THE MONTH OF THE YEAR EFFECT IN THE INDIAN STOCK MARKET: AN ANALYSIS OF THE IMPACT OF MARKET, INDUSTRY AND SIZE OF THE FIRM

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Abstract

The research examines the month-of-the-year effect in the Indian Stock Market for a period of ten years, using daily returns calculated on the NSE Indices, following a regression-based approach. The effect of seasonal abnormalities on the market as whole, on different sectors of the market and the relationship between calendar effects and the firm size is studied. The results show that market returns are significantly different in January, October and December. The Smallcap index returns give evidence of a small cap effect with significantly different returns in January, February, June, October and December. The analysis of the returns of sub-market sectors is also indicative of the presence of Calendar anomalies. Eight out of ten show presence of seasonalities in their returns. However, only in the case of Banking and Financial sectors, such effects were absent. The results of the study can help an investor take informed decisions regarding the stock returns. Also the regulatory bodies may look into the informational efficiency aspect of the stock market in more detail.

Key words: Calendar effects, Market efficiency, Seasonality, Anomalies
JEL Classification: G10, G14

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Introduction

An abnormality in the returns of a stock detected through empirical studies may remain unexplained even after its detailed analysis. Such irregularities are called anomalies. These anomalies are inconsistent with the concept of Efficient Market Hypothesis which defines the degree of efficiency of the market in terms of the type of information that security prices should reflect[1]. In other words, according to this hypothesis security prices follow a random walk, thus making it impossible to predict future returns on the basis of publicly available information[2].

One such anomaly which defies the Efficient Market Hypothesis is the presence of Calendar Effects in the stock market returns. Calendar effects are patterns attributable in stock returns which result due to changes in time and seasons. The effects include different behaviour of stocks at - different times of the day, different days of the week, different periods of the month, or different months of the year[3]. Calendar effects are economically meaningful and statistically significant irregularities that may be utilised by proficient investors for reaping risk adjusted returns on securities. The most common forms of Calendar effects are January effect, April effect, Diwali effect, Monday effect etc.

The following research paper deals with the study of one aspect of Calendar effects on stock returns i.e. the month of the year effect on returns of stock indices of the National Stock Exchange. The effect of different months of the year on returns of CNX 500, CNX Smallcap, and other submarket indices is studied and an analysis to check the presence of Calendar anomaly in stock returns is done on them. The returns data is tested for statistical averaging, standard deviation, skewness, kurtosis, and jarque-bera. The results are checked for significant abnormalities through multiple-regression to draw conclusions regarding the presence of Calendar anomalies in them.

1 Singh Rohini (2009)
2 Fountas and Segredakis (2002)
3 Wikipedia.com

Review of Literature

Presence of Calendar Effects in stock market returns of any country across the world has been a constant subject of study with respect to the market efficiency concept. Recently, the focus has been shifted to various emerging economies and their stock markets.

Poshakwale (1996) studied the Indian Stock Market, basing his study on the Bombay Stock Exchange over a period of 1987-94. He did a very basic testing of the weak form of market efficiency and the day of the week effects using BSENI. The research showed that the variance in stock returns is time dependent and varies according to the day of the week and shows the weekend effect (Friday effect). This study opened avenues for researchers for further testing in the Indian Stock Market.

Pandey (2002) studied the Indian Stock Exchange's BSE Sensex Returns to analyse the randomness of returns affected by seasonal factors over a 12 year period post 1991 reform period. He found results indicating informationally inefficient Indian stock market due to presence of March, July and October effect.

Fountas and Segredakis (2002) in their research have studied seasonal effects in stock returns especially the slightly higher returns in the month of January as compared to the rest of the year, called the 'January effect'. They studied the phenomenon in eighteen emerging economies of the world including India for the period 1987-95 and found little evidence to support the January effect, substantiating the presence of informational efficiency in these markets.

Bildik (2004) conducted research in the Istanbul stock market for the period 1988-99, to check whether the phenomenon of Calendar anomalies existed in the stock returns and trading volumes in consonance with the International studies. He found the presence of almost all sorts of Calendar irregularities and has cited numerous reasons that may be causing them.

Patel (2008) studied the the BSE 500 and NSE S&P CNX 500 (NSE 500), from June 1999-2007 and found a November-December effect wherein mean returns were significantly greater and a March- to-May effect in which mean returns were significantly less than the other nine.

