



DOES MONTH MATTER? CALENDAR EFFECT IN FOREIGN INSTITUTIONAL INVESTMENT

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Abstract

Month – of –the –year effect, a calendar effect, is a common phenomenon in developed as well as developing capital markets. Though this beats the efficient market hypothesis, this seasonal effect facilitates good market return for speculators and investors. In line with this, the investors plan their investment strategy to maximize their returns. The present study is an attempt to investigate whether the Foreign Institutional Investment (FII) in Indian capital market has any calendar effect in net FII(NFII), net FII in equity(EFII) and net FII in debt(DFII). The monthly data during January 1993 to September 2012 was considered for this analysis. Stationarity for the time series were checked using Augmented Dickey Fuller test and Phillips-Perron (PP) tests. The series was tested as different periods, considering the structural breaks in 2003 and 2007. Dummy variable technique was used to analyze the data series. The test results showed that for the early period there were calendar effects in the month of February for NFII, DFII and EFII. After 2003, November effects were also present in both the series in addition to February effect in net FII and in equity. But in the debt no such effects were evident leading to believe that FII are more concerned about increasing their return by participating in the equity market rather than safe assured returns in the debt market. In recent times, September effect was present but in a less significant way for NFII and EFII. Risk aversion hypothesis and interim Accounting Information hypothesis could be the possible explanation for this behavior. The diminishing of the effect is because of efficient market. In the case of DFII, January effect has reappeared which has started in the month of December itself. Since the equity market was so efficient and volatile, the FII have chosen the debt instruments for assured returns. When checked for the monthly seasonality in market return, January effect is present in the first period. During the early stages of opening the market to the global players (after 1992 but before 2003), the market itself was in a developing stage and slightly in the weak form of inefficiency. That is the reason for the January effect in the first period of the study. But later on the effect has disappeared leading to the conclusion that the market has become efficient, making abnormal returns impossible. Also there exists interaction influence on the NFII in the recent period.

Keywords: *Calendar Effect, Foreign Institutional Investment, Dummy Variable Technique, Structural Breaks, Interaction effect.*
JEL Codes: *G23, G01, G02, G14, G15*

1. Introduction

An anomaly¹ is a strange or an unusual occurrence in the finance world. In financial markets, these anomalies refer to situations where a security or group of securities perform contrary to the notion of efficient markets², where security prices fully reflect all available information at any given point in time. With the continuous release and rapid dissemination of new information, maintaining efficient markets are hard to achieve. There are many market anomalies, which occur once and disappear, while others are continuously observed. These anomalies usually relate to either structural factors, such as unfair competition, lack of market transparency, regulatory actions or behavioral biases by economic agents. Anomalies could be fundamental, technical, or calendar related. Anomalies which are associated to a particular time are called calendar effects (seasonal effects). Popular calendar effects include the weekend effect, the turn-of-the-month effect, the turn-of-the-year effect, and the January effect. Many calendar effects have disappeared or reversed since they were discovered.

The main characteristics of the month of the year effect is an increase in buying securities before the month at a lower price and selling the same in the following month to generate abnormal profit from the price differences. This type of pattern in price behavior on the financial market supports inefficient markets. These effects are called anomalies for a reason that they should not occur and they definitely should not persist. No one knows exactly why anomalies happen. Though this beats the efficient market hypothesis, this seasonal effect facilitates good market return for speculators and investors, in such a way that these investors plan their investment strategy to maximize their returns in accordance with seasons. This is applicable to all classes of investors in any stock market including Foreign Institutional Investors, whose country of origin is a foreign country.

2. Need for the study

The calendar effect is a phenomenon in developed as well as developing capital markets. The investors expecting higher returns on their investments plan their investment strategies in accordance with the seasonal effects. Indian Stock Market is believed to be dominated by Foreign Institutional Investors (Neeta Tripathi, 2008) and the net investment by foreign institutional investors in India had been positive every year except for 1998-99, 2007-08 and 2008-09. This class of investor is expected to exhibit some seasonal effects in their investment strategies. Past studies have mainly focused on the nature, cause, determinants, and impact of Foreign Institutional Investment (FII) flow in India (Chakrabarti, 2001; Mukherjee, et al 2002;

¹Kuhn, T.1970 referred anomaly as one which cannot, despite repeated effort, be aligned with professional expectation. It is the recognition that nature has somehow violated the paradigm-induced expectations that govern normal science.

² Brav, Alon, and J. B. Heaton, 2002, *Competing theories of financial anomalies, Review of Financial Studies*

Gordon and Gupta, 2003; Bose and Coondoo, 2004; Badhani, 2006). In these studies the stock market return are the main driving force for the foreign institutional investment along with a few macroeconomic variables. During the recent world economic crisis and recovery period, the Indian stock market return is the only driving force for foreign institutional investment into India (Anuradha and Rajendran, 2012). There are studies on the calendar anomaly in the stock market price movements, especially the week end effect and day of the week effect (Chaudhary, 1991; Poshakwale, 1996; Goswami and Angshman, 2000; Choudhry, 2000; Bhattacharya et al., 2003, Nath and Dalvi, 2004; Badhani and Kavidayal, 2005) on monthly effect which claim unusual returns in a particular month in stock returns (Moosa, 2007; Mihir Dash et al 2011), and a few calendar effect in retail investment, wherein there is an unusual investment flow in certain months (Lilian Ng and Qinghai Wang, 2004; Julia Henker and Debapriya J. Paul 2011). However, the FII behavior with calendar anomaly in India is researched in a limited way, particularly the month of the year anomaly. In this paper, an attempt is being made to link these two issues. The study tried to investigate whether the FII in Indian capital market has any calendar effect along with calendar effect in market return and then the calendar effect because of the control and interaction of market return with foreign institutional investment. The main objective of this study is to examine the patterns of FIIs across the various months of the year.

3. Literature overview

3.1. Seasonality in the market return

Some of the well documented anomalies in the literature are the day-of-the-week effect and week-end effect in the stock market. Differences in returns across weekdays were found by Frank Cross (1973). The stock average returns on Monday were negative and they were significantly lower than the average returns on other days of the week (French, 1980; Chang et al, 1993; Agrawal and Tandon, 1994; and Maberly 1995). However, in some markets negative returns were found for Tuesday (Jaffe and Westerfield, 1985; Agrawal and Tandon, 1994; and Nath and Dalvi 2004). This Tuesday-effect was considered as a spill-over of Monday-effect (Condoyanni et al. 1987). These effects were explained though partially by settlement procedure hypothesis, information release hypothesis, measurement error hypothesis. The information processing hypothesis was also used to explain the day-of the-week effect (Lakonishok and Maberly, 1990; Abraham and Ikenberry, 1994; Sias and Stark, 1995). In some studies (Lakonishok and Maberly 1992; Sias and Stark 1995), the stock returns were tend to be negative over the period from Friday's close to Monday's opening (week end effect). The day-of-the-week effect had been widely researched across the countries and asset-markets. The month of the year effect which was researched globally but to a lesser extent also provided evidences for unusual significant return in a particular month of a year. January effect was found in many developed and developing markets in earlier years which were later replaced by one another month effect for some reason (Moosa, 2007; Ling T. He and Shao C. He, 2011) and these effects were both positive as well as negative in some markets (Mihir Dash et al, 2011; Rima Turk Ariss et al, 2012 and Mishra & Sisira Kanti, 2012). However, in all these studies the stock market had been in focus for the discussions.

