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Month Related Seasonality on the Macedonian Stock Market

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Abstract: *A consistent theme in the market efficiency literature has concerned the presence of calendar anomalies or seasonality in stock market returns. Whereas calendar anomalies in advanced equity markets have been investigated extensively, the stock markets in the transition economies have received less attention. This research examines the month-of-the-year effect on Macedonian Stock Exchange using a simple single ANOVA model and regression-based approach. If there is evidence of existence of predictable pattern or market inefficiency, then investors can have opportunity to generate abnormal returns by forecasting of the predictable movements in asset prices. The results indicate that there is evidence of month of the year effect. ANOVA model rejected the null of equality in the monthly returns during the year, and dummy variable regression model using OLS methodology found that returns are significantly lower in November. These findings can be useful for the investors trading on the Macedonian Stock Exchange.*

Keywords: Calendar pattern, seasonality, month-of-the-year, market efficiency, Macedonian stock exchange

JEL Classification: C12, G10, G14

1. Introduction

Broadly speaking, calendar effects occur when the returns of financial assets display specific characteristics over specific days, weeks, months or even years.

The existence of Seasonality in stock returns, however, violates an important hypothesis in finance called the Efficient Market Hypothesis (EMH). Predictable patterns are possible if existence of seasonality is proved. Literature reveals that most of the studies on monthly seasonality have been done based on developed markets. This research resembles previous international research conducted in this area, though rarely in the context of emerging markets, and complements existing work by including small and young Macedonian Stock Exchange, thereby providing a more detailed understanding of the month-of-the-year effect in emerging Balkan country.

As the objective of this research is to identify the presence of the month-of-the-year effect on the Macedonian Stock Market the following research Hypotheses is tested:

H_1: There is significant difference in the returns among the different months of the year.

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Null assumes that the returns among the different months of the year are equal.

Hypothesis is tested using a simple single ANOVA model and dummy variable regression model using OLS methodology.

The remainder of the paper is divided into five main areas. In section two, previous studies concerning monthly seasonality are summarized. In section three, data and methodology are presented. Section four summarizes statistical and empirical results. The paper ends with a brief conclusion.

2. Literature Review

”October. This is one of the peculiarly dangerous months to speculate in stocks. The others are July, January, September, April, November, May, March, June, December, August,and February.” (Mark Twain, 1984)

According to Efficient Market Hypothesis prices contain all relevant information (Fama 1965). Since the late 1970s, a large body of research in finance has been questioning the efficient market hypothesis and an active area of investigation in finance literature explores the existence of a pattern in stock returns. Seasonal effects in security markets have attracted much interest among both academics and practitioners, as existence of seasonal effects in equity markets can be evidence against Efficient Market Hypotheses, and can provide investors with opportunities to generate abnormal returns.

In essence, the monthly effect occurs where stock market returns are not distributed equally across the months of the year. The main finding in the majority of empirical research on monthly seasonality in stock markets is the so-called January effect concerning abnormal returns during this month compared to the rest of the year. January effect is a calendar anomaly in financial markets where stock prices rise in January and creates an opportunity for investors to buy stocks cheaply before January and sell them after raising their value. Investigation of the January effect refers to the abnormal returns during the month compared with the rest of the year. January effect was first mentioned by Wachtel (1942) and was the first economist to examine and document seasonality in the Dow Jones Industrial Average from 1927 to 1942. He observed frequent bullish tendencies from December to January in eleven of the fifteen years he studied. In 1983 Donald Keim has investigated the phenomenon that existed since 1925, that small capitalization companies have exceeded the broader market in January. This theory explains that individual investors disproportionately hold small stocks, sell them for taxes shares before the end of the year to show a loss and reinvest in January.

