

RELATIONSHIP BETWEEN MACROECONOMIC VARIABLES AND STOCK MARKET TREND

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ABSTRACT

In the present global business era each country is trying to spectator binary number economic growth which is forcing them to adopt swift innovation and rivalry across the globe. In this context Foreign direct investment (FDI) and Foreign Institutional Investment (FII) acting as indicator for the economic growth. FDI and FII has become a gauge instrument for the economic development in India as well as other countries. The purpose of this research is to find out the relationship between stock market trend and the macroeconomic variables i.e. FDI and FII using multiregression techniques where Sensex and Nifty were considered as the diplomat for the Indian Stock market indices. 18 years of data was taken in the study from 2000-2001 to 2017-2018. The findings specifies FDI and FII are moving in a trend with coordination with the Sensex and Nifty and the macroeconomic variables determine the stock market trend The findings will have a immense implication for the national policy makers as well as to corporate institutions.

Key words: FDI, FII, Sensex, Nifty, Macroeconomic.

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1. INTRODUCTION

In the last two decades the development in stock market has taken place in a remarkable manner in our country not only by mobilizing funds in a effective manner rather it has given scope to all the intermediaries in the stock market by showing a tremendous trend in the turnover ratio, stock market capitalization, the volume of trading and most important parameter by stabilizing stock prices in creating wealth for the investors. The stock market in the country was able to maintain transparency in the formulating guidelines and keeping efficiency in converting the information in to share prices quickly. Though share price movement is dependent upon many factors, the present study could not ignore in highlighting the impact of macroeconomic variables upon its movement. The economic condition of a country also revealed by the trend in the indices of the stock market by representing the financial as well as expenditure pattern of the blue chip companies of the economy. The macroeconomic fundamentals affect the performance of both the indices of BSE and NSE. BSE started functioning from the year 1875 and NSE started in the year 1992. There are a lot of reforms happened in the functioning of the capital market with the initiation of liberalization, privatization and globalization policies. New guidelines were added in the functioning of stock market with Basel III norms after the global financial crises seen in the year 2008. The stock market performance is depicted by many a variables like inflation, industrial production, foreign investments, gold price, crude oil price, exchange rate, money supply, bank credit, openness of the country through international trade, etc., in the present study the association in between stock market trend and macroeconomic variables were studied. As stock market trend both the indices of BSE and NSE were taken and as macroeconomic factor the values of foreign direct investments and foreign institutional investments were taken in to consideration. In the last two decades the importance of foreign investments were felt in representing the value additions in the stock market trend. India as an emerging economy is highly dependent on foreign investments in order maintains a healthy fiscal position without compromising its own policy guidelines.

2. LITERATURE REVIEW

Dahir, A. M., (2018) employed volatility tests through AGARCH model in between change in foreign exchange rate and stock market return in BRICS countries keeping in view stock market movement represents both domestic and foreign investors strategies. For the analysis the data were collected from 2006 to 2016 to run the tests for volatility, lead lag and comovement relationships. The findings of the study revealed that as China is highly capitalized country that did not so any sensitivity towards volatility in exchange rate. It was also suggested that stock exchange rate is not a leading indicator for affecting stock returns for those investors meant for a short term holding in comparison to those who holds the equities for a medium or long term investments. Mitra, R.,(2017), examined the relationship between real effective exchange rate and the total value of market capitalization both in short as well as long term perspective in South Africa in between 1979 to 2014 known as Bretton Woods period. By implementing the dynamic co-integration technique the study indicated that in South Africa a positive relation exists in between market capitalization of the index and exchange rate in long run. By comparing the time series data of U.S. and South Africa it was also seen there was no co-integration in between the market capitalization of these two countries. Kal, S. H., (2015) examined the impact of change in foreign exchange returns on the relationship between the returns yields from interest rate and stock market. Impulse response function, Vector autoregressive model were used to achieve the basic objectives of the research area. Data were collected on four currencies in order to frame the exchange rate model which helped in determining to find out the deviation from the fundamentally determined rate of return. During the study period it was found that Sharpe ratios of securities investments in the currencies

