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The Month of the Year Effect on Dhaka Stock Exchange

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Abstract

This study investigated the presence of month of the year (MOY) effect in Dhaka Stock Exchange (DSE), Bangladesh with the data from 2000 to 2012 of DSE all share index (DSI), DSE – 20 index (DSE – 20) and DSE general index (DGEN). DSE indexes were fluctuated more over the last couple of years and the only one previous study was conducted based on only DSI index as per our knowledge. The present study has made progress not only in relationship to documenting the month of year effect but also in highlighting potential explanations for its presence. Several hypotheses have been formulated; student's t – statistics, ANOVA and dummy variable regression model were used in the study. The conclusion of all the findings is that the significant month of the year effect presents in DSE. So, investors can outperform the market and this is against in principle of market efficiency.

***Keywords**: Month of the year effect, Dhaka stock exchange, Dummy variable regression*

1. Introduction

The topic of capital market efficiency is one of the most searched area in Finance. Following Fama [1], number of studies was conducted to test the efficient market hypothesis (EMH). Recently, however, researchers have collected evidence against the EMH. One of the significant anomalies of EMH is the seasonal effect. Examples of such seasonal effect include the day-of-the-week, the week-of-the-month, the month of- the-year (MOY) and the May-to-October effects. Another anomaly closely related to the May-to-October effect is the seasonal affective disorder (SAD) effect. Testing for a seasonal effect in monthly returns has been given considerable attention in the literature and one of the most well-known calendar effects documented for the financial assets returns. Together with the day-of-the-week effect, the MOY effect is a frequent subject matter among individual investors, investment fund managers and economic researchers. This effect states that return on common stock keeps on changing and varies from month to month.

The year of the month effect adds to the anomalies literature in that it raises questions about market efficiency and investors' rationality. A statistically significant and persistent flow in market wide returns around the year of the month becomes unintelligible within a rational frame and lends further support to a growing behavioral finance research. The month of the year effect includes three anomalies, namely, the January effect, the May to October effect and the October effect. According to the January effect, returns in January tend to be higher than returns in other months [2, 3]. The May-to-October effect refers to the fact that stock returns tend to be significantly lower during summer and fall months (May to October) than during winter and spring months [4, 5]. According to the October

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effect, stock returns in October are lower than in other months [6]. Szakmary and Kiefer [7] find that for the S&P 500 the effect disappears after 1993. Frieder and Subrahmanyam [8] find that returns are higher before religious holidays and lower following the holidays. Heston and Sadka [9] present a new pattern in the cross-section of expected stock returns. Stocks with relatively high (low) returns tend to have high (low) returns every year in the same calendar month. More specifically, monthly returns 12, 24, 36 and out to 240 months prior to the current month can predict returns today. Hong and Yu [10] investigate seasonality in trading activity and asset prices associated with vacation periods, typically the summer months, for many countries. They find that trading activity is lower during the summer than during the rest of the year.

The methodologies employed in detecting seasonal effects, such as day of the week and year of the month, range from visual inspection of value and equally-weighted market returns [11, 12] to OLS regressions [13, 14, 15, 16], to GARCH models [17, 18, 19, 20], to general linear procedures such as ANOVA [21, 16], nonparametric tests [21] to cross sectional risk and autocorrelation [22]. The variety of models employed attempt to overcome the usual assumptions about normally distributed returns and constant error variances that so often bring into question the significance of the coefficient estimates in standard regression. Given the variety of testing methods and the range of countries on focus, it is rather unlikely that the general MOY effect is a byproduct of a data mining process. However, there is no better way to disapprove skepticism in relation to a seasonal effect other than employ new data sources that testify to its existence [23].

