Behaviour of Stock Markets across Weeks of the Month: An Empirical Study of Emerging Stock Markets

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ABSTRACT

As the world economy is trapped in economic uncertainty induced by financial crisis, slowing down growth and sticky inflation the investors are looking towards emerging markets as the sources of higher growth and global diversification. An interesting phenomenon in finance literature is to explore the existence of patterns in stock returns. By applying General Autoregressive Conditional Heteroscedasticity (GARCH) model the study investigates week-of-the-month effect in returns and volatility of nine emerging stock markets, namely, Argentina, Brazil, China, India, Indonesia, Mexico, Malaysia, Russia and Taiwan. The study has been conducted over a general time period commencing from January 1997 through December 2011 for which the weekly return data of the selected indices has been used. The results of the study exhibit existence of statistically significant positive means returns in the first week and second week-of-the-month whereas statistically significant negative mean returns are confined to the last week of the month giving a strong evidence of week-of-the-month effect in the return series of majority of stock markets examined. With respect to volatility, it may be inferred that variation in returns is found maximum in the second week of the month and minimum in the fifth week of the month.)

Key-words: *- Seasonality, Week-of-the-Month Effect, Dummy Variable, GARCH (1, 1) Model, Emerging Markets.*

INTRODUCTION

The existence of calendar anomalies might endanger the assumptions of efficient market hypothesis. Presence of calendar anomalies in a stock market is an indicator of market inefficiency. Since the initial works of Fama (1965), a vast number of studies on market efficiency, suggested that most of the securities are efficiently priced to reflect their intrinsic worth and adjust rapidly to the arrival of new information. If market prices do not fully incorporate information, then opportunities may exist to make a profit from gathering and processing information. Researchers over a period of time have reported a number of irregularities or anomalies that result in the mispricing of securities. These market anomalies are exceptions to the notion of market efficiency by documenting anomalous behavior of market with higher or lower returns than what is explained by established asset pricing models.

A predictable pattern of financial assets returns is evidence against market efficiency. Calendar anomalies may be defined as the tendency of stock returns to display consistent and systematic patterns at certain times of the day, week, month or

year. Numbers of studies have found that stock returns are not uniformally distributed across days of week (French 1980, Keim and Stambaugh 1984), months of the year (Rozeff and Kinney 1976, Keim 1983), turn of the month and rest of the month (Ariel 1987, Agrawal and Tandon 1994), weeks of the month (Ali and Akbar 2009), holidays and trading days and across trading hours of a day. A number of explanations have been offered time and again to explain the anomalous patterns in stock returns like tax-loss selling at the end of the year, asymmetric release of information over the weekend, size of the firm, insider-trading, window dressing by institutional players and cash flow at the end of month. Whatever may be the reason presence and identification of the consistent patterns in stock returns provide useful clues to investors for timing their investments and exploiting the investment opportunity through suitable buy or sell decisions.

The objective of this study is to explore the presence of week-of-the-month effect in returns and volatility of nine selected stock markets of emerging economies namely Argentina, Brazil, China, India, Indonesia, Mexico, Malaysia, Russia and Taiwan. Globalization of world financial markets has made emerging markets one of the most attractive investment destinations for international funds seeking global diversification. These economies have experienced huge growth and received attention of practitioners and academicians the world over. It is, therefore, of vital importance to study the stock price behavior of these emerging super powers which might provide useful insight to institutional investors, portfolio managers and individual investors to strategise their investment decisions and diversify their portfolios internationally.

REVIEW OF LITERATURE

Stock market anomalies have been extensively investigated the world over and there have been divergent views on their existence. Some of the important theoretical and empirical studies related to calendar anomalies have been reviewed here.

Cross (1973) is among the first to document stock return regularities as a function of day-of-the-week. He examined the returns on Standard and Poor's (S&P) Composite index for a period of eighteen years and found that mean returns on Friday is higher than the mean returns on Monday. It was attributed as 'Monday Effect'. While studying the United States (US) stock market from January 1904 through December 1974, Rozeff and Kinney (1976) tried to explore the month-of-the-year calendar anomaly. The study concluded that monthly seasonal pattern is evident in the US stock market due to presence of statistically significant differences in monthly mean returns among months of the year with high rate of return in the month of January. French (1980) analyzed the daily return data of S&P for a period of twenty five years, the results provide evidence for the presence of weekend effect. Keim (1983) investigated the existence of month-of-the-year effect in New York Stock Exchange (NYSE) stocks for the period 1963 to 1979 and found that nearly half of the excess returns for small firms occurred in the month of January and most of this return belonged to the first five trading days of the same month. Keim and Stambaugh (1984) studied fifty five years of daily return data of Standard and Poor's (S&P) 500 index and documented negative returns on Monday and highest positive returns towards the end of the week. It was Ariel (1987), who first reported a monthly seasonal pattern in the return of equally-weighted and value-weighted stock index of USA, for a period of nineteen years from 1963 to 1981. The author found that the stock returns in the first half of the month especially during the five day period between the last trading days of the previous month to the fourth trading day of the next month (trading days -1 through -4) are abnormally higher than stock returns in the second half of the month. Lakonishok and Smidi (1988) analyzed the daily return data of Dow Jones Industrial Average (DJIA) index for a period of ninety years (from 1897 to 1986) and found that the mean return around the turn-of-the-month trading days was about eight times higher than that on other trading days.

