Monthly seasonality in the Bucharest stock exchange

Dumitriu, Ramona and Stefanescu, Razvan and Nistor, Costel

Dunarea de Jos University of Galati, Dunarea de Jos University of Galati, Dunarea de Jos University of Galati

8 April 2011

MONTHLY SEASONALITY IN THE BUCHAREST STOCK EXCHANGE

RAMONA DUMITRIU
RAZVAN STEFANESCU
COSTEL NISTOR

Faculty of Economics and Business Administration
UNIVERSITY "DUNAREA DE JOS" GALATI

ABSTRACT

This paper investigates the existence of the monthly effects on the Romanian Stock Exchange. We employ the returns of the main indices and the trading volume and the trading values from the main components of the Bucharest Stock Exchange. We find different forms of monthly seasonality explainable by some characteristics of the stocks.

Keywords ***Seasonality, Bucharest Stock Exchange, Efficient Market Hypothesis, Stock Market Anomalies***

JEL Classification: G02, G10, G14

1. INTRODUCTION

The Efficient Market Hypothesis (EMH) of Fama (1970) stated that past prices of stocks couldn't be used to predict the future prices [1]. However, various studies contested the validity of EMH, giving the argument of stock market anomalies, such seasonal patterns of the returns. Knowing such anomalies the investors could predict the future prices and they could elaborate strategies that could beat the market. Later, Fama (1998) admitted the existence of the stock market anomalies and their implications on EMH [2].

One of the most studied stock market anomalies is the month of the year effect which is materialized in the change of return stocks from month to month. Several studies proved the existence of such anomaly [3,4]. Many of them found that, in general, the returns for January are higher than those from the other months. January effect has many explanations, such as the Tax Loss Selling Hypothesis (in order to obtain tax losses, many investors sell declining stocks at the end of a year and they repurchase them at the beginning of the new year) and Window Dressing Hypothesis (many institutions buy winner stocks and sell loser stocks at the end of a year in order to get a favorable portfolio holding) [5,6,7]. There are also studies that found other forms of monthly effects [8,9].

Some researches revealed the particularities of investors' behaviors for the emerging capital markets which influenced monthly effects [10,11,12]. Other studies identified some differences regarding monthly effects for the small firms stocks in comparison with the big corporations stocks. Such particularities were related to the impact of firm size on the investors' behavior [13,14,15].

In this paper we analyze the potential monthly effects from the Bucharest Stock Exchange (BSE). We take into consideration two main components of BSE: BET, where there are listed some of the biggest Romanian corporations, and RASDAQ, where there are listed, in general, smaller firms. We study the seasonality not only for the returns but also for the trading volume and for the trading values.

The rest of the paper is organized as follows. The second part describes the data

and the methodology. The third part presents the empirical results and the fourth part concludes.

2. DATA AND METHODOLOGY

We use monthly values about the two main components of BSE: BET market and RASDAQ market. Our sample of data is provided by BSE and covers the period January 2000 – March 2011. For both markets we employ the main indices (BET-C, for BET market and RAQ-C, for RASDAQ market), trading volume and trading values.

The monthly returns (R), trading volume measures (Vol) and trading values measures (Val) are computed using the following equations:

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

$Vol_t = \ln Vo_t - \ln Vo_{t-1}$ (2)

$Val_t = \ln Va_t - \ln Va_{t-1}$ (3)

In these equations, P_t, Vo_t and Va_t stand for the closing market index price on the day t, the trading volume on the day t and the trading values on the day t, respectively.

We analyze the stationarity of the time series by employing the Augmented Dickey Fuller Test. We establish the deterministic component based on a graphical representation. The number of lags is chosen based on the Schwarz Bayesian Criterion.

The seasonality of time series will be tested using OLS regressions with dummy monthly variables and autoregressive components:

$$y_t = \sum_{i=1}^{12} a_i dm_{it} + \sum_{k=1}^{m} c_k y_{t-k} + u_t \quad (4)$$

A monthly dummy variable dm_{it} takes the value one for the month i and zero otherwise. The k number of lagged values of the variable y is chosen based on the Schwarz Bayesian Criterion. An a_i coefficient associated with a dummy variable dm_{it} could be interpreted as the average returns in the month i. The seasonality is confirmed if at least one dummy variable is statistically significant.