3.2. Foreign Institutional Investment

The nature, cause, determinants, and impact of FII investment flow in India were the main focus of study in the past (Chakrabarti, 2001; Mukherjee, et al 2002; Gordon and Gupta,

2003; Bose and Coondoo, 2004; Badhani, 2006). The stock market return was the main driving force which determined the investment in the market (Chakrabarti, 2001 and Rai and Bhanumurthy, 2004; Anuradha and Rajendran, 2012), along with macro economic variables of both domestic and foreign country (Mukherjee et al, 2002; Rai and Bhanumurthy, 2004; Narayan Sethi, 2009; Rajkumar and Hariom Gupta, 2010). Bidirectional causality between FII flows and stock returns (Suresh Babu *et al*, 2008) and unidirectional causality between the flow and stock return (Gordon and Gupta, 2003 and Rai and Bhanumurthy, 2004 and Suresh Babu and Prabheesh, 2008) were also discussed in these studies.

3.3. Seasonality in the investment

There are few studies where the seasonal effect was analyzed from the investment point of view. There were unusual investment flow in certain months in the capital markets (Lilian Ng and Qinghai Wang, 2004; Julia Henker and Debapriya J. Paul 2011) and turn of the year effect wherein disinvestment in the last quarter of the year followed by investment in the next first quarter of the year in some markets (Athanasakos et al, 1998; Lilian Ng and Qinghai Wang, 2004; Bohl et al, 2006; Puckett and Yan, 2011; Andrew Lynch et al, 2011). Further, the day of the week effect, Monday effect was caused by the sophisticated retail investors (Su Han Chan et al, 2004) and the January effect was not caused by retail investment (Julia Henker and Debapriya J. Paul, 2011). There existed Tuesday effect on the volume of FII trading in Indian market (Badhani, K. N. 2006). The day of the week effect on FII in the Global markets and on Indian market were researched, in a limited way and the monthly effect on Indian market was not addressed.

4. Methodology

The present study is based on the data for the period 1993 Jan to 2012 September on net FII (NFII), equity and debt FII (EFII and DFII), and return in the equity market (NIFTYRT). For market return the Nifty fifty index return is considered, which is the difference in log of market index. The monthly data are obtained from the Securities and Exchange Board of India.

Table. 1 Chow Breakpoint Test

Data series	For breaks at	statistics			
NFII	2003M01 2007M06	F-statistic	3.153150	Prob. F(4,226)	0.0151
		Log likelihood ratio	12.59906	Prob. Chi-Square(4)	0.0134
		Wald Statistic	12.61260	Prob. Chi-Square(4)	0.0133
DFII	2003M01 2007M06	F-statistic	11.43180	Prob. F(2,179)	0.0000
		Log likelihood ratio	21.87757	Prob. Chi-Square(2)	0.0000
		Wald Statistic	22.86361	Prob. Chi-Square(2)	0.0000
EFII	2003M01 2007M06	F-statistic	6.755698	Prob. F(2,179)	0.0015
		Log likelihood ratio	13.24406	Prob. Chi-Square(2)	0.0013
		Wald Statistic	13.51140	Prob. Chi-Square(2)	0.0012

The entire period is tested for structural breaks and then divided into three sub-periods, considering the structural breaks. To know the exact places of structural breaks, the line chart of the data series (Fig. 1a, 1b & 1c) and the chow test³ results (Table: 1) are consulted. Accordingly in period -1, data for the period up to December 2002 is considered and for the periods 2 & 3, data between January 2003 – June 2007 and July 2007 – September 2012 are considered respectively. The series are tested as separate periods for calendar month anomaly in FII and market return.

Figure 1a: Net Foreign Institutional Investment

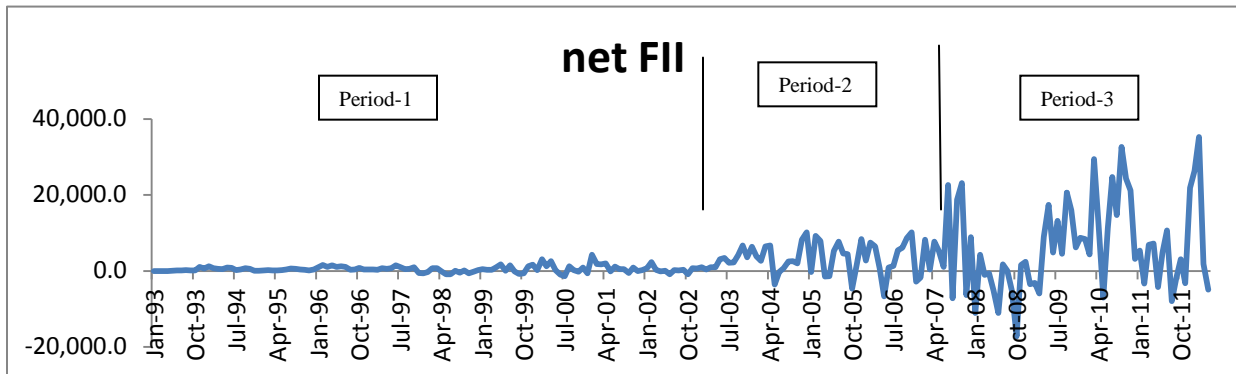
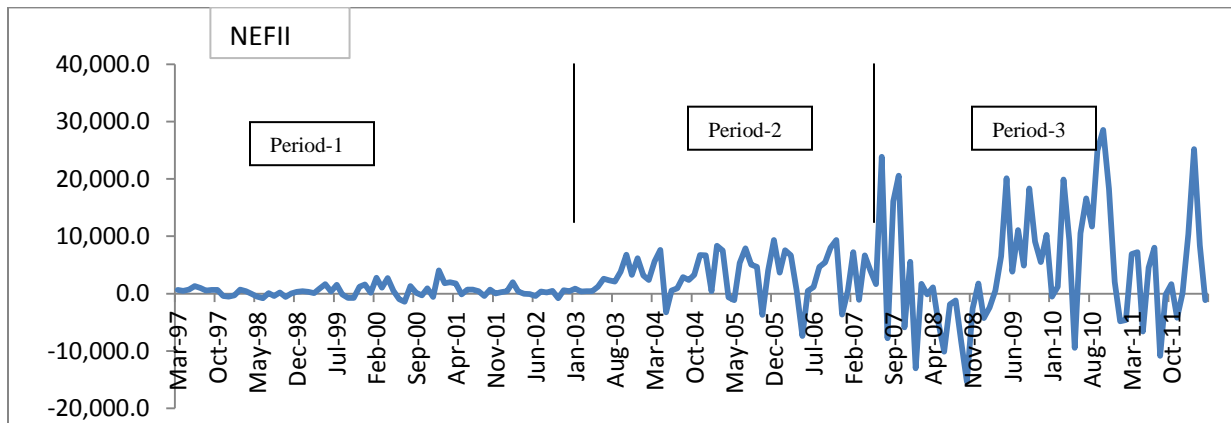
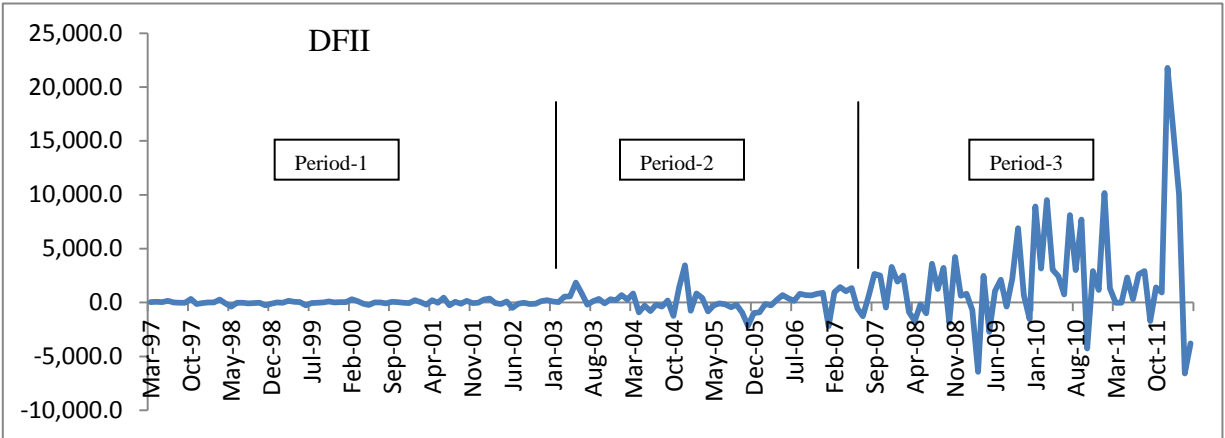


