

A STUDY ON INFLUENCE OF MACROECONOMIC INDICATORS ON FOREIGN INSTITUTIONAL INVESTMENT INFLOWS IN INDIA DURING POST FINANCIAL CRISIS PERIOD

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Abstract

This study is a maiden attempt to determine the influence of macroeconomic indicators on foreign institutional investment inflows during the period 2009 to 2016 which is considered as post financial crisis period. For the purpose of the study, econometric tools like Normality Test, Heteroscedasticity Test, ARCH LM Test, Breusch-Godfrey Serial Correlation test, Unit Root Test Analysis, Granger Causality Test and Auto Regressive Distributed Lag Model (ARDL) have been extensively used. The results of ARDL model confirmed the strong influence of macroeconomic variables such as foreign institutional investment inflows with one lag and two lags. Nominal Effective Exchange Rate (NEER) with 3 lags, BSE_RETURN and Index of Industrial Production (IIP) on Foreign Institutional Investment Inflows (FIIs).

Keywords:

Macroeconomic Indicators, FIIs, ARCH Model, Co-integration and Granger Causality

1. INTRODUCTION

India had opened up its economy to the global players during the year 1991. There were different reforms initiated during the New Economic Policy era. Various policies and reforms were introduced in the finance sector. It was felt that robust banking sector was indispensable for steady growth of capital and money markets. So, banking sector reforms were implemented paving way for private and foreign players. These globalization measures have led to the magnifying effect on investment inflows in terms of foreign direct investment and foreign institutional investment. Developing economy like India has been predominantly dependent on external funding and it requires technological infusion, strategic collaboration and technical advancements through investments from foreign players. India has been the desired investment destiny for foreign investor who expects lucrative returns. However, this is not the case during the recent financial years. India witnessed tremendous decay in investment inflow and it is subjected to withdrawal from the present portfolio by foreign players.

In this backdrop, the study has been organized into 5 sections. Section 2 reviews the existing literature, section 3 presents the research design of the study, section 4 discusses the empirical results and section 5 concludes the entire work.

2. REVIEW OF LITERATURE

Gumus and Gungor [2] examined the relationship between foreign portfolio investments and macroeconomic factors during the period 2006 - 2012 using econometric tools such as Vector Auto Regressive Model (VAR), VAR Granger Casualty test,

Impulse Responses and Variance Decomposition. It was found from the results of Granger Causality tests and Impulse Response foreign portfolio investments affected Istanbul Stock Exchange indices and exchange rates to a considerable extent. It was further observed from the results that Index of Industrial Production had a significant influence on foreign portfolio investments inflows.

Kulshrestha [3] evaluated the influence of Foreign Institutional Investment inflows on Indian capital market especially stock market indices like BSE Sensex and NSE Nifty. Multiple Regression Analysis results showed the positive and statistically significant impact of foreign institutional investment inflows on major stock indices such as BSE Sensex and NSE Nifty. The ratio analysis showed that market had a positive movement when FII inflows were higher. Similarly, the ratio analysis indicated that the market movement declined when foreign institutional investors withdrawn their investment holdings. It was specifically noted that FIIs decreased dramatically during US Subprime crisis period.

Chaudhry et al. [4] assessed the impact of factors affecting foreign portfolio investment in Pakistan during the period 1981-2012. The researchers had applied the Autoregressive Model. It was concluded that the foreign direct investment in Pakistan had a negative influence on net portfolio investment. Likewise, market capitalisation, trade openness, weighted average rate of return on deposit, broad money (M2) and one period lagged net portfolio investment had significant and positive impact on the Net Portfolio Investment.

Bhasin and Khandelwal [9] studied the long run and short run relationship between foreign institutional investment and macroeconomic factors like exchange rate and foreign exchange reserves during the period ranging between September 1993 and July 2003. The results of ARDL Bound test confirmed the existence of long term association between foreign institutional investment and macroeconomic indicators such as exchange rate and foreign exchange reserves. It was observed that exchange rate was the major determinants of foreign institutional investment. It was also noted that magnitude of fluctuations in the exchange rate reflected in the prodigious amount of volatility in the foreign institutional investment movement.

Pala and Orgun [1] determined the impact of macroeconomic variables on foreign portfolio investments in Turkey for the period from 1998 to 2012. The results of OLS Structural Break Model indicated that the deposit interest rate, gross national income and current account balance had a positive and statistically relationship with foreign institutional investment. It was concluded that new economic stability resulted in the positive inflows of foreign institutional investment in Turkey since 2003.

