Efficient Market Hypotheses for Bric Stock Market

* Dr. P.N. Harikumar
** Dr. Susha D

* Associate Professor & Head, Post-graduate Department of Commerce & Tourism, Catholicate College, Pathanamthitta, Kerala, India
** Associate Professor, Post-graduate Department of Mathematics, Catholicate College, Pathanamthitta, Kerala, India

Abstract

This paper is an attempt to test weak form of efficiency for the stock markets of BRIC countries. For this, tests, namely Jarque-Bera, Run test, Kolmogorov-Smirnov (K-S) test, Serial Correlation and GARCH model have been applied. The study is based on daily data for stock indices of the Brazil, Russia, India and China for the period of 1st July 2011 to 31st August 2015. The results of the study revealed that all tests used in present study reject the hypothesis of random walk for all BRIC stock markets except the Run test, which supports the hypothesis of random walk for Brazil and China. Thus, the results of the study makes clear that inefficiency is prevent in the stock markets of BRIC countries. Further, the study provides clear-cut results that certain anomalies exist in these stock markets, which are making these stock markets inefficient. Further, the findings of the study revealed that in these markets investors have chances of earning extra profits by forecasting the security prices.

Keywords: Stock Market efficiency, Serial Correlation, Friday Effect, Efficient Market Hypothesis, share price behavior

I. Introduction

Stock market efficiency is an important concept in finance. Market efficiency has an influence on the investment of an investor because, if the market is efficient, past information will provide no information about the future prices and trying to pick up winners will be a waste of time. There are three major types of the efficiency "weak", "semi-strong", and "strong". Weak form efficient market hypothesis claims that prices on traded assets already reflect all past publicly available information. Semi-strong efficient market hypothesis claims both that prices reflect all publicly available information and that prices instantly change to reflect new public information. Strong efficient market hypothesis additionally claims that prices instantly reflect even hidden or "insider" information. The weak form of efficient Market hypothesis (EMH) (Which is used synonymously with random walk theory) holds that prices have no memory and yesterday has nothing to do with tomorrow. It states that stock prices reflect all available information so that prices are near their intrinsic values. In an efficient market information is freely available. The price of a share approximates to its intrinsic value. It becomes more important to study the concept of market efficiency in the context of International stock markets in the era when Globalization is increasing. The removal of restrictions on capital flows and relaxation of exchange control in many countries have accelerated integration among the world's capital. Thus, the present study makes an attempt to examine random walk hypothesis for BRIC countries stock markets. The paper is organized as follows: Section I is provide introduction. Section II reveals a brief review of literature. Section III explains research methodology used in study. Section IV presents empirical results. Finally, concluding remarks are given in Section V.

II. Review of Literature

Efficiency as important concept in finance has been researched by many researchers in world. Some of the studies are reviewed as below

Sharma and Kennedy (1977) found in their study that stocks on the Bombay Stock Exchange follow a random walk and is equivalent in this sense to the behaviour of stock prices in the markets of advanced countries. Sunil Poshakwale (1996) in their study shown that stock market is not weak form efficient. Alam et al. (1999) in their study tested the random walk hypothesis for Bangladesh, Hong Kong, Sri Lanka and Taiwan and revealed that all the stock indices except the Sri Lankan stock index follow a random walk. Grieb and Reyes (1999) indicated that behavior in the Mexican market was nonrandom while the Brazilian market indicated evidence in favor of the random walk.

Magnusson and Wydick (2000) taken for research a group of African countries and found that there is greater support for the African stock markets than for other emerging stock markets. Nath and Dalvi (2005) found in their study that market inefficiency exists. Chawla, Mohanty and Bhardwaj (2006) suggested in their study the existence of random walk hypothesis in these markets. Anokhi Parikh (2008) revealed in there that December is a month of truly anomalous returns in the Indian stock market. Bepari and Mollik (2009) in their study investigated the existence of seasonality in return series of Dhaka Stock Exchange (DSE) of Bangladesh and confirmed the existence of seasonality in stock returns. K. Mittal and Sonal Jain (2009) in their study brought out that none of the above anomalies exist in the Indian stock market. Further, results of serial correlation and runs tests also supported the Random Walk Theory and market efficiency hypothesis. Srinivasan (2010) attempted to examine the random walk hypothesis by using Augmented Dicky-Fuller test and the Phillips-Perron test. The results of the study revealed that Indian Stock Market did not show characteristics of random walk. Sanjeet Sharma (2011) examined whether day of week effect exist in Indian Stock Market or not, and to analyses whether anomalies exist in India the data has been taken for the period form January 2008 to December 2009 for two indices: Sensex and Nifty. The results of this study showed that the day of the week effect did not exist in the Indian Stock Market and this market can be considered as efficient.

