Impact of Domestic Institutional Investments on Indian Equity Market



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The Indian Equity market is one of the best performing and promising markets in emerging markets. The funds which play an important role in the Indian Capital Market comprises of two major flows one is Domestic Institutional Inflows and other Foreign Institutional Flows. There have been various studies pertaining to the flows of funds from foreign institutional investors but none of the study has been done on Domestic Institutional Investors.

This paper identifies the causal relationship between Domestic Institutional Investors and the movement of Sensex. The tools which have been used to analyze the causal relationship include Vector Auto Regression and Granger Causality Test. The results analyzed by the above tools show that the inflows of Domestic Institutional Investors do not have any positive influence on Sensex as these investments are not making any huge impact on the movement of Indices. But, the movement of Sensex is having a huge impact on the trading pattern of DIIs. Actually, from the study, it has been found that DIIs are not influencing the market but rather market return or market movements have a huge impact on the Investment pattern of DIIs.

Keywords: Domestic Institutional Investors, Granger causality, Sensex, VAR.

Introduction:

After the Financial Liberalization of 1991, Indian market has seen huge inflows from Foreign Institutional Investors. The Indian Capital market was largely depending on the flows of Foreign Institutional Investors. If Foreign Institutional Investors were the net buyers then usually we use to see a rally in the market but if FIIs become the net sellers then we observe a big fall in the market.

But, slowly and slowly the Domestic players were getting matured. On the parallel side they were investing a lot in the market making the market a more stable place to invest. Our study manly focuses on the investment pattern of DIIs and it has been different from all other previous studies as other studies were mainly focusing on FIIs.

Domestic Institutional Investors means the investments made by (Mutual funds, Insurance Companies, Banks, Development Financial Institutions and the amount invested under New Pension Scheme.)

The investment and concept of Domestic Institutional Investors have been new to the market as it has been firstly introduced in the year 2007. Before that we don't have the consolidated data of DIIs but rather we have the individual data.

After 2007, the Securities and Exchange Board of India has taken various reform measures and made the data available on a consolidated basis.

Institutional Investors hold huge fraction of financial assets in the form of stocks and bonds. Domestic Institutional Investors are having a very decisive role in giving support to the Indian Stock market especially when Foreign Institutional Investors are net sellers. From 2007, onwards their daily basis consolidated data is available on the website of SEBI, BSE and NSE.

Unlike other authors like Unlike Bose (2012) which considered the after crisis period only, we took a longer period of time starting from 2007 to 2016 and controlled the other factors with a dummy variable. Three parameters have been used for the study i.e DIIs (Purchase), DIIs (sales) and DIIs (Net Investment).

In this particular study the analysis has been done to see the impact of Domestic Institutional Investors have been seen on India Stock market. The motive of the study is to know that whether the flows of

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Domestic Institutional Investors in either direction have any impact of Indian Equity Market. It means if Domestic Institutional Investors are net buyers does it help Sensex to move upwards and when DIIs are net sellers will it make Sensex to move downwards.

Research Gap: Various studies have been done on the relationship between foreign institutional players and Indian Equity Market but no study focuses on the role of Domestic Institutional Investors on the role of Indian Stock Market although they are the second largest investors in Indian Equity market.

Scope of the Study

The study is specific to India and the reason is that Indian economy is one of the fastest growing economies in the world and because of this reason Indian stock market has been receiving the maximum portfolio investment from both foreign and domestic players. The Bombay Stock Exchange (BSE) and National Stock Exchange (NSE) are two leading stock exchanges of India. The domestic institutional investors are heavily investing in these markets. So, both of these markets have been taken into study to see the impact of Domestic Institutional Investors on these markets.

The Domestic Institutional Investors are the major investors in parallel to Foreign Institutional Investors and it is important to understand the overall strategies of Domestic players available in the market. The study includes all the major issues related to Domestic Institutional Investors like in which companies Domestic Institutional Investors invest in Indian Equity market, do their investments depend on the direction of Sensex and is there any impact of investments made by Domestic Institutional Investors on Volatility of Indian Stock Market.

