BEHAVIORAL FINANCES: IN SOME CIRCUMSTANCES FINANCIAL MARKETS MAY PROVIDE INFORMATIONAL INEFFICIENCIES AND DUE TO THE INFLUENCE OF PSYCHOLOGICAL FACTORS. CONTROVERSIES, STUDIES, STATISTICAL ASPECTS

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Abstract

One of the latest trends in the development of economic thinking is the field of behavioral finance, which brought the human model as close to reality as possible, thus showing its irrationality. In the capital markets, the behavior of investors is detached from the way they manage their investment portfolio, from their economic ambitions and from the financial culture they possess, from their own perception of the profitability-risk relationship. The objective of this paper is to test the informational efficiency of the Romanian stock market, an objective to be achieved through two studies. The first refers to the detection of a calendar anomaly, namely, the day of the week effect on the Romanian stock market, and the second study considers the detection of herd behavior among investors. The daily data on the shares performance for 10 companies listed on the Bucharest Stock Exchange were used, as well as the Bucharest Exchange Trading index, the period analyzed being January 2016 – December 2018. The results indicate effects of the days of Monday, Tuesday and Friday. Regarding the group effect on the Romanian capital market, it was not detected.

Keywords: behavioural finance, day of the week effect, herd behavior, informational efficiency

JEL Classification: G14, G41

Introduction

Traditional finance starts from the premises of strict rationality and optimization of financial-monetary decisions. Behavioral finance adds to the equation the psychological

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and emotional aspects of the decision, thus forming a mix of psychology, sociology and finance. With the progress in financial markets, the foundations of Effective Market Theory (EMH) are no longer as well founded. Since 1986, Black claims that many investors are responding to irrelevant information, evaluating financial assets based on noise and not information. Thaler (2015) states that the prices obtained from EMH are not necessarily the most accurate, as they have often proved quite volatile, especially in times of financial crisis. The main arguments against EMH are the timing anomalies and the behavioral biases of the investors.

The latter, we are concerned in terms of the impact that they have on prices and returns. In the case of the calendar effects, the investors could benefit from the weaknesses of the market and thus could build profitable strategies. It is certain that once this rule is discovered and used, it will be phased out, because the market has a tendency to self-regulate. Testing and detecting herd behavior could be an effective tool in detecting speculative bubbles.

The motivation of the research comes, first of all, from the fact that the empirical studies regarding both the day of the week effect and the group effect on the developing markets in Eastern Europe, in particular, on the Romanian stock market, are very few, the majority of these focusing on developed economies. Given this aspect, the study of anomalies becomes more attractive. In the specialized literature it is noted that the emerging countries have an incomplete regulatory framework and thus a higher level of rumors and manipulations.

1. Literature review

1.1. The day of the week effect

The calendar anomalies from the perspective of the capital market materialize as a temporary model of the profitability of the shares, which appears at a certain time of the day, on a certain day of the week or at a time of the year (Carvalho, Malaquias, 2012). Cross (1973) and French (1980) were among the first researchers to find that stock returns on Mondays are significantly lower than returns on Fridays. Damodaran (2010) defined the effect of Monday as actually a weekend effect because most of the negative returns are manifested from the closing of the stocks exchanges on Friday until the opening of the Monday. The literature on these anomalies, especially the day of the week effect, varies depending on the region and the period analyzed.

Kiymaz and Berument (2003) in the paper *The Day of the Week Effect on the Stock Market Volatility* analyzed the US capital market, using the daily closing prices of the S&P 500 index. The total of 6409 observations covers the period from January 1973 to October 1997. The authors used two models to identify an anomaly, namely the OLS model and the GARCH model. Both models demonstrated the existence of an effect on Tuesdays and Wednesdays, the results being statistically significant for a significance threshold of 1%. These results are in contradiction with those obtained by Prokorp (2010) who studied the US market and concluded that there is no effect of the weekday on this market. The period analyzed by Prokorp concerned the year 2000.