The present study makes an attempt to contribute to the existing literature on the market efficiency by examining the stock markets of BRIC countries.

III. Methodology

The present study is based on the secondary data related to daily closing figures of various stock indices of various stock markets of BRIC countries over the period from 1st July 2011 to 31st August 2015.Table 1 shows country –wise indices considered for present study. The data is taken from Bloomberg.com. The returns using the closing prices of these indices are computed using the first differences of natural logs of prices.

Table 1: Stock Exchange and Stock Indices under Study

S. No.	Country	Index
1	Brazil	BVSP
2	Russia	RTS
3	India	BSE 30
4	China	SSEC

Methodology:

Several tests for establishing statistical independence in a stock price time series are available. The following tests, namely Jarque-Bera, Run test, Kolmogorov-Smirnov (K-S) test and GARCH model are used.

GARCH Model

Uncertainty is measured by looking at volatility in individual series. The volatility of individual series is tested by applying GARCH model (Generalized ARCH), introduced by Bollerslev (1986). In the standard GARCH (1,1) specification $\hat{u}_{xt} = \delta + \beta \hat{u}^2_{xt-1} + \gamma \sigma^2_{t-1} + \varepsilon_t$

Where residual series are generated by regressing x_t and y_t on constant, σ^2 is the one period ahead forecast variance based on past information called the conditional variance. The coefficient β is defined as ARCH (1) and γ as GARCH (1). If both the coefficients are individually significant and their sum is close to one then the series is said to be volatile.

Autocorrelation Function (ACF)

The Autocorrelation Function ACF, 1k, is used to determine the independence of the stock price changes. This measures the amount of linear dependence between observations in a time series that are separated by lag k, and is defined as

$$I_k = \frac{\sum_{t=1}^{n-k} (y_t - \tilde{y})(y_{t+k} - \tilde{y})}{\sum_{t=1}^{n-k} (y_t - \tilde{y})}$$

Where I_k is the autocorrelation coefficient for a lag of k time units and n is the number of observations. If the price changes of the stock are independently distributed, I_k, will be zero for all time lags.

Ljung and Box (Q) Statistic

The Q-statistic is used to test whether a group of autocorrelations is significantly different from zero. Ljung and Box (1978) used the sample autocorrelations to form the statistic

$$Q_{LB} = n(n+2) \sum_{K=1}^{m} \left(\frac{\hat{\imath}^2_k}{n-k} \right) \sim \chi^2_m$$

Under H_0: I_i = ……= I_k = 0 where Q asymptotically follows the χ^2_m distribution with m degrees of freedom. The high sample autocorrelations lead to large values of Q. If the calculated value of Q exceeds the appropriate χ^2_m value in a table, we can reject the null hypothesis of no significant autocorrelations. Rejecting the null hypothesis means accepting an alternative that is at least one autocorrelation is not zero.

Non-Parametric Tests

Run test: It is a test, which is used to detect statistical dependencies (randomness) which may not be detected by the autocorrects test.

The null hypothesis is that the observed series use random variable. The number of runs is computed as a sequence of the price changes of the same sign (such as; + +,--, 00). When the expected number of runs is significantly different from the observed number of runs, the test rejects the null hypothesis. A lower than expected number of runs indicates the market's over-reaction to information, subsequently reversed, while higher numbers of runs reflect a lagged response to information. Either situation would suggest an opportunity to make excess returns.

