

# Does Day-of-the-Week Anomaly Influence BRICS Stock Markets? A Unit Root Testing Approach

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## Abstract

The BRICS (Brazil, Russia, India, China and South Africa) economies have been selected as a basis for the present study due to two reasons. Firstly, economists have prognosticated that these nations are widely considered among the world's ascendant economies and secondly, these countries represent almost every continent on the globe. In this context, the current study examines the existence and persistence of Day-of-the-week (DOW) effect by examining the major indices of these economies of BRICS i.e. IBOVSPA (Brazil), RTSI (Russia), BSE-Sensex (India), SSE Composite Index (China) and FTSE ALL (South Africa). Daily closing prices of these indices are considered and examined for the period of fourteen years from January 1, 2001 up to December 31, 2014. The data has been analyzed with the help of software Eviews5. However, the findings demonstrate the existence of DOW effect in Indian and Chinese stock markets only. The results suggest that market inefficiency still exists and market is yet to price the risk appropriately by hitting the market tactically at appropriate timings. As a consequence, an investor may exploit this technical knowledge to earn abnormal returns to enter the stock market to earn abnormal profits by adjusting their portfolios accordingly.

Keywords: BRICS, Day-of-the-Week Effect, Stock Market Indices, Technical Knowledge, Unit-Root Testing

JEL: G02, G14, G17, G32

## Introduction

The term market efficiency is used to explain the relationship between information and share prices in the capital market literature as it is perhaps the most important concept since 1970s, especially in terms of understanding of the working of capital markets. It assumes greater importance as the trend of investments is accelerating in these markets both as a result of regulatory reforms and removal of other barriers from the international equity investments. As a matter of fact, it is important to know whether there are variations in volatility of stock returns by the day of the week and whether a high (low) return is associated with a correspondingly high (low) volatility for a given day. Matter of fact, market efficiency has evolved to the inevitable evident existence of the returns based on underlying variables and examination for the spread of the information historically. This contradiction of the Efficient Market Hypothesis assumes that security prices fully reflect all available information at any given point of time which implies that price movements do not follow any pattern or trends (Bachelier, 1900).

Antagonistically, inefficiency of the market is a distortion of price or rate of return in a financial market, which eventually

leads to the contradiction of the existence of EMH. Further, stock market anomalies are the evidences that may be in the contradiction of the well-established propositions of asset-pricing department and demonstrate improbable ineffectiveness of stock market (Schwert, 2003). In essence, the DOW (Day of the Week) effect is an anomaly which is evident in literature since long and emphatically expresses that different trading days of the week represent different distributions of expected returns (Parikh, 2009).

In fact, the phenomenon is observed not only in developed capital markets of USA, England, France, Canada, Australia, and Japan but also in emerging economies such as Malaysia, Mexico, Indonesia and Turkey (Tilica & Opera, 2014). However, the day on which the average returns are different from other days is not the same for all markets. If investors can identify a certain pattern in volatility, then it would be easier to make investment decisions based on both return and risk. For example, Engle (1993) argues that investors who dislike risk may adjust their portfolios by reducing their investments in assets whose volatility is expected to increase.

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The current research examines the presence of DOW anomaly in the BRICS stock market i.e. five emerging stock markets by examining the major indices of these countries i.e. IBOVESPA (Brazil), RTSI (Russia), BSE-Sensex (India), SSE Composite Index (China) and FTSE ALL (South Africa). Originally, the BRICS term is made up of Brazil, China, India, Russia, and South Africa countries which are seen as rapidly growing economies and increasing global dominance. In addition, these five nations also represent almost every continent. The BRIC idea was first conceptualized by the consulting firm Goldman Sachs in 2001 which conjectured that these economies may project extensions in economic trends in next fifty years. After the inclusion of South Africa on 14 April 2011, the group of emerging economies known as BRIC has become BRICS. BRICS has also been formalized by the governments of these countries under the 'BRICS Summit' and have already had five editions of the heads of state meetings.

The BRICS countries are rapidly growing influential economies in regional and global affairs and have USD four trillion in combined foreign reserves and 17 percent of world trade.

These countries' collective output constitutes more than 20 percent of the global Gross Domestic Product and are home to 40 percent of the population of world as of 2014 (Chun, 2013).

For the purpose of analysis, data for a recent period has been taken i.e. January 1, 2001 up to December 31, 2014 to examine the presence of DOW effect and DOW trading strategies to evaluate whether this effect is economically significant. There are many causes to revisit this evidence in the context of BRICS stock markets.

1. However, the principle aim of this study is to extend the segment of this literature, which has investigated the impact of DOW on emerging economies globally i.e. BRICS.

2. The growth of the internet provides availability of easy trading may just allow for the necessary conditions for the presence of DOW effect.

3. The anomaly has been known for a long time and the effect should disappear in efficient markets if information and transaction costs are low enough.