Literature Review:

Sripriya and Shamugam (2014) in their paper "Foreign Institutional Investors Trading Activity and Volatility in Indian Stock Market" have used monthly data collected from 2003 to 2013 for their analysis. Various Econometric techniques like unit root test and GARCH (1, 1) model have been used to analyze the Data. It has been observed that Foreign Institutional Investors are the main factors behind the Volatility in the Indian Stock Market. The results also highlight that NIFTY and SENSEX are affected by past and recent affects whereas other sectors are affected only by past volatility. As the research was based on Time Series analysis the Stationarity of the data was tested using ADF test. GARCH (1, 1) model is used to capture time varying volatility of Stock Market. In conclusion, it has been found that the presence of FIIs in Indian Stock market has helped the Indian Stock markets to expand and at the same time it enhances the volatility.

Srinivasan and Kalaivani (2013) also studied various Determinants of Foreign Institutional Investors Investment in India through empirical study. Using quarterly time series data the empirical analysis was carried out for the period from January 2001 to December 2010. Negative impact of Exchange rate on FII inflows has been clearly seen both in the short run as well as in the long run. It means that if the local currency in which FIIs are investing is depreciating than it is making a Negative impact on the economy as well as on the Investment patterns of Foreign Institutional Investors and also on their sentiments.

It creates a kind of nervousness in the Economy and it will become costlier for the FIIs to buy in the Indian Equity Market. Another research area on which they have focused on was US Stock Market and through their analysis it was found that US Equity Market returns has positive and significant influence on FII flows in the long run but positive and insignificant influence in the short run. And this is the reason behind the motivation of FIIs to invest in Indian Equity Market.

There was another important factor which was highlighted in the research and that was Inflation. Inflation has both positive significant impact in long run and negative influence in the short run. Finally, it has been concluded that FII inflows to Indian Stock Market has various deciding determinants or factors which include Inflation, Exchange rate , Domestic Equity returns, Risk and Return associated with US Equity Market.

Mohanamani and Sivagnanasithi (2012) in their research article "Impact of Foreign institutional investors on Indian Capital Market" focus on the nature and extent of foreign institutional investment in Indian Capital Market. It has been found that Foreign Institutional Investment tends to buy and sell stocks in bulk and tend to create a major withdrawal effect when they leave. It is the reason that the term used for Foreign Institutional Investors is "Hot Money". Heavy inflow of money by Foreign Institutional Investors has been seen between the periods from 2000 to 2010 except in 2008 where there has been huge withdrawal of money made by Foreign Institutional Investors and which makes a negative impact on Indian Stock Market.

A very close relationship has been seen between Foreign Institutional Investors investment and the movement of SENSEX and NIFTY. It means that the movement of Foreign Institutional Investors has significant influence on the movement of Stock Market indices especially when there is an upward trend in the market due to heavy buying made by Foreign Institutional Investors (FIIs). Another factor which is prevailing in the market is Volatility. It has been seen that Volatility and Foreign Institutional Investors investment behavior shows some kind of positive correlation.

It means that when FIIs tends to buy or sell in bulk then normally the Volatility factor tends to increase. Although, Indian Stock market is quite promising but one has to be a little cautious since it is very difficult to predict the nature of Foreign Institutional Investors

Objective of the Paper:

1) To find out the causal relationship between Domestic Institutional Investors and Sensex.

2) To explore the impact of Domestic Institutional Investors on Indian Stock Market.

Hypothesis of Study:

Ho1: Sensex does not granger cause DIIs H1: Sensex granger cause DIIs Ho2: DIIs does not granger cause Sensex H2: DIIs granger cause Sensex

Research Methodology:

The data has been based on Secondary Sources. In this paper basically, closing value on daily basis have been collected for both Sensex and DIIs net flows from April 2007 to March 2016.

For Domestic Institutional Investors (Purchase, sales and net Investment were available but to make it precise we have taken net flows of Domestic Institutional Funds.

Since our data was time series that then it is important to make that data a stationary one. For that unit root test have been applied. The data has been taken from the websites of Bombay Stock exchange, National Stock Exchange and Securities Exchange Board of India (SEBI) website.