Over three decades later, Rozeff and Kinney (1976) conducted serious empirical research to examine seasonality in the U.S. stock market and found statistically significant differences in mean returns among months. Subsequent empirical research revealed strong January seasonality in stock returns and money market returns in the U.S., and other developed markets. Gültekin and Gültekin (1983) provides evidence in support of the January effect for the U.S. and other industrialized countries. Lindley et al. (2004) demonstrated that many years during the period 1962-2000 did not have a significant January effect and that some years had a negative January effect. Mehdian and Perry (2002) also provide no statistical support for the January effect in US equity markets in the post-1987 market crash period. Findings of Fountas and Segredakis (2002) supported seasonal effects in eighteen

emerging stock markets for the period 1987-1995, Tonchev and Kim (2004) used a data set from three Eastern European countries (Czech Republic, Slovakia and Slovenia) and very weak evidence has been found for the calendar effects in the three countries. Rosenberg (2004) shows a link between this end-of-month effect and the economic business cycle, and present evidence that the end-of-month anomaly exists only during business cycle expansions, and Marquering et al. (2006), present that increased awareness of anomalies among investors will diminish possible profits as more investors will trade based on these anomalies. Al-Saad and Moosa (2005) report a July effect, instead of a January effect, in Kuwait and Moosa (2007) re-examines the hypothesis of the January effect. Even though his results reveal the presence of a significant January effect except in the period, 1990-2005, when a strong negative July effect surfaced, some explanations are suggested for the disappearance of the January effect and the surfacing of the July effect. Cooper, McConnell, and Octchinnikov (2006) report significant predictive power of January stock market returns in the U.S. for returns in the remainder of the calendar year and thus confirm the market wisdom ’As goes January, so goes the year`.

Doran et al. (2008) and Rezvanian et al. (2008) find no significant January effect in the Chinese stock market. Giovanis (2009) examines fifty five stock markets and the January effect is rejected, as it is presented only in seven stock markets, while the most frequent significant higher monthly returns are reported in December of twelve stock markets. Keongetal (2010) studies the same issue in eleven Asian countries- Hong Kong, India, Indonesia, Japan, Malaysia, Korea,Philippines, Singapore, Taiwan, China and Thailand using GARCH (1,1) model. He finds positive December effect, except for Hong Kong, Japan, Korea, and China. Only some countries do have positive January, April, and May effect and just Indonesia demonstrates negative August effect. Marrett and Worthington (2011) examine the month of the year effect in the Australian stock market. Their results show that returns are significantly higher in April, July and December along with evidence of a small cap effect with systematically higher returns in January, August and December. Patel (2012) finds that the January effect no longer exists for many developed and emerging markets. Asteriou and Kovetsos (2006) examine the January effect in eight transition economies.Georgantopoulos at al.(2011) investigate calendar anomalies for four emerging stock markets (Romania, Bulgaria, Croatia and Turkey) and their mature counterpart in the Balkan region (Greece), during the period 2000-2008 and provide evidence for the existence of calendar effects for Greece and Turkey,while for the three emerging Balkan markets findings are limited and exist only in volatility.

3. Data and Methodology

The Balkan stock markets have a brief history compared to the mature markets of Europe and United States of America (USA). Macedonian capital market is represented by the Macedonian Stock Exchange and it is worth mentioning that impressive changes have occurred in its economy over the last decades.

The modern history of the Macedonian capital market is associated with structural changes in the 1990s, crossing the country's transition to free market economy. The process of privatization has already resulted in the formation of more joint stock companies which have imposed the necessity of creating the market infrastructure for transfer of newly created securities. Although many regional markets passing through the same transition period were established earlier, the constitution of the Macedonian Stock Exchange launched in September 1995. The years that followed showed that the stock market grew gradually, along with economic development and intensification of reforms. The capital market in Macedonia has undergone a robust development since the 2005.

The data set used to investigate the month of the year effect in Macedonian Stock Market consists of daily closing log values for the major Macedonian Stock Exchange index, the MBI10 Index, in the period from January 4, 2005 to December 31, 2009. MBI10 is a weighted index using closing prices and published by the Macedonian Stock Exchange. During this period used in this study, the Macedonian Stock Exchange witnessed its first bull and bear market in its short history.

Continually compounded log returns are used to count monthly returns:

$$Rt(k) = \ln(Pt(k) / Pt(k-1)) \qquad (1)$$

Where Pt refers to MBI10 price index at the last trading day of month k, and Rt refer to return of MBI10 index on day t, month k.

