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An examination of the calendar anomalies in the Romanian stock market

Delia-Elena Diaconasu^a, Seyed Mehdian^b, Ovidiu Stoica^{a,*}^a Faculty of Economics and Business Administration, Alexandru Ioan Cuza University of Iasi, Carol I Boulevard, No. 22, Iasi 700505, Romania^b School of Management, The University of Michigan-Flint, 303 E. Kearsley Street, Flint 48502, MI, USA

Abstract

The main objective of this paper is to investigate the presence of the-day-of-the-week and the-month-of-the-year effects in the Romanian equity market, using Bucharest Stock Exchange returns between 2000 and 2011. While we observe the presence of Thursday effect in Romanian equity market, we do not find any traditional Monday or January effect for the entire sample period. Furthermore, we observe the January effect during pre-crisis period. However, the subsample analysis provides very different results, perhaps due to increasing degree of capital market maturity, EU accession and other important events, such as the financial crisis. It follows that the Romanian equity market is reasonably efficient, where prices reflect all publicly available information and no trading rule and market timing can be used to generate abnormal returns.

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1. Introduction

The investigation of calendar anomalies in security markets has been of particular importance for financial economists and practitioners for many decades, as evidenced by a large number of studies in the literature. The

* Corresponding author. Tel.: +40-742-992379.

E-mail address: ostoica@uaic.ro.

significance of these anomalies derives from the fact that they carry important implications for capital market efficiency and portfolio formation.

The well-researched and documented anomalies in financial markets are the-day-of-the-week and the-month-of-the-year effects. There are numerous studies that confirm or refute these theories of calendar effects in capital market. The results seem to be contradictory at times, depending on the characteristics of capital markets studied. These characteristics include the size and maturity of the capital market, the business cycle, the organizational structure, the degree of integration and liberalization etc.

In Central and Eastern Europe (CEE), Patev 2003 reports negative returns on Monday in Romania and Czech Republic between 1997 to 2000. Ajayi et al. 2004, on the other hand, test the-day-of-the-week effect in the emerging markets of Eastern Europe in the period between 1990 and 2002 and provide mixed support for the existence of the day-of-the-week effect. Moreover, Tonchev and Kim 2004 examine calendar effects in Czech Republic, Slovakia, and Slovenia and find a very weak evidence of the January and the day-of-the-week effects in these markets. Chukwuogor-Ndu, 2006 studies the day-of-the-week effect in fifteen European financial markets and provides evidence of negative returns on Monday in Czech Republic, Slovakia, and Turkey.

Heininen and Puttonen 2008 report the disappearance of these anomalies in CEE countries after joining EU. In the same sense, Hourvouladiades and Kourkoumelis 2009 report the disappearance of Monday effect over time in Turkey, Cyprus and Greece. Borges 2009 observes the presence of calendar anomalies in seventeen Western and Central European equity markets during 1994-2007 and Francesco and Rakesh 2010 examine equity markets of Poland, Hungary, Czech Republic, Slovakia, Romania, Bulgaria, and Slovenia from 1999 to 2009 and observes day-of-the-week effect and high volatility of returns only in Slovenian stock market after EU accession.

In addition, a number of papers investigate calendar anomalies in several particular countries from Central and Eastern Europe Al-Khazali et al., 2008; Floros, 2008; Kenourgios and Samitas, 2008, Tudor, 2006; Henke, 2001; Bohl et al., 2010; Depenchuk et al., 2010; Bildik, 2001; Georgantopoulos and Tsamis, 2010.

In this study we analyze day-of-the-week and month-of-the-year effect using data from BET and BET-C indices of the Bucharest Stock Exchange (BSE), a sample period from 2000 to 2011. This sample is then partitioned into two distinctive sub-periods to compare the day-of-week and month-of-the-year effects during post and pre era of the global finance crisis. While the results provide evidence of Thursday, we do not find any traditional Monday or January effect during 1998 to 2011 period. However, we discover mild January and Monday effects during pre-financial crisis period.

The remainder of the paper is organized as follows. Section 2 presents the literature review and Section 3 provides a brief description of the Romanian capital market. Section 4 describes the data and methodology and section 5 discusses the empirical results. Finally, the last section contains the summary and conclusions.

2. Data

The data set for this study consists of the daily closing values of Bucharest Exchange Trading (BET) and Bucharest Exchange Trading-Composite (BET-C) indexes that represent Bucharest Stock Exchange. The period covered is 12 years, from 2000 to 2011. BET is the first index developed by BSE and is the reference index for the Romanian stock market. BET is a free float weighted capitalization index containing the 10 most liquid companies. The BET-C is a composite index of BSE market and reflects the price movement of all the companies listed in the BSE, except for the Exchange Traded Funds. Daily index data sets for both indices are collected from BSE site.