Table 1. Empirical Evidences on Day-Of-The-Week Effect

Sr. no.	Author	Data	Period of Study	Findings
1.	Apolinario, Santana, Sales, and Caro (2006)	Germany, Austria, Belgium, Denmark, Spain, France, The Netherlands, Italy, Portugal, The United Kingdom, The Czech Republic, Sweden and Switzerland.	1997-2004	Monday effect is found in French and Swedish markets. DOW effect is found in all the countries except Portugal and Czech Republic.
2.	Boynton Oppenheimer, and Reid (2006)	PACAP VW index (Hong-Kong)	1975-2001	From 1975 up to 1990, Tuesday demonstrates abnormal losses. After that, trading returns and volume are low on Monday.
3.	Hu, Huang and Liao (2006)	TWSE (Taiwan)	1991-2004	Mon. returns are negative and Fri. trading returns are higher positive.
4.	Sharma and Singh (2006)	BSE Sensex (India)	1992-2005	DOW effect is found. Wednesday is significant.
5.	Wickremasinghe (2007)	Daily and monthly share prices of 75 Companies (Sri Lanka)	1987-1999	(-ve) Tues. and (-ve) Wed. effect has been found.
6.	Wafa, Liew and Chia (2007)	Bursa Malaysia Composite Index (Malaysia)	1993-2005	Decreasing Monday Returns.
7.	Kenourgios and Samitas (2008)	ASE Index & Three major industry Index FTSE- 20, FTSE- 40	1995-2000	Higher Monday Returns.
8.	Ali and Akbar (2009)	KSE 100 VW Index (Pakistan)	1991-2006	Thursday is significant.
9.	Rahman (2009)	DSI (Dhaka) DGEN (Dhaka) DSE 20 (Dhaka)	2005-2008	(-ve) Monday and (+ve) Thursday returns.
10.	Singhal and Bahure (2009)	BSE Sensex (India) BSE 200 (India) S & P Nifty (India)	2003-2008	(+ve) Fri. returns in all the three indices.
11.	Ali and Akbar (2009)	KSE 100 VW Index (Karachi)	1991-2006	Week-End effect is absent.
12.	Cinko and Ava (2009)	ISE-100	1995-2008	(-) ve Monday, (+) Thursday and Friday.

13.	Singhal and Bahure (2009)	BSE Sensex, BSE 200 and S & P Nifty	2003-2008	Weekend effect is found.
14.	Dicle (2010)	51 markets in 31 countries	2000-2007	DOW is found in Industry level, but not in Individual Stock's Returns.
15.	Hussain Hamid, Akash and Khan (2011)	KSE-100	2006-2010	(+) Tuesday.
16.	Nageshwari (2011)	BSE Sensex	2000-2010	No DOW and MOY effect is found.
17.	Patel and Patel (2011)	BSE Sensex	2001-2010	No volatility is found.
18.	Sharma (2011)	BSE 30 (India), Nikkei (Japan), Hang-Seng (Hong Kong), Sitraits Times (Singapore) and Taiwan Weighted (Taiwan)	2001-211	DOW is found.
19.	Aggarwal (2012)	Nifty	1996-2011	Anomalies are found.
20.	Tevdovski Mihajlov and Sazdovski (2012)	BELEX 15, BIFX, CROBEX, MB 110 & SOFIX	2006-2011	Not found in Macedonian Market, BELEX 15 & BIFX in Tuesday
21.	Werner (2012)	BOVESPA, Merval, IPC, IPSA, IGBC, ISBVL	1993-2007	Volatility is higher on Monday and Lower on Friday. Effect is more found in volatility than returns.
22.	Aziz (2013)	BSE Sensex & S & P CNX Nifty	1990-2013	Reverse Monday effect is found in Sensex & (+) Wednesday is found in Nifty.
23.	Cifuentes and Cordoba (2013)	Columbia, Indonesia, Vietnam, Egypt, Turkey and South Africa markets	Month end July 2012	DOW is found in all economies.
24.	Archana Safeer and Kevin (2014)	BSE Index	2008-2012	Week-End effect, Low TOM AND TOY.
25.	Carlucci (2014)	Inmex (Mexico), USA (Dow-Jones)	2004-2012	DOW effect is not present.
26.	Deyshappriya (2014)	CSE (Colombo)	2004-2013	DOW and Monthly effect is found.
27.	Jamroz and Korankiewicz (2014)	WIG (Warsaw St. Ex.), WIG 20, WIG 40, WIG 890, NIKKEI 225, DAX, CAC 40, S & P 500, IBEX	2003-2013 and 1999-2002	DOW effect is diminishing with the passage of time.
28.	Khanna (2014)	Sensex	2006-2010	Tuesday, Wednesday effect is found.
29.	Mitra and Khan (2014)	NSE Nifty 50	2001-2012	No DOW on Intra day and Interday. Monday (r) =Wednesday (r). Monday has negative returns but maximum Volatile.
30.	Singh (2014)	Nifty (Index), Brazil (Bovespa), China (SSE) 180 and Russia-Moscow	2003-2013	DOW effect is found in China. MOY effect is not found.
31.	Srinivasan and Kalaivani (2014)	NSE Nifty, BSE Sensex	1997-2012	(+) Monday effect, (+) Wednesday effect. Highest volatility is found on Wednesday.
32.	Tilica and Opera (2014)	BEFC, DWG	2005-2011	Friday effect is found.
33.	Islam and Sultana (2015)	Chittagong Stock Exchange	2004-2014	(+)Thursday, Highest Volatile
34.	Khanna (2015)	203 companies listed on NSE	1994-2006	Monday, Friday and Wednesday effect was found in different periods.