3. EMPIRICAL RESULTS

We analyzed the stationarity of the variables. The results of ADF tests, presented in the Table 1, indicate the stationarity of all the six time series.

We performed a regression between the returns of BET-C and the dummy monthly variables. The results, presented in the Table 2, indicate that no dummy variable is statistically significant.

In the Table 3 there are presented the results of the regression between the trading volume of BET market and the dummy monthly variables. We found statistical significance for two dummy variables corresponding to January and February. Coefficients for these variables are positive.

The results of a regression between the trading values of BET market and the dummy monthly variables are presented in the Table 4. We found two dummy variables which are statistically significant: for January and for May. Both variables have positive coefficients.

In the Table 5 there are presented the results of the regression between the returns of RAQ-C and the dummy monthly variables. We found no dummy variable statistically significant.

The results of the regression between the trading volume of RASDAQ market and the dummy monthly variables are presented in the Table 6. We identified two dummy variables statistically significant: for January and for October. The coefficient for the first dummy variable is negative while for the second is positive.

In the Table 7 there are presented the results of the regression between the trading values of RASDAQ market and the dummy monthly variables. We identified a single dummy variable statistically significant, corresponding to September. Its coefficient is positive.

4. CONCLUSIONS

In this paper we analyzed the monthly effects for two main components of BSE: the BET market and the RASDAQ market. We found no monthly seasonality for the

returns but this fact could be related to the significant changes that occurred in the Romanian economy between 2000 and 2011: the industry reorganization, the adhesion to the European Union, the global crisis a.s.o.

We found seasonalities for the trading volume and for the trading values. Such seasonalities are different for BET market and for RASDAQ market, reflecting the differences between the big companies and the small firms.

For BET market higher trading volume in January and February and higher trading values in January and May resulted. The monthly effects for the first months of a year could be explained by the significant changes occurred in comparison with the previous year. A higher trading volume in May could be caused by the uncertainty about the activity in summer.

For RASDAQ market a lower trading volume in January, a higher trading volume in October and higher trading values in September resulted. The seasonality in autumn months could be explained by the changes in the activity in comparison with summer.

BIBLIOGRAPHY

1. Fama E.F. (1970), *Efficient capital markets: a review of theory and empirical work*, Journal of Finance, No: 25, 383-41;

2. Fama, Eugene (1998), *Market Efficiency, Long-Term Returns and Behavioural Finance*, Journal of Financial Economics, 49, pp. 283-306;

3. Ariel, Robert A. (March 1987), *A Monthly Effect in Stock Returns*, Journal of Financial Economics, Vol.18, 161-174;

4. Schwert G. W. (2002), *Anomalies and Market Efficiency*, Working Paper, The Bradley Policy Research Center, Financial Research and Policy, University of Rochester;

5. Lakonishok J., S. Smidt (1988), *Are Seasonal Anomalies Real? A Ninety Years Perspective*, Review of Financial Studies, 1(4): 403-425;

6. Branch, B. (1977), *A Tax Loss Trading Rule*, Journal of Business, 50 (2), 198-207;

7. Barry, C., Brown S. (1984), *Differential Information and the Small Firm Effect*, Journal of Financial Economics, 13, pp. 283-294;

8. Lazar, D., Priya, Julia, Jeyapaul, Joseph (2006), *SENSEX Monthly Return: Is there Seasonality?*, Indian Institute of Capital Markets 9th Capital Markets Conference Paper;

9. Bhabra, H. S., Dhillon, U. S., Ramirez G. G. (1999), *A November Effect? Revisiting the Tax-Loss-Selling Hypothesis*, Financial Management, 28, 5–15;

10. Nassir, A., Mohammad S. (1987), *The January effect of stocks traded on the Kuala Lumpur Stock Exchange: An Empirical Analysis*, Hong Kong Journal of Business Management, 5, 33-50;

11. Pandey, I.M. (2002), *Is There Seasonality in the Sensex Monthly Returns?* Working Paper, Indian Institute of Management, 1-19;

12. Maghayereh, A. (2003), *Seasonality and January Effect Anomalies in an Emerging Capital Market*, The Arab Bank Review, 5(2), 25-32;

13. Keim, D. (1983), Size Related Anomalies and Stock Market Seasonality; Further Empirical Evidence, Journal of Financial Economics, 12: 12-32;

14. Easterday, Kathryn E., Sen, Pradyot K., Stephan, Jens (January 2006), *A Re-examination of the Declining January Effect for Firms Trading on NYSE, AMEX and NASDAQ* Available at SSRN: http://ssrn.com/abstract=877009;

15. Reinganum, Marc R. (1983), *The anomalous stock market behavior of small firms in January*, Journal of Financial Economics, 12, 89-104.