Agrawal and Tandon (1994) investigated the existence of day-of-the-week, month-of-the-year, and turn-of-the-month and semi-monthly seasonality in stock markets of eighteen countries. The results exhibited a weekend effect in nine countries with lowest and negative returns on Monday. They further found, strong evidence of turn-of-the-month and semi-monthly effect in most of the countries. Wang, Li and Erickson (1997) investigated the existence of week-of-the-month effect using the daily return data from 1962 to 1993 in the US markets. The results indicated that mean returns of the first three weeks of the month is not significantly different from zero and negative. High Monday returns are concentrated in the fourth and fifth weeks of the month. Sullivan, Timmermann and White (1998) empirically analyzed the week-of-the-month effect in returns of the S&P 500 and DJIA indices. The study was conducted over a general time period of nineteen years from 1897 to 1986, split into seven sub-periods, each comprising approximately thirteen year of data. The study found non existence of week-of-the-month effect during the period studied.

Choudhry (2001) conducted a study documenting the existence of month-of-the-year effect in three developed stock markets namely Germany, United Kingdom (UK) and USA. Using data for the period January 1870 to December 1913, the results indicate large and significant positive mean returns in the month of January in the US and UK stock markets but no month of the year effect was evident in the German stock market. Aydogan and Booth (2003) investigate week-of-the-month effect in Turkish foreign exchange market. The study was conducted over a time period commencing from 1986 to 1994 which was further divided into two sub-periods: 1986 to 1989 (first sub-period) and 1990 to 1994 (second sub- period). It found that the week-of-the-month effect with significant and higher returns in the first week of the month is present only in the full sample period and second sub-period. Brusa, Liu and Schulman (2003) investigated the existence of week-of-the-month effect in the US stock market for a period of

thirty one years from 1966 through 1996. The study found that returns in the last two weeks of the month are significantly lower than returns in the first three weeks of the month. Brusa (2004) documented the existence of week-of-the-month effect in American market. The author investigated the Monday returns sorted by the week-of-the-month for five major stock indices of America for a period of eleven year from 1988 to 1998. The empirical results provide evidence of the presence of positive Monday return in the first and third week of the month.

The day-of-the-week effect in Chinese stock market was investigated by Zhang and Li (2006). Results provided evidence for the presence of weekend effect in the underlying stock market which disappeared after 1997. Freund, Jain and Puri (2007) also experienced the existence of the turn-of-the-month effect in Indian stock market. They found significantly higher rate of return for the four day period commencing from the last trading day of the previous month through the third trading day of the following month. In their study Ali and Akbar (2009) analyzed the weekly return data of Karachi Stock Exchange (KSE) for a period of fifteen years from November 1991 to October 2006 to measure the week-of-the-month effect in Pakistani stock market. The results of the study did not show any evidence for the presence of week-of-the-month seasonality in the return series of underlying stock market. While analyzing the data of NEX20 for the period ranging from April 2003 to December 2010 divided into two sub-periods: pre-crisis period (the first sub-period, from 2003 to 2007) and the crisis period (the second sub-period, from 2008 to 2010) Karadzic and Vulic (2011) investigated the week-of-the-month effect in Montenegrin capital market. The paper reports the significant and highest mean returns in the last Week-of-the-month. The review of literature indicates that though other calendar anomalies have been extensively investigated the world over, only a few studies are available on week-of-the-month effect in stock prices. Therefore, the present study makes an attempt to investigate the existence of weekly variations in index returns and volatility of emerging stock markets.

RESEARCH METHODOLOGY

Prominent stock indices of all the emerging stock markets constitute the universe of the study. Two most popular sources of country classification have been used namely Morgan Stanly Capital International (MSCI) Emerging Market Index and Financial Times Stock Exchange (FTSE) All-World Emerging Index which give separate list for emerging stock markets. Finally, FTSE emerging stock market list has been used as it is inclusive of all the stock markets named in MSCI emerging stock market list. Further, only those countries have been considered for the study for which a minimum of fifteen years data was available at the end of the year 2011. Based on the above criteria the following nine emerging markets are included in the study: Argentina, Brazil, China, India, Indonesia, Malaysia, Mexico, Russia and Taiwan. Table- 1 presents the country wise details about the index used, reference period and source of data. The study has taken closing weekly price of emerging stock market indices from the year1997 through 2011.

The weekly stock returns for the selected stock indices are calculated as follows:

$$R_t = \ln (P_t/P_{t-1}) * 100$$

Where R_t is weekly return on the share price index for week t, P_t is the closing value of the index for the week t and P_{t-1} is the closing value of the index for the preceding week t-1.