Fields [24] was one of the first researchers who investigated the presence of out-of ordinary patterns in the intra-week financial assets returns. A few decades later, Cross [25] studied 40 years of daily returns for Dow-Jones and other USA indices and sustained Fields' conclusions. French [26] continued this direction of research and was the first author to employ statistical methods in order to test for the existence of the calendar effects. Ariss et al. [27] examined the calendar anomalies in gulf cooperation council (GCC) capital markets and found a statistically significant positive December effect, in contrast to the January effect documented for the Western markets. Henker and Paul [28] separated tax implications and market capitalization and argued that retail investors were not the cause of the January effect and other market anomalies. Doran et al. [29] showed that the New Year's gambling preference of retail investors have an impact on prices and returns of assets with lottery features. Lai et al. [30] applied the nonparametric Skilling–Mack test statistic in assessing the day of the week effect of the closing composite index of the Shenzhen stock exchange in China from December 25, 1995 to July 7, 2006. They have conducted the Kruskal–Wallis test and that showed no statistical significance for the day of the week effects. Maher and Parikh [19] examined (via parametric and non-parametric tests) the turn of the month (TOM) effect and they found little support for the payday and the US macroeconomic news announcements hypotheses. As an alternative, they showed that institutional traders (foreign and domestic) significantly increased their trading volumes (on the buying side) at month end, potentially pushing prices up. There was no evidence of a similar behavior on the retail side. Panait [20] investigated the January effect on monthly returns for 6 Romanian stock market indices during May 1, 2007 to March 15, 2013 using a GARCH-M model with eleven dummy variables both in the mean and in the variance equations. The study could not confirm a statistically significant presence of the January effect or of any other month-of-the-year effect on the Romanian capital market indices during the investigated period.

From our best knowledge, the only one previous study of month of the year effect was conducting by Bepari and Mollik [15] that investigated the nature of seasonality in the monthly stock returns of DSE all share price index (DSI). Descriptive statistics had pointed out the large dispersions in the monthly returns and the analysis also revealed that the seasonality was present in DSE all Index monthly return series. Contrary to the "Tax-loss –selling" and "January effect" hypothesis reported in developed countries, the study

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found an April effect in the DSE all return series. But after Bepari and Mollik [15], as per our knowledge, no study has yet been made to examine the presence of month of the year effect considering all the three indices of DSE (DSI index, DGEN index and DSE - 20 index) which has encouraged us to conduct the study to contribute in finance literature and that will fill the gap.

The present study has made progress not only in relationship to documenting the month of year effect but also in highlighting potential explanations for its presence. These explanations span a variety of causes. Wang et al., [31]; Kohers and Patel, [32] point out that the reason behind of the monthly anomalies is that the returns during the first week of a month tend to be significantly positive, while the returns during the other weeks of a month are statistically indistinguishable from zero. Ogden [33] suggests the payday hypothesis as the likely cause of a TOM effect. Individual investors get generally paid at the end of the month and therefore their (direct or indirect) demand rises during this period. Mills et al., [34] and Floros, [35] presented the two explanations for this anomaly. First, Companies usually announce profits during the first fortnight of the month. Second, end-of-the month effect increases due to enhanced purchasing power resulting from salaries that are typically paid at the end of the month. Islam and Gomes [36] argue that factors such as inadequate financial information, thin and discontinuous trading, reliance on price momentum as a basis for trading, and manipulation by market makers create the conditions that lead to the positive TOM effect in the DSE. Hossain [37] gives evidence that abnormal returns are possible if investors buy on day one and sell on day six. Chowdhury et al. [38] examine the seasonal anomalies such as January effect and unnatural holiday effect in the DSE composite index returns for the reason of abnormal market closure due to political protest, with or without prior notice. Panait [20] concluded that month of year effects are dependent on the development level of the market and on the market cycle. Hence it can be said that different reasons have been given for the month of year effect in stock returns but a most general reason could be that investors wait for the New Year to change or alter their investment strategies already in use.