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	3	-4.11126	0.0009258
Trading Volume of BET market	7	-6.47575	7.906e-009
Trading Value of BET market	2	-10.566	4.951e-021
Return of RAQ-C	5	-4.40116	0.0001
Trading Volume of RASDAQ market	7	-6.18883	4.153e-008
Trading Value of RASDAQ market	2	-10.5325	6.354e-021

Table 2 - OLS Regression for Returns of BET-C

Variable	Coefficient	Std. Error	t-ratio	p-value
dm1	0.0369905	0.0290147	1.2749	0.20481
dm2	0.00119409	0.0292071	0.0409	0.96746
dm3	-0.00976262	0.0277681	-0.3516	0.72577
dm4	0.0471112	0.0289941	1.6249	0.10682
dm5	-0.00507727	0.0292442	-0.1736	0.86246
dm6	0.00635045	0.0289866	0.2191	0.82696
dm7	0.0322628	0.0289894	1.1129	0.26797
dm8	0.00314183	0.0291387	0.1078	0.91432
dm9	0.000268128	0.0290006	0.0092	0.99264
dm10	-0.00896266	0.0289822	-0.3092	0.75767
dm11	0.003838	0.0289893	0.1324	0.89489
dm12	0.0155017	0.028981	0.5349	0.59372
R_1	0.263972	0.0881141	2.9958	0.00333***

Notes: Adjusted R-squared = 0.007583; F (12, 120) = 1.084054; P-value (F) = 0.379588; *** denotes significance at 1% level.

Table 3 - OLS Regression for Trading Volume of BET market

Variable	Coefficient	Std. Error	t-ratio	p-value
dm1	0.284845	0.167695	1.6986	0.09217*
dm2	0.293955	0.168967	1.7397	0.08466*
dm3	0.0820543	0.169121	0.4852	0.62850
dm4	-0.204681	0.175744	-1.1647	0.24663
dm5	0.0664493	0.175328	0.3790	0.70541
dm6	-0.0614773	0.175203	-0.3509	0.72633
dm7	-0.204749	0.165567	-1.2367	0.21880
dm8	-0.0813527	0.166511	-0.4886	0.62610
dm9	0.135345	0.165969	0.8155	0.41653
dm10	0.257799	0.16589	1.5540	0.12300
dm11	-0.0480836	0.166896	-0.2881	0.77380
dm12	-0.214129	0.166993	-1.2823	0.20240
Vol_1	-0.527257	0.0897453	-5.8750	<0.00001***
Vol_2	-0.3561	0.0985386	-3.6138	0.00045***

Vol_3	-0.34762	0.101696	-3.4182	0.00088***
Vol_4	-0.292679	0.101636	-2.8797	0.00477***
Vol_5	-0.223662	0.0924234	-2.4200	0.01713**

Notes: Adjusted R-squared = 0.228189; F(17, 120) = 3.167271; P-value(F) = 0.000132; *, ** and *** denote significance at 10%, 5% and 1% levels, respectively.

Table 4 - OLS Regression for Trading Values of BET market

Variable	Coefficient	Std. Error	t-ratio	p-value
dm1	0.290076	0.157496	1.8418	0.06806*
dm2	0.252089	0.158582	1.5896	0.11464
dm3	-0.0286038	0.160293	-0.1784	0.85868
dm4	-0.0143621	0.166606	-0.0862	0.93145
dm5	0.270011	0.157175	1.7179	0.08848*
dm6	0.0463335	0.158598	0.2921	0.77070
dm7	-0.138088	0.158345	-0.8721	0.38497
dm8	0.0507429	0.158875	0.3194	0.75001
dm9	-0.016304	0.15704	-0.1038	0.91749
dm10	0.174053	0.156949	1.1090	0.26973
dm11	-0.0018212	0.157365	-0.0116	0.99079
dm12	-0.115846	0.157155	-0.7371	0.46252
Val_1	-0.379167	0.089657	-4.2291	0.00005***
Val_2	-0.276703	0.0928688	-2.9795	0.00352***
Val_3	-0.25883	0.0901229	-2.8720	0.00485***

Notes: Adjusted R-squared = 0.158742; F(14, 120) = 2.752178; P-value(F) = 0.001506; * and *** denote significance at 10% and 1% levels, respectively.