Where, ASE = American Stock Exchange, ASX = Australian Index, BEFC (Bucharest composite index), BELEX=Belgrade Stock Exchange, BIFX=Bosnian Investment Funds Index, BOVESPA=Bolsa de Valores de São Paulo, BSE = Bombay Stock Exchange, CAC = Cotation Assiste En Continu, CIVETS= Colombia, Indonesia, Vietnam, Egypt, Turkey and South Africa, CNX = Crisil and National Stock Exchange Index of Fifty Stocks, CROBEX=Croatia Zagreb Stock Exchange, DAX = Deutsche Aktien Indexe, DGEN = DSE General Index, DJIA = Dow Jones Industrial Average, DM = German Ma, DSE = Dhaka AStock Exchange, DSI = Dhaka All Share Price Index, DWG= Dow Jones Global Index, FT = Financial Times, Fri = Friday, FTSE = Financial Times Stock Exchange, HSI = Hang-Sang Index, IBEX = Iberia Index, IGBC= Colombia Stock Exchange, INMEX=Taiwan Stock Exchange, ISECI = Istanbul Securities Exchange Composite Index, IPC=Mexican stock exchange, IPSA= Santiago Stock Exchange, ISBVL=Investors Bancorp, ISE=Irish Stock Exchange, JCI = Jakarta Composite Index, KLSECI = Kuala Lumpur Stock exchange Composite Index, KSC = Korea South Composite, KSE = Karachi Stock Exchange, Merval=Marvell Technology Group Ltd., Mon = Monday, MSEC = Manila Stock Exchange Composite, NASDAQ = National Association of Security Dealers Automated Quotational, Nikkei 225, NSE = National Stock Exchange, NYSE = New York Stock Exchange, PACAP VW = Pacific Basin Capital Market, SES = Stock Exchange of Singapore, SETI = Securities Exchange of Thailand Index, SOFIX=Bulgarian Stock Exchange, S & P 500 = Standard & Poor, SPDRS = Standard and Poor's Depository Receipts, TWSE= Taiwan Stock Exchange, TL = Turkish Lira, TSEI = Taiwan Stock Exchange Index, USD = US Dollar, WIG (Warsaw St. Ex.), (+) means positive and (-) means negative trading returns.

Source: Compiled after referring the research papers mentioning in above table.

As a result, this study fills the gap and can be a major contributor to the finance literature and additionally, it can benefit the investors while choosing any Index among all included in the study or a combination of strategies for optimum portfolio and risk management. It may contribute well to trade analysts, to adopt appropriate trading strategies, if DOW effect is identified in any of the indices. If investors can identify a certain pattern in volatility, then it would be easier to make investment decisions based on both return and risk. For example, Engle (1993) argues that investors who dislike risk may adjust their portfolios by reducing their investments in assets whose volatility is expected to increase. However, a huge literature is available witnessing the existence and persistence of above-said phenomenon, this could be the first study that has been directed towards BRICS.

The paper is structured as follows: In section II, the literature is delineated on DOW effect. The data base and methodology are presented in section III. The findings are interpreted in section IV and section V comprises concluding remarks.

## Review of Literature

In addition to the stability issues raised by academicians, many practitioners are skeptical of the persistence of DOW effect in developing and developed countries in India and abroad as it is clearly visible in Table 1. A brief review of selected studies based on recent period has been presented here to identify research gap in the research area of above-said effect. Table 1 provides an overview of a number of studies representing the research work undertaken recently by different researchers for examining major issues related to the efficiency, volatility and seasonality of the stock market in India and abroad. The effect has been empirically tested at different points of time in stock

markets, fixed income securities markets, option markets and futures market.

There are studies- both previous and recent - which have pointed out empirical irregularities in the distribution of stock returns whereas, according to Zafar, Shakh and Urooj (2009), anomalies are the results of shortfalls in the models applied for testing market efficiency rather than of inefficiency of markets. There are some studies which are available to support the positive Friday effect (Singhal & Bahure, 2009) in the Indian stock market and Thursday effect in Pakistan stock market (Ali & Akbar, 2009). The cause suggested by some of the pioneer studies for this particular effect might be the uncertainty of the opening position of the stock market on Monday.