There are numerous studies that refer to the Asian market. For example, a study for 21 countries by Basher and Sadorsky (2006) titled *Day of the week effects in emerging stock markets* demonstrated the existence of the day effect of the week only for capital markets in Taiwan, the Philippines and Pakistan. Contrary to these results, Lin and Yen (2011), in *The day of the week effect among industries – evidence from Taiwan*, did not find any day of the week effect on the Taiwanese capital market. Yunita and Martin (2012) studied the capital markets of Indonesia, Malaysia and Singapore based on the EGARCH model. The authors demonstrated the existence of this effect on Friday for a 1% significance threshold on the Indonesian and Malaysian capital markets. Also for a level of confidence of 99% demonstrated the effect of Monday on the stock market of Singapore.

Aziz and Ansari (2015) analyzed the Indian capital market in the paper *The day of the week: Evidence from India*, using the daily data of the BSE Sensex index (Bombay Stock Exchange). The data sample covers the period April 1990 - February 2013, with a total number of 5,478 observations. The model applied demonstrated the effect of Monday (most obviously in the period 2005 – 2013) and the effect of Friday on the Indian stock market (for the period 1990 – 1995), the results being statistically significant for a threshold of 1%, under the conditions of a Student's t distributions of errors.

This calendar anomaly has been the subject of numerous studies in Romania. Dumitriu and Ștefănescu (2010) published an article *Changes in the DOW effects in the Romanian foreign exchange market* which aims at analyzing the foreign exchange market. The authors used the daily rates for RON / EUR and RON / USD displayed by the NBR. The period analyzed is January 2005 – February 2010. To capture the day of the week effect more easily, the authors tested it on 4 different intervals: January 2005 – June 2007, July 2007 – September 2008, October 2008 – April 2009 and May 2009 – February 2010. The coefficients were determined using the OLS (least squares) method. The empirical results demonstrate the existence of the day of the week effect for different days and periods. The first subinterval highlights the effect of Monday only for RON / EUR due to the fact that Romania has become more attractive for foreign investors. In the period of crisis related to subinterval 3, we can see the effect of Tuesday for both RON / EUR and RON / USD. The last interval offers a Thursday effect only for RON / EUR. The authors conclude that all the discovered effects appeared as a result of Romania's accession to the EU and following the financial crisis with global impact.

Țilică and Oprea (2014) in the work *Seasonality in the Romanian stock market: the day of the week effect* used daily BET-C index data for the period January 2005 – December 2011. They used the GARCH model to test the calendar anomaly. The conclusion of the study is that on the Romanian capital market, the effect of Friday was present during the analyzed period. The authors concluded that the calendar effect was caused by the global market risk and not the risk on the Romanian market.

Țițan (2017) tested the day of the week effect on the Romanian stock market using the daily closing prices of the BET index for the period January 2012 – December 2016. To detect the calendar anomaly, the author used 6 different samples: one for the entire analyzed period January 2012 – December 2016, and one for each year, respectively January 2012 – December 2012, January 2013 – December 2013, etc., with a total of 1255 observations. The empirical results show the presence on the market of the effect of Thursday, for a confidence level of 95%.

Karanovic (2018), through *The day of the week effect: Evidence from Selected Balkan Markets*, studied this anomaly using 6 representative indices for the related capital markets. The daily closing prices covering the period from January 2012 to December 2016 were used. The study showed that the effect of Monday was only for the Croatian capital market, for a significance threshold of 5%. In Romania there was no effect of the day of the week. These results are contrary to the studies (Țilică, Oprea, 2014) and (Țițan, 2017), although the analysis period was close.

1.2. Herd behaviour

Numerous studies in the field of behavioral finance have focused on herd behavior on financial markets. This topic has become more attractive, especially after financial crises have occurred as a result of the fact that it destabilizes financial markets and accentuates the vulnerability of the financial system. The presence of this effect on the market can, in most cases, lead to a wrong evaluation of the actions, because the rationality of the decisions is disturbed by the presence of subjective expectations regarding the relation profitability-risk. Banerjee (1992) proposes the first model of sequential decision in which an investor makes decisions based on the previous actions of another investor. The reason for this model is that these investors have useful information that is relevant to the investor who is on the verge of making an investment decision.

In 1995, Christie and Huang published *Do individual return herd around the market*, in which they presented a model for detecting gregarious behavior on capital markets. The model is based on CSSD (cross sectional standard deviation) of stock returns, indicating whether they are grouped, more than usual, around market returns. Christie and Huang applied the model to the US capital market in 1995 and the results confirmed that there is no group effect among US investors. The model developed by CH represented a pioneering study that used econometric analysis with a market approach to detect herd behavior.