In another study by **Wyème and Olfa (2011)** in the Tunis Stock Market, the researchers checked for the month of the year effect and its persistence in time over a 6 year period (2003-

08) in the stock returns. They found the presence of April effect and its persistence in the two sub-sample periods thus clearly defying the principles of EMH.

Marrett and Worthington (2011) studied the month of the year effect in the Australian stock returns at the market and the industry levels for a 10 year period. They studied the market and different sectors separately for the Calendar effects. After employing a regression based approach, they found the presence of significantly higher returns in April July and December. A small firm effect was also noticed in the research.

A different approach to seasonal anomalies is studied by **Almudhaf (2012)** in his paper, wherein he investigates the Islamic calendar seasonal anomalies in the stock market returns in 12 Islamic countries for roughly 10 year period (1996-2007). The results showed significant Islamic calendar anomalies in the stock returns and the Ramadan effect (significantly higher returns in the month of Ramadan).

Thus studies undertaken in different stock markets of the world have suggested the presence of Calendar abnormalities in one of its many manifestations. These effects are prevalent in the Indian Stock Markets as well, as some previous studies indicate. These findings seriously question the informational efficiency of the domestic markets and compel one to think, if it would not be possible to gain from such seasonal trends.

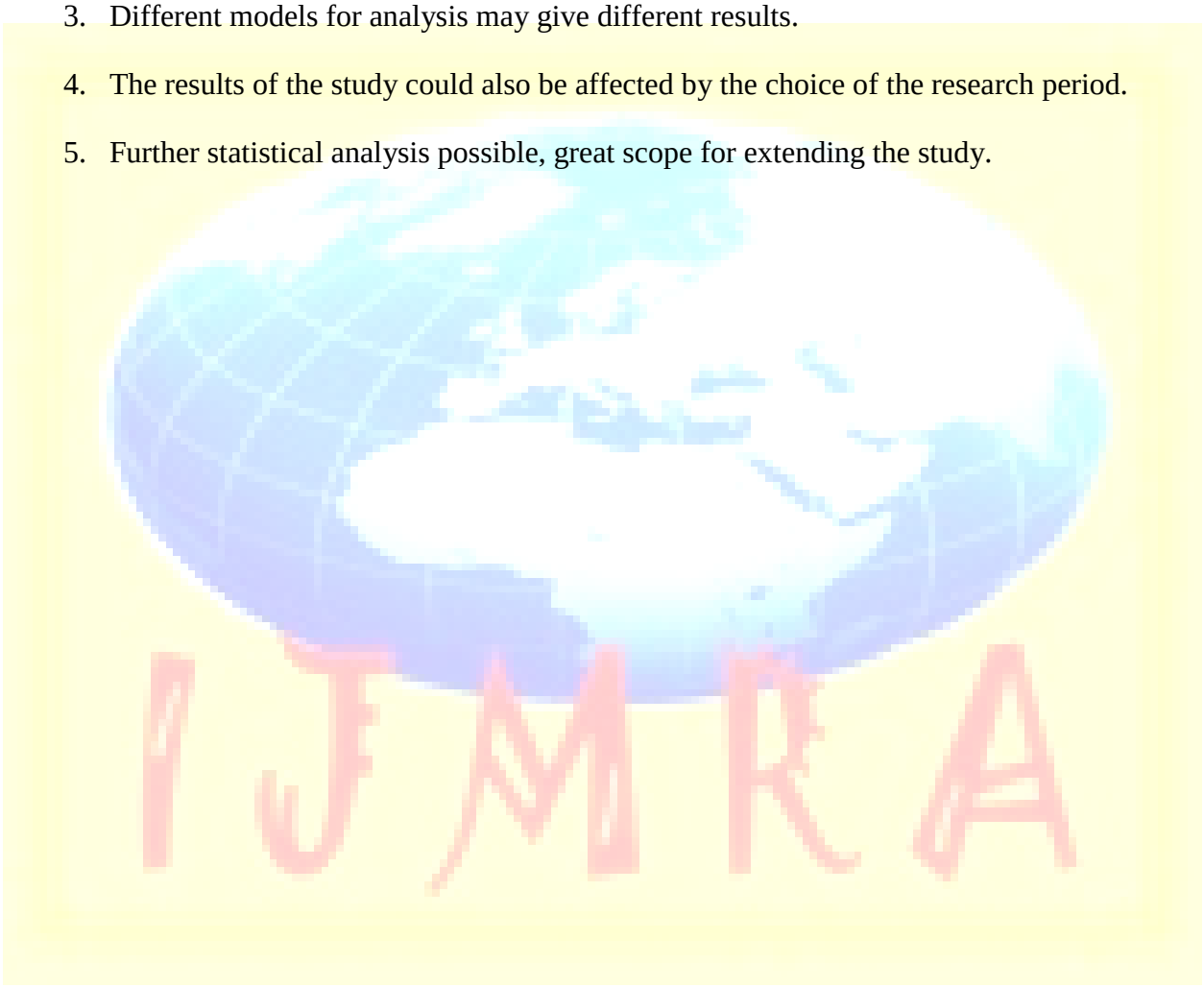
Scope of the study

The study analyses the existence of month-of-the-year effect in 12 different NSE Indices encompassing several sectors of the market. The study period is from 1st January 2002 to 31st December 2011 for majority of indices but depends upon the date of introduction of a particular sector index in the market, in which case, period of study for the sector index will be from its date of introduction till 31st December 2011. The quantum of data is large to reduce various limitations of the study. The daily stock return data is analysed using multiple-regression and other statistical functions. The statistically significant results shall prove presence of Calendar abnormalities in the Indian stock market and its informational inefficiency.