Figure 1b: Net Foreign Institutional Investment in Equity



³The **Chow test** is a statistical and econometric test for whether the coefficients in two linear regressions on different data sets are equal. The Chow test was invented by economist Gregory Chow. In econometrics, the Chow test is most commonly used in time series analysis to test for the presence of a structural break.

Figure 1c: Net Foreign Institutional Investment in Debt



Seasonal analysis using dummy variable is considered for analyzing the calendar effect of FII in the Indian capital market. This is to check the seasonal pattern in the data associated with each season for FII and NIFTYRT. The following model is considered for analysis.

$$Y = \sum_{i=1}^{12} \alpha_i D_i + u_t \dots\dots\dots (1)$$

Where Y is FII or NIFTYRT, D_i 's are the dummy variables taking values of 1 in the relevant month and 0 otherwise, and i represents the calendar months January to December. To avoid dummy variable trap each month is allotted a dummy variable omitting the intercept in the model. If there is any seasonal effect in a given month, that will be indicated by a statistically significant 't' value of the dummy coefficient for that month. The estimated ' α ' coefficients in the model represents the average or mean investment in each month. The above model could be estimated for total net FII, net equity FII, net debt FII and NIFTYRT. To investigate the control of market return on net investment seasonality NIFTYRT is also considered as independent variable along with dummy monthly variables. So the regression equation takes the form of

$$NFII_t = \sum_{i=1}^{12} \alpha_i D_i + \beta NIFTYRT_t + u_t \dots\dots\dots (2)$$

Where D_i 's are the dummy variables taking values of 1 in the relevant month and 0 otherwise, and i represents the calendar months January to December. Significant 't' values and 'F' statistics indicate the existence of control effect.

Though the independent variables have influence on the dependant variables individually, there may be some interrelationship among the independent variables which subsequently may influence the dependent variable jointly. To investigate the interaction effect on foreign institutional investment, interactive dummy variables are introduced in equation (2) which takes the form of,

$$NFII_t = \alpha_1 + \sum_{i=2}^{12} \alpha_{2i} D_{ii} + \beta_1 NIFTYRT_t + \sum_{i=2}^{12} \beta_{2i} D_{ii} NIFTYRT_t + u_t \dots\dots\dots (3)$$

Where D 's are the dummy variables taking values of 1 in the relevant month and 0 otherwise, and i represents the calendar months January to December, excluding any one month (base month) based on the least differential coefficient. To take care of the base month dummy as well as the interactive dummy, a constant α_i is introduced in the estimation. In the previous two estimations the dummy variable regression is done on partition method where in all the period are allotted with a dummy and all the dummies are considered for estimation. But in the current equation (3) this partition method is difficult as this will introduce multicollinearity. To avoid this trap base model is suggested by avoiding any one dummy variable in the estimation and in its place a constant is introduced. Also change from partition to base model does not affect the estimating power of the variables (Yip and Tsang, 2007), but the interpretations. Significant 't' values and 'F' statistics indicate the existence of main and interaction effect on the investment with reference to the base variable.

Since time series data are used in Dummy Variable Linear Regression model, which is based on Ordinary Least Square principle, the stationarity of the time series needs to be checked. Augmented Dickey Fuller (ADF) test and Phillips-Perron (PP) tests are suggested to check the stationarity of the selected time series. ADF is a modified Dickey-Fuller (DF) test with a parametric correction for higher order correlation to take care of possible serial correlation in the error terms. The original regression equation in DF test is augmented by lagged values of the dependent variable ΔY_t . So in ADF the following regression equation is estimated with u_t as pure white noise error term.

$$\Delta Y_t = \alpha_i + \gamma Y_{t-1} + \sum_{i=1}^p \lambda_i \Delta Y_{t-i} + u_t \dots\dots\dots(4)$$

PP test is a nonparametric statistical method which takes care of the serial correlation in the error terms. It is free from parametric errors and allows the error terms to be weakly dependent. So the PP test is also checked for stationarity. But the simplest test being plotting the time series and looking for trends. (Fig. 1a, 1b & 1c)

5. Analysis

5.1. Seasonality in the Foreign Institutional Investment

Table 2: The average net investment in FII and average market return

MONTH	AVE NFII (RsCr)	AVE EFII (RsCr)	AVE DFII (RsCr)	AVE RETURN
January	1,963.80	81.2	2,352.80	0.0445
February	3,828.40	3,650.92	1,263.59	0.0008
March	3,008.47	3,915.87	-73.73	-0.0004
April	2,293.61	2,718.02	12.31	-0.0002
May	-158.9	-353.67	322.95	-0.0014
June	1,156.17	1,306.79	58.1	0.0015
July	4,458.62	4,824.57	961.33	-0.0002
August	1,177.53	898.49	492.91	0.0001
September	4,430.19	4,507.11	988.91	0.0018
October	3,342.35	3,863.66	243.15	-0.0016
November	2,477.75	2,468.98	557.16	-0.0022
December	3,690.75	2,647.03	1,931.03	-0.0010

Table 2 shows the average net inflow of FII and return in the market during different months of the year. The FII did not seem to be identically distributed across the months of the year.