Firstly, the summary statistics of the weekly returns of the selected indices have been calculated, namely, mean, standard deviation, skewness and kurtosis. Jarque-Bera (JB) test of normality has been applied to the index return series. The non-parametric Kruskall-Wallis (H) test has been applied to test whether weekly stock returns across all the weeks of the month are statistically equal or not. The calculated H value has been compared with the table value of the chi-square (χ^2) distribution with (k-1) degree of freedom. Levene's F-statistics has been computed to examine whether volatility of weekly stock returns across all the weeks of the month is statistically equal or not. ARCH – LM at lag one has also been computed for the return distributions. Before applying GARCH (1, 1)

Table 1: Data Table

Country	Index	Period	Source
Argentina	MERVAL (MERV)	Jan,1997 to Dec,2011	Yahoo Finance
Brazil	BVSP INDEX (BOVESPA SAO PAULO Stock Exchange)	Jan,1997 to Dec,2011	Yahoo Finance
China	SSE (Shanghai Stock Exchange)	July,1997 to Dec,2011	www.econstate.com
India	BSE SENSEX (BSESN)	July,1997 to Dec,2011	Yahoo Finance
Indonesia	JKSD (Jakarta Stock Exchange)	July,1997 to Dec,2011	Yahoo Finance
Mexico	IPC (Mexico MXX)	Jan,1997 to Dec,2011	Yahoo Finance
Malaysia	KLCI (Kuala Lumpur Composite Index)	Jan,1997 to Dec,2011	Yahoo Finance
Russia	RTSI (RTS Exchange)	Jan,1997 to Dec,2011	www.rts.ru
Taiwan	TWII (TSEC Weighted Index)	July,1997 to Dec,2011	Yahoo Finance

model it is necessary to test the presence of autoregressive conditional heteroskedasticity (ARCH) effects in the residuals. In the absence of ARCH effects in the residuals, the ARCH family models are unnecessary and misspecified. On the other hand, if the Lagrange Multiplier (LM) test for ARCH effects is significant, one may use an ARCH family model to estimate the time varying nature of not only mean but volatility as well.

The study goes with certain assumption while trying to investigate week-of-the-month effect. Each month is divided into five weeks and the defined week consists of all five days on which stocks are traded. The index value on the last day of the week has been used for measuring weekly returns.

Earlier studies explored calendar seasonalities by employing the conventional Ordinary Least Squares (OLS) method with appropriately dummy variables (e.g., Aydogan and Booth, 2003, Ali and Akbar, 2009 ;):

$$R_{it} = \beta_1 D_{w1t} + \beta_2 D_{w2t} + \beta_3 D_{w3t} + \beta_4 D_{w4t} + \beta_5 D_{w5t} + \varepsilon_t$$

Where R_{it} is the return of the index on week t, D_{w1} through D_{w5} are dummy variables from week1 to week5, respectively. D_{w1},...., D_{w5} equal to 1 if the return for week t is on week1 to week5, respectively, zero otherwise, β_j is the coefficient which represent the average return for each week of the month and ε_t is the error term. OLS assumes that data is serially uncorrelated, normally distributed and has constant variance. It is an established and empirically proved fact that time series data such as stock returns exhibit time-dependent changes in volatility called volatility clustering. This means that large changes in the return series tend to be followed by large changes and small changes by small changes. The strong ARCH effects in all the return series of underlying stock market indices (see table-2) indicated that the variance of the error term may be time varying. Presence of highly significant JB statistics and the skewed return series and excess kurtosis in the return series of underlying stock market indices (see table-2) also leads to rejection of the null hypothesis of normality of index return distributions documenting the presence of heteroscedasticity. In order to consider this problem, the study adopts Engle (1982) autoregressive conditional heteroskedasticity (ARCH) models specifically designed to model and forecast the conditional variance. These models assume that the variance of residuals (σ_t^2) is not constant over time. The generalized version of these models was proposed by Bollerslev (1986), where the variance of the residual is expressed as the sum of a moving-average polynomial of order q on past residuals (the ARCH term) plus an autoregressive polynomial of order p, on past variance (the GARCH term):

$$\sigma_t^2 = \alpha + \sum_{i=1}^{q} \beta_i \varepsilon_{t-i}^2 + \sum_{i=1}^{p} \gamma_i \sigma_{t-i}^2$$

Thus, error term has zero mean and time varying variance of σ_t^2 $\{\varepsilon \sim (0, \sigma_t^2)\}$. This specification requires that $\sum_{i=1}^{q} \beta_i + \sum_{i=1}^{p} \gamma_i < 1$ in order to satisfy the non explosiveness of the conditional variance. Furthermore, each α, β_i and γ_i has to be positive to satisfy the non negativeness of conditional variance.