Limitations of the Study

The study suffers from various limitations. These are:

1. Unavailability of data for some indices for complete 10 years (period of study).
2. Other indices may give different results.
3. Different models for analysis may give different results.
4. The results of the study could also be affected by the choice of the research period.
5. Further statistical analysis possible, great scope for extending the study.



Properties and Description of Data

Twelve National Stock Exchange indices are used to examine the presence of the month-of-the-year effect in the Indian stock market. The period of study is from 1st January 2002 to 31st December 2011 for majority of indices but depends upon the date of introduction of a particular sector index in the market, in which case, period of study for the sector index will be from its date of introduction till 31st December 2011. Table A in the appendix shows the names of indices and the time period covered for each index based on data availability. All data is sourced from Capitaline and NSE website.

Table – 1 Selected Descriptive Statistics

Index	Mean	Annualised mean	Median	Standard deviation	Skewness	Kurtosis	Jarque Bera
CNX 500	0.0657	16.4316	0.1853	1.6175	-0.4891	8.4743	3216.16
CNX Smallcap	0.0501	12.5268	0.2465	1.7048	-1.1629	7.1717	2372.48
CNX Auto	0.0613	15.3314	0.1230	1.6947	-0.2324	4.8545	380.16
CNX Bank	0.0887	22.1804	0.1004	2.1452	-0.1654	5.4089	614.86
CNX Energy	0.0769	19.2184	0.1146	1.8499	-0.4660	8.5899	3340.02
CNX Finance	0.0610	15.2464	0.1161	2.1912	-0.0850	5.8073	822.63
CNX FMCG	0.0564	14.0896	0.0695	1.4151	-0.3681	5.1604	541.78
CNX IT	-0.0433	-10.8148	0.0674	5.0830	-38.0943	1736.7725	313224259.11
CNX Media	0.0073	1.8195	0.0266	2.0283	-0.1541	4.3545	200.68
CNX Metal	0.0453	11.3263	0.1026	2.6486	0.1751	9.0075	3766.08
CNX MNC	0.0495	12.3799	0.0919	1.3889	-0.6070	6.7379	1606.32
CNX Pharma	0.0618	15.4438	0.1027	1.3063	-0.4343	6.3257	1228.71

The 12 Indices used are described below[4]:

1. CNX 500 - The S&P CNX 500 is India's first broad based benchmark of the Indian capital market. The S&P CNX 500 represents about 95.78% of the free float market capitalization and about 95.37% of the total turnover on the NSE as on December 30, 2011.