Under the null hypothesis that successive outcomes are independent, and assuming that $N_1 > 10$ and $N_2 > 10$. The number of runs is asymptotically normally distributed with

$$\text{Mean: } E(R) = \frac{2N_1N_2}{N} + 1$$

$$\text{Variance: } = \frac{2N_1N_2\,(2N_1N_2 - N)}{(N)^2\,(N-1)}$$

Where N = total number of observations

N1 = number of '+' symbols

N2 = number of '–' symbols

R2 = number of runs

The run test converts the total number of runs into a Z statistic. For large samples, the Z statistic gives the probability of difference between the actual and expected number of runs. If the Z value is greater than or equal to +_ 1.96, the null hypothesis is rejected at 5 percent level of significance.

Kolmogorov-Smirnov (K-S) Test

K-S is one of the best-known and most widely used goodness-of-fit tests. It is based on the empirical distribution function and converges uniformly to the population cumulative distribution function with probability measure one. The one sample K-S test procedure compares the observed cumulative distribution function for a variable with a specified the theoretical distribution which may be normal, uniform, Poisson or exponential. The K-S Z is computed form the largest difference (in absolute value) between the observed and theoretical cumulative distribution functions. This goodness-of-fit test checks whether the observations could reasonable have come from the specified distribution.

V Empirical Analysis

The empirical results are presented as below.

Descriptive Statistics and Test for Normality

Descriptive statistics for the return series of all BRIC stock markets has been presented in Table 2. Table makes it clear that the frequency distributions of all the stock market are not normal for the period of study as Jarque-Bera test rejects the null hypothesis of normal distribution for all the series and clearly indicate that return series under study has not been normally distributed.

Table 2: Descriptive Statistics

	Brazil	Russia	India	China
Mean	0.000467	0.000450	0.000426	0.000223
Median	0.001300	0.001859	0.001100	0.000700
Maximum	0.288300	0.202039	0.159900	0.094000
Minimum	-0.172100	-0.211994	-0.118100	-0.092600
Std. Dev.	0.022898	0.027752	0.017338	0.016701
Skewness	0.346683	-0.473012	-0.100223	-0.124180
Kurtosis	15.42700	10.46235	8.218991	6.991380
Jarque-Bera	**22081.29***	**8065.245***	**3888.257***	**2279.640***
Probability	**0.000000**	**0.000000**	**0.000000**	**0.000000**

* Significant at 1 percent level of significance

** Significant at 5 percent level of significance

Run Test:

Table 3 reported the results of the run test used in study. It is revealed from the table that the Z-statistics, which have been computed to test the significance of the difference between the number of actual runs and the expected runs, are found significant in case of India and Russia. It makes clear that stock markets of India and Russia are not efficient in weak form. Further, for the stock markets of Brazil and China difference between the number of actual runs and the expected runs, has not been found significant, which shows that these markets are efficient in weak form

Table 3: Estimates of Run Test

Variable	Runs	Z- test	Assy Sig (2-Tailed)
Brazil	1753	-.033	.974
Russia	**1652**	**-4.163***	**.000**
India	**1621**	**-4.427***	**.000**
China	1681	-1.043	.297

* Significant at 1 percent level of significance

** Significant at 5 percent level of significance

Kolmogorov-Smirnov Test

The results of K-S Z-statistics are reported in Table 4. The K-S Z-statistics is an famous test of the normality. The K-S test confirms that the frequency distribution of the return series of all the BRIC stock markets does not fit the normal distribution. Thus, the findings of the K-S Z-statistics supports the hypothesis of random walk model.

Table 4: Estimates of Kolmogorov- Smirnov Test:

	Brazil	Russia	India	China
Absolute	.065	.087	.055	.074
Positive	.059	.076	.055	.063
Negative	-.065	-.087	-.055	-.074
Kolmogorov-Smirnov Z	**3.854***	**5.196***	**3.284***	**4.300***
Asymp. Sig. (2-tailed)	**.000**	**.000**	**.000**	**.000**

Note: The null hypotheses of normal distribution of the underlying variables are rejected at 1 percent level of significance.

Serial Correlation

In present study, serial correlations or autocorrelation functions have also been used to test the randomness in stock price changes. These functions help in showing that price change in one period are affected by the price change in other period or not. The results of autocorrelation function are presented in Tables 5, 6, 7 and 8.The auto correlation coefficients are computed up to 25 lags. These tables show values of autocorrelations, Box-Ljung statistics and their significances.