Figure 2a: The average net FII

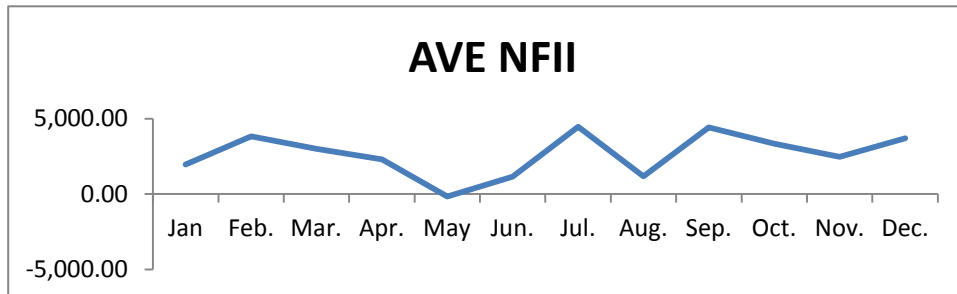


Figure 2b: The average net FII in equity

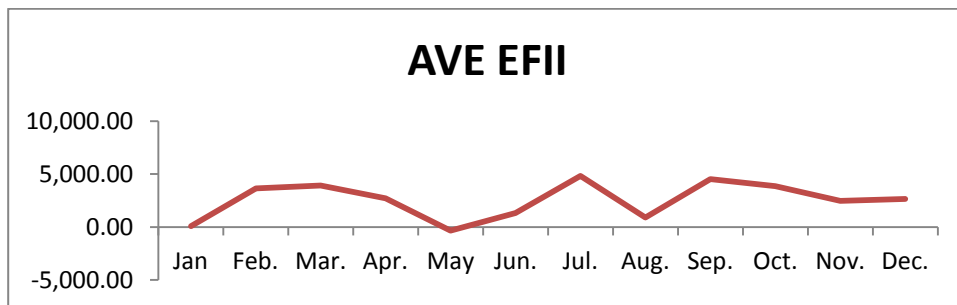


Figure 2c: The average net FII in Debt

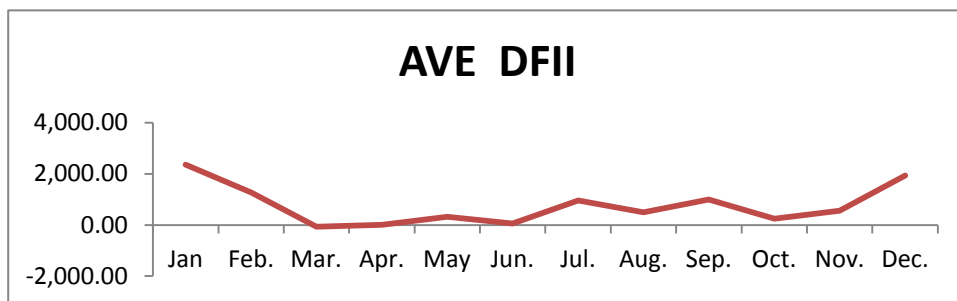
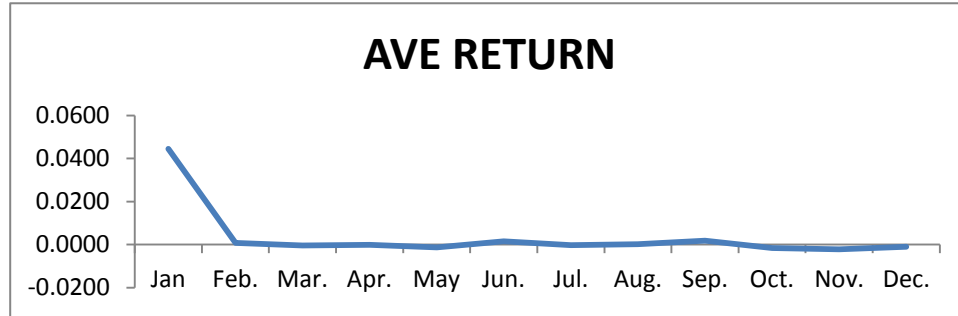


Figure 2d: The average market return



The highest average net investment and equity investment happened during the month of July and the lowest being in the month of May (Figure 2a & 2b). The highest average net debt investment happened during the month of January and the lowest being in the month of March (Figure 2c). But one does not know whether these average investments were significant enough to be called as a seasonal effect. Similarly in the monthly market return the highest happened in the month of January,(Fig.2d.) but one does not know whether this abnormal return is significant enough to be called seasonal effect.

Table 3: Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit-root Test

		Period- 1		Period- 2		Period- 3	
		F value	Sig.	F value	Sig.	F value	Sig.
NFII	ADF	-3.0121	0.0368**	-5.1068	0.0001*	-5.3115	0.0000*
	PP	-8.2106	0.0000*	-6.1256	0.0000*	-5.3959	0.0000*
EFII	ADF	-6.5365	0.0000*	-4.8083	0.0003*	-2.7932	0.0657
	PP	-6.5099	0.0000*	-6.12	0.0000*	-5.5031	0.0000*
DFII	ADF	-8.1718	0.0000*	-5.47	0.0000*	-5.5429	0.0000*
	PP	-8.1688	0.0000*	-5.5419	0.0000*	-5.4485	0.0000*
NIFTYRT	ADF	-6.1853	0.0000*	-5.2022	0.0001*	-3.0430	0.0365**
	PP	-9.1632	0.0000*	-5.2311	0.0001*	-5.6696	0.0000*

* significant at 1%, ** significant at 5%

Table: 3 present the results of Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit-root test analysis which is based on Ordinary Least Square principle, for checking the stationarity of the time series. The 't' statistics were significant at level in all the data series. So all the time series used were having unit root at level and it was assumed that all the data series are stationary in nature.

Dummy variable linear regression model was applied on the three periods of FII and market return, by dummy variables taking the values of 1 in the relevant month and 0 otherwise, for the months January to December. The intercept term was avoided to escape the dummy

Table 4: Dummy Variable results for the period 1

Dummy variable for the months	NFII			EFII			DFII			NIFTYRT		
	Coefficients	t	Sig.	Coefficients	t	Sig.	Coefficients	t	Sig.	Coefficients	t	Sig.
January	808.38	3.2183	.0017	952.78	2.3709	.0211	110.82	1.5196	.1341	0.0210	2.1930	0.0300
February	1119.88	4.4584	.0000	1528.74	3.8041	.0003	140.94	1.9326	.0582	0.0140	1.5510	0.1240
March	683.19	2.7199	.0076	781.02	2.1290	.0375	52.88	.7944	.4302	-0.0020	-0.1850	0.8540
April	807.96	3.2166	.0017	970.72	2.6461	.0105	11.40	.1712	.8646	-0.0110	-1.2430	0.2170
May	394.87	1.5720	.1189	366.85	1.0000	.3215	-71.98	-1.0813	.2841	-0.0020	-0.2420	0.8100
June	262.25	1.0441	.2988	39.62	.1080	.9144	-20.63	-3.099	.7577	0.0080	0.8880	0.3770
July	405.37	1.6138	.1095	379.97	1.0358	.3046	-62.18	-9.340	.3542	0.0000	-0.0190	0.9850
August	336.47	1.3395	.1832	337.55	.9201	.3613	-27.12	-4.073	.6853	-0.0010	-0.0560	0.9560
September	174.15	.6933	.4896	46.55	.1269	.8995	-45.18	-.6787	.5000	-0.0030	-0.3180	0.7510
October	147.26	.5863	.5589	-164.33	-.4480	.6559	92.68	1.3922	.1692	-0.0120	-1.3110	0.1930
November	381.08	1.5171	.1322	405.10	1.1043	.2740	-50.83	-.7636	.4482	-0.0050	-0.5170	0.6060
December	294.34	1.1718	.2439	247.20	.6738	.5031	1.13	.0170	.9865	0.0100	1.1310	0.2610
R ²	.3590			.3860			.1710					
F value	5.0360			3.0370			0.9900			1.0838		
Sig	.0000			0.0020			0.4610			0.3811		