Kaur et al. [5] discussed the impact of foreign institutional investment in on financial and macroeconomic system. They found the bi-directional causality between BSE Sensex and net investment of foreign institutional investment. It was further discussed that interlinkage between FIIs and macroeconomic variables such as index of industrial production, wholesale price index, exchange rate and money supply (M3) had severe repercussions on Indian macroeconomic system. They concluded that FIIs was the predominant factor of financial and macroeconomic instability in India.

Mohanasundaram et al. [12] identified the macroeconomic determinants of Foreign Institutional Investments (FII) in India based on monthly time series data for the period between April 2001 and March 2014. Autoregressive Distributed lag (ARDL) bounds testing approach showed that FII flows had positive association with Exchange Rate, Producer Price Index of USA, return on S&P 500 and Return on Nifty whereas Market Capitalization of NSE and Wholesale Price Index of India had negative and statistically relationship with FIIs. The results of ARDL model indicated that the US 3-month T-bill rate (USTBR) representing foreign interest rate had significant and negative impact on FIIs.

Haider et al. [7] investigated the effect of foreign portfolio investment determinants on Chinese economic structure for the period 1997 to 2014. Multiple regression results revealed that the predictor variables such as GDP, population growth, exchange rate and external debt had significant impact on the foreign portfolio investments of China. The authors also suggested to review the financial policies of China frequently and to focus on investors' rights and financial openness.

Sultana [11] identified the macroeconomic determinants of foreign direct investment inflows of India during the period the period 1981 to 2014 using econometric tools like unit root test, Johansen Co-integration test and pair-wise Granger Causality test. They concluded that exogenous factors like interest rate and corporate tax rate were negatively associated with FDI inflows whereas other exogenous factors like GDP, exchange rate, imports, exports and inflation rate were negatively associated with FDI inflows.

Tripathi [8] discussed the causes and effects of macroeconomic determinants of foreign institutional investment inflows on capital market, money market and foreign exchange market during the period ranging between January 1994 and December 2014. The pair-wise Granger causality test showed the bi-directional causality relationship between Net FII flows and BSE Sensex. Similarly, bi-directional causality relationship was found between net FIIs and index of industrial production.

Kashyap [10] analysed the interrelationship between FII inflows and economic growth in India during the period 2000-2016. They found strong relationship between foreign institutional investment inflows and economic growth in India.

Al-Smadi [6] studied the determinants of foreign portfolio investment of Jordan for the period 2000-2016 using Ordinary Least Square (OLS) Regression Analysis. The empirical results of OLS model showed that exogenous variables like aggregate economic activity, risk diversification, inflation, country credit worthiness, governance and corruption had statistically significant association with foreign investment inflows of Jordan.

3. RESEARCH DESIGN

3.1 STATEMENT OF THE PROBLEM

Investment in an economy predominantly depends on key economic indicators. Beside these generic factors, institutional specific factor such as stock market volatility also plays a pivotal role in this. Market performance is measured through the amount of volatility persisting. Foreign Institutional Investment Inflow has turned a swift change. During the first half of 2017, there was an unprecedented inflow of foreign institutional investment. However, Indian capital market has witnessed a sudden decline in the foreign institutional investment inflow vehemently during the second half of 2017. The magnitude of this scenario is perceptible through the dramatic withdrawal investment from the capital market by institutional investors. Structural changes in the economy and key economic indicators have triggered this drastic change in the capital market. The decelerating stride of economic growth is marked by the declining amount of institutional investment inflow. Based on the aforesaid problem statement, the study thrives to find appropriate answers for the following research questions:

- Is there any relationship between macroeconomic variables and foreign institutional investment inflow?
- If so, do macroeconomic variables have any impact on foreign institutional investment inflow?
- If the impact of macroeconomic variables persists on FII inflow, is it short term or long term in nature?

3.2 OBJECTIVES OF THE STUDY

- To analyse the relationship between the Foreign Institutional investment Inflows in India and Macroeconomic Indicators during pre-crisis period.
- To examine the influence of selected macroeconomic variables on FII's investment in India during pre-crisis period.

3.3 HYPOTHESES OF THE STUDY

In line with the objectives framed above, the following hypotheses are formulated.

- H_{01} : Macroeconomic variables and foreign investment inflow do not have stationarity during the chosen period.
- H_{02} : There is no homogenous relationship between macroeconomic variables and foreign investment inflows.
- H_{03} : Macroeconomic variables do not granger cause foreign institutional investment inflows and vice versa.
- H_{04} : There is no significant relationship between foreign investment inflows and macroeconomic variables.

