

Dynamic Relationship between Macro Economic Indicators and Indian Capital Market: An Application of ADRL Bound Testing Approach

Tom Jacob¹ & Thomas Paul Kattookaran²

Abstract

This empirical study intends to examine the dynamic long and the short run relationship between capital market return (BSE Sensex return) and select macro-economic variables in India using Auto Regressive Distributed Lag (ARDL) Methodology. It can be seen that there is a long run equilibrium relationship between capital market return and macroeconomic variables in India. Empirical results show that FIIs investment and wholesale price index have significant impact on the performance of Indian capital market. FIIs investment is statistically significant and has positive impact on the capital market of India. The wholesale price index has an adverse impact on capital market return. But exchange rate, interest rate, index of industrial production and gold price are statistically insignificant for the performance of the domestic capital market. Variance Decomposition Analysis (VDA) is also used to explore how much forecast error variance of conditional stock market volatility is explained by the innovation of each explanatory conditional macro-economic variables. The result of VDA shows that the capital market return is mostly explained by its own shock.

Keywords: ADF, AIC, ARDL, stock returns, macro economic variables.

¹ Assistant Professor, Department of Commerce, Christ College, Irinjalakuda, Kerala, India, E Mail: tomjacob9753@gmail.com.

² Associate Professor and H.O.D, Research Department of Commerce, St. Thomas College (Autonomous), Thrissur, Kerala, India, E Mail: thomascommerce@gmail.com.

1. Introduction

Financial system of a country is of immense use in its economic development. The volume and growth of the capital market in the country very much depends upon the efficiency and intensity of the operations and activities in the financial market. An immature financial system hinders the growth of the economy. Macro-economic variables are indicators signalling the current trend in the economy. Investing the impact of macro-economic indicators on capital market return is a crucial area of finance. It is commonly believed that macroeconomic variable fluctuations are unpredictable and uncontrollable. From a thorough analysis of the various economic indicators and its implications on the stock markets, it is observed that stock market movements are largely influenced by inflation, exchange rate, interest rate, foreign institutional investors, index of industrial production and gold price. There is a reciprocal relationship between stock return and macro-economic variables. Macro-economic variables influence stock return, and similarly, stock return reflects and influences macro-economic variables of a country. Therefore knowledge of stock markets and macro-economic variables is necessary to understand areas of investment, finance and business environment.

This paper attempts to examine the influence of macroeconomic variable on stock return. Macro-economic variables include exchange rate, T-bill rate as proxy for interest rate, foreign institutional investors, index of industrial production as proxy for economic growth, gold price, and wholesale price index as proxy for inflation. For analysing the stock returns in India, we have taken BSE Sensex, the benchmark stock index for the Indian equity market. It is known that the economic stability of a country could be measured by macroeconomics variables. Some macroeconomic variables reflect economic conditions in India and the economic condition will affect the industry conditions which ultimately will affect the company activity. Therefore, it is said that macroeconomic variables are factors that could not be controlled by the companies which might be affecting the volatility of the stock price.

Determinants of stock prices are expected cash flows from the stock and required rate of return from the stock. Macro-economic indicators influence a firm's cash flow and risk adjusted discount rate. They are dependent up on interest rate, as well as on inflation. Money supply simultaneously negatively and positively affect stock return i.e. increase in money supply can adversely affect the stock return; alternately, money supply increases cash flows, which in turn, increase stock price and stock return. In modern portfolio theory, the Arbitrage Pricing

Theory is based upon the assumption that there are few major macro-economic factors that influence security return. In other words, the expected return from a security is a linear function of various factors affecting the return from a security in the market. These factors are currency rate, index of industrial production, interest rate etc. Each factor is represented by a factor specific beta co-efficient. This theory by Stephen Ross predicts the relationship between the return of a portfolio and return of a single asset through a linear combination of many independent macro-economic variables.