[4] Nseindia.com

2. CNX Smallcap - The CNX Smallcap Index is designed to reflect the behaviour and performance of the small capitalised segment of the financial market. The CNX Smallcap Index comprises of 100 tradable, exchange listed companies. The CNX Smallcap Index represents about 2.19% of the free float market capitalization of the stocks listed on NSE as on December 30, 2011 and approximately 7.46% of the traded value of all stocks on NSE.
3. CNX Auto - The CNX Auto Index is designed to reflect the behaviour and performance of the Automobiles sector which includes manufacturers of cars & motorcycles, heavy vehicles, auto ancillaries, tyres, etc. The CNX Auto Index comprises of 15 stocks that are listed on the National Stock Exchange.
4. CNX Bank - CNX Bank Index is an index comprised of the most liquid and large capitalised Indian Banking stocks. The index includes 12 stocks from the banking sector which trade on the National Stock Exchange.
5. CNX Energy - Energy sector Index includes companies belonging to Petroleum, Gas and Power sub sectors. The CNX Energy Index comprises of 10 stocks that are listed on the National Stock Exchange.
6. CNX Finance - The CNX Finance Index is designed to reflect the behaviour and performance of the Indian financial market which includes banks, financial institutions and housing finance and other financial services companies. The CNX Finance Index comprises of 15 stocks that are listed on the National Stock Exchange.
7. CNX FMCG - FMCGs (Fast Moving Consumer Goods) are those goods and products, which are non-durable, mass consumption products and available off the shelf. The CNX FMCG Index comprises of 15 companies who manufacture such products which are listed on the National Stock Exchange.
8. CNX IT - CNX IT provides investors and market intermediaries with an appropriate benchmark that captures the performance of the IT segment of the market. Companies in this index are those that have more than 50% of their turnover from IT related activities like IT Infrastructure , IT Education and Software Training , Telecommunication Services and Networking Infrastructure, Software Development, Hardware Manufacturer's, Vending, Support and Maintenance.
9. CNX Media - The CNX Media Index is designed to reflect the behaviour and performance of the Media & Entertainment sector including printing and publishing. The CNX Media Index comprises of 15 stocks that are listed on the National Stock Exchange.

10. CNX Metal - The CNX Metal Index is designed to reflect the behaviour and performance of the Metals sector including mining. The CNX Metal Index comprises of 15 stocks that are listed on the National Stock Exchange.
11. CNX MNC - The CNX MNC Index comprises 15 listed companies in which the foreign shareholding is over 50% and / or the management control is vested in the foreign company.
12. CNX Pharma - CNX Pharma Index captures the performance of the companies involved in Pharma outsourcing, low cost Healthcare services, biotechnology etc.

Returns

After listing down the daily stock prices for each index, the log natural of the price relative is calculated on daily stock data to create a time series data stream of continuously compounded returns, i.e.

$$r_t = \log (p_t / p_{t-1}) * 100,$$

where *pt* and *pt*-1 are the stock index price at time *t* and *t*-1, respectively. Table 1 presents a summary of descriptive statistics of the daily returns on all the stock indices under study. The sample and annualised means, medians, standard deviations, skewness, kurtosis and Jarque-Bera statistics are calculated.

Empirical Methodology

Table 1 provides insight into various properties displayed by the data. After that, a regression-based approach is used to test the month-of-the-year hypothesis. The following statistical regression model is used:

$$R_t = \sum_{i=1}^{12} \square_i M_{it} + \square_t$$

Where M_i is a dummy variable having a value of '1' for the trading data of month 'i' and '0' for the rest of the months (where i = 1 to 12), α are parameters to be generated from the regression model for each month and ε is the error term for that month. The hypothesis tested is

H0: □1□ □1□ □ 11□ □ 1□

as against the alternative hypothesis that all α are not equal. If the null hypothesis is false, then it shows that the stock returns display month-of-the-year effect in the Indian Stock Market.

Empirical Results

The descriptive statistical analysis done on the returns of different stock indices indicated following:

- The mean return on CNX Bank is the highest amongst all sectoral indices.
- The variability in returns is highest for CNX IT.
- The returns of all stock indices are slightly skewed to the left (skewness is negative) and bulk of the values lie to the right of the mean returns.
- The Kurtosis calculated on the returns of the stock indices indicates kurtosis > 3, signalling flatter tails as compared to normal distribution. A point to note here is the kurtosis calculated for the returns on CNX IT. Its kurtosis figure is very high indicating a very low, flat and even distribution.
- The Jarque-Bera test tests whether the skewness and kurtosis of the sample matches to that of normal distribution. Therefore greater the deviation of sample from a normal distribution, higher the JB value. In our study, returns on CNX IT have the highest JB value indicating an almost even distribution.

