Turn - of - the - month effect on the Bucharest stock exchange

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Abstract
This paper explores the presence of the turn – of – the – month effect on Bucharest Stock Exchange. We employ daily values from 2002 to 2011 of the two important indices of the Romanian capital market: BET – C and RAQ – C, composed on the stock prices of some of the biggest Romanian companies and RAQ – C, which includes the stock prices of smaller firms. We find evidences of the turn – of – the – month effect only for the BET – C evolution.

Key words: *Calendar anomalies, Turn – of – the - month effect, Romanian capital markets, Seasonality, Efficient Market Hypothesis*

JEL CLASSIFICATION: G02, G10

1. Introduction

The presence of the Calendar anomalies on the financial markets was used as an argument against Fama's (1970) Efficient Market Hypothesis (EMH). Such Calendar anomalies include the turn – of – the – month effect, materialized in the significant differences between the stock returns from the so called TOM period, which includes the first trading days of a month plus the last trading days of the precedent month and the stock returns from the so called rest – of – the month (ROM) period, which includes the days not belonging to the TOM period.

The study of TOM effects is important in the investment decision making and in characterizing the financial markets evolutions. In the last decades many scientific papers found evidences of the turn – of – the – month effect for various categories of the financial markets.

In this paper we investigate the existence of TOM pattern in the Bucharest Stock Exchange (BSE). To our knowledge there was no other attempt to analyze this kind of seasonality on the Romanian capital market. This situation could be explained by its recent history marked by significant changes. BSE was founded in 1882, but it was closed during the Communist regime. In 1995 BSE was reopened, but the effects on the East Asian Financial Crisis and the difficulties of transition caused a drastic decline of the stock prices.

The Romania's adhesion to the European Union stimulated the recovery of BSE, but the global crisis caused another decline of the stock prices.

In our study we focus on two main components of BSE: BET market and RASDAQ market. On BET market there are listed some of the biggest Romanian companies, while RASDAQ contained rather smaller companies. We try to identify TOM effects by employing regressions with dummy variables.

The rest of this paper is organized as follows. The second part approaches the relevant literature. The third part describes the data and the methodology used in this paper. The empirical results

are presented in the fourth part and the fifth part concludes.

2. Literature review

The TOM effects were highly approached in the specialized literature during the last decades. Ariel (1987), Lakonishok and Smidt (1988), Pettengill and Jordan (1988), Ogden (1990) and Hensel and Ziemba (1996) found evidence of TOM patterns on the New York Stock Exchange. Casby and Radner (1992), Jaffe and Westerfield (1985), Complon (1999), Boudreaux (1995), Agrawal and Tandon (1994), Kunkel et al (2003) identified such form of seasonality in other countries. Instead, Lee et al (1990) and Wong et al (2006) found no evidence of the TOM effect in some Asian capital markets.

There is no unanimity about TOM time period. Ariel (1987) used a period from -1 to +9 (the last trading day of a month and nine trading days of the following month). Lakonishok and Smidt (1988) analyzed this period but they found strong TOM effect only from -1 to +3. Hensel and Ziemba (1996) identified relevant TOM effects in the US stock market between days -2 and +3, while Ziemba (1991) found relevant TOM effects in Japan from -5 to +2.

Some studies approached the stock market seasonality in case of the small firms. Reinganum (1983) and Keim (1983) revealed different investors' behavior which could lead to some particularities of the calendar effects.

3. Theoretical Background

We employ daily closing prices of two indices: BET-C for BET market and RAQ-C for RASDAQ market. Our sample of data is provided by BSE and it covers a time period from January 4, 2002 to April 15, 2011. We compute the returns of the two indices using the equation:

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

where:
- R_t is the return on the day t;
- P_t is the closing market index price on the day t.

We study the stationarity of the two time series employing the Augmented Dickey Fuller (ADF) test. We use a graphical representation to establish the deterministic component of this test. The number of lags is chosen based on the Akaike Information Criterion.

We investigate TOM effects, using, initially, a -3 to +8 (the first eight trading days of a month and the last third trading days of the previous month) time period. We try to find the relevant seasonalities by performing the OLS regression:

$$R_t = \sum_{i=-3}^{8} \beta_i D_i + \varepsilon_t \quad (2)$$

where:
- D_i is a dummy variable taking the value one for the i trading day and zero otherwise,
- $\bullet_i$ is the coefficient of dummy variable (meaning the return for the i trading day) and $\bullet_i$ is the error term.