Chang, Cheng and Korana (2000) published *An Examination of Herd Behavior in Equity Markets: An International Perspective*, presenting the CSAD (cross sectional absolute deviation) model. The CCK analyzed stock markets in the US, Japan, South Korea, Taiwan and Hong Kong between 1963 – 1997. Their results did not indicate any evidence of gregarious behavior on the US and Hong Kong markets and partial evidence of this effect on the Japanese market. In contrast, markets in South Korea and Taiwan have demonstrated group behavior.

Kapusuzoglu (2011) studied the group effect on the Turkish stock market. Herding in the Istanbul Stock Exchange is based on the CSAD model developed by CCK (2000). The database contains the daily prices of the ISE National-100 index and the 70 companies that make up this index. The presented results indicate the existence of the herd effect both in the periods when the market is in an upward trend (bull) and in the case of a market with a downward trend (bear), with a result of -0,700, respectively -0,963, both results being statistically significant for a significance threshold of 1%.

Al-Shboul (2012) in the work of *Asymmetric Effects and the Herd Behavior in the Australian Equity Market* tests the herd behavior for the period from January 2003 to October 2010. The database consists of the prices of AOI and S&P300 indexes and the prices of 251 companies. Both daily and monthly data series were used. The study was based on the CSSD model developed by CH (1995) and the CSAD model developed by

CCK (2000). After estimating the regression by the two methods, it was shown that the group effect exists on the Australian capital market, the results being statistically significant for a significance threshold of 1%.

In 2012, Lindhe applied the method proposed by CCK (2000) for the Nordic countries Norway, Sweden, Finland and Denmark. The period analyzed covers the period from January 2001 to December 2011. Daily data series were used. Results obtained showed the existence of herd behavior only in Finland. Lindhe also tested the group effect on 11 subintervals, separately for each year. The results confirmed the existence of the group effect on the Finnish stock market in 2001 and 2004. These results are in contradiction with the results obtained by Ohlson (2010) who, in *Herd Behavior on the Swedish Stock Exchange*, tested herd effect on the Swedish stock market through two models, CSSD – developed by CH (1995) and CSAD model - developed by CCK (2000). The author used the daily prices for all the components of the OXMS index from January 1998 to November 2009. According to the CSSD model, the Swedish stock market does not register gregarious behavior. Following the estimation of the regression using the CSAD model it was found that the group effect exists on the Swedish stock market, the coefficient $\gamma 2$ having a value of -1,688 and being statistically significant for a threshold of 1%. The subinterval analysis showed that the investors showed this behavior in 2005 and 2007.

Kumar, Bharti and Bansal (2016) in the paper *An Examination of Herding Behavior in an Emerging Economy: a Study of Indian Stock Market* tested herd behavior on the Indian capital market. The data series used range from January 2008 to December 2015 and take into account the daily prices of the CNX Nifty index and 36 titles that are included in this index. The model used is CSAD. Following the regression estimation, the authors found that the herd behavior is not present on the Indian capital market, and investors generally make rational decisions. These results are validated by the study by Prosad et al (2012) which tested the Indian capital market between April 2006 – March 2011. The study was based on the same model and consisted of daily prices for 50 companies. The results showed that there is no group effect on the Indian capital market.

Regarding the Romanian capital market, Pochea (2015) analyzed the herd behavior in ten countries in Central and Eastern Europe between January 2003 and December 2013, including Romania. The methodology used to test this effect was based on the CSAD model developed by CCK (2000). The database contains daily prices for 384 companies and representative indices for each capital market in the 10 countries. The BET index was used to identify mimicry in Romania. The empirical results showed that on the Romanian stock market there was no group effect during the analyzed period. The same result was obtained in the case of herd behavior testing for a market with an upward or downward trend. The author also tried to identify the group behavior during the crisis. The positive results indicate that even during the crisis years the investors did not show a group effect, but they acted rationally. This study confirms the results obtained by Pop (2012) who tested the same effect, but used the model developed by Hwang and Salmon (2004) which is based on the sensitivity factor analysis, examining the weekly data of the BET-C index and all the component titles. The period analyzed is from January 2003 to March 2012. The author certifies that no group behavior was recorded on the Romanian stock market, even in times of crisis.