Simple single ANOVA model and regression analysis are used to test the stated hypothesis:

H_1: There is significant difference in the returns among the different months of the year.

The standard F-statistic test is based on a single-factor, between-subjects, analysis of variance (ANOVA). The basic idea is that if the subgroups have the same mean, then the variability between the sample means (between groups) should be the same as the variability within any subgroup (within group). The F-statistic for the equality of means under the assumption that the subgroup means are identically computed as:

$$F = \frac{\frac{BSS}{df_b}}{\frac{WSS}{df_w}} \qquad (2)$$

where, BSS is between sum of squares, WSS is within sum of squares and d_{fB} is degrees of freedom between groups and d_{fw} is degrees of freedom within groups.

BSS and WSS are calculated as follows:

$$WSS - \sum_{g=1}^{G} \sum_{i=1}^{n_g} [(x_i]_g - \bar{x}_g)^2 \qquad (3)$$

where is the sample mean within group g and is the overall sample mean, n is the total number of observations.

To test the hypothesis, the regression for the following equation is used:

$$R_t = \beta_0 + \beta_1 M_{1t} + \beta_2 M_{2t} + \beta_3 M_{3t} + \beta_4 M_{4t} + ... + \beta_{11} M_{11t} + \sum_{i=1}^{n} \beta_i R_{t-i} \qquad (4)$$

Where *Rt* stands for the monthly return, M_1 through M_{12} are monthly dummy variables. If *t* is February, then M_1= 1 and 0 for all other months, and so forth. The error terms may not be white noise due to autocorrelation and lagged values of the return variable are included.

The model uses monthly return as the independent variable and, using ordinary least squares estimation, regresses this monthly return on dummy variables, representing the months of theyear. A variable for January is excluded from the model, so β_0, the constant, represents average monthly returns for January. The other coefficients represent the difference in average returns for the respective months, compared to January. If the coefficients are statistically different from zero, we can conclude that the returns for those months are different than the returns for January.

4. Empirical Results

Table 1 presents mean monthly returns by each year, and the whole sample and observing the table can be seen that the most profitable months are February and March 2005 when actually bull market was announced and the worst months were October and November 2008. On the whole, it appears that most profitable months are March and August what is unusual, and worst month is November. January does not exceed highest returns and for the whole period standard deviation is lowest.

Table 1: Mean Monthly Returnby Each Year for the Sample

	2005	**2006**	**2007**	**2008**	**2009**	Mean	SD
January	6,74	8,65	8,20	-8,54	6,54	4,32	7,25
February	33,43	0,51	12,11	-0,72	-14,70	6,13	17,98
March	37,99	3,15	18,93	-5,07	-1,37	10,73	17,77
April	-8,10	0,97	21,95	-14,27	-6,40	-1,17	14,02
May	-9,05	2,21	4,29	-1,10	33,50	5,97	16,21
Jun	-0,91	8,43	-2,99	-16,31	1,33	-2,09	9,04
July	3,15	13,16	14,81	10,09	-3,91	7,46	7,77
August	12,17	23,97	22,62	-5,22	6,83	12,08	12,03
September	18,68	0,24	-8,02	-14,25	17,36	2,80	14,82
October	-4,49	0,68	-11,69	-39,33	12,01	-8,57	19,25
November	-5,48	-11,26	-22,93	-24,32	-16,52	-16,10	7,91
December	-1,76	-2,76	16,45	-11,60	-7,46	-1,43	10,74

Source: Macedonian Stock Exchange

Best and worst months are followed by high standard deviation showed in Figure 1, and especially high volatility is noticed during October, February and March

For examining month of the year anomaly, the returns in all months are compared for the whole period using One Way ANOVA. A glance through the Table 2 provides that there is month effect on the Macedonian stock exchange and the differences between mean returns for various months are significant at 8%.