affected the over or under valuation of the exchange rates in comparison to their fundamental values. Tang, X., et al., (2018) had analysed the impact of financial structure on exchange rate and stock market trend by including the data of eleven emerging countries. By utilizing the co-integration methodology and multivariate granger causality tests, the study found financial structure acts as a strong indicator in establishing the relationship between stock prices and exchange rate. On the other side financial economic structure had not much contribution towards establishing such relationships. Heimonen, K., et. al., (2017), utilized the Taylor rule in order to measure its significance by measuring the relationship between exchange rate and stock prices effectively. For establishing the Taylor rule data were framed from 1999 to 2016 for fourteen OECD countries. The study revealed that unlike other theories belonging to this rule which has previously explained that inflation and real economic activity were playing a major role, but in this analysis as stock price information dividend data and real exchange rate as currency market data were seen as relevant in the formation of the Taylor rule. Gong, P., et. al., (2017), examined the impact of changes in interest rate and exchange rate on the stock market in China. It has seen that when yen has depreciated and interest rate has increased the stock market was showing a downward trend. The author has suggested that lottery type stocks were always preferred by retail investors. An aggregate behavior was also found that is monetary policy announcements and changes in the exchange rate at the extreme level affects mostly the stock prices in China as these factors were very powerful in gaining public attention collectively. Gyntelberg, J. et al (2018) used daily frequency data on the transactions by foreign investors and analysed the impact of the volume of that transactions on exchange rate volatility in Thailand. They have seen that volatility in stock prices were dependent upon the availability of private information by the foreign investors capital flows. The findings of the information suggested that the amount brought by the investors in the bond market was not significantly affected the exchange rate where as exchange rate were changed because of the volume of transactions and capital flows done by the foreign investors during the study period. Karmakar, N., (2017) employed VAR, CVAR, AR-T-GARCH-EVT model in order to frame the marginal as well as joint model on the foreign exchange market in India. The study revealed that foreign exchange market never crash together rather to boom together. Through the AR-T-GARCH-EVT model the marginal distribution in individual currency return series was established. Out of the seven copulas used BB1 fitted as the copula by using their BIC, LL and AIC values. By using VAR and CVAR model portfolio risk in a joint model was found on the basis of their efficient frontiers. Tsagkanos, A., et al (2013) employed structural nonparametric cointegrating regression model in order to measure the existence of long-run relationship in between foreign exchange rate and stock market index in two countries those are USA and EU. The data were structured in two data set post financial crisis 2008 to 2012 and before the financial crisis an another data series. By using the portfolio balance effect theory it was evident that there exists a causal relationship in the short run in between the variables. By implementing the advanced structural non-parametric cointegrating regression in between stock exchange rate and stock price index it was revealed that in USA there exist a short run causal relationship and in EU a long run causality between the variables were found during the study period. Andries, A. M., (2017) examined the relationship in between interest rate and exchange rate in Romania. By implementing wavelet-based methodology the study has revealed that there exists a negative relationship in the short term and a positive relationship in the long run in between the two variables and always interest rate took the lead. The study has also suggested that the findings are different in comparison to the developed economies as they are not so directly affected by inflation adjusted monetary policies always. During the study period it was also suggested that in order to achieve the monetary policy objectives there is need of giving equal importance to both the variables by the central bank of the country. W. Li, et al., (2018) established a versatile relationship between stock market index liquidity and exchange rate in China by using the data

series of Shanghai Component Index, the Shenzhen Component Index and Chinese Yuan Nominal Effective Exchange Rate from 2010 to 2017 with 1617 observations. The study has also suggested that because of the strict monetary policy in the country there was a positive persistence exists in the running of cross-correlation analysis in between stock market liquidity and the exchange rate. U. Bashir, et al.,(2016) worked on the relationship between stock market movement and exchange rate fluctuation with a motive to help the investors, organizations, portfolio managers to give a dynamic understanding regarding the linkage between the two variables so that they can avoid any risk associated with their investments in the changing market conditions. For the study data were collected from 1991 to 2015 and employed cross correlation test and causality test in the Latin American countries. The results suggested that a strong positive cross correlation was found in Mexico. A negative cross correlation was found in Mexico and Chile in the short run and in the long run that became slightly positive. In Argentina in short run a weak positive cross correlation was found which increased slightly in the long run. J.-F. Boilard, et al (2018) studied the impact of event rates on foreign currency market in Japan by collecting the data from interbank foreign exchange market i.e. EBS. The data are collected for three weeks of 2011. A high degree of correlation was also found between the market events with consideration to injection, cancellation, transaction and diffusion of the mid price. Zolfaghari, M., (2017) examined the value at risk of the operating oil companies on the Teheran stock exchange by implementing MRS-GARCH model. The value at risk of stock returns of the operating oil companies were significantly affected by the volatility in the exchange rate during the study period from 2012 to 2016. The data were analysed and compared on the basis of both ARMA GARCH family model and MRS-GARCH family model and the findings suggested that MRS-EGARCH-M model was superior than MRS-GARCH model on the basis of the comparisons formed. Liao, S., et al., (2011) investigated the financial characteristics issues in Taiwan's capital market by implementing a data mining approach to measure the co-movement in between exchange rate and Taiwan's capital market. The data in relation to exchange rate and capital market were collected from E. Sun Bank web site from 2006 to 2008 with 138 observations. By doing the data mining operation various portfolio were established in between foreign currencies and category of stock indexes in Taiwan which will help the investors and portfolio managers in building up the respective financial investment proposals. Tudor, C., et al (2012) analysed the movement of exchange rates and stock prices in 6 emerging and 6 developed financial market by utilizing the Granger causality tests during 1997 to 2012. The study revealed that in UK volatility in stock price was a major factor for the volatility in exchange rate. In Korea both the variables became very interactive during the study period. In Brazil and Russia change in exchange rate affects the stock returns in the subsequent month. Though the direction of causality found through Granger causality still correlation among the variables could not be found out during the study period. Dieci, R., et al., (2013) established a financial model which helps the investors in designing proper strategies in determining their order size. This model considered from the point of view of both domestic as well as foreign investors requirements as they are dependent on foreign exchange market for their trading. The financial model has involved natural nonlinearity at its state on the basis of the connections in between the stock market of two countries and the foreign exchange market which will help the speculators of both the countries in implementing their technical fundamental trading strategies. Afshan, S., et al., (2018) utilized the wavelets approach in order to establish a strong relationship in between foreign exchange rate and stock market index. For the analysis purpose the weekly data were collected from 1999 to 2016 in relation to USD/PKR, YEN/PKR, EUR/PKR, PKR/GBP and CNY/PKR as exchange rate and SP as stock price index. For the stationarity of the data set unit root test was implemented on the log series of the dataset. The study has revealed that there was presence of bidirectional causality in the long