To measure the week-of-the-month effect on the volatility of underlying stock markets, the GARCH (1, 1) model, including appropriate defined dummy variable are used in the above equation. The result of this approach is the joint estimates of the week-of-the-month effects not only in the mean but also in the variance.

$$r_{it} = \beta_1 D_{w1t} + \beta_2 D_{w2t} + \beta_3 D_{w3t} + \beta_4 D_{w4t} + \beta_5 D_{w5t} + \sum_{i=1}^{4} \beta_{i+5} r_{t-i} + \varepsilon_t$$

$$\varepsilon_t \sim iid(0, \sigma_1 t^2 2)$$

$$\sigma_t^2 = \beta_1 D_{w1t} + \beta_2 D_{w2t} + \beta_3 D_{w3t} + \beta_4 D_{w4t} + \beta_{w5} D_{5t} + \sum_{i=1}^{q} \alpha_{5+i} \varepsilon_{t-1}^2 + \sum_{i=1}^{p} \gamma_i \sigma_{t-i}^2$$

Since unit root is a necessary condition for application of an econometric model like GARCH, therefore to ensure the stationarity in the selected stock index series the Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) unit root tests have been applied (table 4).

RESULTS AND DISCUSSION

The stochastic properties of weekly returns of indices of the selected emerging stock markets are presented in Table-2 which gives a brief summary about the distribution pattern of returns in these markets over the sample period. It is apparent that all the stock return series except Taiwan record a positive mean return during the period investigated. This implies that the stock indices have increased over a period of time. Mexico records the highest mean return of 0.3079 per cent followed by Russia (0.2680 per cent) and Brazil (0.2671 per cent) respectively. Standard deviation is assumed as an unconditional and constant measure of fluctuations in return series. Accordingly, the table shows that Russian stock market witness highest variability in the return distribution (6.9389 per cent) whereas minimum standard deviation is recorded by Mexican stock market (3.0092 per cent) which implies that returns are more volatile in Russia in comparison to other stock markets. The basic principle of finance 'higher the risk higher would be the return' does not hold good in case of weekly index returns of majority of the emerging stock markets. Coefficient of variation, which measures the risk per unit of return is found maximum in Malaysia (39.9308 times) followed by Argentina (29.6381 times). This indicates that trading in Malaysia and Argentina is more risky than the other stock markets under consideration. Mexican market appears to be the safety heaven recording the least coefficient of variation,

i.e., 9.77 times. Skewness tells the direction and extent of asymmetry of distribution. The return distributions are positively skewed in case of Brazil, China and Malaysia. The remaining stock markets have negatively skewed return distribution indicating towards a higher probability of negative returns in these markets an also points towards the asymmetric behaviour of the distributions. The kurtosis of all the markets investigated shown consistently positive and larger than three, suggesting that the return series are leptokurtic that means all series have a thicker tail and higher peak than a normal distribution. Thus, it is not surprising that all nine return distributions are found to be non-normal using the Jarque-Bera (J-B) statistics. in all the cases at one percent level questioning the randomness of stock prices in these markets. One of the main objectives of the study is to investigate the existence of week-of-the-month effect in volatility (risk) of underlying emerging stock markets. The ARCH-LM statistics has been used to find out the volatility clustering in the return series. It is evident from the table that all the return series suffer from the problem of heteroskedasticity as indicated by their respective p-values which are significant at a one per cent level rejecting the null hypothesis of homoscedasticity. The return series exhibit clustering effect in weekly return series which has lead us to estimate the GARCH (1,1) to the data sets.

Mean and standard deviation of stock index returns for each week of month of the selected emerging stock markets are presented in Table-3. All the countries exhibit positive mean return in the first week of the month and mean returns of Brazil, China, India, Mexico and Russia are statistically different from zero as revealed by their respective t-statistics. The table shows that out of nine counties, four counties such as Argentina, Brazil, India and Russia record non-significant negative mean returns in the second week of the month. However, the remaining five countries: China, Indonesia, Malaysia, Mexico and Taiwan record positive mean returns. From the table it can be seen that third and fourth week of the month depict mixed non-significant negative and positive mean returns but only Indian stock market exhibits statistically different from zero negative mean return during the third week. As per the results related to fifth week of the month only three counties namely, Argentina, Brazil and India have positive mean returns and the rest of the countries record negative mean returns. Variation in returns measures in term of standard deviation is found maximum in the second week of the month in seven stock markets, namely, Argentina, China, India, Indonesia, Malaysia, Russia and Taiwan. Five markets registered minimum volatility in the fifth week of the month.

To check the robustness of the results of parametric test the non-parametric tests, namely the Kruskal-Wallis (H) and Levene's F-Statistics have been used to check the uniformity of the mean returns across the all five weeks and for the uniformity of variances over the five weeks of the month. The results of K-W (H) statistics and Levene's F-statistics are presented in the Table-3. From the table, it is ostensible that there is significant difference in mean returns over the weeks in case of Brazil, China, India, Indonesia, Mexico and Russia as evident by their respective K-W (H) statistics. Therefore the null hypothesis of equality of mean returns across various weeks of the month stands rejected indicating the presence of week-of-the-month effect in six out of nine markets investigated. The results of Levene's F-statistics depict that besides Argentina, Indonesia and Malaysia variance varies on week to week bases in rest of the markets giving an evidence of presence of seasonality in volatility, as well, across weeks of the month.