In addition, we investigate the nature of the-day-of-the-week and the-month-of-the-year effect during pre and post 2007 global financial crisis by partitioning our data into two sub-periods: one from January 1, 2000 to June 30, 2007 and the other one from July 1, 2007 to December 31, 2011.

3. Methodology

The daily return for each index is calculated using the following equation:

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

where: R_t is the daily return; P_t is closing value of index on day t ; P_{t-1} is closing value of index on day $t-1$.

In order to test for stationarity of the stock prices indexes series we perform Augmented Dickey-Fuller and Kwiatkowski-Philips-Schmidt-Shin tests. The tests indicate that the daily returns are integrated of first order. This is confirmed also through the KPSS test.

To investigate the presence of the day-of-the-week effect in our series, we estimate the following model:

$$R_t = a_1d_1 + a_2d_2 + a_3d_3 + a_4d_4 + a_5d_5 + u_t \quad (2)$$

where R_t is the return on day t ; a_i is the mean return for each day-of-the-week; d_{it} is a dummy variable for the five days of the week, such that $d_{it} = 1$ for Monday, 0 otherwise and so on; and u_t is a random error term.

The null hypothesis and its alternative can be expressed as $H_0: a_1=a_2=a_3=a_4=a_5=0$ and H_1 : at least two of variables are different from zero, respectively.

The rejection of null hypothesis implies that the daily mean returns (a_i) are statistically significantly different from each other. It follows that there exists daily seasonality in returns across different days of the week.

To examine the month-of-the-year effect, we estimate the following model:

$$R_t = \sum_{i=1}^{12} a_i d_{it} + u_t \quad (3)$$

where R_t is the monthly return in month t ; a_i is the mean return in month t ; d_{it} is dummy variable for the twelve months of the year, such that $d_{it} = 1$ if the month is January and 0 otherwise, and so on; u_t is an error term assumed to be independent and identically distributed (IID)..

Similar to the above discussion, we consider two hypotheses: $H_0: a_1=a_2=a_3=...=a_{12}=0$ and its alternative hypothesis is stated as H_1 : at least two of coefficients are different from zero.

Equations 2 and 3 suffer from heteroscedasticity and autocorrelation in returns. So, following Ariss et al. (2011), we test for heteroscedasticity using the Cook–Weisberg test and if it is present, we apply the Huber–White sandwich estimator to correct for it to obtain robust t-values. We further test for autocorrelation function to confirm the use of first-order autoregressive process [AR(1)].

4. Empirical results

Equation 2 and AR(1) are estimated using data for both Romanian indices for entire sample period (2000-2011) and the results are displayed in Table 1. The specification of AR(1) model is used to adjust the stock returns. These financial time series do not adjust instantaneously to changes, meaning that different stocks have different price adjustment speeds to new information arrival into the market. So, this lag in price response leads to a positive autocorrelation in index returns.

As can be seen from Table 1, the variation in returns is not statistically significant for week-days, except for Thursdays, when the returns are positive and statically significant in the case of both BET and BET-C. In addition, a positive Friday effect during the sample period is observable for BET-C.

It is interesting to note that both indices do not demonstrate any traditional Monday effect since Monday returns are positive though not statistically significant. However, it seems that the variable day is not the main reason for recording these anomalies and so, other considerations such as the information inefficiency, manipulation of the capital market, high volatilities of the prices, investors' nature, could be more important.

Table 1. Day-of-the-week effect in the BET and BET-C index, 2000-2011

			Monday	Tuesday	Wednesday	Thursday	Friday
2000/2011	BET	OLS	0.059301	-0.030376	0.012469	0.162745**	0.106287
		AR(1)	-0.000177	-0.000123	-0.000114	-0.001900	-0.000844
	BET-C	OLS	0.049253	-0.031741	0.017595	0.150574**	0.120053*
		AR(1)	-0.000149	-0.000121	-0.000211	-0.001929	-0.001340
2000/2007	BET	OLS	0.131515	0.130349	0.179650**	0.227127***	0.222361***
		AR(1)	-0.001151	-0.001767	-0.003418	-0.006146	-0.006156
	BET-C	OLS	0.160115*	0.108447	0.202233**	0.210123*	0.234547*
		AR(1)	-0.002126	-0.001496	-0.005103	-0.006164	-0.009004
2007/2011	BET	OLS	-0.026218	-0.221955	-0.187699	0.085660	-0.035931
		AR(1)	-0.000032	-0.002037	-0.001588	-0.000358	-0.000076
	BET-C	OLS	-0.084015	-0.198840	-0.203475	0.079276	-0.020228
		AR(1)	-0.000331	-0.001985	-0.001970	-0.000365	-0.000152

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The results for the period 2000-June 2007 suggest that there are seasonal anomalies during the pre-crisis period. More specifically there exist statistically significant Wednesday, Thursday and Friday effect in both indexes. In addition the findings show that means of Thursdays returns are higher than those of the other days of the week in the case of BET. On the other hand, Fridays means returns are greater than those of other days of the week in the case of BET-C. In addition, in the case of the last reminded index it can be seen a mild Monday effect.