2. Literature Review

Studies which deal with relationship between macro-economic variables and stock return are reviewed. Inflation is the rate of change in general price level of goods and services. It is an important macro-economic variable because it signals the economic health of the nation. Inflation is likely to influence the stock price directly through changes in the price level and indirectly through the policies designed to control it. Therefore the movement of inflation rate affect the stock market through its various channels. Inflation represents one of the major threats to stock investors. According to Fama (1981) inflation adversely or negatively affects economic activity. It also negatively influences stock return. A rise in the expected inflation rate leads to restrictive monetary policies which would increase the interest rate and have a negative effect on stock market activity. Moreover, the inflationary tendency would decrease the purchasing power of the people. A high rate of inflation increases the cost of living and there will be shift of resources from stock market instruments to consumables. This lead to reduction in demand for market instruments, which tends to reduce the volume of trading. Another reason why inflation negatively impact equity price is that the investors shift their portfolio towards real assets if the expected inflation becomes remarkably high. Moreover, high rate of inflation can cause uncertainty about future price and trigger precautionary savings. Higher precautionary saving will impact consumption and hence lead to corporate sales growth. Geske & Roll (1983), Mukherjee & Naka (1995), Sohail & Hussain (2009), Pal & Mittal (2011) also argue that the relationship between inflation and stock return is negative.

The exchange rate is extremely important especially to the countries that depend to a great extent on international trading activities. The change in exchange rate influences international competitiveness of firms, and it affects the value of the company since the expected cash flows change together with changes in the currency values. This will also result in a change in the investments and profitability, reflected in the financial performance and stock returns (Kim, 2003; Agrawal et al., 2010). According to Fama (1981), the exchange rate is a double

edged weapon. In such a case, the impact of exchange rate depends upon whether the firm is an export-firm or import-firm. A depreciation of the local currency will result in higher import prices, while an appreciation of the local currency have the opposite influence, resulting in lower costs for imports. Further, an appreciation in local currency relative to foreign currency is expected to decrease the cost of imported goods, which may be beneficial for the country that has substantial trade relations with foreign market. For exporters, it has the reverse influence. Dornbusch & Fisher (1980) indicate the same; they argue that depreciation in the domestic currency improves the competitiveness of exporting companies, resulting in increasing stock performance. This will result in increasing stock prices as a response to rise in expected cash flows. Conversely, an appreciation in the local currency will decrease the foreign demand of an exporting company. This will lead to a decline in the profit as well as the stock returns.

On contrary, an appreciation in the local currency will lead to a downward movement in the demand of an exporting company and will lead to a decline in the profit and the stock returns. Exchange rate fluctuations affect the international competitiveness of companies, considering their influence on import and export prices. It influences the value of the company since the future cash flows change together with the fluctuations in the currency values. Economic theory suggests that fluctuations in exchange rate will result in a change in the investments and profitability, reflected in the financial performance. Consequently, movements in the company's operations affect stock returns. The relationship between exchange rate and stock prices has been found to be positive (Gay, 2008) whereas some others have found it to be negative (Abugri, 2008). Hence the relationship between stock prices and exchange rate is empirical proved.

The increased interest rate has a single direct effect on stock price. Any increase in the interest rate will raise the cost of capital, hence corporate costs increase and profits fall in response, which may depress the value of the company's stock. There are other two equivalent explanations why expectations of higher interest rates would lower stock prices. First, for an investor to value future dividends, they must discount them back to the present time. Since higher interest rates make a given future dividend less valuable in terms of today's rupee, the value of that share or stock will decline. Second, the higher real interest rate increases the required return on stocks. Consequently it makes other investments, such as bonds, more attractive to investors. Several studies find that interest rates and stock prices are negatively related. According to the results of the Abugri (2008), the response of stock returns to interest rate is negative and significant in Brazil, Argentina, and Chile.

Industrial production Index (IIP) is used as proxy to measure the growth rate in the real sector. IIP is a measurement that represents the status of production in the industrial sector for a given period of time. It helps to measure the level of industrial activity in the Indian economy. The industrial production index presents a measure of the overall economic activity and affects stock prices by way of its influence on expected future cash flows. Thus, it is expected that an increase in the industrial production index can be positively related to stock price. The IIP and stock prices are positively related because an increase in the IIP results in an increase in production of industrial sector and leads to an increase in the profit of industries and corporations and thereby, results in the increase of share prices.