Since unit root is necessary condition for an econometric model, in order to apply the GARCH model the stationarity of the index return series has been measured using ADF and PP test. The results of the tests in Table-4 confirm that all the return series are stationary and reject the unit root at one percent level, it means they are integrated of zero order i.e. I (0).

The results of GARCH (1, 1) mean equation which was applied using dummy variables for five weeks of the month so as to

Table-2: Descriptive Statistics of Weekly Stock Returns of Emerging Stock Markets Indices

Descriptive	Argentina	Brazil	China	India	Indonesia	Malaysia	Mexico	Russia	Taiwan
Mean	0.1705	.2671	0.2184	0.682	0.2195	0.1301	0.3079	0.2680	-0.1351
Std. Dev.	5.0533	4.6580	4.0025	3.7008	4.2620	5.1950	3.0092	6.9389	3.5841
C.V.	29.6381	17.4391	18.3264	22.0023	19.4168	39.9308	9.7733	25.8914	-26.5292
Skewness	-0.3518	0.5915	0.1746	-0.2985	-0.4134	0.1243	-0.2651	-0.6098	-0.1691
Kurtosis	7.3167	6.4989	7.7079	4.8881	6.9441	12.1879	6.5244	8.6888	4.9398
Jarque-Bera	622.513*	445.064*	480.803*	123.698*	507.511*	756.192*	414.436*	139.471*	120.532*
Probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ARCH-LM (lag=1)	15.9696*	10.5722*	12.7921*	16.1586*	30.4061*	23.3976	11.8158*	40.8115	15.4688*
Probability	0.0001	0.0012	0.00011	0.0001	0.0000	0.0000	0.0006	0.0000	0.0002
Obs.	781	783	750	757	750	783	783	737	746

*significant at 1% level

TABLE-3: Week Wise Descriptive of Weekly Stock Returns of Emerging Stock Markets Indices

Countries	Descriptive	Week1	Week2	Week3	Week4	Week5	K-W (H) Statistics	Leven's F-Statistics
Argentina	Mean	0.6255	-0.5835	-0.0823	0.5441	0.2213	8.7823	1.5775
	Std. Dev.	5.027	5.3189	5.1909	4.8933	4.2179	-0.2467	-0.1783
	t-value	1.6694	-1.4719	-0.2127	1.4835	0.4165		
		-0.0967	-0.1427	-0.8317	-0.1397	-0.6785		
	Observations	180	180	180	178	63		
Brazil	Mean	0.9461	-0.2012	-0.0255	0.2837	0.4545	10.5294*	1.0265*
	Std. Dev.	4.8912	4.5805	4.5217	4.3564	5.285	-0.0323	-0.0325
	t-value	2.5952**	-0.5895	-0.0759	0.8737	0.6827		
		-0.0102	-0.5562	-0.9395	-0.3834	-0.4973		
	Observations	180	180	180	180	63		
China	Mean	0.0188	0.0183	0.0184	-0.0178	-0.0169	6.2182*	3.9912**
	Std. Dev.	0.0048	0.0077	0.0014	0.0047	0.0037	-0.0344	-0.0032
	t-value	3.2448**	2.4791	1.0778	2.6619	-0.1877**		
		-0.0039	-0.5912	-0.2913	-0.9312	-0.0129		
	Observations	174	174	173	171	58		
India	Mean	1.0136	-0.0299	-0.3986	-0.0366	0.3148	7.2149**	0.6645**
	Std. Dev.	2.0053	4.1148	3.5076	3.8324	3.4092	-0.0017	-0.0167
	t-value	4.0702*	-0.096	-1.4993*	0.1263	0.7213		
		-0.0238	-0.9236	-0.0356	-0.8996	-0.4735		
	Observations	174	174	174	174	61		
Indonesia	Mean	0.898	0.3339	-0.2169	-0.2363	-0.3133	5.2112*	1.0394
	Std. Dev.	4.1889'	4.6336	4.6119	3.7547	3.5122	-0.0263	-0.3858
	t-value	2.82	0.0963*	0.0483	-0.1269	0.6851*		
		-0.1053	-0.0233	-0.9615	-0.8991	(-0.0459)		
	Observations	173	173	173	172	59		
Malaysia	Mean	0.3416	0.0429	-0.1485	0.0643	-0.4839	4.1158	1.7514
	Std. Dev.	3.2202	3.3495	2.9194	2.5925	2.5084	-0.3905	-0.1367
	t-value	1.1694	0.172	-0.6828	0.3331	-1.4181		
		-0.2437	-0.8635	-0.4955	-0.7393	-0.1611		
	Observations	180	180	180	180	63		
Mexico	Mean	0.8684	0.1511	0.3201	-0.1452	-0.4478	8.1211*	0.6132*
	Std. Dev.	3.5231	3.811	3.599	3.2483	4.1296	-0.0372	-0.0531
	t-value	3.3070**	0.5319	1.1933	-0.5997	-0.8607		
		-0.0011	-0.5953	-0.2343	-0.5494	-0.3926		
	Observations	180	180	180	180	63		
Russia	Mean	0.8465	-0.0321	-0.0583	0.5536	-0.972	4.6631*	0.6573*
	Std. Dev.	6.5577	7.4855	7.4138	6.25	6.2077	-0.0236	-0.0218
	t-value	1.7319*	-0.0575	-0.1056	1.0921	-1.0176**		
		-0.035	-0.9541	-0.9159	-0.2764	-0.0144		
	Observations	180	180	180	152	45		
Taiwan	Mean	0.0475	0.1857	-0.1516	-0.1972	-0.1315	1.6178	1.0336*
	Std. Dev.	3.7082	3.8684	3.8362	3.5971	3.0394	-0.8055	-0.0388
	t-value	0.1691	0.7274	-0.5215	-0.7084	-0.3266		
		-0.8658	-0.4679	-0.6026	-0.4796	-0.7451		
	Observations	174	174	174	167	57		