Table 5: Dummy Variable results for the period 2

Dummy variable for the months	NFII			EFII			DFII			NIFTYRT		
	Coefficients	t	Sig.	Coefficients	t	Sig.	Coefficients	t	Sig.	Coefficients	t	Sig.
January	1122.44	.6562	.5154	1738.32	1.0916	.2814	-615.88	-1.4491	.1549	0.0120	1.1780	0.2450
February	5588.48	3.2669	.0022	5195.98	3.2628	.0022	392.50	.9235	.3611	-0.0080	-0.5320	0.5980
March	4424.94	2.5867	.0133	3825.02	2.4019	.0209	599.92	1.4115	.1656	-0.0200	-1.3210	0.1940
April	2945.68	1.7220	.0926	2923.10	1.8356	.0737	22.58	.0531	.9579	-0.0070	-0.4490	0.6560
May	-639.86	-.3740	.7103	-1312.14	-.8240	.4147	672.28	1.5818	.1214	-0.0190	-1.2530	0.2170
June	2330.38	1.2185	.2300	2226.55	1.2506	.2182	103.83	.2185	.8281	-0.0210	-1.3530	0.1830
July	2982.93	1.5597	.1265	3084.85	1.7326	.0907	-101.93	-.2145	.8312	0.0110	0.7260	0.4720
August	3704.30	1.9368	.0597	3669.48	2.0610	.0457	34.83	.0733	.9419	0.0140	0.8760	0.3860
September	4335.65	2.2669	.0287	4077.10	2.2899	.0272	258.55	.5441	.5893	0.0140	0.9130	0.3670
October	3198.25	1.6722	.1021	3595.00	2.0191	.0500	-396.75	-.8350	.4086	0.0080	0.5130	0.6110
November	5960.03	3.1163	.0033	5865.03	3.2941	.0020	95.00	.1999	.8425	0.0080	0.4810	0.6330
December	5529.05	2.8909	.0061	4628.13	2.5994	.0129	900.93	1.8960	.0650	0.0160	0.9850	0.3300
R ²	.5710			.5830			.2290					
F value	4.4800			4.7830			1.0100			1.565		
Sig	.0000			.0000			.4400			0.146		

Table 6: Dummy Variable results for the period 3

Dummy variable for the months	NFII			EFII			DFII			NIFTYRT		
	Coefficients	t	Sig.	Coefficients	t	Sig.	Coefficients	t	Sig.	Coefficients	t	Sig.
January	5116.02	.9323	.3560	-2447.36	-.5253	.6018	7563.38	3.6769	.0006	0.0040	0.2700	0.7880
February	7485.36	1.3640	.1790	4228.04	.9075	.3688	3257.32	1.5835	.1200	-0.0180	-1.2250	0.2260
March	6242.56	1.1376	.2611	7121.36	1.5286	.1331	-878.80	-.4272	.6712	-0.0010	-0.0980	0.9230
April	4612.84	.8406	.4048	4609.70	.9895	.3275	3.14	.0015	.9988	0.0240	1.6020	0.1150
May	242.33	.0395	.9687	-236.35	-.0454	.9640	478.67	.2081	.8360	0.0020	0.1030	0.9180
June	2207.58	.4023	.6893	2091.58	.4489	.6555	116.00	.0564	.9553	0.0070	0.5120	0.6110
July	14590.02	2.6587	.0107	11549.88	2.4791	.0168	3040.14	1.4779	.1461	-0.0010	-0.0930	0.9260
August	838.22	.1527	.8793	-645.18	-.1385	.8904	1483.40	.7211	.4744	0.0010	0.0640	0.9490
September	13017.90	2.3722	.0218	10203.80	2.1902	.0335	2814.10	1.3681	.1778	0.0160	1.1960	0.2370
October	9847.80	1.7946	.0792	8912.18	1.9130	.0619	935.62	.4548	.6513	0.0030	0.2180	0.8290
November	3885.28	.7080	.4824	2228.80	.4784	.6346	1656.48	.8053	.4247	-0.0160	-1.0750	0.2870
December	9012.94	1.6424	.1072	3941.96	.8461	.4018	5070.98	2.4652	.0174	0.0030	0.1700	0.8660
R ²	.3380			.3000			.3710					
F value	2.0030			1.6820			2.3140			0.591		
Sig	.0400			.1020			.0200			0.839		

variable trap. Applying dummy variable multiple linear regression on each of the data series, the following results were obtained (Tables 4, 5 & 6).

The Analysis of Variance results suggest that the monthly net investment by FIIs were not equally distributed throughout the month of the years for all the three periods (F-value is significant at 0.01 levels). The net investment in equity was not equally distributed for the first and second period but not for the third period. The investment in Debt was equally distributed for the first and second period. The reason may be, the FII were allowed in the debt instruments since 1997 and were in a nasal and growing stage. For the third period, Debt FII was not equally distributed. These imply that the net investments in equity as well as debt investment on the monthly basis were volatile and irregular. This is because during the third period, the economic crisis and its recovery period, the FIIs were not sure of both global as well as host country's investment scenario and resulted in rapid reversals in the investment decisions. The market might be efficient, preventing the investors in formulating any investment strategy. But when checking the monthly average return of the market for all the three periods, the returns are equally distributed throughout the year. The average monthly returns were not significantly different from each other (insignificant F value) for all the three periods. So whatever may be the period or phase of the stock market, the market returns were equally distributed throughout the year. This implies that though the market return are the main driving force for FI Investments there are some other factors which influence the timing of investment into India.

For the first period, seasonality occurred in the months of January to April for net and equity investment. This period covered the initial investment scenario for the FII when the market was opened for the global players and the investments were allowed in the equity alone⁴. Like in any developed market, beginning of the year effect which spreads into two more months was present. The February effect starts in January, peaks in to February and recedes in the next two months. This could be explained by Tax loss selling hypothesis where in the investors off load their loss making investment to shield the tax gain on other investments during the year end, sit on cash and make fresh investment in the new year or window dressing at the year-end by the portfolio managers by disinvesting on loss making investments to present an attractive portfolio as well as sit on cash before January and start new investment in the new year. For the debt investment, the average investment was significant only in the month of February. So as far as the first period is concerned February effect was present.

For the second period, the mean investments were significant for the months February and March followed by the months of August & September and November & December in net and equity investment. This period covered data in the rapid growth phase of global capital market. The growth of Indian capital market was also very phenomenal. So people with surplus money looked for better opportunities for which they needed information. By analyzing the first and second quarterly financial year reports on economy, corporate performance, and market timing, these investors tried to maximize their return. These information were analyzed for investment decisions since stock price reactions to quarterly releases of annual reports were statistically significant (Gajewski and Que´re´, 2001). Even here the second quarter reports which come in the third quarter was much more relied upon for making investment decisions which explain very high November effect. The effect could be explained by Risk aversion

⁴ FII were allowed to invest in debt instruments since March 1997 as per RBI press release dated 8th March 1997.

hypothesis and interim Accounting Information hypothesis. During this period the foreign institutional investors were ready with information regarding the economic condition, Govt. policy and the corporate expected results which they used for investment strategy. This was a combined effort of the Risk aversion hypothesis and interim Accounting Information hypothesis. This is in line with the findings, January effect being replaced by one another month of the year effect (July effect, Moosa 2007). They made robust investments during the period of November. So in addition to February effect, November effect was also present during the second period in total net FII and Equity FII. But in the debt no such effects were evident leading to believe that FII are more concerned about increasing their return by participating in the equity market rather than safe assured returns in the debt market.