The estimated coefficients and their p-values of the parameters detailed in the regression equation are presented in Table-2.

Table – 2 Estimated Coefficients and P-values

Index		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CNX 500	Beta	**-0.4654**	-0.2948	-0.2304	-0.0925	-0.2482	-0.2744	-0.1424	-0.1372	-0.1326	**-0.3462**	-0.1435	**0.2743**
	P-value	0.0033	0.0669	0.1452	0.5648	0.1145	0.0793	0.3606	0.3822	0.4007	0.0289	0.3671	0.0138
CNX Smallcap	Beta	**-0.5636**	**-0.4042**	-0.2145	0.1510	-0.1567	**-0.3818**	-0.0576	-0.0482	-0.1968	**-0.5092**	-0.2726	**0.2706**
	P-value	0.0026	0.0318	0.2462	0.4254	0.3961	0.0369	0.7536	0.7930	0.2881	0.0064	0.1436	0.0384
CNX Auto	Beta	**-0.3761**	-0.1046	-0.0910	0.0056	-0.2700	-0.2523	0.0131	-0.0713	0.1012	-0.3312	-0.1111	0.1850
	P-value	0.0438	0.5775	0.6218	0.9764	0.1428	0.1666	0.9428	0.6976	0.5838	0.0754	0.5500	0.1556
CNX Bank	Beta	-0.3778	-0.3435	-0.2525	-0.0476	-0.2019	-0.3464	-0.0017	-0.2329	0.1107	-0.3356	-0.1299	0.2679
	P-value	0.0714	0.1061	0.2283	0.8231	0.3324	0.0944	0.9933	0.2630	0.5963	0.1098	0.5380	0.0690
CNX Energy	Beta	**-0.4209**	-0.1539	-0.0983	-0.0923	-0.2855	-0.2635	-0.1754	-0.1008	-0.1277	-0.2885	-0.2351	**0.2640**
	P-value	0.0200	0.4013	0.5870	0.6152	0.1124	0.1405	0.3248	0.5747	0.4790	0.1112	0.1964	0.0379
CNX Finance	Beta	-0.3798	-0.3427	-0.1578	0.0812	-0.1748	-0.2723	0.1014	-0.1752	0.2306	-0.3117	-0.0470	0.1808
	P-value	0.1153	0.1581	0.5084	0.7396	0.4631	0.2482	0.6682	0.4601	0.3345	0.1956	0.8450	0.2830
CNX FMCG	Beta	-0.2555	-0.1187	-0.1993	-0.0604	-0.2135	-0.0559	-0.0696	-0.0536	-0.0173	**-0.3003**	0.0284	0.1658
	P-value	0.0646	0.3973	0.1494	0.6672	0.1203	0.6822	0.6090	0.6963	0.8999	0.0301	0.8383	0.0881
CNX IT	Beta	-0.4667	-0.2914	**-1.2887**	-0.2357	-0.1966	-0.1122	-0.1915	-0.0814	-0.0919	-0.1413	-0.0062	0.2138
	P-value	0.3475	0.5629	0.0095	0.6403	0.6905	0.8193	0.6954	0.8690	0.8529	0.7764	0.9901	0.5404
CNX Media	Beta	-0.5007	**-0.5114**	-0.0022	0.0694	-0.1126	-0.4400	-0.1272	-0.2225	-0.2025	**-0.5514**	-0.2989	0.2494
	P-value	0.0527	0.0498	0.9932	0.7923	0.6604	0.0832	0.6156	0.3835	0.4313	0.0329	0.2463	0.1704
CNX Metal	Beta	**-0.6502**	-0.3092	-0.2002	-0.0999	-0.3846	**-0.5677**	-0.0881	-0.3391	-0.1557	-0.5210	-0.2311	0.3410
	P-value	0.0259	0.2924	0.4879	0.7353	0.1821	0.0467	0.7582	0.2373	0.5901	0.0738	0.4269	0.0943
CNX MNC	Beta	**-0.3950**	-0.1729	**-0.2759**	-0.1113	-0.2445	-0.1736	-0.1634	-0.1084	-0.0711	**-0.3648**	-0.0965	**0.2308**
	P-value	0.0036	0.2085	0.0419	0.4190	0.0697	0.1953	0.2211	0.4205	0.5993	0.0072	0.4795	0.0155
CNX Pharma	Beta	**-0.4969**	-0.2476	-0.1070	-0.0783	-0.2321	-0.2243	-0.1837	-0.1103	-0.1205	**-0.3986**	-0.0543	**0.2496**
	P-value	0.0001	0.0550	0.4003	0.5443	0.0666	0.0745	0.1427	0.3825	0.3424	0.0018	0.6714	0.0053