2. Data and Methodology

2.1. The day of the week effect

The present study use the daily closing prices of the BET index for a period of 3 years, from 1st of January 2016 to 31st of December 2018. The daily effect of the week was tested on 4 different samples for a more detailed analysis. The first sample is for the whole period, and the other for each year, as follows:

- Sample 1: January 1, 2016 – December 31, 2018, 750 observations;
- Sample 2: January 1, 2016 – December 31, 2016, 253 observations;
- Sample 3: January 1, 2017 – December 31, 2017, 248 observations;
- Sample 4: January 1, 2018 – December 31, 2018, 249 observations.

Testing the calendar anomaly involves estimating a regression of form (Aziz and Ansari, 2015):

$$R_t = \delta_1 D_{1t} + \delta_2 D_{2t} + \delta_3 D_{3t} + \delta_4 D_{4t} + \delta_5 D_{5t} + \varepsilon_1 \quad \textbf{(1)}$$

Where

R_t – the return on day t;

$\delta_1, \delta_2, \delta_3, \delta_4, \delta_5$ – dependent variables to be determined by regression estimation and representing the average return of the corresponding weekday, respectively δ_1 – Monday, δ_2 – Tuesday, δ_3 – Wednesday, δ_4 – Thursday, δ_5 – Friday;

$D_{1t}, D_{2t}, D_{3t}, D_{4t}, D_{5t}$ – dummy variables for each day of the week. Monday = 1, Tuesday = 2, Wednesday = 3, Thursday = 4, Friday = 5;

For example, if t is a Monday, $D_1 = 1$, iar $D_2 = D_3 = D_4 = D_5 = 0$

ε_1 – the regression error term.

As a null hypothesis of this regression, the coefficients of the dummy variables are equal to zero. In the event that the null hypothesis is rejected, the alternative hypothesis is accepted, which assumes that at least one day a week presents anomalies of the returns, compared to the other days of the week. In this study I applied the GARCH and EGARCH models, both for the normal distribution of errors and for the Student's t type. In order to avoid multicollinearity I eliminated the free term.

2.2 Herd behavior

To test the herd behavior on the Romanian stock market I used the model developed by Chang, Cheng and Khorana (2000), *cross sectional absolute deviation*:

$$CSAD = \frac{1}{n}\sum_{i=1}^{n} | R_{i,t} - R_{m,t} | \quad (2)$$

Where

n – the number of stocks in the portfolio;

$R_{i,t}$ – the return of the stock i at time t;

$R_{m,t}$ – market return at time t.

The detection of group behavior starts from estimating the following regression:

$$CSAD_{i,t} = \alpha + \gamma_1 |R_{m,t}| + \gamma_2 (R_{m,t} - \bar{R}_m)^2 + \varepsilon_t \quad (3)$$

Where

α – the free term;

γ_1, γ_2 – the coefficients to be determined by regression estimation;

ε_t – the regression error term.

Because mimicry in the market most often occurs under conditions of large price fluctuations, the relationship between the deviations of the returns of individual stock from the market profitability is nonlinear (CCK, 2000). According to Yao et al. (2014), the variable $\bar{R}_m$, which represents the arithmetic mean of the variable $R_{m,t}$, has the role of reducing multicollinearity. If γ2 takes negative values and is statistically significant, it means that we have group behavior on the stock market. If this is positive, this behavior does not exist on the market.

An alternative method of testing herd behavior in the market is the dummy method. This allows you to identify mimicry when the market is rising or falling. The following regression is estimated:

$$CSAD_{i,t} = \alpha + \gamma_1 D_{up}^{down} |R_{m,t}| + \gamma_2 (1 - D_{up}^{down}) |R_{m,t}| + \gamma_3 D_{up}^{down} (R_{m,t} - \bar{R}_m)^2 + \\ + \gamma_4 (1 - D_{up}^{down}) (R_{m,t} - \bar{R}_m)^2 + \varepsilon_t \quad (4)$$

Where

D_{up}^{down} are the dummy variables that take the value 1 when the market is growing and the 0 when the market is decreasing.

The database consists of daily stock prices for 10 companies listed on the Bucharest Stock Exchange, as well as daily prices of the BET index and were extracted from the Thomson Reuters Datastream database. The period analyzed is January 1, 2016 – December 31, 2018.