In the third period, the mean investments were significant for the months July and September for net investment and equity investment. During this period the world economy was in turbulence and the market mood was battered. All information revealed was reflected in the market and investment decisions. Risk aversion hypothesis and interim Accounting Information hypothesis are the only possible explanation for the effect. Because of this the significance level of seasonal investment has reduced dramatically and started to vanish. The vanishing effect could be attributed to changing in the accounting standards and tax treatments and efficient market. But in the case of debt the January effect has reappeared which has started in the month of December itself. Since the equity market was so efficient and volatile, the FIIs have chosen the debt instruments for assured returns.

5.2. Seasonality in the market return

When checked for the monthly seasonality in market return, none of the monthly coefficients are significant except for the month of January in the first period (insignificant 't' values). But this has an insignificant F statistics accepting the null hypothesis of no difference in the average return among the months. During the early stages of opening the market to the global players (after 1992 but before 2003), the market itself was in a developing stage. That is the reason for the January effect in the first period of the study has no meaning. But in the 2nd and 3rd periods also the F statistics are insignificant. During these periods the market has seen tremendous growth and high volatility respectively. And none of the monthly averages are significant (insignificant 't' values). This leads to the conclusion that the average investments across the months remain unchanged because the market is efficient, making abnormal returns impossible. This is totally opposite to the finding of previous studies (Mihir Dash et al, 2011 and Mishra & Sisira Kanti, 2012) in Indian scenario.

5.3. Control effect in Foreign Institutional Investment

While checking the Control of market return on net foreign institutional investment, interesting results were found. In all the three periods the 'F' statistics are significant. So the average monthly investments in all the three periods are significantly different from one another for the particular period. There is no change in the relationship between the investment and the months because of the control of return in market. Only it has strengthened in the later case. The R² has increased because of the addition of market return as an independent variable in the model. The incremental increase in R² is 5%, 23% and 87% respectively for the three periods. So not only there exists a control effect of market return on net foreign institutional investment but that control is increasing.

Table 7: Control on seasonality

Independent Variable	period 1			period 2			period 3		
	Coefficients	t	Sig.	Coefficients	t	Sig.	Coefficients	t	Sig.
NIFTYRT	3916.7640	1.4750	0.1430	89106.0630	4.1400	0.0000	228751.0430	6.0710	0.0000
January	815.8570	3.0330	0.0030	18.4510	0.0130	0.9900	4195.5160	1.0350	0.3060
February	1064.6940	4.2180	0.0000	5189.3070	3.5730	0.0010	11663.3650	2.8380	0.0070
March	689.7640	2.7630	0.0070	5070.5320	3.4790	0.0010	6575.7580	1.6230	0.1110
April	852.1890	3.3890	0.0010	2436.4400	1.6750	0.1020	-850.9200	-0.2050	0.8380
May	403.4690	1.6160	0.1090	-83.5270	-0.0570	0.9550	487.0580	0.1200	0.9050
June	230.6600	0.9210	0.3590	3128.3230	1.9170	0.0620	442.7640	0.1190	0.9050
July	406.0460	1.6270	0.1070	858.1190	0.5050	0.6160	14725.1880	3.9810	0.0000
August	338.4550	1.3560	0.1780	1369.9220	0.7990	0.4290	2342.7850	0.6330	0.5290
September	185.4750	0.7430	0.4590	1948.9940	1.1330	0.2640	10438.9200	2.7840	0.0080
October	193.9040	0.7710	0.4430	1373.4780	0.8180	0.4180	9105.4300	2.2460	0.0290
November	399.4750	1.5980	0.1130	4179.7470	2.4940	0.0170	7552.3010	1.8440	0.0710
December	254.1020	1.0120	0.3140	3040.2080	1.7590	0.0860	8433.1530	2.0810	0.0430
R ²	0.3780			0.7000			0.6330		
F	4.9630			7.1680			6.7700		
Sig.	0.0000			0.0000			0.0000		

In the first period, the coefficient of market return is not significant. But in the second and the third periods the coefficient of market return is significant. So the market return is a driving force for foreign institutional investment in the later part of investment periods. When looked into the coefficients of monthly investments, in the first period, there is seasonal effect in the months of January till April. (Significant 't' values). During these months the average investments are significantly large with February at the peak. This supports the high February effect during the first period. Comparing this with the dummy variable result for foreign institutional investment (Table. 4), very clearly spells minor control in the part of market returns on the seasonality of foreign institutional investment

In the second period seasonality occur in the months of February and March months and again in the month of November. Compared to the previous period, the around February effect has diminished a little and a new effect November is emerging. And the market return coefficient is also significant. Comparing Table 5 with Table.7, one can see the control effect of market return on the monthly seasonal that it is diminishing the February effect and introducing a new effect in November.

On analyzing the third period in the months of February, July, September to December, seasonality occurs along with significant market return. But the February effect is diminishing still further and new effects in the later part of the year are increasing. This definitely indicates vanishing February effect. Comparing this with the dummy variable result for foreign institutional investment (Table. 6), the seasonal effects have shown a shift in their behaviour from beginning of the year towards the end of the year because of the control effect. Actually July effect is very predominant in the recent period. So in all the three periods there exists an control effect on the seasonality of foreign institutional investment.

5.4. Interaction effect in Foreign Institutional Investment

From table.8a it is observed that for the first period the F statistics is insignificant concluding there is no significant difference among the monthly net foreign institutional investment because of either the month, monthly market return or the interaction effect of market return and the month. On investigating t values neither the main effect coefficients nor the interacting effect coefficients are significant to warrant a calendar effect on net foreign institutional investment. (except a January effect at 10% level). Here the October month is considered as a base dummy variable and estimations are with relevance to this base dummy. All the α coefficients are concurrent.

For the second period the monthly net foreign institutional investment is significantly different from one another (significant F statistics) because of the month, monthly market return or the interaction effect of market return and the month. On investigating t values for the main effects, in February and March, the monthly effect is significant at 5% level and in market return at 10% level. But none of the interactive dummy is significant enough to be called an effect. Here May month is considered as the base dummy and the estimation is with reference to this base dummy. So there is February and March effect on the net foreign institutional investment but no interaction effect on investment. And for the third period the May month is again considered as the base month and the monthly net foreign institutional investment is significantly different from one another (significant F statistics). February and July effects are present at 5% level and the market return is significant at 10%. As for the interaction effect is concerned in the

month of September alone the effect is present at 10%. So along with February and July effects interactive effects is present in the September month.

Table 8a: Interaction effect - period 1

	Coefficients	t	Sig.
(Constant)	201.16	.71	.4819
D1	714.83	1.69	.0934
D2	674.43	1.64	.1045
D3	474.33	1.24	.2165
D4	499.94	1.26	.2104
D5	226.89	.59	.5536
D6	-8.58	-.02	.9823
D7	206.91	.54	.5884
D8	135.07	.35	.7238
D9	-20.27	-.05	.9579
D11	214.05	.56	.5781
D12	4.76	.01	.9904
INDEXRT	4526.14	.41	.6817
D1RT	-5376.16	-.40	.6889
D2RT	12812.09	.82	.4126
D3RT	-9113.62	-.69	.4924
D4RT	-13989.63	-.95	.3428
D5RT	10587.53	.71	.4772
D6RT	4111.83	.30	.7627
D7RT	11117.37	.66	.5118
D8RT	-4994.60	-.36	.7174
D9RT	-2193.29	-.14	.8909
D11RT	2741.83	.19	.8496
D12RT	4080.99	.27	.7867
R Square	.2191		
F	1.1586		
Sig.	.3018		

On comparing this with tables 4,5,6 and 7, in the first period the high February effect which is originally present as a spread from January to April has diminished into a very mild to nil January effect because of the interactive effect of months with the market return. The nasal stage into the market may be the reason for this behaviour. In the second period The February-March and November-December effect has turned into February-March effect alone and in the third period from July & September effect to February & July effect. And in the September month a mild interaction effect is present. So it is observed that in the latest period very slowly the interactive effect is influencing the monthly net foreign institutional investment.