The objective of the current study is to investigate the existence MOY effect in DSE. The results show that the hypothesis one and two support the MOY anomalies but hypothesis three does not agree with hypothesis one and hypothesis two. Side by side the dummy variable regression analysis shows the May effect for DGEN index which is the support for the existence of MOY anomalies in DSE. The results have also practical implications for financial managers, investment advisers and investors at large. Its relevance lies in the direct bearing of its results on the timing and nature of investment decisions. In the following we elaborate the experimental design, empirical results and conclusion.

2. Experiments

The following hypotheses have been formulated to know the month of the year effect anomaly in DSE.

2.1 Testable Hypothesis

Hypothesis 1

H_0: The average monthly return of all the month is not statistically different from zero, that is, $\mu_{ij} = 0$

H_1: The average monthly return of all the month is statistically different from zero, that is, $\mu_{ij} \neq 0$

Where, i = 1, 2, 3 (the examined index) and j = 1, 2 …12 (the month from January to December).

Hypothesis 2

H_0: The average monthly returns between two sequential months are not statistically different, that is, $\mu_1 = \mu_2$ or $\mu_1 - \mu_2 = 0$, where, μ_1 and μ_2 are the population mean of the respective month.
H_1: The average monthly returns between two sequential months are statistically different, that is, $\mu_1 \neq \mu_2$ or $\mu_1 - \mu_2 \neq 0$
Hypothesis 3
H_0: The average monthly return of every month of a year is statistically equal, that is, $\mu_1 = \mu_2 = \ldots\ldots = \mu_{12}$
H_1: The average monthly return of every month of a year is statistically different, that is, $\mu_1 \neq \mu_2 \neq \ldots\ldots \neq \mu_{12}$; where, μ_1, μ_2, μ_3 are average returns of January, February, March, and so on.

2.2 Data

The data used in the study include monthly closing prices of DSE indices, for example, DSE all share prices index (DSI), DSE general index (DGEN) and DSE 20 index (DSE 20) for the period of 12 years, from 2000 to 2012. The DSE indexes were reformulated after 2012 and we couldn't include the 2013 and 2014 indexes under this study. All data have been collected from DSE library and DSE website. The seasonal effect is easily detectable in the market indices or large portfolios of shares rather than in individual shares [39]. Stock indices are used because index truly represents the traits and performance of overall market and anomalies are more easily detected in indexes as compared to individual shares [40].

2.3 Methodology

First of all, the Eq. (1) is used to determine the average monthly return of the particular index for each month of the year. According to Strong [41], there are both theoretical and empirical reasons for preferring logarithmic returns. Theoretically, logarithmic returns are analytically more tractable when linking together sub-period returns to form returns over long intervals. Empirically, logarithmic returns are more likely to be normally distributed and so conform to the assumptions of the standard statistical techniques.

$$R_{i,t} = L_n(P_{i,t}/P_{i,t-1})^* \ 100 \tag{1}$$

$R_{i,t}$ is the continuously compounded percentage change of share price index of *i* (*i* = 1, 2, 3) on the month of *t*, $P_{i,t}$ is the price index of *i* on the month of *t* and $P_{i,t-1}$ is the price index of *i* on the month of *t-1*; and L_n is the natural logarithm.

In the next step, we tested whether the average monthly return of all the months are statistically different from zero or not. In order to test this hypothesis we use one-sample *t*-test. The *t*-statistic is calculated according to Eq. (2):

$$t = \frac{\bar{X} - \mu}{\sigma/\sqrt{n}} \tag{2}$$

Where, $\bar{X}$ is the average return for each month of the year from January to December and for each index, μ is the hypothetical mean which equal to zero, σ is the standard deviation of the each month's return from January to December, *n* is the number of observations of each month and $\sigma/\sqrt{n}$ is the standard error.