Firstly, it has been checked that whether the DIIs data is stationary or not by Augmented –Dickey Fuller test but the data was found stationary as the probability value was .000 which was less than 0.05 and therefore no further test has been applied. After this Sensex index has been checked on stationary aspect and it has been seen that the sensex series was non stationary.

To make it stationary test the first difference log have been used or the data have been made stationary at first difference. After making both series stationary the granger causality test have been applied. But, before applying granger causality test VAR framework have been formed and various necessary conditions of granger causality have been tested before applying the final test.

Before applying the Granger Causality test various conditions have to be fulfilled which includes checking the problem of Auto correlation also called as serial correlation.

Econometric Models and Estimations:

With respect to the study, the combination to be studied is DII (Net Investment) and Sensex (Closing). The absence or presence of granger causality will be tested using the following eqn.

Set1: Sensex and DIIs

SNX=Co+C1SNXt-i+....+SNXt-p+d1DIIt-i+....+dpDIIt-p+vtn Eqn (1) DII= ao+ aiDIIt-i+...+ab+biSNXt-i+...+bbSNXt-p+ut.... Eqn (2)

Therefore hypothesis from eq1 are as follows

Ho1: Sensex does not granger cause DIIs

H1: Sensex granger cause DIIs

Ho=d1=d2=dp=0

H1=d1≠d2≠.. ≠dp≠0

The hypothesis from eqn(2) are as follows

Ho=Ho2: DIIs does not granger cause Sensex

H2: DIIs granger cause Sensex

Ho=b1=b2=bp=0

H1=b1≠b2≠.. ≠bp≠0

Since the data was time series one it is important to check whether the data is stationary or not and if not the data has to be made stationary. We have two time series one is the net investment of Domestic Institutional Investors and other closing of sensex.

Audmented-Dickey Fuller Test has been applied to check the stationary of both the series. Firstly, the test has been applied on DIIs (Domestic Institutional Investors) and it has been found that the series is already stationary (Table 1).

Variable Analysis DII Table 1

Null Hypothesis: DII has a unit root Exogenous: Constant, Linear Trend Lag Length: 4 (Automatic - based on SIC, maxlag=26)

		t-Statistic	Prob.*
Augmented Dickey-Fulle	er test statistic	-10.64749	<mark>0.0000</mark>
Test critical values:	1% level	-3.962185	
	5% level	-3.411836	
	10% level	-3.127809	

*MacKinnon (1996) one-sided p-values. Source: Scholar own work using E-views 9

Null Hypothesis: DII has a unit root

Exogenous: Constant

Log Logoth 4 (Assternation has a down

Lag Length: 4 (Automatic - based on SIC, maxlag=26)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.46621	0.0000
Test critical values:	1% level	-3.433103	
	5% level	-2.862642	
	10% level	-2.567403	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation Dependent Variable: D(DII) Method: Least Squares Included observations: 2217 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DII(-1) -0.21386		0.020434	-10.46621	0.0000
D(DII(-1))	-0.339860	0.025556	-13.29869	0.0000
D(DII(-2))	-0.196243	0.025544	-7.682570	0.0000
D(DII(-3))	-0.114115	0.024430	-4.671062	0.0000
D(DII(-4))	-0.088923	0.021484	-4.139119	0.0000
C	2.168849	8.583427	0.252679	0.8005

Source: Scholar own work using E-views 9

DII is stationary as the prob. value is less than 0.05

After that the test have been applied on sensex and instead of sensex we use the term SNX.

Table 2

Variable Analysis SNX

Null Hypothesis: SNX has a unit root Exogenous: Constant, Linear Trend Lag Length: 1 (Automatic - based on SIC, maxlag=26)

		t-Statistic	Prob.*
Augmented Dickey-Fuller		-2 342872	0 1000
test statistic		-2.042072	0.4077
Test critical values:	1% level	-3.962180	
	5% level	-3.411833	
	10% level	-3.127807	

*MacKinnon (1996) one-sided p-values. Augmented Dickey-Fuller Test Equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SNX(-1)	-0.004514	0.001926	-2.342872	0.0192
D(SNX(-1))	0.082470	0.021169	3.895764	0.0001
С	60.05111	26.19311	2.292630	0.0220
@TREND	0.027918	0.014228	1.962180	0.0499

As the probability value is more than 5%, it mans series is non stationary. Then First Differencing will be done.