3.4 RESEARCH METHODOLOGY

This section presents the details of the nature of the study, data source, period, limitations of the study and econometrical model adopted.

3.4.1 Nature of the Study:

This study aims to identify the influence of macroeconomic factors influencing foreign institutional investments inflows in

India. It analyses the cause and effect. So, this study can be construed as analytical research.

3.4.2 Sources of Data:

Secondary data have been comprehensively used in the present study. The monthly data with respect to FII inflows have been collected from the website of RBI. Monthly data of other macroeconomic variables is also collected from the website of RBI. Monthly data covers post financial crisis period of 8 years from 2009 to 2016.

3.4.3 Period of the Study:

FIIs were allowed to invest in India since 1992. However, the study covers only a period of 8 years from 2009 to 2016 which is considered as post financial crisis.

3.4.4 Limitations of the Study:

- The study focuses on the influence of Foreign Institutional Investments (FIIs) for only 7 variables. Therefore, there may be a limitation as to the number of variables. The inferences drawn from the analysis of 7 variables may not be generalised to other types of variables.
- Period of study consists of eight years only. Therefore, the number of years could be considered as limitation of the study.

3.4.5 Variables Considered for the Analysis:

Reasonable care has been exerted to select the variables for the analysis. This study predominantly used variables which were extensively used in the previous research works.

Table.1. Variables used in the analysis

Variables used in the analysis	Expected Sign
Foreign Institutional Investment inflows (Dependent Variable)	
Independent Variables	
Weighted Average Call Money Rate	-
Market Capitalisation of NSE	+
Wholesale Price Index	-
Index of Industrial Production	+
Nominal Effective Exchange Rate	+/-
Money Supply	+
Sensex Return	+/-

3.5 RESEARCH INSTRUMENTS

Since all the variables used in this study are time series, appropriate econometrics techniques used for time series analysis have been applied. A general overview of these techniques has been presented in the following section.

3.5.1 Stationarity:

Stationarity is a preliminary test which has applied before applying other major econometrics tools. Time series data should be stationary. It denotes that the time series data set should be invariant with respect to time. If time series data is non-stationary, then it causes spurious regression. As a first step, unit root test has

been adopted to confirm the stationarity of chosen study variables. Raw data may not be stationary. So, natural logarithms of the variables are taken to ensure stationarity. If there is unit root in the time series data, then the data set is non-stationary. If there is no unit root in the data set, then it implies the existence of stationarity of the data set. Generally, Augmented Ducky Fuller (ADF) unit root test is used in most of the previous studies. In the present study also, ADF test is applied to find the stationarity.

3.5.2 Granger Causality Test:

In time series data, causality is usually tested. As one event causes changes in another event, this causality relationship is tested between endogenous and exogenous variables. It helps to predict the movement of endogenous variables with the help of exogenous variables. This tool is predominantly applied to find the short term relationship among the study variables. This tool also expresses the unidirectional causality and bidirectional causality between any two study variables.

3.5.3 ARDL Model:

Auto Regressive Distributed Lag Model has been employed in this study to know the impact of macroeconomic indicators on foreign institutional investment inflow. Heteroscedasticity among the study variables are removed after taking natural logarithms. This model is more reliable and robust in explaining the explanatory power of exogenous variables than ordinary least square regression model.

This model is more appropriate when some variables are integrated at order of zero i.e., $I(0)$ and some other variables are integrated at order of one i.e., $I(1)$. An appropriate model is arrived at after checking at different lag levels. Finally, a particular model is adopted which gives the minimum AIC values.

4. ANALYSIS AND INTERPRETATION OF EMPIRICAL RESULTS

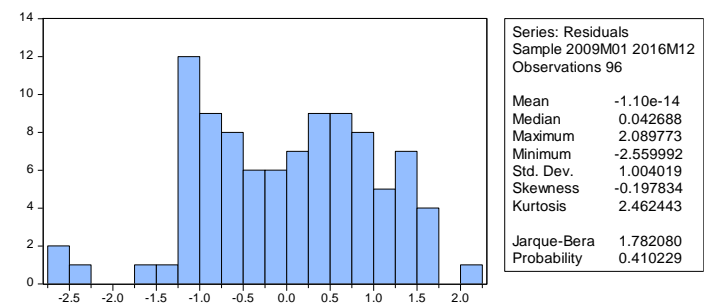


Fig.1. Results of Normality Test

The Fig.1 describes the results of Normality test. Skewness and Kurtosis statistics showed that presence of normality in the data set. Further, Jarque-Bear Statistics also confirmed the normality of the data. So, it is clear from the Fig.1 that data is normally distributed.