Then, we tested whether the average monthly returns between two sequential months are statistically different from zero or not. To test this hypothesis we use two-sample *t*-test. The *t*-statistic is calculated according to Eq. (3):

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$$t = \frac{\bar{x}_1 - \bar{x}_2}{\left\{\frac{1}{n_1}(SD_1)^2 + \frac{1}{n_2}(SD_2)^2\right\}^{1/2}} \quad (3)$$

Where, $\bar{x}_1$ is the average return of month 1 (e.g. January's average return), $\bar{x}_2$ is the average return of month (e.g. February's average return), $(SD_1)^2$ is the standard deviation of returns of month 1(e.g. January), $(SD_2)^2$ is the standard deviation of returns of month 2 (e.g. February), $n_1$is sample size of month 1(e.g. January) and n_2 is sample size of month 2 (e.g. February).

After that, we tested whether the average monthly return of every month of a year is statistically equal or not. In order to test this hypothesis we use single factor ANOVA. The standard *F*-statistic is calculated as following:

$$F = \frac{BSS/df_B}{WSS/df_W} \quad (4)$$

$$BSS = n_1(\bar{x}_1 - \bar{X})^2 + \ldots\ldots + n_n(\bar{x}_n - \bar{X})^2 \quad (5)$$

$$WSS = (SD_1)^2\,(n_1 - 1)^2 + \ldots\ldots + (SD_n)^2\,(n_n - 1)^2 \quad (6)$$

Where, *BSS* is between sum of squares, *WSS* is within sum of squares and df_B is degrees of freedom between groups and df_W is degrees of freedom within groups; $n_1, n_2, \ldots\ldots\ldots\ldots n_n$ are the sample sizes of every month from January to December; $\bar{x}_1, \bar{x}_2, \ldots\ldots\bar{x}_n$ are the mean returns of every month from January to December; $\bar{X}$ is the population mean; and $(SD_1)^2$,$(SD_2)^2$…..$(SD_n)^2$are the standard deviations of return of each month from January to December.

Following Peterson [42], Mehdian and Perry [43], Ariss et al. [27], Levy and Yagil [44], and Maher and Parikh [19], to detect the presence of month of the year anomalies we use the following dummy variable regression for half of the month. As most of the companies at DSE announced their dividend at the end of June or December, as tax year in Bangladesh ends in June but the calendar year ends in December, we just divide the whole year into two half. The first half is the January to June and second half is the July to December. And most of the studies [45,46,47,48,49,50,51] reported that the share price is fluctuated sharply after the dividend announcement.

$$R_{i,t} = \sum_{i=1}^{6} \beta_i D_{i,t} + \varepsilon_t = \beta_1 D_{1,t} + \beta_2 D_{2,t} + \ldots\ldots + \beta_6 D_{6,t} + \varepsilon_t \quad (7)$$

Where, $R_{i,t}$ is the return of index i on the month of t; D_1 through D_6 are dummy variables for each month of the year such that D1 takes a value of 1 for all January observations and zero otherwise. D2 is a dummy variable for February taking the value of 1 for all February observation and zero otherwise and so on. The coefficients from β_1 through β_6 are estimate of the average returns for each month from January to June and July to December and εt is the disturbance term.

In order to specifically examine the effect of each specific month, the dummy variable representing the month that will be excluded from the model. Gultekin and Gultekin [52], Karadžić and Vulić [53] suggested a regression model with dummy variables as a method of testing the MOY effect. It takes the following form:

$$R_{i,t} = \beta_0 + \sum_{i=1}^{5} \beta_i D_{i,t} + \varepsilon_t \quad (8)$$

Where β_0 represents the return on the month that is dropped from the model, which is called base month; here both January and July are considered as base month, β_i represents the return difference between the month specified by dummy variable and base month.

The hypothesis to be tested for testing the presence of the month of the year effect is as follows:

$$\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 \quad (9)$$

If the monthly returns are drawn from an identical distribution, they will be expected to be equal. The null hypothesis will indicate a specific pattern in the stock return that indicates no difference among of the comparing months with their base month.