The result of the regression done to check month of the year effect in the market wide **CNX 500** index indicates significantly lower returns in the months of January and October and significantly higher returns in December. The mean return of the CNX 500 Index for the study period is 0.0657 percent. The daily mean returns in January, October and December are -0.4654 percent, -0.3462 percent and 0.2743 percent respectively.

The presence of January effect in the market wide stock returns may be speculatively attributable to the notion that FIIs drive Indian Markets or at least play a major role. This works on the tax-loss-selling hypothesis. This is relevant for investors for whom tax year ends on 31st December. It sees investors selling their stocks to register capital losses to claim tax benefits. As the taxpaying period rolls over, the investors put their money back into the markets which pushes the prices up. The negative returns may be due to profit booking by investors.

Presence of October abnormal returns in the CNX 500 (representing the market) returns may be due to Diwali effect as Diwali is a cultural festival in India and investor sentiments are attached to it. Also corporate bonuses are announced at this time, so investors have more disposable incomes to put in the market.

The December effect in the returns could be attributable to speculation related to the Financial Budget which is presented at the end of February in India, or due to growth in foreign mutual funds for which the fund managers tend to window-dress their portfolios to look profitable before year end.

The regression results for **CNX Smallcap** show January, February, June, October and December effect as the coefficients for these months are significantly different from its mean value of 0.0501percent. The additional seasonal abnormalities displayed by the small capitalised segment in terms of February effect may be because of occurrence of an important economic event in the country i.e. presentation of the Union Budget.

In the **Sectoral indices**, 8 out of 10 show Calendar anomalies. Auto and Energy sectors show a January effect may be due to FII movement. FMCG sector shows an October-Diwali effect. IT sector shows a March effect attributable to tax-loss-selling hypothesis, Media sector shows February and Diwali effects. Metals show January effect, MNC and Pharma show January, March, December and Diwali effects.

Summary and Conclusion

The focus of this study was on investigating the existence of seasonality in stock returns in India. For this purpose the daily returns data of the 12 different NSE indices for the period from 1st January 2002 to 31st December 2011 was used for analysis.