Naka, Mukherjee, & Tufte (1998) point out that industrial production is the most important determinant of Indian stock prices and there exist a positive relationship between them. Humpe & Macmillan(2009) indicate that both the US and Japanese stock prices are positively related to industrial production. Abugri(2008) reports that changes in industrial production have a positive and significant effect on stock returns in Brazil and Chile. The results of both developed and emerging market generally indicate a positive relationship between real economic activity and stock return. The relationship between stock price and economic growth has also been studied by Levin & Zervos (1996). The study finds a strong positive correlation between stock prices and real activity.

In the era of globalization, investment in international stock market is very common. The term “foreign institutional investment” or FII is used most commonly in India to refer to investments in the Indian financial markets by cross-border financial institutions. International institutional investors must register with the SEBI to participate in the market. Positive fundamentals, combined with fast-growing markets, have made India an attractive destination for foreign institutional investors. FII acts as a stimulator for the development of the country’s economy because it helps in obtaining capital at a lower cost and provides access to cheap global credit. Moreover, it complements domestic savings and investments. FII is allowed to enter into our country only through stock exchanges.

Due to unstable world markets, there is an increasing interest in gold. Some financial theorists argue that gold could be considered as a safe investment when the economic environment is uncertain. Gold is a substitute and a secure investment avenue for investors. In order to avoid to loss due to volatility in the stock market, the smart investors prefer to divert their funds and intend to invest on the safer side. In the view of the prudent investors in the stock market, gold is one of the safest investment avenues in times of bearish stock market. It has

been observed that whenever the share market goes down, the gold prices go up. When other investments are risky, people usually tend to invest in gold and when money is invested in gold, the price of gold increase; when other investments become safe, people disinvest from gold and enter into the other investments, resulting in the decline in demand for gold, thereby decreasing the price of gold. Therefore, a negative relationship is expected between gold prices and stock prices. Thus, the price of gold is a very important macroeconomic variable that influences stock market movement. Moore(1990) found that the gold prices and the stock or bond prices are negatively correlated; this means that when gold prices are rising, the stocks or bond markets are on the decline.

After a thorough review of literature, it was found that the following variables are extensively used in literature viz., foreign institutional investment, interest rate, inflation rate, gold price and exchange rate as macroeconomic indicators influence or predict stock return.

3. Materials and Methods

Arbitrage Pricing Model (APM) explains that stock price is influenced by the macro economic variables like inflation, exchange rate, money supply, gold price, interest rate etc. Literature also reveals that macro-economic variables and capital market returns are related. Many researchers have used macro-economic variables to explain the stock market return of Indian capital market. Therefore, this study focus on how significantly does the macro economic variables contribute to the performance of Indian capital market. In other words, what are the effects of macro-economic variables on the performance of Indian capital market. This research paper also tried identify to the volatility of Indian capital market with respect to changes in the macro-economic variables in India.

3.1 Objectives of the Study

- To analyse the impact of macro-economic variables on capital market (BSE Sensex) in India.
- To examine the development of Indian capital market as a result of growth in various macro-economic variables.

3.2 Hypothesis of the Study

The macro economic variables such as inflation, exchange rate, interest rate, foreign institutional investors, index of industrial production and gold price have significant impact on the performance of Indian capital market (BSE Sensex).

3.3 Research Methodology

This study is based on secondary data. The required information related to inflation, exchange rate, interest rate, foreign institutional investors, index of industrial production and gold price were gathered from various sources like RBI Bulletin, Publications from Ministry of Commerce, SEBI Handbook, Handbook of statistic of Indian economy, RBI database etc. The current study considers 23 years data starting from 1995 to 2018. In order to capture the dynamic link, both short run and long run, between stock market return and macro-economic variables, advanced econometric technique of Auto Regressive Distributed Lag (ARDL) Model was used. The analysis was carried out by using the statistical package of E views 8.

3.4 Limitations of the Study

The capital market performance is measured only based on BSE Sensex. Effect of international macro-economic variables on the performance of Indian capital market is not considered in this study.