Table.2. Heteroscedasticity Test - ARCH

F-statistic	0.249115	Prob. F(3,89)	0.7800
Obs*R ²	0.512314	Prob. Chi-Square(3)	0.7740

In order to check Heteroscedasticity in the chosen sample observations, The ARCH test has been applied. The results indicated the absence of Heteroscedasticity problem which implies that the residuals are identically distributed.

Table.3. Breusch-Godfrey Serial Correlation LM Test

F-statistic	3.037498	Prob. F(2,75)	0.0539
Obs*R ²	6.968543	Prob. Chi-Square(2)	0.0307

Probs from chi-square with 1 df.

Breusch-Godfrey Serial Correlation LM Test has been applied to check the presence of auto correlation problems in the chosen model. The results of Breusch-Godfrey Serial Correlation LM test revealed that there is an autocorrelation problem in the chosen model at the lag 3. As 3 lags are used for most of the analysis based on Akaike Information Criteria, the study proceeded with further econometric analysis.

Table.4. Unit Root Test between FII and Macroeconomic Indicators

Variables	Augmented Dickey Fuller Test		
	Level	First Difference	Order of Integration
FII	-7.121053	-10.07207	I(0)
IIP	-1.364208	-12.5756	I(1)
M3	-1.605908	-9.119585	I(1)
MCNSE	-2.961653	-7.807299	I(0)
NEER	-1.170756	-8.297740	I(1)
WACM	-1.518975	-9.995603	I(1)
WPI	-1.980319	-9.912496	I(1)
BSE_RETURN	-10.01449	-11.40542	I(0)

The Table.4 displays the consolidated results of unit root test. It is important that macroeconomic indicators used in the study must be stationary. If the variables are not stationary, it is assumed that they include stochastic or deterministic trends. In order to check whether the time series data are stationary or nonstationary, Augmented Dickey Fuller (ADF) Unit Root test has been applied. The analytical results reveal that all the endogenous and exogenous variables are stationary at first difference. The rejection of null hypothesis against the alternative hypothesis implies that the time series variables such as Foreign Institutional Investment Inflows (FII), Market Capitalisation of NSE (MCNSE) and BSE_RETURN are stationary and integrated the order of zero i.e., I(0). However, exogenous variables such as Index of Industrial Production (IIP), Nominal Effective Exchange Rate (NEER), Weighted Average Call Money Rate (WACM) and Wholesale Price Index (WPI) are stationary and integrated at the order of 1 i.e., I(1). To further validate and strengthen the results, first difference of the series has been taken to ensure stationarity of the data.

Table.5. Granger Causality test between FIIs and Macroeconomic Indicators

Pairwise Granger Causality Tests		
Null Hypothesis	F-Statistic	Prob. Value
IIP does not Granger Cause FII	0.48039	0.9574
FII does not Granger Cause IIP	1.13031	0.3654
M3 does not Granger Cause FII	2.84699	0.0033
FII does not Granger Cause M3	0.37988	0.9876
MCNSE does not Granger Cause FII	0.91553	0.5728
FII does not Granger Cause MCNSE	1.60559	0.1075
NEER does not Granger Cause FII	1.22756	0.2901
FII does not Granger Cause NEER	0.79908	0.6978
WACM does not Granger Cause FII	2.23035	0.0184
FII does not Granger Cause WACM	0.94417	0.5426
WPI does not Granger Cause FII	0.35802	0.9912
FII does not Granger Cause WPI	0.57827	0.9019
BSE_RETURN does not Granger Cause FII	2.16564	0.0221
FII does not Granger Cause BSE_RETURN	0.92279	0.5651

The Table.5 represents the summarized results of Granger Causality Test. Granger Causality Analysis is a statistical hypothesis test for determining whether one time series variable is helpful in predicting the movement of another variable in short run. Granger causality test results have shown the unidirectional relationship between Foreign Institutional Investment Inflows (FII) and exogenous variables like Money Supply (M3), Weighted Average Call Money Rate (WACM) and BSE_RETURN.