Some studies have documented that there is negative correlation coefficient between Monday and Friday investors (Apolinario et al., 2006; Boynton et al., 2006; Wafa et al., 2007; Inghal & Bahure, 2009; Werner, 2012; Archana et al., 2014), which provides very significant information about the trading behaviour of the investors, however the phenomenon is not documented in Karachi, Indian, Mexico and USA (Ali & Akbar 2009; Nageshwari, 2011; Aziz, 2013; Carluccl, et al., 2014; Mitra & Khan, 2014). Rahman (2009) examined Dhaka stock exchange (DSE) and his findings clearly indicate towards the negative trading returns on Monday, consistent with Mitra & Khan (2014), whereas the market was significantly positive on Thursday (Cinko & Ava 2009). The literature has supported that the reason for positive Wednesday trading returns might be due to the optimistic attitude of the Indian investors to make their dealings on Wednesday most of the times (Sharma & Singh, 2006; Wickremasinghe, 2007; Khanna, 2014; Srinivasan & Kalaivani, 2014).

Thus, these studies have indicated that the strategies that may potentially exploit the Calendar effects should be further explored to determine if excess returns could be generated. These studies develop the analytical models about the association between information and stock prices and show that more informed trading helps stock prices become more efficient. Despite the existence of these theoretical studies, little evidence exists on whether informed trading activity affects the market efficiency in real stock markets (Muramiya, 2009).

Therefore, despite the diminishing persistence and increased awareness of these anomalies and lowered information and transaction costs with the high rate of growth of the internet and its major role in strategic decision making processes, the DOW effect has persisted in recent times (Werner, 2012).

It is clearly evident from the literature review that a number of similar studies have been carried out for global stock markets both for developed and for developing markets, yet no study has examined the presence of DOW patterns for BRICS countries together.

## Database and Methodology

The use of daily data facilitates to empirically test the relationship between the share prices fluctuations and especially to study the DOW anomaly. The study examines the indices i.e. IBOVESPA (Brazil), RTSI (Russia), BSE-Sensex (India), SSE Composite index (China) and FTSE ALL (South Africa). Daily closing prices were taken as the sample period of fourteen years from January 1, 2001 up to December 31, 2014 for the purpose of analysis for the current study.

The daily stock price data of stock market indices for respective countries have been taken from web resources i.e. yahoo finance.com. If Pt be the closing price on date t and Pt-1 be the same for the previous trading day, then the return on the market portfolio is calculated as:

$$R_t = \log(P_t / P_{t-1})$$

The Unit Root Testing is conducted by adding the lagged values of the dependent variable i.e., return  $Y_t$ .

$$(1) \quad Y_t = \log P_t - \log P_{t-1}$$

For the purpose of analysis of the DOW effect, dummy variables have been used for the current study. The 2, 3, 4 and 5 stands for Tuesday, Wednesday, Thursday and Friday respectively. The following equation is designed below to test the Week-End effect:

$$\Delta \log P_t = \beta_1 + \log P_{t-1} + \sum_{i=1}^m \alpha_i \Delta \log P_{t-i} + \partial_1 D_{\text{Tues}} + \partial_2 D_{\text{Wed}} + \partial_3 D_{\text{Thurs}} + \partial_4 D_{\text{Fri}} + \varepsilon_t$$

Where,

$$(2) \quad D_i = \begin{cases} 1: \text{ith day} \\ ; i = \text{Tues, Wed, Thurs, Fri} \\ 0: \text{otherwise} \end{cases}$$

Where,  $R_t$  represents the daily returns at time  $t$ ,  $D_i$  in equation (3) is a dummy variable that represents each day (i.e., Monday, Tuesday,....., Friday) for Day-of-the-Week effect.

When the results document that average of return is statistically significant, then it can be said that the structural break is significant. On the contrary, the structural break is significant when the dummy variable represents seasonality.

## Results

The results from summary statistics refute the existence of EMH and provide the evidence of existence of abnormal trading returns on different trading days of the week in Indian stock market (Table 2).

The results of Table 2 indicate that Monday trading returns are lowest negative for IBOVESPA. It clearly documents the presence of Monday effect in this economy. Trading returns are highest positive for Wednesday for SENSEX and SSE. Surprisingly Week-End effect/Monday effect is observed for IBOVESPA. Friday trading returns are highest for FTSE/JSE.

One notable observation is that for SENSEX, in Table 2, average trading returns are positive for all trading days. However, Monday trading returns are highest negative on Monday only for IBOVESPA and FTSE/JSE. Trading returns are maximum on Monday for SENSEX, IBOVESPA and FTSE/JSE, on Friday for RTSI and on Tuesday for SSE and minimum on Monday for SENSEX and IBOVESPA.

Surprisingly, it is found that the standard deviation is highest on Monday for all stock indices. It clearly indicated that stock prices are highly fluctuated on Monday in all these markets.