Table 5: Autocorrelations Function of Brazil

Lag			Box-Ljung Statistic		
	Autocorrelation	Std. Error[a]	Value	df	Sig.[b]
1	.022	.017	1.656	1	.198
2	-.022	.017	3.367	2	.186
3	**-.042****	.017	9.450	3	.024
4	**-.031*****	.017	12.918	4	.012
5	**-.031*****	.017	16.387	5	.006
6	**-.034****	.017	20.421	6	.002
7	-.022	.017	22.159	7	.002
8	**.045***	.017	29.167	8	.000
9	**.031*****	.017	32.628	9	.000
10	**.073***	.017	51.383	10	.000
11	-.017	.017	52.369	11	.000
12	-.019	.017	53.666	12	.000
13	-.001	.017	53.673	13	.000
14	.003	.017	53.713	14	.000
15	**.037****	.017	58.436	15	.000
16	.015	.017	59.177	16	.000
17	.017	.017	60.232	17	.000
18	-.025	.017	62.381	18	.000
19	.001	.017	62.383	19	.000
20	.023	.017	64.272	20	.000
21	-.022	.017	66.025	21	.000
22	-.004	.017	66.070	22	.000
23	-.006	.017	66.189	23	.000
24	.010	.017	66.517	24	.000
25	.010	.017	66.861	25	.000

a. The underlying process assumed is independence (white noise).

b. Based on the asymptotic chi-square approximation

* Significant at 1 percent level of significance

** Significant at 5 percent level of significance

*** Significant at 10 percent level of significance

Table 6: Autocorrelations Function of Russia

Lag	Auto correlation	Std. Error[a]	Box-Ljung Statistic		
			Value	Df	Sig.[b]
1	**.128***	.017	58.550	1	.000
2	**.038****	.017	63.714	2	.000
3	-.013	.017	64.348	3	.000
4	.004	.017	64.399	4	.000
5	-.008	.017	64.646	5	.000
6	.013	.017	65.237	6	.000
7	.026	.017	67.666	7	.000
8	**-.036****	.017	72.333	8	.000
9	**.004**	.017	72.379	9	.000
10	**.041****	.017	78.278	10	.000
11	.022	.017	80.075	11	.000
12	**.058***	.017	91.928	12	.000
13	**.066***	.017	107.552	13	.000
14	.004	.017	107.617	14	.000
15	.003	.017	107.648	15	.000
16	-.004	.017	107.701	16	.000
17	-.022	.017	109.500	17	.000
18	**-.030*****	.017	112.718	18	.000
19	.015	.017	113.517	19	.000
20	.005	.017	113.617	20	.000
21	**.033****	.017	117.494	21	.000
22	.012	.017	117.985	22	.000
23	.023	.017	119.929	23	.000
24	.001	.017	119.930	24	.000
25	**.041****	.017	125.949	25	.000

a. The underlying process assumed is independence (white noise).

b. Based on the asymptotic chi-square approximation

* Significant at 1 percent level of significance

** Significant at 5 percent level of significance

*** Significant at 10 percent level of significance

Table 7: Autocorrelations Function of India

Lag	Auto correlation	Std. Error[a]	Box-Ljung Statistic		
			Value	Df	Sig.[b]
1	.072*	.017	18.187	1	.000
2	**-.039****	.017	23.558	2	.000
3	.004	.017	23.614	3	.000
4	.021	.017	25.110	4	.000
5	**-.030*****	.017	28.244	5	.000
6	**-.053***	.017	38.254	6	.000
7	.017	.017	39.230	7	.000
8	**.047***	.017	47.144	8	.000
9	**.044***	.017	53.910	9	.000
10	.014	.017	54.642	10	.000
11	-.019	.017	55.912	11	.000
12	.000	.017	55.912	12	.000
13	.005	.017	56.005	13	.000
14	**.038****	.017	61.219	14	.000
15	-.018	.017	62.421	15	.000
16	.007	.017	62.607	16	.000
17	**.040***	.017	68.140	17	.000
18	-.010	.017	68.477	18	.000
19	**-.037****	.017	73.296	19	.000
20	**-.045***	.017	80.375	20	.000
21	.006	.017	80.484	21	.000
22	.001	.017	80.488	22	.000
23	.015	.017	81.231	23	.000
24	.011	.017	81.636	24	.000
25	.024	.017	83.719	25	.000

a. The underlying process assumed is independence (white noise).