3. Empirical results

3.1. The day of the week effect

Table 1 shows the descriptive statistics of the BET index. It can be seen that on Wednesdays and Thursdays average negative returns are recorded. Their highest average is obtained on Tuesday, 0.11%. The average square deviation takes values between 0.70% and 1.14%. The highest maximum of daily returns can be seen on Monday with a value of 7.06%.

Table no. 1. Descriptive statistics related to the daily returns of the BET index

BET						
	Monday	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Total/Max vs Min*
Obs.	144	150	152	153	151	750
Mean	0,03%	0,11%	-0,05%	-0,04%	0,02%	0,01%
Std. Dev.	1,03%	0,70%	1,14%	0,86%	0,84%	0,92%
Maximum	7,06%	2,74%	2,70%	3,34%	2,10%	7,06%
Minimum	-5,07%	-2,13%	-11,21%	-3,83%	-5,06%	-11,21%

Source: Thomson Reuters DataStream and own processing in EViews

In addition to the descriptive indicators mentioned above, EViews establishes skewness, which shows the degree of distribution asymmetry around the average and kurtosis – which measures the thickness of the distribution queues. The negative skewness (-2.32) denotes that the data series is asymmetrically negative, with leftward elongation. Kurtosis has values greater than 3, which means that we have leptokurtic distribution, with a higher peak than in the case of a normal distribution.

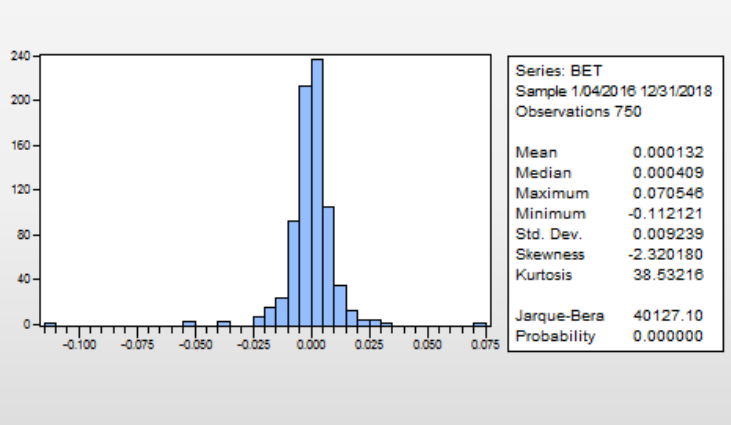

Figure no. 1. Descriptive statistics related to the daily returns of the BET index
(Own processing in EViews)

Table no. 2. presents the results obtained by applying the GARCH model for the 4 established samples, for a normal distribution of errors. Interpretations were made according to p-value. So:

- Regarding the first sample, which covers the entire period analyzed from January 2016 to December 2018, we can observe an effect of Tuesday, with a statistically significant result for a significance threshold of 1% with higher yields than in the other days of the week.
- For sample 2, which refers to 2016, no effect of the day of the week is recorded.
- In the sample 3, which covers the period January 2017 – December 2017, an effect of Tuesday is identified, but this time for a significance threshold of 10%, with higher returns than on the other days of the week.
- Sample 4 for the period January 2018 – December 2018 emphasizes the effect of Tuesday for a 99% confidence level, recording higher returns than the rest of the days. Also in this sample you can see an effect of Monday, but with a statistically significant result for a significance threshold of 5%.

Table 2. Testing of the day of the week effect, GARCH model – normal distribution

	Monday	Tuesday	Wednesday	Thursday	Friday
Sample 1					
p-value	0.1219	0.0003***	0.3455	0.8354	0.4150
t-stat	1.5467	3.6191	0.9432	-0.2077	0.8151
Sample 2					
p-value	0.2326	0.8785	0.5425	0.1996	0.6248
t-stat	-1.1937	0.1528	0.6090	1.2826	-0.4890
Sample 3					
p-value	0.1247	0.0903*	0.5023	0.5099	0.1209
t-stat	1.5351	1.6939	0.6708	-0.6589	1.5511
Sample 4					
p-value	0.0314**	0.0001***	0.6724	0.3704	0.2648
t-stat	2.1516	4.0467	-0.4228	0.8957	1.1150