3. Empirical Results

Table 1.1, 1.2 and 1.3 represent monthly mean returns and standard deviation of returns. To test the first hypothesis, the tables also represent *t*-values and their corresponding *p*-values for DSI, DSE-20 and DGEN index respectively. From the tables we can see that for all the three indices mean returns for January, February and April are negative. Mean return for July is negative for DSI and DGEN index and return for March is negative for DSE – 20 index. For all other months mean returns are positive. The average mean return of August, June and November are highest for the index of DSI, DSE – 20 and DGEN respectively but it is lowest for the month of February, January and January of the respective indices.

Table 1.1 Monthly Mean Return of DSI

Month	Obs.	Mean Return	Std. Dev.	*t* - value	*P* - value
January	7	-2.256	13.080	-0.456	0.664
February	7	-4.111	15.230	-0.714	0.502
March	7	3.241	8.230	1.042	0.338
April	7	-0.617	4.600	-0.355	0.735
May	8	2.508	6.243	1.136	0.293
June	8	3.118	6.427	1.372	0.212
July	8	-1.199	8.542	-0.397	0.703
August	8	5.040	6.026	2.366**	0.05
September	8	2.105	3.748	1.589	0.156
October	8	0.780	10.119	0.224	0.829
November	8	2.867	10.980	0.738	0.484
December	8	1.930	4.896	1.115	0.302

** Significant at 5%

The study of month of year effect by Bepari and Mollik [15], reported that returns for the months of February, April, September and December are negative and the rest of the months have positive mean returns. The maximum average return occurs in the month of May and minimum average returns result in the month of April. Again from our study, it is observed that the first quarter of the year the return is more deviated comparing to middle of the year and return on December is less deviated comparing to other months of the year. This is due to the stockholders change their investment strategy at the beginning of the New Year and they get their remunerations at the end of the year. It is also evident that only positive returns on December are statistically significant at 1% and 5% significance level for the index of DSI and DGEN respectively. Positive returns on June and August are statistically significant at 1% and 5% significance level for the index of DSE – 20 and DSI respectively. So our testable first hypothesis is rejected for all the three indices at 1% as well as 5% significance level. So we can say that significant month of the year effect observed in DSE for all the three indices.

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Table 1.2 Monthly Mean Return of DSE – 20

Month	Obs.	Mean Return	Std. Dev.	*t* - value	*P* - value
January	10	-3.2544	8.892	-1.157	0.277
February	11	-2.863	9.903	-0.959	0.360
March	11	-0.242	6.096	-0.131	0.898
April	11	-0.915	7.932	-0.383	0.710
May	11	3.333	9.084	1.217	0.251
June	11	6.607	6.373	3.438***	0.006
July	11	0.603	9.076	0.221	0.830
August	11	0.264	6.700	0.131	0.899
September	11	0.641	2.960	0.718	0.489
October	11	0.275	5.601	0.163	0.874
November	11	3.766	8.506	1.469	0.173
December	11	3.344	3.317	3.344***	0.007

*** Significant at 1%

Table 1.3 Monthly Mean Return of DGEN

Month	Obs.	Mean Return	Std. Dev.	*t* - value	*P* - value
January	13	-3.173	9.860	-1.160	0.268
February	13	-2.493	11.065	-0.812	0.432
March	13	2.409	6.648	1.307	0.216
April	13	-0.819	8.371	-0.353	0.730
May	13	3.475	6.800	1.842	0.090
June	13	3.251	6.119	1.916	0.080
July	13	-0.062	8.397	-0.026	0.979
August	13	3.449	5.896	2.109	0.057
September	13	1.848	4.207	1.584	0.139
October	13	0.950	7.571	0.452	0.659
November	13	5.248	10.851	1.744	0.107
December	13	2.514	3.960	2.289**	0.041

** Significant at 5%

Table 2.1 Mean Return of Two Sequential Months of DSI

Pair of months	Mean return	*t* - value	*P* - value
January February	-2.256 -4.111	0.257	0.806
February March	-4.111 3.241	-0.893	0.406
March April	3.241 -0.617	0.975	0.367
April May	-0.617 2.508	-0.869	0.418
May June	2.508 3.118	-0.209	0.841
June July	3.118 -1.199	1.306	0.233