Null Hypothesis: (SNX) has a unit root Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=26)

		t-Statistic	Prob.*
Augmented Dickey-Fuller	test statistic	-43.44854	0.0000
Test critical values:	1% level	-3.962180	
	5% level	-3.411833	
	10% level	-3.127807	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation Dependent Variable: D(SNX,2) Method: Least Squares

Included observations: 2220 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SNX(-1))	-0.919764	0.021169	-43.44854	0.0000
C	3.961126	10.63723	0.372383	0.7096
@TREND	0.000813	0.008291	0.098104	0.9219
R-squared	0.459897	Mean dep	Mean dependent var	
Adjusted R-squared	0.459410	S.D. dependent var		340.4759
S.E. of regression	250.3342	Akaike info criterion		13.88482
Sum squared resid	1.39E+08	Schwarz criterion		13.89253
Log likelihood	-15409.15	Hannan-Quinn criter.		13.88764
F-statistic	943.8881	Durbin-Watson stat		1.996515
Prob(F-statistic)	0.000000			

SNX is non-stationary at level but stationary at 1^{st} difference Graph 2

The Multivariate Analysis



After making the series stationary Granger causality test have been applied using Conventional approach.

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Table - 3

The following are the steps

Step-1.

Firstly Vector Auto Regression model will be set up with VAR (1, 1). The basic objective of creating this VAR model is to analyze that whether the Impact on Sensex movement or Sensex Index is due to the Investment pattern of Domestic Institutional investors or it is due to the previous lags means previous days investment pattern of sensex itself. It has to be seen that how the previous lags if DII are having an effect on itself and Sensex. Because the VAR model will treat both Dii and Sensex as dependent variable and will how its previous lags are having an effect on its values. It has been observed that it has been rejected as the lag length criterion says 7 when we estimate with 10 lags as hit and trial. Thus, we again estimate VAR (1, 1) and the output is as follows

Granger Causality by conventional approach

We have two series; series DII is stationary while SNX is stationary at level one. We make the data stationary for SNX variable. **(Table 2)**

Step 1: Setup VAR (1, 1). It is rejected as the Lag Length Criteria says 7 when we estimate with 10 lags as hit and trial. Thus, we again estimate VAR with (1, 7) and the output is as follows: **(Table 3)**

Table - 3

Vector Auto regression Estimates Included observations: 2214 after adjustments Standard errors in () & t-statistics in []

Table-3 is a VAR(1,7) model of DIIs (Net Investment) and Sensex return and it has been found that that DIIs previous values up to 7 lags are having an impact on it and similarly sensex previous lags are also having an impact on Domestic Institutional Investors. But, Domestic Institutions does not making any impact of Sensex return.

Step - 2.

We now check the VAR model for stability condition and the necessary condition will be check to reach towards the granger causality test. Stability Condition: Graph 1

AR Roots Graph

Since we have seven lags than the formula is 7x2=14 points should live within the circle if they are coming within the circle than the stability condition is fulfilled otherwise not

Rule: All the points should remain within the unit root circle. If they are not then the model is unfit for Granger causality testing.