Further visualization of Tables 3-7 (see appendix-I) clearly describes that the DOW effect is statistically significant for Sensex and SSE indices only. The results document that a slight Thursday effect has been observed during the period BSE-Sensex in India. The coefficient for Friday is negative and

Table 2. Descriptive Statistics for BRICS Markets

Ibovespa (Brazil)							
Variables	N	Mean	Maximum	Minimum	Standard Deviation	Skewness	Kurtosis
Monday	710	-0.083	13.67	-9.83	2.034	0.224	5.417
Tuesday	701	0.046	12.59	-6.85	1.751	0.477	4.200
Wednesday	718	0.082	6.14	-12.09	1.821	-0.889	5.256
Thursday	707	0.0131	7.21	-7.62	1.854	-0.191	1.404
Friday	703	0.097	9.13	-7.157	1.607	-0.048	2.894
Total	3540	0.0318	13.68	-12.09	1.819	-0.095	4.133
RTSI (Russia)							
Monday	710	0.088	8.854	-21.19	2.324	-1.669	13.29
Tuesday	725	-0.011	10.27	-13.25	2.166	-0.628	6.763
Wednesday	726	-0.053	13.24	-13.83	2.154	-0.536	7.119
Thursday	722	0.138	16.39	-9.99	2.219	0.483	6.394
Friday	721	0.093	20.20	-14.71	1.984	0.574	19.12
Total	3604	0.0506	20.20	-21.19	2.172	-0.440	10.20
BSE SENSEX (India)							
Monday	698	0.035	15.98	-11.81	1074	0.315	14.39
Tuesday	692	0.045	7.93	-6.84	1.42	0.013	3.96
Wednesday	692	0.102	5.77	-7.52	1.42	-0.046	3.32
Thursday	690	0.028	6.67	-7.00	1.39	-0.276	2.68
Friday	685	0.066	7.90	-11.60	1.66	-0.622	5.54
Total	3460	0.0556	15.99	-11.81	1.53	-0.114	7.81
SSE (China)							
Monday	704	0.070	8.849	1.855	-0.299	-0.299	3.297
Tuesday	709	-0.022	9.400	1.456	-0.852	-0.852	7.834
Wednesday	714	0.102	7.890	1.531	0.240	0.240	3.886
Thursday	713	-0.131	8.887	1.500	0.043	0.043	3.656
Friday	711	0.042	9.034	1.367	0.345	0.345	4.095
Total	3552	0.012	9.400	1.551	-0.129	-0.129	4.543
FTSE- ALL (South Africa)							
Monday	670	-0.018	8.81	-7.95	1.352	-0.029	8.051
Tuesday	718	0.048	5.78	-5.35	1.151	0.178	2.797
Wednesday	724	-0.069	7.31	-7.11	1.153	0.347	5.620
Thursday	724	0.014	5.09	-5.53	1.167	-0.466	3.626
Friday	714	0.052	8.16	-8.70	1.125	-0.334	10.42
Total	3546	0.004	8.81	-8.70	1.196	-0.190	6.400

\*Significant at 1% significance level.



observed to be reducing the RETURN. Slight Wednesday and Thursday are found statistically significant for SSE Composite Index.

As it is clearly evident in Table 3, 4 and 7 no variable is found significant for IBOVESPA, RTSI and FTSE-ALL indices. Therefore, it is evident that except these two feeble effects, no strong DOW effect has been observed during the period of the study for the economies. Inferring the documentary evidences of BRICS, it can be documented that trading returns are depicting the presence of seasonality in all the economies. The study has covered the period from 2001 to 2014 and examined BRICS indices. The results have indicated that DOW effect is not found for the IBOVESPA (Brazil), RTSI (Russia) and FTSE ALL (South Africa) stock markets. However, Slight Thursday effect is found for Indian stock market and slight Wednesday and Thursday effect is in existence in Chinese stock market.

### Conclusion

The present study is an attempt to examine the presence of DOW effect in the emerging stock markets. For this purpose, Indian, Russian, Chinese, Brazilian and South African stock markets are selected as a sample for the current research. The regular closing prices of these five indices from January 2001 to December 2014 form the database of the study. However, it is evident that there is significant variation in return across all the week days over the study period. The summary results of descriptive analysis of BRICS demonstrate that Wednesday is causing the highest variability in the weekly distribution of mean returns for Sensex and SSE. However, trading returns are highest on Thursday for IBOVESPA and RTSI and on Friday for FTSE-ALL.

The DOW effect for BRICS indicates that none of the variable is found significant for Russian, Brazil and South African stock market. Thursday effect is found during the period for Indian and Chinese stocks, whereas slight Wednesday effect is evident during the period for Chinese stock market. Wednesday is the significant variable for Chinese economy which is consistent with the findings of Anshuman and Goswa-

mi (2000), Keef and McGuinness (2001), Sharma and Singh (2006), Wickremasinghe (2007), Khanna (2014) and Srinivasan and Kalaivani (2014).