By changing the trading days in successive regressions we identify the relevant TOM time period. We compare then the returns from TOM and ROM time periods. Finally, we analyze the TOM effects for the two markets by running the OLS regression:

$$R_t = \bullet + \bullet D_{TOM} + \bullet_t \quad (3)$$

where:
- $\bullet$ is the intercept (meaning the return for the ROM period),
- D_{TOM} is a dummy variable taking the value one for the trading days from TOM time period and zero otherwise,
- $\bullet$ is a coefficient for dummy variable (meaning the differences between the mean TOM return and mean ROM return) and
- $\bullet_t$ is the error term.

4. Empirical Results

We studied the stationarity of the variables. Based on the graphical representation we chose a constant as deterministic term of ADF tests. The results, presented in the Table 1, indicate the stationarity of BET-C and RAQ-C returns.

We perform the first regression for BET-C and RAQ-C returns (Table 2). For BET-C returns it resulted the most suitable TOM time period is between -1 to +2 trading days. The coefficients of the three dummy variables represent the mean returns for the trading days from TOM time period. The largest returns occurred in the first trading day of a month. In case of RAQ-C returns we didn't find a significant relationship for no one of the time periods studied.

The smallest p-value of F-test occurred for TOM time period between -1 to +2 trading days.

The descriptive statistics for the returns of BET-C and RAQ-C revealed that TOM returns are greater than ROM returns (Table 3). These returns indicate an apparent TOM pattern.

We perform the second regression for BET-C and RAQ-C returns (Table 4). The F-test indicates a significant relation only in the case of BET-C returns. The positive value of coefficient • indicates that in general TOM returns are greater than ROM returns.

5. Conclusions

In this paper we investigated the presence of TOM effects in the two main components of BSE: BET and RASDAQ markets. We found significant evidences about such calendar anomalies only in the case of BET market.

These results could be explained by the differences between BET and RASDAQ markets. On BET market where there are listed some of the biggest Romanian companies, the foreign investors play a major role. Moreover, BET market is very sensitive to the evolutions of the foreign capital markets, some of them being affected by TOM effect. Instead, RASDAQ market, where there are listed many small companies, is not very attractive for the foreign investors and the influence of the foreign capital markets is lower than in the case of BET market.

The research on the TOM effects at BSE could be continued by taking into consideration the possible interactions with other calendar anomalies such the monthly and the daily seasonalities.

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APPENDIX

Table 1 - Results of Augmented Dickey-Fuller Tests for the six time series

Variable	Lagged Differences	Test statistics	Asymptotic p-value
Return of BET-C	21	-8.14112	2.007e-014
Return of RAQ-C	18	-8.31225	5.948e-014

Table 2 - Results of the first regression for BET-C and RAQ-C returns

Return	•-$_1$	•$_1$	•$_2$	F-test
BET-C	0.00261986 (0.00156444) [1.6746] {0.09414}	0.00642574 (0.00156445) [4.1074] {0.00004}	0.0044633 (0.00155744) [2.8658] {0.00420}	9.295922 {4.14e-06}
RAQ-C	0.0024427 (0.00116619) [2.0946] {0.03632}	0.000282214 (0.0011662) [0.2420] {0.80880}	0.00110715 (0.00116097) [0.9536] {0.34037}	1.785113 {0.147871}

Notes: •-$_1$, •$_1$, •$_2$ and F-test are for the following regression: R_t = •-$_1$D(-1) + •$_1$D(1) + •$_2$D(2) + •$_t$;
The standard errors are within the round brackets;
t – Values are within the squared brackets; p – values are within the braces.

Table 3 - Descriptive Statistics for returns of BET-C and RAQ-C on TOM and ROM time periods

Return	BET-C		RAQ-C	
	TOM	ROM	TOM	ROM
Mean	0.00450285	0.000251279	0.00127684	0.000153326
Minimum	-0.0455560	-0.121184	-0.260412	-0.198265
Maximum	0.0568535	0.108906	0.233651	0.0750852
Std. Dev.	0.0153325	0.0166742	0.0208475	0.0101630
Skewness	0.264020	-0.827565	-1.71751	-3.86881
Ex. kurtosis	1.34884	8.36903	118.547	78.7454

Table 4 - Results of the second regression for BET-C and RAQ-C returns

Return	•	•	F-test
BET-C	0.000251279 (0.000370441) [0.6783] {0.49763}	0.00425157 (0.000975261) [4.3594] {0.00001}	19.00455 {0.000014}
RAQ-C	0.000153326 (0.000276077) [0.5554] {0.57869}	0.00112352 (0.000726828) [1.5458] {0.12229}	2.389443 {0.122294}

Notes: •, • and F-test are for the following regression: R_t = • + • D_{TOM} + •$_t$;
The standard errors are within the round brackets;
t – Values are within the squared brackets; p – values are within the braces.