	DII	SNX
DII(-1)	0.328625	-0.003032
	(0.02220)	(0.01440)
	[14.8053]	[-0.21059]
DII(-2)	0.107933	0.007131
	(0.02333)	(0.01513)
	[4.62718]	[0.47128]
DII(-3)	0.088213	-0.001520
	(0.02339)	(0.01517)
	[3.77143]	[-0.10016]
DII(-4)	0.039779	0.006590
	(0.02357)	(0.01529)
	[1.68799]	[0.43105]
DII(-5)	0.077374	-0.027377
(-)	(0.02343)	(0.01520)
	[3 30179]	[-1 80094]
DII(-6)	0.040401	0.010721
DII(0)	(0.02322)	(0.01506)
	[1 74025]	[0.71186]
DII(7)	0.074746	0.003381
DII(-7)	(0.074740	(0.01307)
	[3 46965]	[0.01397]
CNIV(1)	0.267674	0.070222
5117(-1)	-0.307074	0.079223
	(0.03406)	(0.02210)
	[-10.7939]	[3.58526]
SNX(-2)	-0.241067	-0.019469
	(0.03489)	(0.02263)
	[-6.90887]	[-0.86014]
SNX(-3)	-0.203447	-0.009168
	(0.03529)	(0.02289)
	[-5.76470]	[-0.40046]
SNX(-4)	-0.051715	-0.015611
	(0.03552)	(0.02304)
	[-1.45577]	[-0.67741]
SNX(-5)	-0.071090	-0.046517
	(0.03539)	(0.02296)
	[-2.00860]	[-2.02604]
SNX(-6)	0.053371	-0.035792
	(0.03504)	(0.02273)
	[1 52306]	[-1 57453]
SNIX(-7)	-0.058833	0.020575
5147(7)	(0.03416)	(0.0220070)
	[_1 72223]	[0.92849]
C	7 019040	5 262898
C	(8 24449)	(5.34820)
	[0.24449]	[0.09405]
P. caused	0.484208	0.012206
A d: D d	0.464206	0.012290
Auj. K-squared	2.205.00	1.200.000
Sum sq. restus	3.20E+U8 286 1570	1.30E+U8 250 4009
E statistic	147 4522	1 055262
F-SIDENE	147.4002	1.900000
Alusilus AIC	-10321.13	-13362.94
AKAIKE AIC	14.75/12	13.89155
Schwarz SC	14.79575	13.93018
Mean dependent	16.37312	5.024426
S.D. dependent	535.9798	251.2556
Determinant resid covar	riance (dof adj.)	8.72E+09
Determinant resid of	covariance	8.60E+09
Log likelihood		-31606.03
Akaike information	n criterion	28.57816
Schwarz criterion		28.65543

As all the points are within the unit circle, therefore, the VAR model is stable.

Since all the points are within the unit circle, therefore the VAR model is stable. After this the necessary conditions have to be fulfilled.

First necessary Condition: Lag Length Criteria (Table 4) According to lag length criteria maximum stars should come

at 7 to fulfill the condition.

The lag length criteria should come at 7 for using this model. And for this we run the lag length criteria test with an additional lag that is 7+1=8 and the output is as follows

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(Table - 4) VAR Lag Order Selection Criteria Endogenous variables: NET RETURN Exogenous variables: C Date: 09/23/16 Time: 22:09 Sample: 4/01/2010 3/31/2016 Included observations: 1487

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-13676.01	NA	334713.8	18.39679	18.40392	18.39944
1	-13269.51	811.3596	194789.1	17.85543	17.87683	17.86340
2	-13179.82	178.7688	173585.6	17.74018	17.77585	17.75348
3	-13131.87	95.45655	163621.1	17.68106	17.73100*	17.69968
4	-13120.06	23.48190	161910.8	17.67055	17.73477	17.69449*
5	-13112.89	14.23115*	161222.3*	17.66629*	17.74477	17.69554
6	-13109.09	7.535078	161265.6	17.66656	17 75931	17 70113

* 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

All the criteria except one suggest 7 to be the appropriate lag length criteria. Thus, the model has fulfilled the first necessary condition.

Second Necessary Condition:

Auto Correlation:

The VAR model should be free from the problem of

Auto Correlation (Serial correlation). We run the LM

Auto correlation test for 10 lags that is few lags then the more than the lags suggested by Lag length criteria. **(Table-5)**

The rule is that majority of the lags should accept the null hypothesis of "No correlation". The output is as follows.

Table - 5

VAR Residual Serial Correlation LM Tests Null Hypothesis: no serial correlation at lag order h

Lags	LM-Stat	Prob
1	2.510685	0.6427
2	6.352409	0.1743
3	7.523506	0.1107
4	10.21976	0.0369
5	6.936741	0.1393
6	1.494746	0.8276
7	7.996055	0.0917
8	1.603598	0.8081
9	12.43892	0.0144
10	1.445690	0.8362

Probs from chi-square with 4 df.