3.5 Empirical Model

The model of macroeconomic determinants of stock market return (SMR) in India is formulated with six independent variables. It includes Foreign Institutional Investors (FIIs), Interest Rate (IR), Index of Industrial Production (IIP), Gold Price (GP), inflation (WPI) and Exchange Rate (NEER). A linear equation model is developed:

$$\text{SMR} = f(\text{FIIs}, \text{NEER}, \text{WPI}, \text{IR}, \text{IIP}, \text{GP})$$

Where,

SMR=Domestic Stock Market Return

FIIs=Foreign Institutional Investment

NEER=Nominal Effective Exchange Rate

IR=Interest Rate

WPI=Wholesale Price Index

IIP=Index of Industrial Production

GP=Gold price

On the basis of review of literature, the expected relationship between macroeconomic variables and stock return as represented in the Table 1.

Table 1: Expected Relationship between Macroeconomic Variables and Stock Return

Dependent Variable	Independent Variables	Expected Relationship
SMR	NEER	Positively or Negatively related
	WPI	Negatively related
	IIP	Positively related
	FII	Positively related
	GP	Negatively related
	IR	Negatively related

Source: Literature Review

4. Results and Discussions

4.1 Stationarity Test

The Augmented Dickey-Fuller Unit root test is used to check the stationarity of the time series. It is seen from the result the entire variables are stationary at level or first difference. Table 2 shows that domestic stock market return or Sensex return (SMR), foreign institutional investment (FII) and interest rate (IR) are stationary at level i.e., I(0). At the same time wholesale price index (WPI), index of industrial production (IIP), gold price (GP) and exchange rate (NEER) are stationary at first difference i.e. I(1).

Table 2: ADF Unit Root Test for Determinants of Stock Return

Variables	ADF Unit Root Test
SMR	I(0)
FIIs	I(0)
NEER	I(1)
IR	I(0)
WPI	I(1)
IIP	I(1)
GP	I(1)

Source: ADF Unit Root Test, E Views 8.

4.2 ARDL Model

To empirically analyse the long run relationship and short run dynamics of stock market return with macroeconomic variables, the above model has been estimated by the Auto Regressive Distributed Lag (ARDL) Model. Where t-1 is variable's lagged value by one period and t-2 is variable's lagged value by two period, t-3 is variable's lagged value by third period and t-4 is variable's lagged value by fourth period. Table 3 shows that R-square value is 33 percent. This indicates that macro-economic variables explain 33 per cent of variation in the Sensex return.

Table 3: ARDL Model for Determinants of Stock Return

Dependent Variable: SMR				
Method: ARDL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
SMR(-1)	0.201924	0.060817	3.320207	0.0010
FII	0.032152	0.005229	6.149051	0.0000
FII(-1)	0.004222	0.005689	0.742097	0.4588
FII(-2)	-0.012232	0.005068	-2.413515	0.0165
NEER	0.522024	0.222325	2.348026	0.0197
NEER(-1)	-0.568133	0.221766	-2.561861	0.0110
IR	-0.101583	0.135449	-0.749973	0.4540
IR(-1)	-0.013365	0.139234	-0.095987	0.9236
IR(-2)	-0.115902	0.136251	-0.850654	0.3958
IR(-3)	0.361646	0.135147	2.675937	0.0080
IR(-4)	-0.259441	0.127180	-2.039956	0.0424
WPI	-0.980165	0.571065	-1.716380	0.0874
WPI(-1)	0.025329	0.597166	0.042415	0.9662
WPI(-2)	-0.598829	0.589850	-1.015223	0.3110
WPI(-3)	1.630970	0.590135	2.763723	0.0062
WPI(-4)	-1.547871	0.561550	-2.756427	0.0063
IIP	-0.017445	0.021791	-0.800592	0.4242
GP	-7.33E-05	0.000109	-0.669904	0.5036
C	9.236356	6.547078	1.410760	0.1596
R-squared	0.339650	Mean dependent var	1.018919	
Adjusted R-squared	0.290124	S.D. dependent var	6.127300	
S.E. of regression	5.162504	Akaike info criterion	6.191250	
Sum squared resid	6396.348	Schwarz criterion	6.452175	
Log likelihood	-782.7668	Hannan-Quinn criter.	6.296157	
F-statistic	6.857982	Durbin-Watson stat	2.040443	
Prob(F-statistic)	0.000000			