b. Based on the asymptotic chi-square approximation

* Significant at 1 percent level of significance

** Significant at 5 percent level of significance

*** Significant at 10 percent level of significance

Table 8: Autocorrelations Function of China

Lag			Box-Ljung Statistic		
	Auto correlation	Std. Error[a]	Value	df	Sig.[b]
1	.011	.017	.434	1	.510
2	-.022	.017	2.070	2	.355
3	**.039****	.017	7.303	3	.063
4	**.045***	.017	14.196	4	.007
5	.002	.017	14.208	5	.014
6	-**.048***	.017	22.002	6	.001
7	.025	.017	24.204	7	.001
8	-.014	.017	24.907	8	.002
9	-.022	.017	26.596	9	.002
10	.014	.017	27.302	10	.002
11	**.030*****	.017	30.433	11	.001
12	**.045***	.017	37.433	12	.000
13	.028	.017	40.062	13	.000
14	-.008	.017	40.259	14	.000
15	**.055***	.017	50.636	15	.000
16	-.003	.017	50.678	16	.000
17	-.002	.017	50.692	17	.000
18	.024	.017	52.630	18	.000
19	-.013	.017	53.242	19	.000
20	.000	.017	53.243	20	.000
21	-.028	.017	55.848	21	.000
22	.013	.017	56.412	22	.000
23	-.003	.017	56.443	23	.000
24	.005	.017	56.534	24	.000
25	-.026	.017	58.814	25	.000

a. The underlying process assumed is independence (white noise).

b. Based on the asymptotic chi-square approximation

* Significant at 1 percent level of significance

** Significant at 5 percent level of significance

*** Significant at 10 percent level of significance

The ACF for the return series of Brazil along with their Q statistic has been presented in Table 5. The ACF are significant at lags 3, 4, 5, 6, 8, 9, 10 and 15 during the period of study. This exercise is repeated for the stock market of Russia and the results are presented in Table 6. The ACFs are significant at lags 1, 2, 8, 10, 12, 13, 18, 21 and 25. During the period of the study, ACFs at lags 1, 2, 5, 6, 8, 9, 14, 17, 19 and 20 are significant for the returns in the Indian stock market. In the stock market of China (Table 7), ACFs are significant at lags 3, 4, 6, 11, 12 and 15 (Table 8). Further, the Q test rejects the joint null-hypothesis of zero autocorrelations in all lags for stock markets of India and Russia whereas in other markets it is significant in majority of lags. Based on the results of Tables 5, 6, 7 and 8, it can be concluded that all the stock markets are inefficient markets during the period of study as the price changes (returns) have been serially dependent in these stock markets.

GARCH Results

The GARCH estimates, as shown in Table 9, are highly significant for all BRIC stock markets understudy. It is observed from the table that the sum of ARCH (I) and GARCH (I) coefficients are close to unity. This implies that all the series are highly volatile. The highly significant values of the sum of ARCH (I) and GARCH (I) coefficients rejects the null hypothesis of a random walk of stock indices. Further, it makes clear that return series in the BRIC stock markets are highly volatile and this increases the likelihood of continuously earning extra returns by forecasting the security prices. It is important to mention that the results based on GARCH model supports the earlier findings based on non-parametric tests and only the Run test supports the hypothesis of random walk for Brazil and China whereas all other tests used in the study reject the hypothesis of random walk for all selected Asian stock markets understudy.