As it is clear that for majority of lags the prob. value is more than 0.05 thus accepting the null of no serial correlation. Thus the model is free from Autocorrelation.

Finally, we move to measure the Granger Causality. We run the Granger Causality Block Exogeneity Test on both the series and the output is also follows

Since 7 values are more than 0.05 than the null hypothesis is accepted i.e. no serial correlation and hence accepted the null hypothesis of serial correlation. Thus the model is free from Auto correlation.

Finally, we move towards granger causality test. We run the Granger Causality Block Exogeneity Test on both the series and the output is as follows. (Table 6)

Table – 6 VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: DII

Excluded	Chi-sq	df	Prob.
SNX	201.3987	7	0.0000
All	201.3987	7	0.0000

Dependent variable: SNX

Excluded	Chi-sq	df	Prob.
DII	3.511664	7	0.8340
All	3.511664	7	0.8340

H01: SNX does not Grange cause DII. Rejected, as the prob. value is less than 0.05

H02: DII does not Granger cause SNX. Accepted, as the probability value is more than 0.05.

As H01 is rejected, it means that SNX causes DII. Therefore, we attempt to measure the specific impact of SNX on DII.

We have two null hypotheses

Ho1: SNX (sensex) does not granger cause DIIs

Ho2: DIIs does not granger cause SNX (sensex)

After applying the test following are the results

Ho1: SNX does not granger cause DIIs –Rejected as the probability value is less than 0.05.

Ho2: DIIs does not granger cause SNX have been accepted as the Probability value is more than 0.05.

As Ho1 is rejected, it means the Sensex is causing Domestic Institutional Investors. Means, Sensex movement in either ways is going to impact the investment strategies made by Domestic Institutional Investors and mutual funds in particular. But, on contrary the investments made by DIIs are not making any impact on the movement of

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Sensex. Although, there are various other factors which helps the Sensex to move in either way.

Since, Sensex is having an impact on Domestic Institutional Investors; therefore, we attempt to measure the specific impact through regression. Since the value of Mean is negative it means SNX movement and DIIs investments are moving in opposite direction.

And it has been normally seen that when Sensex is in negative direction or having a downward trend either because of local factors or international factors or due to heavy selling from Foreign Institutional investors, the strategies of DIIs is totally different and they try to buy stock when sensex is at lower level and when fundamentally good stocks are available at cheap prices.

It means there is huge buying made by DIIs when Sensex is in downwards trend and on the opposite side Foreign Institutional Investors used to sell at this moment. But, when sensex changes its direction and start moving upwards, DIIs became net sellers or they start booking their profits on the investments which they have made at lower level.

Table - 7 Dependent Variable: DII Method: Least Squares

	1			
Variable	Coefficient	Std. Error	t-Statistic	Prob.
SNX	-0.410137	0.044427	-9.231627	0.0000
С	18.76089	11.15044	1.682525	0.0926
R-squared	0.036986	Mean dependent var		16.61025
Adjusted R-squared	0.036552	S.D. dependent var		535.2507
S.E. of regression	525.3775	Akaike info criterion		15.36701
Sum squared resid	6.12E+08	Schwarz criterion		15.37215
Log likelihood	-17063.07	Hannan-Quinn criter.		15.36889
F-statistic	85.22293	Durbin-Watson stat		0.790748
Prob(F-statistic)	0.000000			

Conclusion:

It has been concluded that the DIIs used to influence the stock market but not in a huge manner because there are other players also mainly Foreign Institutional players or investors which play an important role in volatility of Indian Stock Market.. DIIs play an important and crucial role in channelizing the savings of individual Indian investors and then invest in Indian stock market. DIIs buying or selling is not making huge impact on the movement of Sensex or on returns of sensex.

But, on the contrary side Sensex is causing the DII and Sensex movement and returns are affecting the investments made by DIIs. So DIIs always look towards the movement of sensex for their investments and also some other factors like company fundamentals to invest in Indian Stock market.

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