In this context, a positive and maximum trading return is documented on Monday for Sensex, RTSI and SSE stock return, which implies that from the starting of the week, stock prices have the tendency to rise (Yakob Azuddin, Beal, Delpachitra, 2005). This paradox can also be linked with the rational expectations' hypothesis in which one can make fool of one person only once. When they realize the situation, they start reacting accordingly. This increase in demand of equities inflates their prices and consequently increases the trading returns of the investors on that particular day. Because of the increased selling activity by individual investors on Monday relative to the rest of the week, it can be inferred that some association might exist between the trading behaviour/behavior of individual investors and trading on Monday. By virtue of this, if investors are using that information, then a market can be termed as efficient with respect to a particular set of information. As a result, they receive the expected return and make no consistent abnormal returns. Moreover, certain regularities in the common stocks have been discovered and some cross sectional differences among stock returns have been found to occur with regularity.

Therefore, it is proved that the daily trading returns of a substantial number of stocks sometimes do not follow random walk hypothesis and hence could be predicted as well in different trading categories on the basis of return. Moreover, the findings of the current study suggest that Russia, Brazil and South Africa economies are efficient enough, that's why no DOW anomaly has been found in those stock markets. Therefore, it becomes difficult for the knowledgeable traders to make decisions for sale or purchase of stocks therein. Therefore, if any investors who are looking for some foreign market investment avenues and lower risk as well, BOVESPA, RTSI and FTSE ALL seem to be good option.

The anomaly DOW effect suggests is that market participants can predict the market prior and can be benefitted from the market through timing their plans for investment and sale of securities in order to sell their investment after seven days, if

Table 3. Day-of-the-Week Effect in Stock Returns of IBOVESPA

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRETU(-1)	-0.994341	0.016974	-58.58049	0.0000
D1	-0.080255	0.069115	-1.161178	0.2456
D2	0.041897	0.069544	0.602457	0.5469
D3	0.076224	0.068693	1.109640	0.2672
D4	0.011547	0.069249	0.166742	0.8676
D5	0.107989	0.069482	1.554189	0.1202
R-squared	0.498301	Mean dependent var		-0.000131
Adjusted R-squared	0.497578	S.D. dependent var		2.574893
S.E. of regression	1.825128	Akaike info criterion		4.042901
Sum squared resid	11565.56	Schwarz criterion		4.053518
Log likelihood	-7024.605	Hannan-Quinn criter.		4.046691
Durbin-Watson stat	1.999018			

Table 4. Day-of-the-Week Effect in Stock Returns of RTSI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRETU(-1)	-0.904251	0.016694	-54.16495	0.0000
D1	0.090385	0.081257	1.112338	0.2661
D2	-0.014920	0.080489	-0.185362	0.8530
D3	-0.054193	0.080309	-0.674807	0.4998
D4	0.115649	0.080541	1.435907	0.1511
D5	0.081281	0.080602	1.008421	0.3133
R-squared	0.452608	Mean dependent var		-0.000155
Adjusted R-squared	0.451838	S.D. dependent var		2.906521
S.E. of regression	2.151928	Akaike info criterion		4.372289
Sum squared resid	16467.11	Schwarz criterion		4.382695
Log likelihood	-7781.046	Hannan-Quinn criter.		4.375999
Durbin-Watson stat	1.995385			

Table 5. Day-of-the-Week Effect in Stock Returns of Sensex Composite

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRETU(-1)	-0.922712	0.016970	-54.37166	0.0000
D1	0.094857	0.057939	1.637194	0.1017
D2	0.007106	0.058125	0.122256	0.9027
D3	0.048071	0.058191	0.826095	0.4088
D4	0.111276	0.058319	1.908060	0.0565*
D5	-0.009042	0.058567	-0.154385	0.8773
R-squared	0.462286	Mean dependent var		-0.000185
Adjusted R-squared	0.461507	S.D. dependent var		2.085970
S.E. of regression	1.530727	Akaike info criterion		3.691097
Sum squared resid	8086.130	Schwarz criterion		3.701768
Log likelihood	-6374.062	Hannan-Quinn criter.		3.694908
Durbin-Watson stat	1.992498			

Source: Author's calculations.

\*, \*\*, \*\*\* indicate significance at 10, 5 and 1 per cent levels respectively.

Table 6. Day-of-the-Week Effect in Stock Returns of SSE Composite

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRETU(-1)	-0.993504	0.016797	-59.14756	0.0000
D1	0.069947	0.058452	1.196659	0.2315
D2	-0.022949	0.058253	-0.393949	0.6936
D3	0.102202	0.058038	1.760953	0.0783*
D4	-0.131215	0.058100	-2.258418	0.0240*
D5	0.042717	0.058201	0.733958	0.4630
R-squared	0.498928	Mean dependent var		0.000202
Adjusted R-squared	0.498221	S.D. dependent var		2.189255
S.E. of regression	1.550788	Akaike info criterion		3.717092
Sum squared resid	8525.528	Schwarz criterion		3.727526
Log likelihood	-6593.697	Hannan-Quinn criter.		3.720813
Durbin-Watson stat	1.999673			

Source: Author's calculations.