Table 9: GARCH Estimates

Variable	Coefficients	Coefficient	Std. Error	z-Statistic	Prob.
Brazil	ARCH	0.110208	0.006917	**15.93264***	**0.0000**
	GARCH	0.868249	0.009151	**94.87859***	**0.0000**
Russia	ARCH	0.144505	0.007411	**19.49985***	**0.0000**
	GARCH	0.844828	0.007815	**108.1070***	**0.0000**
India	ARCH	0.110593	0.007035	**15.72117***	**0.0000**
	GARCH	0.873608	0.007439	**117.4286***	**0.0000**
China	ARCH	0.097804	0.006505	**15.03605***	**0.0000**
	GARCH	0.887873	0.006692	**132.6717***	**0.0000**

* Significant at 1 percent level of significance

** Significant at 5 percent level of significance

V. Conclusion

This paper is an attempt to test weak form of efficiency for the stock markets of BRIC countries. For this, tests, namely Jarque-Bera, Run test, Kolmogorov-Smirnov (K-S) test, Serial Correlation and GARCH model have been applied. The study is based on daily data for stock indices of the Brazil, Russia, India and China for the period of 1st July 2011 to 31st August 2015. The results of the study revealed that all tests used in present study reject the hypothesis of random walk for all BRIC stock markets except the Run test, which supports the hypothesis of random walk for Brazil and China. Thus, the results of the study makes clear that inefficiency is prevent in the stock markets of BRIC countries.

Further, the study provides clear-cut results that certain anomalies exist in these stock markets, which are making these stock markets inefficient. Further, the findings of the study revealed that in these markets investors have chances of earning extra profits by forecasting the security prices.

References:

1. Agathee, Ushad Subadar (2008), " Day of the Week Effect: Evidence from the Stock Exchange of Mauritius (SEM)," International Research Journal of Finance and Economics, Vol.17, pp.7-14
2. Ahmad, K. M. ,Shahid, Ashraf and Sahid, Ahmed (2006), "Testing weak form efficiency for Indian stock markets," Economic and Political Weekly, Vol. XLI, No. 1, pp. 49-57
3. Alam M. I., Hasan T. and Kadapakkam, P. (1999), "An Application of Variance Ratio Test to Five Asian Stock Markets", Review of Pacific Basin Financial Markets and Policies, Vol. 2, pp. 301-315
4. Barua, S. K. (1981), "The Short-Run Price Behaviour of Securities- Some Evidence on Efficiency of Indian Capital Market," Vikalpa, Vol.6, No. 2. pp. 93-100
5. Bepari, K. and Molik, A. T. (2009), "Seasonalities in the Monthly Stock Returns: Evidence from Bangladesh Dhaka Stock Exchange (DSE)," International Research Journal of Finance and Economic, Vol. 24, pp. 167-176
6. Bin Li et al,. (2010)," Monthly Seasonality in the New Zealand Stock Market," International Journal of Business Management and Economic Research, Vol. 1, No.1, pp. 9-14
7. Bodla, B.S. (2005), "Efficiency of the Indian Capital Market: An Empirical Work," Vision, Vol. 9, No. 2, pp. 55-63
8. Boudreaux, D O. (2009), "The Monthly Effect in International Stock Markets: Evidence and Implication," Journal of Financial and Strategic Decisions, Vol. 8, No.1, pp.15-20.
9. Chakrabarti, G., and Sen, C. (2007), "November Effect: An Example of Calendar Anomaly in Indian Stock Market," West Bengal University of Technology, Kolkata, India. Online at: http://ssrn.com/abstract=1121606
10. Chawla , Deepak and Makkad, M. (2000), " Weak Form Efficiency in Indian Capital Market: An Empirical Investigation," Management and Accounting Research, Vol. 4, No. 2, pp. 67-90.
11. Deb, S. S. (2003), "In Search of Weak Form of Efficiency in India Capital Market," The ICFAI Journal of Applied Finance" Vol. 9, No. 9, pp. 31-50.
12. Deepak, C.., Mohanty, P. K. and S.," Bhardwaj (2006) , "Random walk Hypothesis and Integration Among the Indian Stock Market vis-à-vis Some Developed Markets" Prajnan, Vol. XXXIV, No. 2, pp.113-127
13. Dubois, M. and Louvet, P. (1996), "The Day of the Week Effect: International Evidence," Journal of Banking and Finance, Vol. 20, No. 9, pp. 1463-1484
14. French, K. R. (1980), "Stock Returns and the Weekend Effect," Journal of Financial Economics, Vol. 8, No.1, pp 55-69.
15. French, K.R. and Roll, P. (1986), "Stock Return Variances: The Arrival of information and the Reaction of Traders," Journal of financial Economics, Vol.17, No.1 (September), pp. 5-26
16. Gibbons, M. and Hess, P. (1981), "Day of the Week Effects and Asset Returns," Journal of Business, Vol.54, No.4 (October), pp. 579-596