*** significant for 1%; ** significant for 5%; * significant for 10%

Source: Thomson Reuters DataStream and own processing in EViews

Table no. 3. presents the results obtained by applying the GARCH model for the 4 established samples, for the distribution of errors of type Student's t. The interpretations were made according to p-value. So:

- Regarding the first sample, which covers the entire period analyzed January 2016 - December 2018, an effect of the day of Monday and an effect of the Friday were identified, both results being statistically significant for a significance threshold of 10%, the highest yields being recorded on Fridays.
- For sample 2, which refers to 2016, there is no effect of the day of the week. It seems that in 2016 the Romanian capital market was informationally efficient.
- In the sample 3 which refers to the year 2017, an effect of Friday is highlighted, with a statistically significant result for a significance threshold of 1%. The yields recorded on this day are higher compared to the returns recorded on the other days of the week.

- Sample 4 for the period January 2018 - December 2018 has an effect of Monday, but also this time with a statistically significant result for the 10% threshold. The yields obtained on the days of the months are significantly higher than the yields obtained on the other days.

Table no. 3. Testing the day of the week effect, GARCH model – Student's t distribution

	Monday	Tuesday	Wednesday	Thursday	Friday
Sample 1					
p-value	0.0900*	0.1059	0.8644	0.6974	0.0545*
t-stat	1.6955	1.6168	0.1708	0.3888	1.9226
Sample 2					
p-value	0.8435	0.4710	0.3979	0.2778	0.8503
t-stat	-0.1974	0.7208	0.8454	1.0852	-0.1887
Sample 3					
p-value	0.4349	0.4819	0.6304	0.4562	0.0084***
t-stat	0.7858	0.7032	-0.4812	-0.7451	2.6364
Sample 4					
p-value	0.0582*	0.2399	0.8974	0.5454	0.4791
t-stat	1.8941	1.1752	-0.1289	0.6046	0.7076

*** significant for 1%; ** significant for 5%; * significant for 10%

Source: Thomson Reuters DataStream and own processing in EViews

Table no. 4. presents results obtained by applying the EGARCH model. As in the previous model I analyzed 4 different samples and used a normal distribution of errors. Interpretations were made according to p-value. So:

- The first sample for the whole period analyzed, namely January 2016 – December 2018, highlights the effect of Tuesday, this is statistically significant for a significance threshold of 10%, with higher returns than on the other days of the week.

- In contrast to the GARCH model, within sample 2 an effect of Monday was detected, with a statistically significant result for a significance threshold of 10%. In this case, the returns are significantly lower than the returns obtained the rest of the days.
- The results obtained in sample 3 do not indicate any calendar anomaly.
- The effect of Tuesday is also highlighted in the case of sample 4, for the year 2018, with a statistically significant result for a significance threshold of 1%. And this time, the returns obtained on Tuesdays are significantly higher than the returns obtained on the other days of the week. According to the EGARCH model, Monday no longer presents a calendar anomaly, but for the first time it has a Wednesday effect, with a statistically significant result for a 90% confidence level.

Table no. 4. Testing the day of the week effect, model EGARCH – normal distribution

	Monday	Tuesday	Wednesday	Thursday	Friday
Sample 1					
p-value	0.4592	0.0694*	0.4635	0.3405	0.4742
t-stat	0.7401	1.8155	0.7331	-0.9530	0.7157
Sample 2					
p-value	0.0603*	0.9565	0.7443	0.3414	0.5983
t-stat	-1.8785	-0.0545	0.3262	0.9513	-0.5268
Sample 3					
p-value	0.9187	0.8228	0.3231	0.2554	0.3462
t-stat	0.1020	0.2238	0.9881	-1.1373	0.9420
Sample 4					
p-value	0.3898	0.0025***	0.0956*	0.3561	0.3081
t-stat	-0.8600	3.0271	1.6667	-0.9227	1.0193

*** significant for 1%; ** significant for 5%; * significant for 10%
Source: Thomson Reuters DataStream and own processing in Eviews

Table no. 5. presents results obtained by applying the EGARCH model, for a distribution of Student's t errors. The interpretations were made according to p-value. So:

- The first sample targeting the period from January 2016 to December 2018 highlights the effect of Friday, this is statistically significant for a significance threshold of 10%.
- The results obtained in the sample 2 do not indicate any calendar anomaly, unlike the result in the table above, which indicates an effect of the Monday day in the sample 2, under the conditions of a normal distribution of errors.
- The results obtained in the sample 3 which refers to the period January 2017 – December 2017 confirm the results obtained in the above model. The calendar effect persists on Fridays, the result being statistically significant for a significance threshold of 1%. The yields obtained on Friday are significantly higher than on the other days of the week.
- Sample 4, in the case of a distribution of Student's t errors, has no effect of the day of the week, unlike the model tested using a normal distribution of errors, which detected the day of the week effect on Tuesdays and Wednesdays.