July August	-1.199 5.040	-1.828	0.11
August September	5.040 2.105	1.159	0.285
September October	2.105 0.800	0.447	0.668
October November	0.800 2.867	-0.537	0.608
November December	2.867 1.930	0.195	0.851
December January	1.930 -2.256	-0.826	0.44

Table 2.2 Mean Return of Two Sequential Months of DSE – 20

Pair of months	Mean return	*t* - value	*P* - value
January February	-3.254 -2.863	0.014	0.989
February March	-2.863 -0.242	-0.630	0.543
March April	-0.242 -0.915	0.208	0.839
April May	-0.915 3.333	-1.339	0.210
May June	3.333 6.607	-0.993	0.344
June July	6.607 0.603	1.538	0.155
July August	0.603 0.264	0.086	0.933
August September	0.264 0.641	-0.183	0.858
September October	0.641 0.275	0.262	0.798
October November	0.275 3.766	-1.602	0.140
November December	3.766 3.344	0.140	0.891
December January	3.344 -3.254	-2.422**	0.038

** Significant at 5%

Table 2.1, 2.2 and 2.3 represent monthly mean returns for the pair of months. To test the second hypothesis, the tables also represent t-values and their corresponding p-values for DSI, DSE-20 and DGEN index respectively. It is apparent from the tables that the mean monthly returns between two consecutive months differ significantly for the pairs of January – February and July – August for the DSI index, June – July and December – January for the DSE – 20 index, October – November and December – January for the DGEN index. Similarly, for the other pair of months for all the indices mean returns also differ significantly except 2/3 pair of months. But none pair of returns are statistically significant instead of December – January for the DSE – 20 index. So, it can be said that the mean comparison and t – statistics does not provide the same results and our second testable hypothesis also rejected as we know to prove the presence of month of the year effect, at least one of these coefficients has to be positively significant [12]. We can thus accept that DSE is experiencing significant month of the year effect and this result is supported our first testable hypothesis.

Table 2.3 Mean Return of Two Sequential Months of DGEN

Pair of months	Mean return	*t* - value	*P* - value
January February	-3.173 -2.493	-0.169	0.868
February March	-2.493 2.409	-1.109	0.289
March	2.409	0.982	0.345

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April	-0.819		
April May	-0.819 3.475	-1.291	0.221
May June	3.475 3.251	0.086	0.933
June July	3.251 -0.062	1.470	0.167
July August	-0.062 3.449	-1.202	0.252
August September	3.449 1.848	0.971	0.351
September October	1.848 0.950	0.487	0.635
October November	0.950 5.248	-1.460	0.170
November December	5.248 2.514	0.807	0.436
December January	2.514 -3.173	-1.864	0.087

Table 3.1, 3.2 and 3.3 represent analysis of ANOVA for DSI, DSE-20 and DGEN index respectively. It is obvious from the tables that for all the three indices calculated *F*-values are less than critical *F*-values and none of the F – values is statistically significant. Thus our third hypothesis also can't be rejected for all the three cases. So we can't infer that the average monthly return of every month of the year is not statistically equal which supports the existence of month of the year effect in DSE. Hence it can be said that the third testable hypothesis has shown the different result with our previous two hypotheses.

Table 3.1 ANOVA of DSI

Source of variation	SS	DF	MS	*F*	*P* - value	*F* crit
Between Groups	574.708	11	52.246	0.685	0.749	1.910
Within Groups	6105.279	80	76.316			
Total	6679.987	91				

Table 3.2 ANOVA of DSE-20

Source of variation	SS	DF	MS	*F*	*P* - value	*F* crit
Between Groups	967.529	11	87.957	1.627	0.099	1.870
Within Groups	6431.665	119	54.048			
Total	7399.194	130				