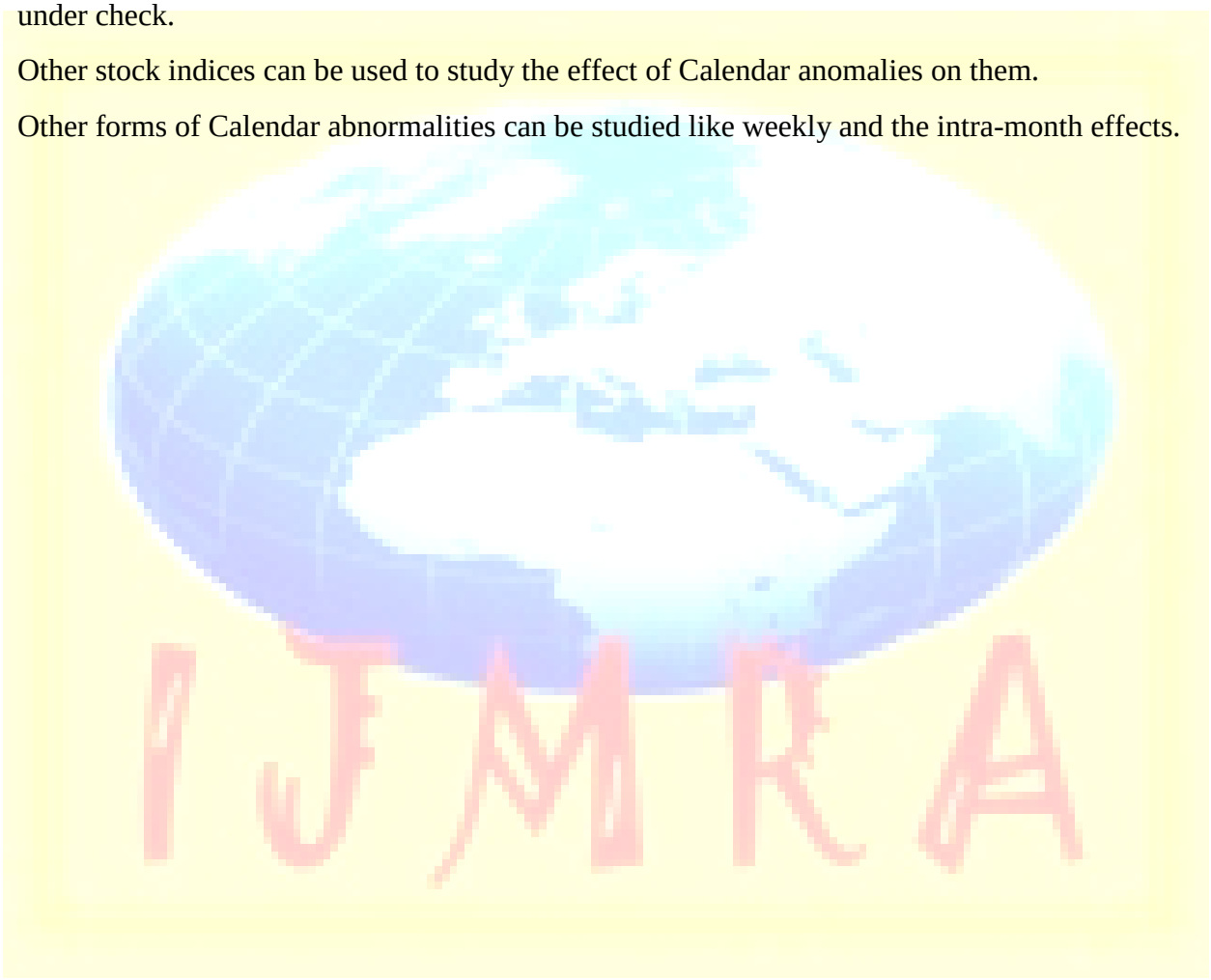
The regression results confirmed the seasonal effect in stock returns in India. We found that returns were statistically significant in January, February, March, October and December. At the market level, evidence is found of significantly different returns in January, October and December. The impact for small cap firms is pronounced with January, February, June, October and December returns displaying significantly different returns as compared to the mean returns. At the sub-market level, month-of-the-year effects are found in the Auto, Energy, FMCG, IT, Media, Metal, MNC and Pharma industries, but not in the Banking and Financial sectors. The most prominent effects of seasonality on the sectors were observed in the months of January, October and December.

The January effect is may be related to FII movement. The February effect related to the Union Budget. The Indian tax year ends in March. The statistically significant coefficient for March is consistent with the 'tax-loss-selling' hypothesis. October is affected by Diwali and December affected by speculations and year-end performance issues of funds.

The results of the study indicate that stock returns in India are not entirely random. This implies that the Indian stock market may not informationally efficient.

Suggestions

- Investors can improve their returns by timing their investments, but more research is required in this regard.
- There are implications for the stock exchange administrators and policy makers, one of them being the surveillance regime around the Budget should be stricter to keep excessive volatility under check.
- Other stock indices can be used to study the effect of Calendar anomalies on them.
- Other forms of Calendar abnormalities can be studied like weekly and the intra-month effects.



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Appendix

Table – A

Index	Start Date	End Date
CNX 500	01-01-2002	30-12-2011
CNX Smallcap	01-01-2004	30-12-2011
CNX Auto	01-01-2004	30-12-2011
CNX Bank	01-01-2002	30-12-2011
CNX Energy	01-01-2002	30-12-2011
CNX Finance	01-01-2004	30-12-2011
CNX FMCG	01-01-2002	30-12-2011
CNX IT	01-01-2002	30-12-2011
CNX Media	30-12-2005	30-12-2011
CNX Metal	01-01-2004	30-12-2011
CNX MNC	01-01-2002	30-12-2011
CNX Pharma	01-01-2002	30-12-2011