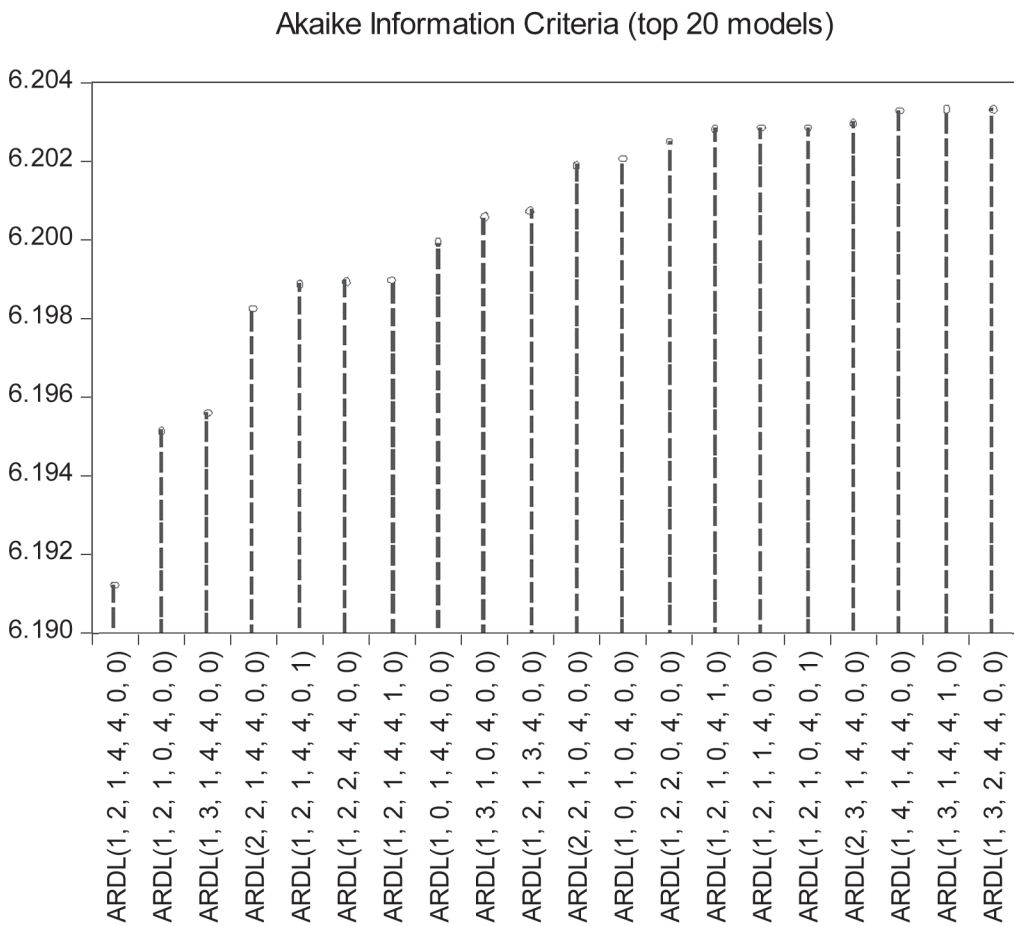
*Note: p-values and any subsequent tests do not account for model selection.