Figure 1: Mean Monthly Returns and Standard Deviation for the period 2005-2009

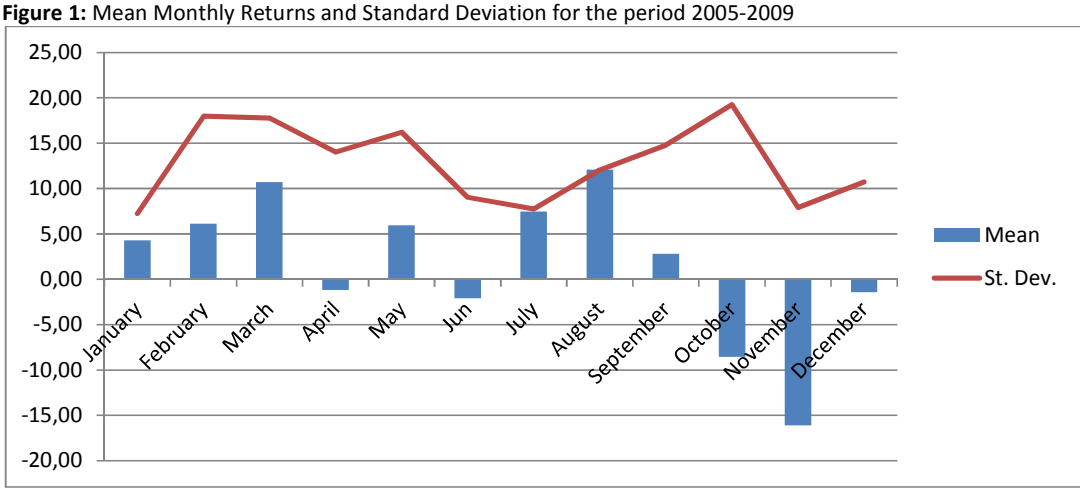

Table 2: Month effect using ANOVA

	2005-2009
F-statistic	1,79
P-value	0,08

The results obtained using the regression in equation (2), where β_0 represents the intercept, *c*, e.g. January and $\beta_{1\text{-}11}$ stand for coefficients indicating the difference in return between January and the i_{th} month of the year are presented in Table 3.

Table 3: OLS coefficients using regression equation (5) for the Sample Period 2005-2009

variable	OLS Coefficient	t-statistic
January	3.69	0.56
February	4.72	0.12
March	5.04	0.57
April	-8.35	-0.94
May	2.67	0.30
Jun	-7.72	-0.88
July	4.46	0.51
August	5.96	0.67
September	-4.82	-0.54
October	-13.16	-1.49
November	-16.99	-1.92*
December	0.14	0.02
MBIRET(-1)	0.33	2.33**

Notes:***, ** and * indicate statistical significance at the 1%, 5% and 10% level respectively.

Table 3 shows that there is statistically significant t-coefficient at 10% significance level for the month November, indicating month of the year seasonal anomaly, or negative November month effect.

5. Conclusion

The assumption that stock prices are random is basic to the Efficient Market Hypothesis (EMH) and capital asset pricing models. This study has presented evidence focusing on the weak form efficiency and calendar anomalies that violate the EMH examining

month-of-the-year effect in the stock market of Macedonia. The empirical results of this paper are in the support of the previous research findings: Month Related Seasonality in stock markets is an international phenomenon. Study employed ANOVA and the Ordinary Least Square (OLS) regression analyses to the monthly returns, to determine whether the studied calendar anomaly existed on the Macedonian stock market in the period 2005-2009.

The major conclusion of this paper is that monthly pattern is detected on Macedonian stock exchange. The tests showed that we cannot reject the null hypothesis that the monthly returns are all equal. Using one way ANOVA method, month effect on the Macedonian stock exchange was detected rejecting null hypothesis of equality of monthly returns across the months of the year at 8% significance level.

Further, applied regression analysis showed negative November effect. In other words, investors could take advantage of information accessible in this study, but it is hard to explain the significant negative returns in November. The mean monthly change of November was negative for the entire data set as well as for each year. Observing mean monthly returns by each year also unusual high returns are found in the summer months. Behavioural finance approach maybe can help explanation of this unusual monthly pattern.

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