Table-4: Results of Unit Root Test

Variable	Augmented Dickey-Fuller (ADF) Test		Phillips-Perron (PP) Test	
	With Intercept	With Intercept & Trend	With Intercept	With Intercept & Trend
Argentina data series	-28.3617*	-28.3475*	-28.3870*	-28.3739*
Brazil data series	-27.5093*	-27.5267*	-27.5064*	-27.5239*
China data series	-23.8899*	-25.5511*	-28.0878*	-27.8578*
India data series	-26.6547*	-26.7847*	-26.8091*	-26.8869*
Indonesia data series	-24.7014*	-24.7326*	-24.7468*	-24.7609*
Malaysia data series	-25.9254*	-25.9491*	-26.1086*	-26.1193*
Mexico data series	-27.8513*	-27.8798*	-27.9623*	-27.9922*
Russia data series	-24.9803*	-24.9791*	-24.9519*	-24.9493*
Taiwan data series	-27.2295*	-27.2339*	-27.2309*	-27.2363*
Critical Values				
1% level of significant	-3.4385	-3.9698	-3.4385	-3.9698
5% level of significant	-2.8650	-3.4155	-2.8650	-3.4155
10% level of significant	-2.5686	-3.1302	-2.5686	-3.1302

* Significant at 1% level

find out the impact of a particular week on stock returns of the underlying emerging stock markets are given in Table-5. Statistically significant positive mean coefficients are present in the first week of the month in Argentina (0.5927), Brazil (0.8876), China (0.0086), India (1.1043), Mexico (0.7211) and Russia (0.6131). It refers towards significant high returns in the first week of the month than the mean returns for the other four weeks in most of the underlying stock markets. These results are consistent with the study of Karadzic and Vulic (2011). Mean coefficients for the second week of the month are also positive and significant for Chinese, Indonesian and Mexican stock markets. But Chinese and Mexican markets offer higher returns in the first week as compare to the second week. India is the only market to record significantly low mean returns in third week of the month. The positive value of coefficient indicates toward an increase in mean returns. The coefficients of fifth week dummy in case of Chinese, Indonesian and Russian stock markets are -0.0091, -0.0656 and -1.2836 respectively. Although, the size of the above said coefficient is very small but they are significant at one percent level. The negative sign of coefficients indicate significantly low returns. In the third and fourth week of the month most of the underlying countries exhibit negative mean returns indicating by the negative sign of their coefficient but are not statistically significant except India. As far as Malaysia and Taiwan are concerned none of the mean coefficient is statistically significant indicating the non-existence of week-of-the-month effect in mean return distribution of Malaysian and Taiwan stock markets. So the results that statistically significant positive means returns occur in the first week and second week of the month and statistically significant negative mean returns occur in the last week of the month give a strong evidence of week-of-the-month effect in the majority of stock markets studied. The results show that beginning of the new month is marked by significant positive mean returns which might be a result of infusion of money in form of cash into the economy at the start of every month leading to enhanced liquidity or may be attributed to arrival of most of the positive economic news at the beginning of the month because of which investors show hopeful investment behaviour resulting in positive returns at the month start. By trading strategy of buying at end of the month and selling at the beginning of the month investors can expect to earn some abnormal return.

The results of the GARCH (1, 1) model confirmed the results of above said parametric and non-parametric tests and found week-of-the-month effect in the Argentina, Brazil, China, India, Indonesia, Mexico, and Russian stock markets.