Table 3.3 ANOVA of DGEN

Source of variation	SS	DF	MS	*F*	*P* - value	*F* crit
Between Groups	942.840	11	85.713	1.406	0.176	1.856
Within Groups	8776.159	144	60.946			
Total	9718.999	155				

Table 4.1, 4.2 and 4.3 represent OLS regression results for DSI, DSE-20 and DGEN index respectively. It is clear from the tables of 4.1 (a), 4.2 (a) and 4.3 (a) that all the intercepts, i.e., the coefficient of January for all the indices are negatively insignificant side by side some coefficient are positive but insignificant with the exception of May of DGEN index. The difference of mean return coefficient in between of January and May for the DGEN index are positive and significant at 5% level. So it can be said that there is

no January effect or any other month of year effect in the first half of the year on DSE. But DSE is experiencing a May effect for the DGEN index.

Table 4.1 (a) Regression Results of DSI (For first Half Period, January as the base Month)

Variable	Coefficient	Std. Error	*t* - value	*P* - value
Intercept	-5.457	6.076	-0.898	0.534
February	-0.289	0.802	-0.360	0.780
March	-0.266	1.133	-0.234	0.853
April	-0.076	1.609	-0.047	0.970
May	1.999	0.706	2.833	0.216
June	-0.216	1.088	-0.198	0.875
R^2	0.915	Sum of square raised		938.991
Adj. R^2	0.488	*F* – statistics		2.146
Std. Error	9.356	*P* – value (*F*)		0.475

Table 4.1(b): Regression Results of DSI (For Second Half Period, July as the base Month)

Variable	Coefficient	Std. Error	*t* - value	*P* - value
Intercept	5.195	8.698	0.597	0.657
August	-0.222	1.039	-0.214	0.866
September	-2.133	1.977	-1.079	0.476
October	0.767	0.973	0.788	0.575
November	-0.052	0.538	-0.096	0.939
December	0.016	1.126	0.015	0.991
R^2	0.683	Sum of square raised		243.749
Adj. R^2	-0.900	*F* – statistics		0.432
Std. Error	10.627	*P* – value (*F*)		0.812

Table 4.2 (a) Regression Results of DSE – 20 (For First Half Period, January as the base Month)

Variable	Coefficient	Std. Error	*t* - value	*P* - value
Intercept	-6.124	4.056	-1.510	0.191
February	0.121	0.344	0.352	0.739
March	0.165	0.610	0.271	0.798
April	-0.028	0.346	-0.081	0.939
May	0.708	0.327	2.165	0.083
June	0.177	0.491	0.360	0.734
R^2	0.522	Sum of square raised		376.638
Adj. R^2	0.044	*F* – statistics		1.093
Std. Error	8.301	*P* – value (*F*)		0.462

Table 4.2 (b) Regression Results of DSE – 20 (For Second Half Period, July as the base Month)

Variable	Coefficient	Std. Error	*t* - value	*P* - value
Intercept	5.314	6.415	0.828	0.445
August	-0.283	0.516	-0.547	0.608
September	-2.211	1.590	-1.391	0.223
October	1.265	1.037	1.220	0.277
November	-0.487	0.574	-0.848	0.435
December	-0.518	1.165	-0.445	0.675
R^2	0.384	Sum of square raised		315.961
Adj. R^2	-0.233	*F* – statistics		0.622
Std. Error	10.077	*P* – value (*F*)		0.692

Again from the tables of 4.1 (b), 4.2 (b) and 4.3 (b), all intercepts, i.e., the coefficient of July are positive but insignificant for all the indices. The interesting result is that the coefficient of October is positive but insignificant in all the indices. The coefficient of remaining months of the second half is negative and insignificant for all the indices. With

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the different of first half of the year, there is no July effect or any other month of year effect in DSE. In all the indices from both series, the Low level of adjusted R square and the insignificant *F*-statistic suggest poor model fit. With the support of our previous results hence we can summarize that the significant month of the year effect present in DSE and this conclusion is due to May effect for the DGEN index and again null hypothesis is rejected. To document the monthly effect on the DSE return series (only DSI index), Bepari and Mollik [15] reported that only the month of April has statistically significant coefficient with the low level of R square and the insignificant *F*-statistic.