Table 8b: Interaction effect - period 2

	Coefficients	t	Sig.
(Constant)	20.63	.01	.9888
D1	110.35	.05	.9618
D2	4573.96	2.19	.0368
D3	5098.57	2.45	.0205
D4	2420.10	1.17	.2499
D6	2641.65	1.22	.2340
D7	5325.28	.74	.4664
D8	3879.81	.82	.4186
D9	3284.01	.43	.6725
D10	-1633.77	-.56	.5799
D11	-7807.59	-.89	.3824
D12	-3089.89	-.81	.4260
INDEXRT	105788.18	1.89	.0687
D1RT	-25764.43	-.26	.8003
D2RT	116075.82	.96	.3457
D3RT	-9964.70	-.12	.9044
D4RT	-17432.38	-.21	.8320
D6RT	-68725.20	-1.05	.3003
D7RT	-204882.59	-.70	.4917
D8RT	-113274.85	-.67	.5109
D9RT	-67295.31	-.24	.8126
D10RT	129158.61	1.16	.2553
D11RT	582272.68	1.35	.1870
D12RT	202050.58	1.60	.1206
R Square	.6325		
F	2.1698		
Sig.	.0248		

Table 8c: Interaction effect - period 3

	Coefficients	t	Sig.
(Constant)	546.58	.14	.8876
D1	2700.17	.49	.6240
D2	15602.78	2.44	.0191
D3	6305.83	1.16	.2529
D4	1438.31	.23	.8205
D6	436.22	.08	.9343
D7	14368.55	2.76	.0087
D8	1820.58	.35	.7281
D9	4704.45	.81	.4247
D10	8615.52	1.59	.1207
D11	3887.30	.66	.5105
D12	9276.02	1.69	.0983
INDEXRT	189984.00	1.86	.0703
D1RT	274541.86	1.47	.1499
D2RT	284380.97	1.35	.1847
D3RT	228696.18	1.14	.2626
D4RT	-79959.45	-.48	.6368
D6RT	-38749.18	-.26	.7993
D7RT	188883.90	.89	.3807
D8RT	10971.27	.06	.9518
D9RT	357497.05	1.86	.0699
D10RT	21304.98	.18	.8585
D11RT	-155761.99	-.91	.3662
D12RT	-509427.07	-1.65	.1067
R Square	.6520		
F	3.2580		
Sig.	.0005		

6. Conclusion

Calendar effect in stock market was used for investment planning by institutional and retail investors in both developed as well as developing markets. The investment made by these investors also exhibit calendar effect. Many a times, calendar effect in the stock market is caused by uneven investments across the calendar period (Su Han Chan et al, 2004). In Indian stock market, the largest custodian of assets, Foreign Institutional Investors, are believed to be the market movers (Rajkumar and Hariom Gupta, 2010). On Analyzing the investment patterns of FIIs across the months of the year, during the early period of investment (before 2003) in India, the seasonal effect starts with the beginning of the calendar year called February effect which could be explained by the Tax loss selling hypothesis and window dressing hypothesis for NFII and EFII. During this period, the market return also exhibit January effect. There is no seasonal

effect in the market return and there exists control effect of market return on investment seasonal. The high February effect which is originally spread from January to April has diminished into a very mild to nil January effect because of the interactive effect of months with the market return. The nasal stage into the market may be the reason for this behaviour.

After 2003, the calendar effect has changed into first, third and fourth quarter of the accounting year effect, in the months of February & March followed by the months of August & September, and November & December, because of interim Information hypothesis and risk aversion hypothesis. Also the FIIs are more return driven and during this period the equity stock market growth was phenomenal throughout the globe. Return chasing hypothesis can also explain the monthly effects in NFII and EFII. But there is no seasonality in the market return. So, interim Information hypothesis and risk aversion hypothesis are plausible reason for the effect. The first period February effect is diminishing in the second period. The control of market return spreads the seasonal effect. But the interaction of market return on monthly investment alters the calendar effect into February-March effect alone.

After 2007, July & September effect was present in NFII and EFII. Risk aversion hypothesis and interim Accounting Information hypothesis could be the possible explanation for this behavior. But in the recent period, monthly effects are not so prominent. Again there is no seasonal effect in the market return. The diminishing effect could be because of changes in the market behaviour in an efficient way. This result could be checked with the stock market efficiency for robustness. Instead of the February effect, July effect is happening in this recent period. The control of market return has amplified the shift in seasonal effect. And in the September month a mild interaction effect is present. Along with main effect interaction effect is present in the third period. So the interactive effect is influencing the monthly net foreign institutional investment though in a mild way.

In the case of DFII, during the early period there exists February effect which later vanished and resurfaced again as January and December effects. The reason could be that in the recent past the investment ceiling has been revised and relaxed when compared to the previous/early periods of investment⁵.

7. Scope for further research

Since the role of FII on Indian stock markets tends to be growing, knowing the seasonal and cyclical effects in FII will help the authorities to develop an environment where FIIs would maintain their positions with confidence, thereby making the markets, as well as investments, more stable. This research addressed the seasonal effect in the monthly investments and stock market returns and their interaction effect with three periods of FII investment. Further analysis on cyclical effect would yield an in depth understanding in to the issue. The same seasonal as well as cyclical effects could be addressed at the trade level for better understanding and policy formulation.

⁵ As per circular IMD/FII&C/37/2009 of SEBI dated February 6, 2009 the methodology for calculating the limit for debt exposure is revised to bidding stem.