Table.6. Auto Regressive Distributed Lag Model of FIIs and Macroeconomic Indicators

Dependent Variable: D(FII)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-30.03749	29.11216	-1.031785	0.3065
D(FII(-1))	-0.593556	0.133656	-4.440919	0.0000
D(FII(-2))	-0.389322	0.139745	-2.785950	0.0072
D(FII(-3))	-0.054976	0.129485	-0.424573	0.6727
D(IIP(-1))	0.478072	1.240771	0.385302	0.7014
D(IIP(-2))	1.695740	1.342413	1.263203	0.2117
D(IIP(-3))	0.715929	1.199720	0.596746	0.5530
D(M3(-1))	-10.05760	12.59367	-0.798624	0.4278
D(M3(-2))	-1.101987	11.84642	-0.093023	0.9262
D(M3(-3))	-6.120662	13.26844	-0.461295	0.6463
D(MCNSE(-1))	-0.085913	0.467426	-0.183800	0.8548
D(MCNSE(-2))	0.485716	0.362850	1.338613	0.1860
D(MCNSE(-3))	0.331381	0.468823	0.706836	0.4825
D(NEER(-1))	-12.10527	10.05567	-1.203825	0.2336
D(NEER(-2))	-14.25304	9.676897	-1.472894	0.1463
D(NEER(-3))	-25.34987	8.801563	-2.880156	0.0056

D(WACM(-1))	-1.305881	1.416875	-0.921663	0.3606
D(WACM(-2))	1.004751	1.999074	0.502608	0.6172
D(WACM(-3))	-0.531999	1.761045	-0.302093	0.7637
D(WPI(-1))	1.125530	2.000530	0.562616	0.5759
D(WPI(-2))	-1.524806	2.013453	-0.757309	0.4520
D(WPI(-3))	-1.016911	2.013443	-0.505061	0.6155
D(BSE_RETURN (1))	0.311455	0.129585	2.403487	0.0195
D(BSE_RETURN (2))	0.012233	0.183258	0.066755	0.9470
D(BSE_RETURN (3))	-0.003961	0.119456	-0.033156	0.9737
IIP(1)	-1.928656	0.898036	-2.147637	0.0360
M3(1)	0.151253	1.156576	0.130776	0.8964
MCNSE(1)	0.276630	0.367733	0.752259	0.4550
NEER(1)	9.029503	4.350070	2.075714	0.0424
WACM(1)	-1.146977	0.802623	-1.429036	0.1585
WPI(1)	-0.323849	1.326259	-0.244182	0.8080
BSE_RETURN (1)	-0.424781	0.253958	-1.672640	0.0999
C				
RESID(-1) ²				
GARCH(-1)				
R ²	0.490791	Mean dependent var	0.002407	
Adjusted R ²	0.213853	S.D. dependent var	1.289331	
S.E. of regression	1.143185	Akaike info criterion	3.379029	
Sum squared residue	74.49164	Schwarz criterion	4.273819	
Log likelihood	-118.3668	Hannan-Quinn criter.	3.739693	
F-statistic	1.772204	Durbin-Watson stat	2.194931	
Prob(F-statistic)	0.030497			

After empirically testing the causality relationship between FIIs and all other explanatory variables (IIP, M3, MCNSE, NEER, WACM, WPI and BSE_RETURN), the study estimated the long run coefficients by using Auto Regressive Distributed Lag Model. This model is considered to be more robust in explaining the regression relationship than ordinary least square. ARDL Model is more reliable and valid than ordinary least square. The estimation results show that the present FDI inflows is having statistically significant and long run relationship with its one and lag value i.e., [FII(-1) and FII(-2)]. This result indicates FII inflows in the previous year negatively influence FII inflows in subsequent months. FII is also having statistically significant and long-run association with Nominal Effective Exchange Rate [NEER(-1)]. The negative coefficient relationship implies that with increase in NEER, there is a consequent decline in the inflows FDI but with a 3 lag only. The fluctuations in the foreign exchange market have implications on the foreign investment inflow. It can be also witnessed from the recent episode like depreciation of Indian Rupee Value against US Dollars. It is also further observed from the results that the BSE_RETURN is statistically significant and positive with lag of

one month. This denotes that with increase in BSE_RETURN, there is an increase in FII inflows. As foreign institutional investors keenly watch the movement of major stock exchange indices, their investment decision is reflected due to this market movement. Regression coefficient of Index of Industrial Production (IIP) is having negative and long-run association with FII inflows. This delineates that the IIP does not trigger the foreign investment inflows. This can be witnessed through the declining performance of industries in terms of output growth. Exogenous variable NEER(1) has a positive regression coefficient with FIIs in line with our expectation. It indicates that exchange affects FIIs in a positive way. Developing countries like India should receive huge amount of foreign investment due to its size of the capital market. However, the regression coefficients of Weighted Average Call Money Rate (WACM) and Wholesale Price Index (WPI) Coefficient have not statistically significant with FIIs.