The estimates of various parameters for the variance equation of GARCH (1, 1) model to investigate the presence of week-of-the-month effect in volatility of emerging stock markets are presented through Table-6. It is obvious from the table that in all the underlying stock markets the coefficient of ARCH (α_1) is significant at one percent level which indicates that the recent news has positive and significant impact on the volatility of the return of the stock markets. Similarly, the coefficient of GARCH (β_1) terms representing the impact of historical news are also statistically significant but the impact of coefficient of GARCH term is much higher than the ARCH term which implies that the effect of past volatility is more on the future volatility. The total of the ARCH and GARCH term ($\alpha+\beta$) is very near but less than one, which implies that the model is perfectly structured. The results revel that all the stock markets except Mexico have shown an increase in the volatility in the second week of the month.

Table-5: The Week-of-the-Month Effect in GARCH (1, 1) Model (Estimates of Mean Equation)

Countries		Week1 (β_1)	Week2 (β_2)	Week3 (β_3)	Week4 (β_4)	Week5 (β_5)
Argentina	Coefficient	0.5927	-0.979	-0.1147	0.4844	0.1546
	t-value	1.4029**	-2.3358	-0.2712	1.143	1.1834
	p-value	0.0161	0.2198	0.7863	0.2534	0.3335
Brazil	Coefficient	0.8876	-0.6092	-0.3807	0.2212	0.2026
	t-value	2.2225*	-1.5206	-0.9478	0.1527	0.3257
	p-value	0.0265	0.4288	0.3435	0.9579	0.7447
China	Coefficient	0.0086	0.0072	0.0081	-0.0092	-0.0091
	t-value	2.7881**	0.9574*	0.4378	-1.0265	-0.5262**
	p-value	0.0054	0.0387	0.6616	0.3051	0.0089
India	Coefficient	1.1043	-0.2589	-0.7376	-0.1682	0.1548
	t-value	3.4159**	-0.7859	-2.2581*	-0.5104	0.3037
	p-value	0.0007	0.1322	0.0242	0.6099	0.7614
Indonesia	Coefficient	0.8916	0.3353	-0.2608	-0.3193	-0.0656
	t-value	2.1956	0.8204**	-0.638	-0.7802	-0.1027**
	p-value	0.2284	0.0123	0.5237	0.4355	0.0112
Malaysia	Coefficient	0.3973	0.2163	-0.2288	0.2507	-0.5583
	t-value	1.3594	0.0558	-0.7828	0.1734	-1.2379
	p-value	0.1744	0.4455	0.4339	0.8624	0.2161
Mexico	Coefficient	0.7211	0.5933	0.5188	-0.2082	-0.1544
	t-value	2.3614*	1.9397*	2.0611	-2.6769	-0.3243
	p-value	0.0185	0.0528	0.9513	0.4987	0.7458
Russia	Coefficient	0.6131	-0.3525	-0.2132	0.4012	-1.2836
	t-value	0.9489*	-0.5459	-0.3302	0.5854	-1.1119**
	p-value	0.0429	0.5853	0.7413	0.5585	0.0065
Taiwan	Coefficient	0.1081	0.2883	-0.1519	-0.2087	-0.1044
	t-value	0.3467	0.928	-0.4883	-0.6618	-0.2107
	p-value	0.7289	0.1537	0.6254	0.5083	0.8332

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

The increase in the volatility is found significant at five percent level in case of seven stock indices namely Argentina, China, India, Indonesia, Malaysia, Russian and Taiwan as revealed by their respective p values. Chinese and Indian stock market produce significantly higher level of volatility in the first week of month whereas Russia is the only country which shows low level of volatility (-0.3961) at one percent level as negative sign of the coefficients indicate the reduction in volatility. This implies that first and second week of the month are marked by higher level of price fluctuations might be due to the arrival of unexpected news. In case of Brazil, China and Indonesia volatility is significantly higher in the fifth week of the month. However, Mexico remains an exception as it has shown a decrease in volatility at one percent level in the second and fifth week of the month. The table further indicates that there is reduction in the volatility in the first week of the month in case of Argentina, Brazil, Indonesia and Malaysia. However, this reduction is not statistically significant. None of the parameter estimates related to the third and fourth week of the month have been found statistically significant in all the stock markets studied which implies that price almost remain stable in the third and fourth week of the month.