Table 5 - OLS Regression for Returns of RAQ-C

Variable	Coefficient	Std. Error	t-ratio	p-value
dm1	0.0195384	0.0222308	0.8789	0.38122
dm2	0.00518344	0.022285	0.2326	0.81647
dm3	-0.0198435	0.0212971	-0.9317	0.35334
dm4	0.0201236	0.0222667	0.9038	0.36794
dm5	0.0236965	0.0222708	1.0640	0.28946
dm6	-0.000918468	0.022364	-0.0411	0.96731
dm7	0.0191628	0.0222359	0.8618	0.39052
dm8	0.00788829	0.0223044	0.3537	0.72421
dm9	-0.00969621	0.0222605	-0.4356	0.66392
dm10	0.00254952	0.0222331	0.1147	0.90890
dm11	-0.0089364	0.0222275	-0.4020	0.68837
dm12	-0.00200792	0.0222404	-0.0903	0.92821
R_1	0.282046	0.0876122	3.2193	0.00165***

Notes: Adjusted R-squared = 0.019777; F(12, 120) = 1.221931; P-value(F) = 0.275916; *** denotes significance at 1% level.

Table 6 - OLS Regression for Trading Volume of RASDAQ market

Variable	Coefficient	Std. Error	t-ratio	p-value

dm1	-0.33319	0.18079	-1.8430	0.06789*
dm2	0.047352	0.183334	0.2583	0.79665
dm3	0.234486	0.178159	1.3162	0.19072
dm4	-0.196784	0.187299	-1.0506	0.29561
dm5	0.16978	0.179984	0.9433	0.34749
dm6	-0.0213194	0.177386	-0.1202	0.90454
dm7	-0.0704796	0.177314	-0.3975	0.69174
dm8	-0.115669	0.175701	-0.6583	0.51163
dm9	0.192555	0.175798	1.0953	0.27565
dm10	0.375482	0.176702	2.1250	0.03571**
dm11	-0.191654	0.17977	-1.0661	0.28859
dm12	-0.234189	0.180641	-1.2964	0.19740
Vol_1	-0.541396	0.0880646	-6.1477	<0.00001***
Vol_2	-0.37796	0.0948372	-3.9854	0.00012***
Vol_3	-0.31961	0.0881202	-3.6270	0.00043***

Notes: Adjusted R-squared = 0.286497; F(15, 120) = 4.413303; P-value(F) = 1.67e-06; *, ** and *** denote significance at 10%, 5% and 1% levels, respectively.

Table 7 - OLS regression for Trading Values of RASDAQ market

Variable	**Coefficient**	**Std. Error**	**t-ratio**	**p-value**
dm1	-0.0826961	0.172136	-0.4804	0.63184
dm2	-0.151798	0.171706	-0.8841	0.37850
dm3	0.223299	0.171024	1.3057	0.19425
dm4	-0.157581	0.180636	-0.8724	0.38481
dm5	0.19355	0.173303	1.1168	0.26638
dm6	-0.209423	0.174225	-1.2020	0.23180
dm7	0.0341965	0.17438	0.1961	0.84487
dm8	-0.115149	0.17286	-0.6661	0.50664
dm9	0.29251	0.172749	1.6933	0.09309*
dm10	0.121562	0.173992	0.6987	0.48616
dm11	-0.0884012	0.17329	-0.5101	0.61093
dm12	-0.1039	0.17348	-0.5989	0.55040
Val_1	-0.514541	0.0909426	-5.6579	<0.00001***
Val_2	-0.387397	0.0962249	-4.0260	0.00010***
Val_3	-0.198614	0.0909278	-2.1843	0.03095**

Notes: Adjusted R-squared = 0.227713; F(15, 120) = 3.488749 ; P-value(F) = 0.000064; *, ** and *** denote significance at 10%, 5% and 1% levels, respectively.