Table no. 5. Testing the day of the week effect, model EGARCH – distribution Student's t

	Monday	Tuesday	Wednesday	Thursday	Friday
Sample 1					
p-value	0.1715	0.1609	0.7710	0.9146	0.0615*
t-stat	1.3675	1.4020	0.2910	0.1072	0.1870
Sample 2					
p-value	0.3360	0.1571	0.3934	0.6407	0.5564
t-stat	-0.9621	1.4149	0.8534	0.4667	-0.5882
Sample 3					
p-value	0.4355	0.4887	0.7054	0.3561	0.0094***
t-stat	0.7798	0.6924	-0.3780	-0.9228	2.5980
Sample 4					
p-value	0.1498	0.5430	0.9650	0.9665	0.5859
t-stat	1.4401	0.6082	0.0439	-0.0420	0.5447

*** significant for 1%; ** significant for 5%; * significant for 10%
Source: Thomson Reuters DataStream and own processing in Eviews

3.2. Herd behavior

Table no. 6. presents the descriptive statistics of the returns of the stocks for the analyzed period that covers the interval from January 2016 to December 2018. It can be observed that the highest average of the returns is registered by SNN, with a value of 0.000421. Two titles, EL and TEL show negative averages. The skewness for all 10 titles is negative, which indicates that the distribution of variables is negative. Kurtosis takes values greater than 3 in all cases, the distribution being a leptokurtic one, with a higher peak than in the case of a normal distribution.

Table no. 6. Descriptive statistics of the returns of the 10 stocks analyzed

Stock	*Obs.*	*Mean*	*St. Dev.*	*Maximum*	*Minimum*	*Skewness*	*Kurtosis*
SNP	750	0,000157	0,015676	0,105357	-0,129683	-0,56	13,33
BRD	750	0,000074	0,014922	0,101338	-0,166168	-1,88	28,27
TLV	750	0,000392	0,016068	0,111111	-0,199149	-2,85	42,74
FP	750	0,000186	0,010430	0,047619	-0,062500	-0,88	11,57
SNN	750	0,000421	0,014794	0,110476	-0,173913	-1,90	35,07
EL	750	-0,000202	0,012713	0,061702	-0,100901	-0,78	11,38
TGN	750	0,000297	0,014821	0,061770	-0,130045	-1,93	21,18
SNG	750	0,000162	0,014498	0,049327	-0,141304	-2,99	26,79
TEL	750	-0,000301	0,013615	0,077859	-0,092496	-0,58	12,18
COTE	750	0,000218	0,018507	0,147959	-0,249180	-2,60	56,20

Source: Thomson Reuters DataStream and own processing in Eviews

In the **table no. 7.** the descriptive statistics of the standard cross-sectional deviations of the returns of the stocks from the market profitability and the descriptive statistics of the BET index representing the market profitability are centralized. It can be seen that the skewness for CSAD is greater than 0, that is, we have a positive asymmetric distribution, with the right elongation. In terms of market profitability, we have a negative skewness that indicates an asymmetrical distribution elongated to the left. Kurtosis is greater than 3 in both cases, ie the distributions are leptokurtic, with a longer tip than in the case of a normal distribution.

Table no. 7. Descriptive statistics of CSAD and BET

Var.	*Obs.*	*Mean*	*St. Dev.*	*Maximum*	*Minimum*	*Skweness*	*Kurtosis*
$CSAD_t$	750	0,005764	0,007218	0,112121	0,000003	6,54	77,90
$R_{m,t}$	750	0,000132	0,009239	0,070546	-0,112121	-2,32	38,50

Source: Thomson Reuters DataStream and own processing in Eviews

Table no. 8. reflects the results obtained from the regression estimation in order to detect the gregarious behavior using the OLS (the least squares) method. The existence of this behavior on the market is given by the value of the coefficient γ2 (it must be negative and statistically significant). As can be seen in the table, this coefficient has a positive value and is not statistically significant, which indicates that, for the period analyzed January 2016 – December 2018, the group effect was not present on the Romanian stock market.