References

- Abraham. A, and Ikenberry. D. (1994), The Individual Investors and the Weekend Effect. *Journal of Financial and Quantitative Analysis*, Vol.29(2), pp.263-277.
- Agrawal, A. and Tandon, K. (1994), Anomalies or Illusion? Evidence from Stock Markets in Eighteen Foreign Countries. *Journal of International Money and Finance*, Vol. 13(1), pp.83-106.
- Andrew Lynch, Andy Puckett and Xuemin Sterling Yan. (2011), Institutions and the Turn-of-the-Year Effect: Evidence from Actual Institutional Trades. *Working paper*.
- Anuradha, N. Rajendran, G. (2012), Macroeconomic variables on Foreign Institutional Investment during the economic crisis and recovery period in an emerging market: India, *European Journal of Economics, Finance and Administrative Sciences*, Vol. 51, pp. 134-145
- Athanassakos, George, Ackert, Lucy. (1998), The seasonal impact of institutional investors [The January effect]. *Canadian Investment Review*, Vol.11(3), p. 28.
- Badhani, K. N. (2006), Empirical Regularities in the Intra-Week Trading Patterns of Foreign Institutional Investors in India. Available at SSRN: <http://ssrn.com/abstract=900501>.
- Badhani, K. N. and Kavidayal, B.D. (2005), Structural Changes and the Day-of-the- Week Effect in Indian Stock Market. *Working Paper*, Kumaun University, Nainital.
- Bhattacharya, K. Sarkar, N. and Mukhopadhyay, D. (2003), Stability of the Day-of-the- Week Effect in Return and in Volatility at the Indian Capital Market: A GARCH Approach with Proper Mean Specification. *Applied Financial Economics*, Vol. 13(8), pp. 553-563.
- Bohl, M.T. Gootschalk, K. and R. Pal. (2006), Institutional investors and stock market efficiency: The case of the January anomaly, *MPRA Paper* no. 677.
- Bose, Suchismita and Dipankor Coondoo. (2004), The Impact of FII Regulations in India: A Time - series Intervention Analysis of Equity Flows. *Money & Finance*, Vol. 2, No.18-19, July-December.
- Chakrabarti Rajesh. (2001), FII Flows to India: Nature and Causes, *Money & Finance*, October-December.
- Chang, E.; Pinegar, M. and Ravichandran, R. (1993), International Evidence on Robustness of the Day-of-the-Week Effect. *Journal of Financial and Quantitative Analysis*, Vol. 28, pp. 497-513.
- Chaudhury, S.K. (1991), Seasonality in Share Returns: Preliminary Evidence on Day-of-the-Week Effect. *The Chartered Accountant*, Vol. 40.November, pp.107-109.
- Choudhry, T. (2000), Day-of-the-Week Effect in Emerging Asian Stock Market:Evidence from GARCH Model. *Applied Financial Economics*, Vol. 10,pp. 235-242.
- Condoyanni, L.; O'Hanlon, J. and Ward, C. (1987), Day-of-the-Week Effects on Stock Returns: International Evidence. *Journal of Business Finance and Accounting*, Vol. 14, pp. 159-174.
- Frank Cross, K. (1973), The Behaviour of Stock Prices on Friday and Wednesday. *Financial Analysts Journal*, Vol. 29(6), pp.67-69.
- French, K. R. (1980), Stock returns and the weekend effect. *Journal of Financial Economics*, Vol.8, pp. 55-70.
- Gajewski. J and Que're´B.P. (2001), The information content of earning and turnover announcement in France. *European Accounting Review*, Vol.10(4), pp.679-704.

- Gordon, James and Poonam Gupta. (2003), Portfolio Flows into India: Do Domestic Fundamentals Matter? *IMF working paper*, No 03/20.
- Goswami, R. and Angshuman, R. (2000), Day-of-the-Week Effect on the Bombay Stock Exchange. *ICFAI Journal of Applied Finance*, Vol. 6, pp. 31-46.
- Jaffe, J. and Wasterfield, R. (1985), The Weekend Effect in Common Stock Returns: The International Evidence. *Journal of Finance*, Vol. 40, pp.433-454.
- Jayen B. Patel. (2008),Calendar Effects In The Indian Stock Market. *International Business & Economics Research Journal*, Vol.7(3), p. 61.
- Julia Henker and Debapriya J. Paul. (2011), Retail investors exonerated: The case of the January effect. *Accounting & Finance*.
- Kuhn, Thomas S. (1970), *The structure of scientific revolutions*, second edition, enlarged. Chicago: University of Chicago Press.
- Lakonishok, J. and Maberly, E. (1990), The Weekend Effect: Trading patterns of Individual and Institutional Investors. *Journal of Finance*, Vol. 45(1), pp. 231-243.
- Lakonishok, J., Shleifer, A. and Vishny, R.W. (1992), The Impact of Institutional Trading on Stock Prices. *Journal of Financial Economics*, Vol.32, pp.23- 43.
- Lilian Ng and Qinghai Wang. (2004), Institutional trading and the turn-of-the-year effect. *Journal of Financial Economics*, Vol. 74(2), pp. 343-366.
- Ling T. He and Shao C. He. (2011), Has the November Effect Replaced the January Effect in Stock Markets?. *Managerial and Decision Economics*, Vol. 32(7), pp. 481–486.
- Maberly, E. (1995), Eureka! Eureka! Discovery of Monday-effect Belongs to the Ancient Scribes. *Financial Analyst Journal*, Vol. 2, pp. 10-11.
- Mihir Dash, Mohit Sabharwal, Anirban Dutta. (2011), Seasonality and Market Crashes in Indian Stock Markets. *Asian Journal of Finance & Accounting*, Vol. 3(1), E11.
- Mishra and Sisira Kanti. (2012), Stock Market Seasonality: A Study of Calendar Anomalies in the Indian Stock Market. Available at SSRN: <http://ssrn.com/abstract=2125799>
- Moosa, I. (2007), The Vanishing January Effect. *International Research Journal of Finance and Economics*, Vol. 1(7), pp. 92-103.
- Mukherjee, Paramita, Suchismita Bose and Dipankor Coondoo. (2002), Foreign Institutional Investment in the Indian Equity Market : An Analysis of Daily Flows During January 1999-May 2002. *Money & Finance*, Vol. 2, Nos. 9-10, April – September.
- Narayan Sethi. (2009), International Capital Flows And Growth In India: The Recent Experience. *Economic Political Weekly*, Vol.38, Nov / Oct 11-17, pp. 4319- 4330.
- Nath, G.C. and Dalvi, M. (2004), Day-of-the-Week Effect and Market Efficiency- Evidence from Indian Equity Market using High Frequency Data of National Stock Exchange. Paper Presented at The Center for Analytical Finance, Indian School of Business, Hyderabad, December, 19-21.
- Neeta Tripathi. (2008), Foreign institutional investment flows in Indian companies. *Asia-Pacific Business Review*, Jan-March.
- Poshakwale, S. (1996), Evidence on Weak Form of Efficiency and Day of the Week Effect in the Indian Stock Market. *Finance India*, Vol. 10(3), pp. 605- 616.
- Puckett, A. and Yan, X. (2011), The Interim Trading Skills of Institutional Investors. *The Journal of Finance*, Vol.66, pp. 601–633.

- Rai K and Bhanumurthy.N.R. (2004), Determinants of Foreign Institutional Investment in India: The Role of Return, Risk, and Inflation. *The Developing Economies*, Volume 42(4), pp. 479-93.
- Rajkumar & Hariom Gupta. (2010), FII Flows to India: Economic Indicators. *SCMS Journal of Indian Management*, January – March, pp.104-116.
- Rima Turk Ariss, Rasoul Rezvanian, Seyed M. Mehdian. (2012), WTO membership, ownership deregulation, and market efficiency: Evidence from China. *Applied Financial Economics*, Vol. 22(3).
- Sais, R. W. and Starks, L.T. (1995), The Day-of-the-Week Anomaly: The Role of Institutional Investors. *Financial Analysts Journal*, Vol. 51, May-June pp.58-67.
- Su Han Chan, Wai-Kin Leung, Ko Wang. (2004), The Impact of Institutional Investors on the Monday Seasonal. *Journal of Business*, Vol.77(4), pp.967-986.
- Suresh Babu. M and K.P. Prabheesh. (2008), Causal relationships between Foreign Institutional Investments and stock returns in India. *Int. J. Trade and Global Markets*, Vol.1(3), pp.259-265.
- Yip, P. S. L. Tsang, E. W. K. (2007), Interpreting dummy variables and their interaction effects in strategy research. *Strategic Organization*, Vol. 5(1), pp.13–30.