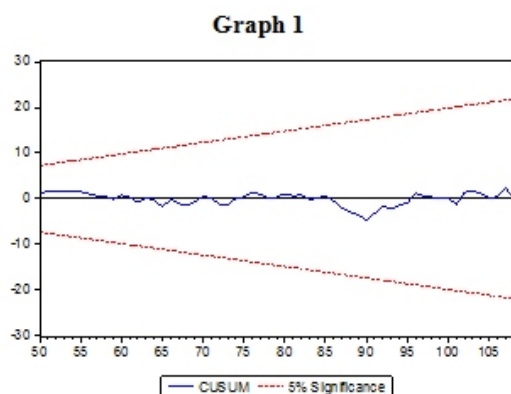
**Breusch-Godfrey Serial Correlation LM Test:**

|               |          |                     |        |
|---------------|----------|---------------------|--------|
| F-statistic   | 0.479523 | Prob. F(5,54)       | 0.79   |
| Obs*R-squared | 4.293787 | Prob. Chi-Square(5) | 0.5079 |

Source: from [www.rbi.org](http://www.rbi.org) and computed in Eviews 7

#### 6.4 Stability Test

The stability of the long run coefficients is tested by short run dynamic coefficients. Once ECM has been estimated, the stability test is applied to determine the parameter stability (Pesaran et al. (2001)) by using the cumulative sum of recursive residuals (CUSUM) and CUSUM of square (CUSUMQ). Graph 1 and 2 Plot is the result of CUSUM and CUSUMQ tests. The result of this two test indicate that the plot of CUSUM and



CUSUMQ statistic felt inside the critical bound of the 5% significant level of parameter stability which implies that there is absence of any instability of the coefficients.

In Granger causality test, there are two of results while are Unidirectional or Unilateral and Bidirectional and Bilateral. Unidirectional relationship means it cause from X to Y or from Y to X, in other hand Bidirectional relationship means it causes both side from X to Y and Y to X. The results of Granger causality test represented in table 10, CNX Bank cause unidirectional relationship with CRR, REPO and WPI. NEER, REER, REPO and WPI cause unilateral relation with CRR. CRR cause unidirectional relationship with RRR. NEER and FXR were bidirectional relationship and it causes both directions. FXR have unilateral relationship with REER and WPI. NEER and REER cause unidirectional relationship with RRR and WPI. RRR and REPO were bidirectional relationship and it effects from both side. WPI causes unidirectional relationship with REPO and RRR. No variables cause CNX Bank returns in granger causality. The results clearly exhibit that CRR caused by CNX Bank, NEER, REER, REPO and WPI, if any changes or variables fluctuation affect the CRR at 1 percent, 5 percent and 10 percent significant level.

Table 9: Granger Causality Test

| Pairwise Granger Causality Tests |   |      |             |          |
|----------------------------------|---|------|-------------|----------|
| Null Hypothesis:                 |   |      | F-Statistic | Prob.    |
| CNX BANK                         | → | CRR  | 4.78125     | 0.00007  |
| CNX BANK                         | → | REPO | 2.62593     | 0.0129   |
| CNX BANK                         | → | WPI  | 2.19863     | 0.0356   |
| NEER                             | → | CRR  | 2.55475     | 0.0153   |
| REER                             | → | CRR  | 2.52072     | 0.0166   |
| REPO                             | → | CRR  | 4.00196     | 0.0005   |
| CRR                              | → | RRR  | 5.61803     | 0.000001 |
| WPI                              | → | CRR  | 1.79931     | 0.0887   |
| NEER                             |   | FXR  | 1.79253     | 0.0901   |
| FXR                              | ← | NEER | 8.61353     | 0.000002 |
| FXR                              | → | REER | 6.88521     | 6.00E-07 |
| FXR                              | → | WPI  | 2.34593     | 0.0252   |
| NEER                             | → | RRR  | 1.94832     | 0.0634   |
| NEER                             | → | WPI  | 2.09811     | 0.045    |
| REER                             | → | RRR  | 2.58716     | 0.0142   |
| REER                             | → | WPI  | 2.08905     | 0.0459   |
| RRR                              |   | REPO | 4.64567     | 0.0001   |
| REPO                             | ← | RRR  | 7.2834      | 0.000003 |
| WPI                              | → | REPO | 2.60671     | 0.0135   |
| WPI                              | → | RRR  | 3.50712     | 0.0015   |

Source: from [www.rbi.org](http://www.rbi.org) and computed in Eviews 7

## 7. Conclusion

The present study endeavors examined the dynamic effects of macroeconomic variables on Indian stock market by using monthly time series data from 1<sup>st</sup> June 2004 to 31<sup>st</sup> July 2014. The study results concluded that macroeconomic variables are integrated with CNX Bank returns, approximately 55 percent of selected macroeconomic variables were influenced CNX Bank returns with reliable. In error correction results exhibit that existence of short run relationship macroeconomic variables and CNX Bank. Wald test revealed that F-stat value is less

than critical bound value which implies the absence of long run relationship during the study period. There is causal effects between selected macroeconomic variables and CNX Bank returns. The results suggested that in short run, exchange rate, CRR, RRR, REPO and WPI movements are vigorously affect the returns of CNX Bank especially exchange rate volatile cause CNX Bank returns, but in case of long run, those macroeconomic variables are not affected the CNX Bank returns during the study period. Investors should concentrate the selected macroeconomic variables for short term investments in CNX Bank. Exchange rate and

Inflation rate play vital role to mitigate the harmful effect of financial crises and economic recession. The study findings have made suggestions to policy makers who are responsible for the management of an economy.

## References

- Belloumi, M. (2014). The relationship between trade, FDI and economic growth in Tunisia: An application of the autoregressive distributed lag model. *Economic Systems*, 38(2), 269-287.
- Borna, E., & Garaz, M. The investigation of the effects of gold & oil world prices and exchange rate on the total index of using ARDL method Tehran Stock Exchange.
- Hasan, A., & Nasir, Z. M. (2008). Macroeconomic factors and equity prices: An empirical investigation by using ARDL approach. *The Pakistan Development Review*, 501-513.
- Ioannides, D., Katrakilidis, C., & Lake, A. (2005, May). The relationship between Stock Market Returns and Inflation: An econometric investigation using Greek data. In *International Symposium on Applied Stochastic Models and Data Analysis*, Brest-France (pp. 17-20).
- Movahedizadeh, H. The impact of macroeconomic factors on Tehran Stock Exchange Index during unjust economic and oil sanctions from January 2006 to December 2012 (Doctoral dissertation, University Putra Malaysia Malaysia).
- Rahman, M. M., & Salahuddin, M. (2009, September). The determinants of economic growth in Pakistan: does stock market development play a major role?. In *Proceedings of the 38th Australian Conference of Economists (ACE 2009)* (pp. 1-22). Economic Society of Australia (South Australian Branch).
- Shahbaz, M. (2012). Does trade openness affect long run growth? Cointegration, causality and forecast error variance decomposition tests for Pakistan. *Economic Modelling*, 29(6), 2325-2339.
- Trivedi, P., & Behera, S. R. (2012). The Macroeconomic Determinants Gold Prices in India: An ARDL Approach. *Journal of International Economics* (0976-0792), 3(2).