\*, \*\*, \*\*\* indicate significance at 10, 5 and 1 per cent levels respectively.

gaining a positive return. However, the information is concluded on the basis of historical data and sometimes, in future, an investor might not be able to earn abnormal return on the basis

of the results of the current study. Moreover, sometimes these anomalies behave well in short-run only. They might disappear in the long run.

Table 7 Day-of-the-Week Effect in Stock Returns of FTSE ALL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRETU(-1)	-1.040458	0.016787	-61.97857	0.0000
D1	-0.016723	0.046034	-0.363280	0.7164
D2	0.048919	0.044461	1.100284	0.2713
D3	-0.068085	0.044283	-1.537502	0.1243
D4	0.011299	0.044292	0.255112	0.7987
D5	0.052523	0.044585	1.178039	0.2389
R-squared	0.521428	Mean dependent var		0.000662
Adjusted R-squared	0.520752	S.D. dependent var		1.719709
S.E. of regression	1.190516	Akaike info criterion		3.188342
Sum squared resid	5015.928	Schwarz criterion		3.198791
Log likelihood	-5645.337	Hannan-Quinn criter.		3.192069
Durbin-Watson stat	1.999801			

## References

- Aggarwal, M. (2012). Efficiency of Indian capital market: A study of weak form of EMH on Nifty. *South Asian Academic Research Journals*, 2(6), 16-28.
- Ali, S., & Akbar, M. (2009). Calendar effects in Pakistani stock market. *International Review of Business Research Papers*, 5 (1), 389- 404.
- Anshuman, R., & Goswami, R. (2000). Day of the week effects on the Bombay stock exchange. *The ICAFI Journal of Applied Finance*, 6(4), 31-41.
- Apolinario, R. M. C., Santana, O. M., Sales, L. J., & Caro, A. R. (2006). Day-of-the-week effect on European stock markets. *International Research Journal of Finance and Economic*, 9 (2), 53-70.
- Archana, S., Safeer, M., & Kevin, S. (2014). A study on market anomalies in Indian stock market. *International Journal of Business & Administration Research Review*, 1(3), 128-137.
- Aziz, T. (2013). Day of the week effect: Evidence from India. *Afro-Asian Journal of Finance and Accounting*, 5(2), 99-112.
- Bachelier, L. (1900). *Théorie de la speculation* (Paris: Gauthier-Villars) reprinted in English in Cootner, P. (1964). *The Random Character of Stock Market Prices*. Cambridge: M.I.T. 17-78.
- Boynton, W., Oppenheimer, H.R., & Reid, S.F. (2006). Japanese day of the week-end return patterns: New results. Retrieved August 7, 2006, from <http://www.fma.org>
- Carluccl, F. (2014). The week day effect anomaly in the behaviour of stock index returns of Brazil, Mexico & The U.S.A.. *Business & Management Review*, 3(9), 31-38.
- Chun, K. H. (2013). *The BRICs superpower challenge*. Retrieved January 20, 2015, from <http://www.ashgate.com/isbn/9781409468691>
- Cifuentes, J. C. A., & Cordoba, B. E. G. (2013). The day-of-the-week effect: The CIVETS stock markets case. *Journal of Applied Business & Economics*, Vol. 15(3), 102.
- Cinko, M., & Avei, E. (2009). Examining the DOW effect in Istanbul stock exchange. *International Business & Economics Research Journal*, 8(11), 45-50.
- Deyshappriya, N. (2014). An empirical investigation on stock market anomalies: The evidence from Colombo stock exchange in Sri Lanka. *International Journal of Economics & Finance*, 6(3), 177-187.
- Dicle, M., & Levendis, J. (2010). DOW effect re-visited: International evidence. *Journal of Economics & Finance*, 38(3), 407-437.
- Engle, R., & Victor, K. (1993). Measuring and Testing the Impact of News on Volatility. *The Journal of Finance*, 48(5), 1749-1778.
- Hu, O., Huang, Z., & Liao, B.S. (2010). Short sale, stock liquidity, and the day-of-the-week effect: evidence from the Taiwan stock market. *Review of Pacific Basin Financial Markets*, 13(1), 71-90.
- Hussain, F., Hamid, K., Akash, R.S.I., & Khan, M.I. (2011). Day of the week effect and stock returns: (Evidence from Karachi Stock Exchange-Pakistan). *Far East Journal of Psychology and Business*, 3a(3), 25-31.
- Islam, R., & Sultana, N. (2015). DOW effect on stock returns & volatility: Evidence from Chittagong stock exchange. *European Journal of Business & Management*, 7(3), 165-172.
- Jamroz, P., & Korankiewicz, G. (2014). The occurrence of DOW effects on Polish and major world stock markets. *Studies in Logic, Grammar and Rhetoric*, 37(50), 71-88.
- Keef, S., & McGuinness, P. (2001). Changes in settlement regime and modulation of day of the week effects in the stock returns. *Applied Financial Economics*, 11 (4), 361-372.
- Keim, D., & Stambaugh, R. (1984). A further investigation of the weekend effect in stock returns. *Journal of Finance*, 39, 819-35.
- Kenourgios, D., & Samitas, A. (2008). The day-of-the-week effect patterns on stock market return and volatility: Evidence for the Athens stock exchange. *International Research Journal of Finance and Economics*, 15(15), 78-89.
- Khanna, V. (2014). An analysis of DOW effect in Indian stock market. *International Journal of Business Management*, 1(2), 341-355.