In contrast, the results in case of the second sub-period imply no link between stock returns and the-day-of-the-week in the case of this sample. In addition, the returns during post-crisis are all negative with the exception of Thursdays' returns. These findings are in line with those of Hourvoulades and Kourkoumelis (2009) who report the absence of daily anomalies in 2007-2009 period in Romania. We speculate the disappearance of the daily anomalies and the presence of negative returns in the post financial crisis may be caused by investors' pessimism and skepticism during the severe market downturn.

In sum, one can conclude high market volatility and uncertainty following the financial crisis resulted in the disappearance of calendar anomalies in Romanian market, although a Thursday effect is observed during the entire sample period (2000-2011) in the case of both indices.

Table 2 reports the estimated parameters of the-month-of-the-year effect for entire sample period. As can be seen, the April and July show statistically significant positive anomalies in the case of both indices. In addition, BET return exhibits a positive significant December effect.

Table 2. Month-of-the-year effect on BET and BET-C in the period 2000-2011

	BET		BET-C	
	OLS	AR(1)	OLS	AR(1)
January	0.168506	0.105657***	0.169689	0.123454***
February	0.056811	0.068292***	0.057661	0.123111***
March	0.078969	0.046573**	0.113070	0.073947**
April	0.215514*	0.126433***	0.275898**	0.149416***
May	-0.006601	0.012198	-0.024974	0.020990
June	0.019299	0.140633***	0.006306	0.151192***
July	0.195753**	0.043971**	0.161747**	0.027676
August	-0.007379	0.185408***	0.002062	0.216650***
September	0.005766	0.096387***	0.013745	0.109243***
October	-0.010980	0.195119***	-0.022799	0.215493***
November	-0.021292	0.060949**	-0.025615	0.095106***
December	0.177792*	0.114312***	0.095746	0.130224

*p<0.1, **p<0.05, ***p<0.01.

In order to conserve space, the results for pre and post financial crisis period respectively are not displayed here, but are available by the authors upon the request of the readers. There exists a statistically significant January effect in Romanian stock market during the pre-crisis period. We also note that the abnormal return during this month is highest compared to other months of the year in the case of both indices. Furthermore, the other significant positive returns anomalies for BET index are represented by the following months, in ascending order: September, July, December, October and June. In the case of BET-C the order is: September, April, October, July and June. These findings are in contrast with those of Tudor (2006) who reports the absence of January effect in the same index between 2000 and 2005. We argue that Tudor's result may be influenced by the period that he used because this period is generally characterized by low transactions, participation of a small number of domestic and foreign investors and weak correlation of Romanian stock market to the global markets.

A comparison between the two sub-periods reveals the absence of any month-of-the-year effect during the post financial crisis period in Romania, except April, in the case of BET, and March in the case of BET-C.

One interesting point is that, similar to the results of the-day-of-week effect, the majority of the coefficients of the-month-of-year are negative though not statistically significant. This result could be due to the global financial crisis after which the Romanian market plunged drastically and investor behave on the side of caution.

5. Conclusions

Following the analysis of two Romanian indices, BET and BET-C, we document a Thursday effect and a lower mean return on Fridays in the case of BET-C. We, however reject the hypothesis of presence of abnormal returns on Monday.

The examination of pre and post financial crisis indicates dissimilar results. More specifically, no daily return abnormally was found in the case of both indices during post financial crisis period; however, we observe stronger return abnormalities on Thursday, in pre financial crises period.

The analysis of the entire period provides evidence of the presence of higher returns in April and July and the absence of January effect in both indices. By dividing the sample into two and analyzing month-of-the-year effect in the sub-periods the results indicate the disappearance of these anomalies during the financial crisis.

In sum, the absence of any Monday or January effects over the entire sample period and the disappearance of these anomalies during post financial crisis period imply that the Romanian equity market is becoming fairly efficient. It follows that prices appear to reflect all available information and no trading rules and market timing can be utilized to generate abnormal return.

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