run. It was also observed that both the variables are leading and lagging each other during the study period.

3. RESEARCH OBJECTIVES

- To learn the force of Foreign Direct Investment on Indian Stock market trend
- To learn the force of Foreign Institutional Investment on Indian stock market movement.

4. RESEARCH METHODOLOGY

The study is based on secondary data collected from RBI and NSE and BSE Website. The study considers 18 years of data from 2000 to 2018. Statistical tools i.e. Correlation and Multiregression analysis was used for analysis the data. Correlation coefficient measures the strength of relation between the variables. The variables considered in the study for finding the relation are Sensex, Nifty, FDI and FII. Multiple regression analysis was used to find out the cause and effect of FDI, FII on Sensex and Nifty.

5. DATA ANALYSIS

Table 1 Flow of FDI and FII to India

YEAR	SENSEX	NIFTY	FDI Rupees Billion	FII Rupees Billion
2000-01	4269.69	1291.43	184.04	118.20
2001-02	3331.95	1075.87	292.45	92.90
2002-03	3206.29	1074.05	243.97	45.04
2003-04	4492.19	1740.06	198.30	518.98
2004-05	5740.99	2021.94	269.47	413.12
2005-06	8278.55	2772.61	394.57	553.57
2006-07	12277.33	3910.18	1026.52	318.81
2007-08	16568.89	5963.57	1394.21	1106.19
2008-09	12365.55	2895.80	1906.45	-650.45
2009-10	15585.21	5099.74	1578.19	1539.67
2010-11	18605.18	5971.32	1323.58	1393.81
2011-12	17422.88	4782.36	1549.61	855.71
2012-13	18202.10	5890.96	1469.54	1464.67
2013-14	20120.12	6246.87	1868.30	296.80
2014-15	26556.53	8309.87	2158.93	2578.53
2015-16	26322.10	7802.64	2942.58	-272.03
2016-17	27338.22	8114.03	2832.92	504.82
2017-18	32314.10	10322.26	4,741	-354

Source: NSE, BSE and DIP Websites

The above table represents the data about FDI, FII, Sensex and NIFTY from the website of NSE, BSE and DIPP. The data is taken from 2000-01 to 2017-18.

Table 2 Correlation Analysis of FDI, FII on Sensex and Nifty

		Correlations			
		Sensex	Nifty	FDI Rupees Billion	FII Rupees Billion
Sensex	Pearson Correlation	1	.990**	.930**	.210
	Sig. (2-tailed)		.000	.000	.402
	N	18	18	18	18
Nifty	Pearson Correlation	.990**	1	.908**	.267
	Sig. (2-tailed)	.000		.000	.284
	N	18	18	18	18
FDI Rupees Billion	Pearson Correlation	.930**	.908**	1	-.091
	Sig. (2-tailed)	.000	.000		.720
	N	18	18	18	18
FII Rupees Billion	Pearson Correlation	.210	.267	-.091	1
	Sig. (2-tailed)	.402	.284	.720	
	N	18	18	18	18

** . Correlation is significant at the 0.01 level (2-tailed).

From the table it was found there is a very strong correlation between Sensex and FDI and Nifty and FDI but very weak correlation between the Nifty and FII as well as Sensex with FII and the correlation is not significant.