CONCLUSION

. The paper aims to empirically investigate the week-of-the-month effect in returns and volatility of nine selected emerging stock markets, namely Argentina, Brazil, China, India, Indonesia, Mexico, Malaysia, Russia and Taiwan by using the weekly return data for the period commencing from January, 1997 to December, 2011. A basket of tests, i.e., unit root test, t-test, Kruskal-Wallis (H) test, Levene's F-Statistics and GARCH (1, 1) have been applied for analyzing the data and testing the seasonality in stock returns. The results of the study exhibit existence of statistically significant positive means returns in the first week and second week of the month and statistically significant negative mean returns have been found in the last week of the month give a strong evidence of week-of-the-month effect in the return series of the majority of stock markets

TABLE-6: The Week-of-the-Month Effect in GARCH (1, 1) Model (Estimates of Variance Equation)

Countries	Days	C Coefficient	P Value	ARCH Coefficient	P Value	GARCH Coefficient	P Value	DUMMY Coefficient	P Value
Argentina	Week1	0.3744	0	0.0783	0	0.8929	0	-0.6624	0.6935
	Week2	0.1926	0	0.0781	0	0.8937	0	0.2655*	0.0461
	Week3	0.4038	0	0.0762	0	0.8927	0	0.1226	0.8045
	Week4	0.4707	0	0.0758	0	0.8939	0	0.0831	0.7371
	Week5	0.1236	0	0.0783	0	0.8894	0	-0.0406	0.1589
Brazil	Week1	0.1893	0	0.0677	0	0.9112	0	-0.8915	0.6123
	Week2	0.1321	0	0.0679	0	0.9231	0	0.6505	0.1207
	Week3	0.1811	0	0.0673	0	9212	0	-0.2377	0.2004
	Week4	0.255	0	0.0662	0	0.9266	0	-0.0783*	0.0229
	Week5	0.2366	0	0.0661	0	0.9222	0	0.3480**	0.0105
China	Week1	0.9312	0	0.076	0	0.9123	0	0.8620**	0
	Week2	0.0417	0	0.0726	0	0.9133	0	0.8718*	0.0312
	Week3	0.8863	0	0.0756	0	0.9121	0	0.7681	0.7152
	Week4	0.2262	0	0.0788	0	0.9121	0	-0.6878	0.9981
	Week5	0.6444	0	0.0757	0	0.9132	0	0.6991**	0
India	Week1	0.5236	0	0.0689	0	0.9261	0	0.3357*	0.0424
	Week2	0.4107	0	0.0678	0	0.9231	0	0.4690*	0.0451
	Week3	0.4296	0	0.0677	0	0.9229	0	-0.405	0.6578
	Week4	0.3824	0	0.0656	0	0.9222	0	0.4987	0.7441
	Week5	0.4013	0	0.0652	0	0.9232	0	0.5137	0.9583
Indonesia	Week1	0.4685	0	0.1314	0	0.856	0	-0.2055	0.4328
	Week2	0.3651	0	0.1278	0	0.8567	0	0.3047*	0.0271
	Week3	0.4107	0	0.1288	0	0.8569	0	0.2628	0.3134
	Week4	0.3651	0	0.1287	0	0.8567	0	0.1838	0.4311
	Week5	0.5612	0	0.1299	0	0.8543	0	0.9175*	0.0023
Malaysia	Week1	0.5109	0	0.0574	0	0.9211	0	-0.1884	0.5436
	Week2	0.5171	0	0.0589	0	0.9237	0	0.1351*	0.0544
	Week3	0.4189	0	0.0626	0	0.9263	0	0.2525	0.2327
	Week4	0.5186	0	0.0627	0	0.9153	0	-0.1331	0.2555
	Week5	0.5206	0	0.0628	0	0.9198	0	-0.2609	0.1454
Mexico	Week1	0.7902	0	0.1261	0	0.8543	0	-0.4926	0.2607
	Week2	0.7131	0	0.1239	0	0.8467	0	-0.4720*	0.0254
	Week3	0.7345	0	0.1247	0	0.85	0	-0.4417	0.1996
	Week4	0.7762	0	0.1244	0	0.8491	0	0.4188	0.9588
	Week5	0.7817	0	0.1237	0	0.8478	0	-0.3989*	0.0181
Russia	Week1	0.3961	0	0.0788	0	0.8862	0	-0.3961**	0.0101
	Week2	0.2701	0	0.0781	0	0.8789	0	0.2701*	0.0418
	Week3	0.6619	0	0.0778	0	0.8676	0	0.3985	0.1903
	Week4	0.6142	0	0.0786	0	0.8699	0	0.3743	0.3921
	Week5	0.9785	0	0.0784	0	0.8674	0	0.3022	0.9501
Taiwan	Week1	0.643	0	0.0748	0	0.9137	0	0.1234	0.3288
	Week2	0.6945	0	0.076	0	0.9141	0	0.1949*	0.0249
	Week3	0.6455	0	0.0732	0	0.9133	0	0.147	0.7064
	Week4	0.6413	0	0.0743	0	0.9123	0	0.1287	0.8569
	Week5	0.6624	0	0.0741	0	0.9117	0	-0.1259	0.1885

*significant at 5% level **significant at 1% level

studied. With respect to volatility, it is inferred that variation in returns is found maximum in the second week of the month. The results give strong evidence of existence of time-varying returns and volatility patterns in weekly return distributions of majority of the emerging markets. A rational financial decision maker considers not only the returns but also volatility of returns. Exploiting the patterns identified in stock returns and volatility for timing the investments, portfolio immunisation and risk management may help investors

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