Source: ADRL Model, EViews, 8.

$$SMR = \alpha + \beta_1SMR_{t-1} + \beta_2FII_t + \beta_3FII_{t-1} + \beta_4FII_{t-2} + \beta_5NEER_t + \beta_6NEER_{t-1} + \beta_7IR_t + \beta_8IR_{t-1} + \beta_9IR_{t-2} + \beta_{10}IR_{t-3} + \beta_{11}IR_{t-4} + \beta_{12}WPI_t + \beta_{13}WPI_{t-1} + \beta_{14}WPI_{t-2} + \beta_{15}WPI_{t-3} + \beta_{16}WPI_{t-4} + \beta_{17}IIP_t + \beta_{18}GPT + C$$

4.3 Optimum Lag Length Selection Criteria

Akaike Information Criterion (AIC) is used to choose the optimum lag length of the model. The result shows 20 best model with lowest AIC values. The Figure 1 shows that the optimal lag length of the ARDL model is (1, 2, 1, 4, 4, 0, and 0).



Source: AIC, EViews, 8.

Figure 1: Akaike Information Criterion (AIC)

4.4 ARDL Bound Test Approach for Co-integration

ARDL Bound Test is used to investigate the Co-integration or long run relationship between macroeconomic variables and stock return. The computed F-statistic is 25, which is more than the upper bound critical value at 5 percent level (Table 4). It indicates that there is a long term relationship or co-integration between variables of this model. Thus, there is a long-run co-integration or relationship between domestic stock market return (SMR) and macroeconomic variables such as economic Growth (IIP), inflation (WPI) and exchange rate (NEER), interest rate (IR), foreign institutional investors (FIIs) and gold price (GP).

Table 4: ARDL Bound Test for Determinants of Stock Return

ARDL Bounds Test				
Null Hypothesis: No long-run relationships exist				
Test Statistic	Value	k		
F-statistic	25.02986	6		
Critical Value Bounds				
Significance	I(0) Bound	I(1) Bound		
10%	2.12	3.23		
5%	2.45	3.61		
2.5%	2.75	3.99		
1%	3.15	4.43		
Test Equation:				
Dependent Variable: D(SMR)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FII)	0.031728	0.005239	6.055796	0.0000
D(FII(-1))	0.012251	0.005076	2.413465	0.0166
D(NEER)	0.535477	0.221126	2.421586	0.0162
D(IR)	-0.104658	0.136009	-0.769493	0.4424
D(IR(-1))	0.013124	0.158944	0.082568	0.9343
D(IR(-2))	-0.106801	0.147155	-0.725773	0.4687
D(IR(-3))	0.258668	0.127627	2.026746	0.0438
D(WPI)	-0.950310	0.578539	-1.642604	0.1018
D(WPI(-1))	0.551666	0.716093	0.770384	0.4418
D(WPI(-2))	-0.095869	0.636132	-0.150706	0.8803
D(WPI(-3))	1.574406	0.560552	2.808671	0.0054
C	9.094066	6.633704	1.370888	0.1717
FII(-1)	0.024046	0.007397	3.250826	0.0013
NEER(-1)	-0.045208	0.052321	-0.864051	0.3884
IR(-1)	-0.127341	0.143663	-0.886390	0.3763
WPI(-1)	-1.448329	0.865781	-1.672859	0.0957
IIP(-1)	-0.017448	0.022051	-0.791244	0.4296
GP(-1)	-7.12E-05	0.000111	-0.643120	0.5208

SMR(-1)	-0.799092	0.060981	-13.10390	0.0000
R-squared	0.572644	Mean dependent var	0.018571	
Adjusted R-squared	0.540593	S.D. dependent var	7.618765	
S.E. of regression	5.163969	Akaike info criterion	6.191817	
Sum squared resid	6399.977	Schwarz criterion	6.452742	
Log likelihood	-782.8403	Hannan-Quinn criter.	6.296724	
F-statistic	17.86627	Durbin-Watson stat	2.039316	
Prob(F-statistic)	0.000000			

Source: ADRL Bound Test, EViews, 8.

Table 5 shows that the coefficient of foreign institutional investment is statistically significant and has a positive impact on capital market. Likewise, inflation is another extremely important variable in stock market performance. Inflation has an adverse impact on stock market performance. On the other side, the impact of exchange rate, interest rate, Index of Industrial Production and gold price are statistically insignificant in the performance of domestic stock market in India. Ibrahim (2003), Chaudhary & Smiles (2004) and Buyuksalvarci (2010) also reveal the same finding.