Hypothesis testing

H0 FDI, FII Inflow and Stock Market Movement is Independent of each other

H1 FDI, FII Inflow and stock market Movement are dependent on each other

MultiRegression Analysis of FDI, FII on Sensex

Table 3 Model Summery

<i>Model</i>	<i>R</i>	<i>R Square</i>	<i>Adjusted R Square</i>	<i>Std. Error of the Estimate</i>	<i>Durbin-Watson</i>
1	.976 ^a	.953	.946	2112.41562	1.731

a. Predictors: (Constant), FII Rupees Billion, FDI Rupees Billion

b. Dependent Variable: Sensex

The table shows that the predictors i.e FDI, FII are able to explain 94.6% of the variation in the dependent variable which is the Sensex. That R Square value is 0.953 which means FDI and FII explains 95% of variance of Sensex. So we can conclude that there is very good model fit for Sensex Movement and inflow of FDI, FII to India. Durbin-Watson static informs us whether the assumption of independent errors is tenable. The closer to 2 the value is the better and for the data it was 1.588 which is close to the 2.

Table-4 ANOVA^a

<i>Model</i>	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
1 Regression	1350508934.458	2	675254467.229	151.324	.000 ^b
Residual	66934496.119	15	4462299.741		
Total	1417443430.577	17			

a. Dependent Variable: Sensex

b. Predictors: (Constant), FII Rupees Billion, FDI Rupees Billion

The F statistics for the model is significant at 95% confidence level which proves that the model is statistically significant at 95% confidence level.

Table-5 Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
(Constant)	2514.662	909.694		2.764	.014					
1 FDI Rupees Billion	7.273	.428	.957	16.988	.000	.930	.975	.953	.992	1.008
FII Rupees Billion	3.413	.647	.297	5.275	.000	.210	.806	.296	.992	1.008

Dependent Variable: Sensex

The p-value related to FDI, FII shown in table 5, is .000 less than 0.05 so null hypothesis is not accepted. Hence it is concluded that Flow of FDI, FII s in to India and BSE Sensex trend are dependent

The mathematical representation of research model for the above relationship is displayed as.

$$\text{Sensex} = \alpha + \beta_1 \text{ FDI} + \beta_2 \text{ FII} + e$$

From the table there is no problem of Collinearity among the variables used in the model as evident from the Collinearity statistics and multi regression is appropriate.

MultiRegression Analysis of FDI , FII on NIFTY

H0 FDI, FII Inflow and NIFTY are Independent of each other

H1 FDI ,FII Inflow and NIFTY are dependent on each other

Table-6 Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.974 ^a	.948	.941	680.41579	2.030

a. Predictors: (Constant), FII Rupees Billion, FDI Rupees Billion

b. Dependent Variable: Nifty

The table shows that the predictors i.e FDI, FII are able to explain 94.1% of the variation in the dependent variable which is the Nifty. So we can conclude that there is very good model fit for Nifty and inflow of FDI, FII to India.

Table -7 ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	127570197.463	2	63785098.732	137.775	.000 ^b
Residual	6944484.776	15	462965.652		
Total	134514682.239	17			

a. Dependent Variable: Nifty

b. Predictors: (Constant), FII Rupees Billion, FDI Rupees Billion

Table 8 Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
(Constant)	783.594	293.015		2.674	.017					
1 FDI Rupees Billion	2.201	.138	.940	15.962	.000	.908	.972	.936	.992	1.008
FII Rupees Billion	1.247	.208	.353	5.986	.000	.267	.840	.351	.992	1.008

a. Dependent Variable: Nifty

The p-value related to FDI, FII shown in above table, is .000 less than 0.05 so null hypothesis is not accepted. Hence it is concluded that Flow of FDIs and FII in to India and NIFTY are dependent. From the table there is no problem of Collinearity among the variables used in the model as evident from the Collinearity statistics and multi regression is appropriate.

CONCLUSION

The present study had examined the relationship among foreign investment flows and movement of stock indices and has revealed a strong relationship was established in between these two variables. By utilizing the multiregression model it was indicated that both FDI and FII is playing a significant role in predicting the stock indices movement in India. A high degree of correlation was also revealed in between economic fundamentals and stock market movement. Though the degree of correlation in between stock indices and FDI seems very high still it was also believed that FII was not correlated with the market index at a higher rate during the study period. So the findings has suggested that as the globalised economy has given enough scope to a country still in an emerging economy like India there is need of careful evaluation and policy formulation in raising any additional foreign capital in the country's balance sheet.

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