- Khanna, V. (2015). Day-of-the-week effect in returns in the Indian capital market: Evidence from the National Stock Exchange. *Indian Journal of Research in Capital Markets*, 2(2), 26 – 43.
- Leybourne, S., Kim, T. H., & Newbold, P. (2003). Examination of some more powerful modifications of the Dickey-Fuller test. *Journal of Time Series Analysis*, 26(3), 355-369.
- Mangala, D., & Mittal, R. (2005). *Efficiency of Indian stock market-An evidence of day of the week effect*. Gyan, 1, 3-8.
- Mitra, P., & Khan, G. (2014). An analysis of DOW and intra-day effects in the Indian stock market: Evidence from National Stock Exchange. *Journal of Contemporary Issues in Business Research*, 3(3), 115-127.
- Muramiya, K. (2009). *Informed Trader and Market Efficiency*. Research Arena, 2(2), 5-6.
- Nageshwari, P., & Selvam, M. (2011). An empirical study on seasonal analysis in the Indian stock market. *International Journal of Management & Business Studies*, 1(4), 90-95.
- Pandey, I. (2002a). Is there seasonality in the sensex monthly returns. Retrieved February 12, 2016, from <http://www.iimahd.ernet.in>
- Pandey, I. (2002b). Seasonality in the Malaysian stock market: 1992-2002. *Journal of Financial Management and Analysis*, 15, 37-44.
- Parikh, R., Mathai, A., Parikh, S., Chandra Sekhar, G., & Thomas, R. (2008). Understanding and using sensitivity, specificity and predictive values. *Indian J Ophthalmol*. 56(1), 45-50.
- Patel, R., & Patel, M. (2011). An econometric analysis of Bombay stock exchange: Annual returns analysis, day-of-the-week effect and volatility of returns. *Research Journal of Finance and Accounting*, 2(11), 1-10.
- Rahman, M. (2009). Stock market anomaly: Day of the week effect in Dhaka stock exchange. *International Journal of Business and Management*, 4 (5), 193-206.
- Sah, A. (2009). Stock market seasonality: A study of the Indian market. Retrieved from <http://www.nseindia.com/content/research+Res+paper-final+1228.pdf> 2009, 2-24.
- Schwert, G.W. (2003). Anomalies and market efficiency. *Handbook of Economics and Finance*, Elsevier, 937–972.
- Sharma, S. (2011). Stock market behaviour: Evidence from Asian stock markets. *International Journal of Research in Commerce and Management*, 2(10), 131-135.
- Sharma, V., & Singh, B. (2006). Day of the week effect and Indian stock market. *Paradigm*, 10 (1), 31-43.
- Singh, S. P. (2014). Stock market anomalies: Evidence from emerging BRIC markets. *Vision, Journal of Business Perspective*, 18 (1), 23-28.
- Singhal, A., & Bahure, V. (2009). Week-end effect of stock returns in the Indian market. *Great Lakes Herald*, 3 (1), 12-22.
- Srinivasan, P., & Kalaivani, M. (2014). DOW effects in the Indian stock market. *International Journal of Economics & Management*, 8(1), 158-177.
- Tevdovski, D., Mihajlov, M., & Sazdovski, I. (2012). *The DOW effect in South Eastern Europe stock markets*. Annals of the Constantin Brâncuși University of Targu Jiu, Economy Series, Issue 3, 20-24.
- Tilica, E., & Opera, D. (2014). Seasonality in the Romanian stock market: *The DOW Effect*. *Procedia Economics & Finance*, 15, 704-710.
- Wafa, S., Liew, V., & Chia, R. (2007). Calendar anomalies in the Malaysian stock market. *The ICFAI Journal of Applied Finance*, 13 (6), 5-18.
- Werner, K. (2012). Day of the week effect: The case of Mexico, Indonesia and Turkey. *International Symposium on Management Ubaya, Makassar*, 12, 1-10.
- Werner, K. (2012). Day of the week effect in Latin American stock markets. *Revista de Análisis Económico*, In Latin American Stock Markets, 27(1), 71-89.
- Wickremasinghe, B. G. (2007). Seasonality of emerging stock markets: Evidence from the Colombo stock exchange. *The ICFAI Journal of Applied Finance*. 13(6), 43-65.
- Yakob, N., Azuddin, N., Beal, N., & Delpachitra, S. (2005). Seasonality in the Asia Pacific Stock Markets. *Journal of Asset Management*, 6 (4), 298-318.
- Zafar, N., Shakh SZA, & Urooj, F. (2009). Calendar anomalies: Case of Karachi stock exchange. *Research Journal of International Studies*, 29 (9), 88-99.