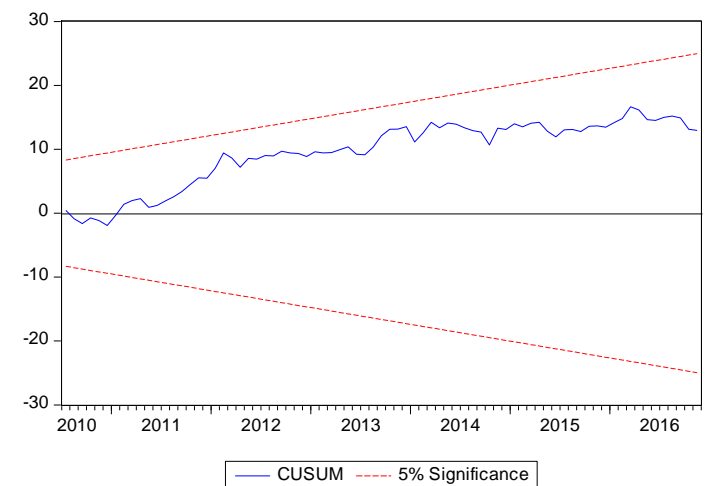


Fig.2. CUSUM Test - Plot of Cumulative Sum of Recursive Residuals

This Cumulative Sum of Recursive Residuals (CUSUM) test has been applied to check the parameter constancy of the chosen model. Normally, an econometric model encompasses of many parameters which are presumed to be constant. Hence, it is inevitable to test the parameter constancy of the chosen model over the sample period and to modify the model if factors are not constant. As cumulative plot lies between these two upper and lower segments, the chosen ARDL model is considered to be stable one.

5. CONCLUSIONS

Foreign investment inflows is considered to be a vivacious element for the economic growth of a developing countries. The Government of India had initiated a series of reforms during the 1990s. It is thriving to boost up the foreign capital through easing of regulatory and investment norms. After opening up the economy for foreign players, Government of India had deregulated various sectors and eased its foreign capital policies since 1990's. In this study, an attempt has been made to analyse the impact of macroeconomic indicators on foreign investment inflows (FIIs) during the pre-crisis period starting from 2009 to 2016. The results of Heteroscedasticity Test revealed the absence

of Heteroscedasticity problem in the chosen variables. The results of Augmented Dickey Fuller (ADF) test showed that FIIs and macroeconomic variables such as Index of Industrial Production (IIP), Money Supply (M3), Market Capitalization of NSE (MCNSE), Nominal Effective Exchange Rate (NEER), Weighted Average Call Money Rate (WACM), Wholesale Price Index (WPI), and BSE RETURN are stationary and suitable for the analysis using econometric tools. There existed a unidirectional causal relationship between Market Capitalization of NSE (MCNSE) and FIIs. The Granger Causality test delineated the short run dynamics of macroeconomic variables like Money Supply (M3), Weighted Average Call Money Rate (WACM) and BSE_RETURN on Foreign Institutional Investment Inflows (FIIs). ARDL explained the explanatory power of macroeconomic indicators like 1 lag and 2 lags Foreign Institutional Investment Inflows [D(FIIs)(-1)] and [D(FIIs)(-2)], Nominal Effective Exchange Rate (NEER) with 3 lags [D(NEER) (-3)], BSE_RETURN with one lag [D(BSE_RETURN(1))] and Index of Industrial Production (IIP) on Foreign Institutional Investment Inflows during post financial crisis period. So, it can be concluded from the results of the various econometric tools that the foreign investors were keen on market related indicators like historical data of indices movement and exchange rate volatility in the investing country especially during post financial crisis period.

5.1 IMPLICATIONS FOR POLICY MARKERS

Exchange rate index of INR (with six major currencies) is found to have negative influence on the FII inflows, therefore the policy makers could bring appropriate policy changes to appreciate the INR which will ensure higher amount of FII inflows.

Government of India could increase its foreign exchange reserves to gain confidence and attract more foreign institutional investors investing in our Indian Stock Market. The policy makers could consider improving the index by offering incentives and attractive benefits for the lacking industries in the economy.

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