Table 4.3 (a) Regression Results of DGEN (For First Half Period, January as the base Month)

Variable	Coefficient	Std. Error	*t* - value	*P* - value
Intercept	-5.554	3.395	-1.636	0.146
February	-0.343	0.313	-1.093	0.311
March	-0.498	0.499	-0.999	0.351
April	0.398	0.368	1.080	0.316
May	1.039	0.383	2.711**	0.030
June	-0.172	0.526	-0.326	0.754
R^2	0.607	Sum of square raised		707.808
Adj. R^2	0.326	*F* – statistics		2.159
Std. Error	8.097	*P* – value (*F*)		0.172

** Significant at 5%

Table 4.3 (b) Regression Results of DGEN (For second half period, July as the base Month)

Variable	Coefficient	Std. Error	*t* - value	*P* - value
Intercept	3.162	3.645	0.867	0.414
August	-0.081	0.502	-0.162	0.876
September	-1.412	0.691	-2.044	0.080
October	0.607	0.435	1.394	0.206
November	-0.173	0.270	-0.640	0.542
December	-0.0003	0.654	-0.0004	1.000
R^2	0.440	Sum of square raised		372.121
Adj. R^2	0.040	*F* – statistics		1.099
Std. Error	8.230	*P* – value (*F*)		0.438

4. Conclusion

In this paper we have examined the presence of MOY effect in DSE. We considered monthly closing values of DSE indices for the year from 2000 to 2012. We can conclude from all the results that the hypothesis one and two support the month of the year anomalies but hypothesis three disagree with it. Side by side the dummy variable regression analysis have shown the May effect for DGEN index which is the support for the existence of MOY anomalies in DSE. In all the indices from both series, the Low level of adjusted *R* square and the insignificant *F* – statistic suggest poor model fit. In a nutshell, we can say that DSE is experiencing the MOY anomalies for the examined duration. Our findings are very close to the findings of previous study [15].

The results have important practical implications to different capital market participants such as investors, managers and regulatory authorities. Investors can formulate their investment strategies and investment timing on the basis of this result and can earn some abnormal return by predicting future prices. More specifically said, as the return on January, February and April are negative and highest significant positive return on August, June, November and December, so for abnormal return, investors can buy the shares on January, February and April and can sell the share on August, June November and December. First quarter of the year, the return is more deviated comparing to middle of the year and return on December is less deviated comparing to other months of the year. It is the psychology of investors that towards end of the year, they start selling their shares,

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hoping for new and positive changes in policies in upcoming year. Another reason behind this trend could be the release of news about a firm near or in start of a new year. To get maximum benefit from this situation, investors impose a selling pressure in market, near at the end of year which yield high returns and then at the beginning of new month, they start purchasing shares after incorporating new policies and information.

One weakness of the study is that it does not consider individual share price rather it considers market index. So on the basis of the findings, the investment strategy in case of individual share may not provide expected result. But if the size of the portfolio is larger that closely represent the market then investment strategy on basis of the findings is expected to provide some abnormal return to the investors. As the presence of the MOY anomaly indicates investors can outperform the market and this is against the principle of market efficiency that no one can earn above the market. Existence of anomalies increases prediction power of investors and they become able to predict stock returns with more confidence. This helps them to beat the market.

Moreover, DSE is a thin market where very large number of investors are not present, rather, few investors possess major chunks of the market and so they can not only control but also can outperform the market by following the arbitrage policy in short run. However, in the long run, it could not be the effective strategy as arbitrage policy works only in short run, and in long run, arbitrage is adjusted automatically through mean reversion and thus, cannot give desirable results in long run. The extent to which our explanation for the DSE MOY effect is valid in individual share price remains the topic of future debate.

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