Table 5: Co-Integrating Form and Long-Run Coefficients

ARDL Co-integrating and Long Run Form				
Dependent Variable: SMR				
Short Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FII)	0.032152	0.005229	6.149051	0.0000
D(FII(-1))	0.012232	0.005068	2.413515	0.0165
D(NEER)	0.522024	0.222325	2.348026	0.0197
D(IR)	-0.101583	0.135449	-0.749973	0.4540
D(IR(-1))	0.115902	0.136251	0.850654	0.3958
D(IR(-2))	-0.361646	0.135147	-2.675937	0.0080
D(IR(-3))	0.259441	0.127180	2.039956	0.0424
D(WPI)	-0.980165	0.571065	-1.716380	0.0874
D(WPI(-1))	0.598829	0.589850	1.015223	0.3110
D(WPI(-2))	-1.630970	0.590135	-2.763723	0.0062
D(WPI(-3))	1.547871	0.561550	2.756427	0.0063
D(IIP)	-0.017445	0.021791	-0.800592	0.4242
D(GP)	-0.000073	0.000109	-0.669904	0.5036
CointEq(-1)	-0.798076	0.060817	-13.122659	0.0000
Cointeq = SMR - (0.0303*FII -0.0578*NEER -0.1612*IR -1.8426*WPI -0.0219*IIP -0.0001*GP + 11.5733)				
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FII	0.030251	0.008696	3.478542	0.0006

NEER	-0.057776	0.064499	-0.895762	0.3713
IR	-0.161194	0.178773	-0.901671	0.3681
WPI	-1.842640	1.087481	-1.694411	0.0915
IIP	-0.021859	0.027256	-0.802007	0.4233
GP	-0.000092	0.000137	-0.671491	0.5026
C	11.573277	8.157512	1.418726	0.1573

Source: Co-integration Test, EViews, 8.

4.5 Short Run Coefficient and Error Correction Term

The short run coefficient and error correction term of the macroeconomic variables on domestic stock market return is also presented in the Table 5. Inflation rate (wholesale price index) and exchange rate (NEER), interest rate (IR), and foreign institutional investment (FIIs) are statistically significant while economic growth (IIP) and gold price (GP) are statistically insignificant in the short run. The coefficient of Error Correction Term should be significant and should be negative. The equilibrium of Error Correction Term estimated -0.798076 has the right sign (negative) and is highly significant at 1%. The absolute value of coefficient ECT is very high indicating very high speed of adjustment to equilibrium following short run shock. The disequilibrium caused by the previous month's shock converges back to long-run equilibrium in the current month. This result provides the evidence of Co-integration (long-run relationship) among variables in the model.

4.6 Variance Decomposition Analysis

The Variance Decomposition Analysis (VDA) method helps to estimate the proportion of Sensex return affected by various determinants of macroeconomic variables in the long run. VDA is unable to identify whether the impact of the macro economic variables are positive or negative. The results of VDA are presented in the Table 6. The empirical evidence indicates that 94 percent of Sensex return change is contributed by its own innovative shocks. Further, shock in FIIs explains change in Sensex return by 3 percent and WPI contribute 0.49 percent. The remaining is the contribution of other macro-economic variables.

Table 6: Variance Decomposition Analysis of Sensex Return

Variance Decomposition of ASR								
Period	S.E.	ASR	FII	NEER	IR	WPI	IIP	GP
1	5.909	100.000	0.000	0.000	0.000	0.000	0.000	0.000
2	6.144	96.339	2.828	0.449	0.000	0.165	0.079	0.139
3	6.169	95.755	2.947	0.478	0.019	0.361	0.214	0.227
4	6.176	95.592	2.996	0.479	0.023	0.426	0.236	0.249
5	6.183	95.383	3.029	0.547	0.024	0.438	0.304	0.273
6	6.191	95.162	3.055	0.674	0.027	0.439	0.344	0.298
7	6.200	94.930	3.063	0.821	0.034	0.446	0.387	0.318
8	6.209	94.711	3.069	0.957	0.045	0.459	0.426	0.332
9	6.216	94.516	3.072	1.073	0.059	0.478	0.461	0.342
10	6.222	94.344	3.073	1.169	0.075	0.497	0.492	0.350

Source: Variance Decomposition Analysis, E Views,8.