17. Grieb, T. and Reyes, M.R., (1999), "Random walk tests for Latin American equity indexes and individual firms", The Journal of Financial Research, Vol. XXII (4), pp 371-383

18. Gultekin, M.N., and Gultekin, N.B. (1983) "Stock Market Seasonality: International Evidence," Journal of Financial Economics, Vol. 12, 469-481

19. Gupta, O. P. (1997)," An empirical Test of Random Walk Model on the Indian Stock Market" Management & Change, Vol.1, No.1

20. Ignatius, R. (1998), "The Bombay Stock Exchange: Seasonalities and Investment Opportunities," Managerial Finance, Vol. 24, 52-61

21. Kaundal, R.K. and Sharma, Sanjeet. (2010), "Stock Market Integration Examining Linkages between India and Select Asian Markets", Foreign Trade Review, Vol. XLV, pp.3-18

22. Magnusson M A and Wydick B (2002) "How Efficient are Africa's Emerging Stock Markets," Journal of Development Studies, Vol. 38, pp 141-156

23. Mittal, Satish K. and Jain, Sonal (2009), "Stock Market Behaviour: Evidences from Indian Market," Vision, Vol. 13, No. 3, pp.19-29.

24. Nath, Golka C. and Dalvi, M. (2005), "Day-of-the-week effect and Market Efficiency: Evidences from Indian Equity Market Using High Frequency Data of National Stock Exchange", The ICFAI Journal of Applied Finance, Vol. 11

25. Pandey, I.M. (2002), "Seasonality in the Malaysian Stock Market: 1992-2002", Journal of Financial Management and Analysis, Vol. 15, No 2, pp. 34-37

26. Parikh, A (2008), "The December Phenomenon: Month of Year Effect in the Indian Stock Market," downloaded from NSE website.

27. Poshakwale, Sunil (1996), "Evidence on Weak Form Efficiency and Day of the Week Effect in the Indian Stock Market," Finance India, Vol. X, No.3, pp. 605-616.

28. Raj, M. and Thurston, D. (1994), "January or April? Tests of the turn-of-the-year effect in the New Zealand stock market" Applied Economics Letters. Vol. 1, No 5, pp. 81-83

29. Ramasastri, A. S. (1999), "Market Efficiency in the Nineties: Testing Unit Roots," Prajnan, Vol. 28, pp. 155-161

30. Ranganatham, M. and Subramanian, V (1993), "Weak Form Efficient Markets Hypothesis: A Spectral Analytic Investigation," Vikalpa, Vol. 18, No. 2. pp. 25-31

31. Rozeff, Michael S., and. Kinney, William R. (1976), "Capital Market Seasonality: The Case of Stock Market Returns, "Journal of Financial Economics, Vol. 3, pp. 376-402

32. Selvarani, M. and Jenefa, L. (2009), "Calendar Anomalies in National Stock Exchange Indices," The Icfai Journal of Applied Finance, Vol.15, No. 1, pp.57-67

33. Sharma J. L. & Kennedy, R.E. (1977). Comparative analysis of stock price behavior on the Bomabay, London and New York stock exchanges. Journal of Financial and Quantitative Analysis, Vol. 31, pp 391-413

34. Sharma, Sanjeet. (2011), "Day of Week Effect: Evidences from Indian Stock Market", Indian Journal of Commerce & Management Studies, Vol. II, No. 6, pp.25-30

35. Sharma, Sanjeet. (2011), "Stock market development and Economic Growth", Indian Journal of Management Science (IJMS), Vol. I, No. 1, pp. 25-30

36. Verma, O.P. and Sharma, Sanjeet. (2011), "Macro Economic Indicators and Stock Prices: Evidence from Indian Stock Market", Kegees Journal of Social Science, Vol. 3, No. 2, pp. 266-272