5. Conclusion

Over the years it has been observed that there is a significant relationship between market return of BSE Sensex and macro-economic variables in India. This study investigates the long run and short run relationship between selected macro-economic variables and stock return in Indian capital market using different statistical analysis of ARDL approach and Error Correction Model. In other words, this study investigates the short and long run relationship between macro-economic variables and capital market return in India. The empirical result shows that foreign institutional investment and inflation significantly affect stock market return in India. Exchange rate, inflation, foreign institutional investment and interest rate have significant impact on the stock market return in the short run while foreign institutional investment and inflation have significant impact on the stock market return in the long run. Foreign institutional investors have been the key drives of Indian equity market ever since they were allowed to invest since 1992. In short, Indian equity markets are highly influenced by foreign institutional investor's activity. But FIIs investment is frequently referred to as hot money for the reason that it can leave the country at the same period at which it comes in. In countries like India statutory agencies like SEBI has prescribed norms to register FIIs and also to regulate such investment flowing in through FIIs.

Reference

- Abugri, B. A. (2008). Empirical Relationship between Macroeconomic Volatility and Stock Return: Evidence from Latin American Markets. *International Review of Financial Analysis*, 17(2), 396-410.
- Agrawal, D. G., Srivastav, A. K., & Srivastava, A. (2010). A Study of Exchange Rates Movement and Stock Market Volatility. *International Journal of Business and Management*, 5(12), 110-122.
- Dornbusch, R., & Fischer, S. (1980). Exchange Rates and the Current Account. *American Economic Review*, 70(2), 960–971.
- Fama, E.F (1981), Stock Returns, Real Activity, Inflation, and Money. *The American Economic Review*, 71(4), 545-565.
- Fama, E. F. (1990). Stock Returns, Expected Returns, and Real Activity. *The Journal of Finance*, 45(4), 1089–1108.
- Gay, D. R. (2008), Effect of Macroeconomic Variables on Stock Market Returns for Four Emerging Economies: Brazil, Russia, India, and China. *International Business & Economics Research Journal*, 7(3), 1-8.
- Geske, R. & Roll, R. (1983), The Fiscal and Monetary Linkage between Stock Returns and Inflation. *The Journal of Finance*. 38(1), 1-33.
- Humpe, A., & Macmillan, P, (2007), Can Macroeconomic Variables Explain Long Term Stock Market Movements? A Comparison of the US and Japan, Centre for Dynamic Macroeconomic Analysis Working Paper Series.
- Kim, K. (2003). Dollar Exchange Rate and Stock Price: Evidence from Multivariate Co-integration and Error Correction Model. *Review of Financial Economics*. 12(4).301-313.
- Levine, R., & Zervos, S. (1996). Stock Market Development and Long-Run Growth. *World Bank Economic Review*, 10(2), 323–339.
- Moore, Geoffrey H. (1990), Gold Prices and a Leading Index of Inflation. *Challenge*, 33 (4), 52-57.
- Mukherjee, T.K. & Naka, A. (1995), Dynamic Relations between Macroeconomic Variables and the Japanese stock market: An Application of a Vector Error Correction Model. *Journal of Financial Research*, 18(2), 223-237.
- Naka, A., Mukherjee, T., & Tufte, D. (1998). Macroeconomic Variables and the Performance

Tom Jacob & Thomas Paul Kattookaran

of the Indian Stock Market, Department of Economics and Finance Working Papers, 1991-2006), University of New Orleans. U.S.

Pal, K. & Mittal, R. (2011), Impact of Macroeconomic Indicators on Indian Capital Markets. *The Journal of Risk Finance*, 12(2), 84-97.

Sohail, N. & Hussain, Z. (2009), Long-run and Short-run Relationship between Macroeconomic Variables and Stock Prices in Pakistan: The case of Lahore Stock Exchange. *Pakistan Economic and Social Review*, 47(2), 183-198.