Table no. 8. Results of herd behavior testing, OLS method

$CSAD_{i,t} = \alpha + \gamma_1 \lvert R_{m,t} \rvert + \gamma_2 (R_{m,t} - \bar{R}_m)^2 + \varepsilon_t$	
α	0,0015*** (5,6836)
γ_1	0,1049*** (0,1401)
γ_2	0,0358 (13,1044)

*** significant for 1%; ** significant for 5%; * significant for 10%
Source: Thomson Reuters DataStream and own processing in Eviews

Barnes and Hughes (2002) consider that quartile regression is more suitable for analyzing the dispersion of returns in the extreme tails of their distribution, than the OLS method that is based on the mean and thus losing information from the extreme tails of the distributions. The authors claim that in the case of the OLS model, the estimators can record deviations from the information published on the market being statistically reflected as extreme values. Taking these into account, I applied the QREG (Quartile Regression) model, considering 4 quartiles: 10%, 25%, 50%, 75% and 90%.

Table no. 9. presents the results obtained as a result of applying the QREG model. We can see from the table that the coefficient γ_2 takes negative values for both the 75% and 90% quartiles. These results, however, are not statistically significant, which is why we cannot say that there is mimicry in the Romanian stock market.

Table no. 9. Results of herd behavior testing, QREG model

$CSAD_{i,t} = \alpha + \gamma_1 \lvert R_{m,t} \rvert + \gamma_2 (R_{m,t} - \bar{R}_m)^2 + \varepsilon_t$			
	α	γ_1	γ_2
Quartile τ = 10%	0,0002*** (4,2454)	-0,0020 (-0,1731)	0,9868*** (9,4818)
Quartile τ = 25%	0,0005*** (8,4870)	0,0319** (2,2839)	0,6592*** (4,9933)
Quartile τ = 50%	0,0011*** (10,8478)	0,0853*** (3,9969)	0,1332 (0,7185)
Quartile τ = 75%	0,0020*** (11,5273)	0,1611*** (3,7241)	-0,5940 (-1,6102)
Quartile τ = 90%	0,0032*** (10,6769)	0,2029*** (4,0142)	-0,9166 (-1,2086)

*** significant for 1%; ** significant for 5%; * significant for 10%

Source: Thomson Reuters DataStream and own processing in Eviews

Table no. 10. presents the results of the herd effect testing on a bull / bear market. To estimate this regression we used dummy variables that take the value 1 when the market is increasing, respectively the value 0 when the market is decreasing. In this case there are 2 values that interest us, γ_3 and γ_4. The first refers to the upward trend of the market, and the second concerns a market under the sign of the bear. The results obtained from the regression estimation confirm those obtained in the previous examples. When we have a bull market, the coefficient is positive, so there is no herd effect. In the case of the bear market, although the coefficient has a negative value, it is not statistically significant, and in this case we cannot admit the presence of mimicry on the Romanian stock market.

Table no. 10. The results of the group behavior testing in a bull/bear market

$CSAD_{i,t} = \alpha + \gamma_1 D_{up}^{down} \lvert R_{m,t} \rvert + \gamma_2 (1 - D_{up}^{down}) \lvert R_{m,t} \rvert + + \gamma_3 D_{up}^{down} (R_{m,t} - \bar{R}_m)^2 + \gamma_4 (1 - D_{up}^{down}) (R_{m,t} - \bar{R}_m)^2 + \varepsilon_t$	
α	0,0016***(13,2038)
γ_1	0,0718*** (2,7881)
γ_2	0,1128*** (5,2213)
γ_3	1,0650* (1,7066)

γ_4	-0,1233 (-0,4446)

*** significant for 1%; ** significant for 5%; * significant for 10%

Source: Thomson Reuters DataStream and own processing in Eviews

Conclusions

The first case study concerns the day of the week effect on the Romanian stock market. The period analyzed is January 2016 – December 2018. To explain these series of financial data I used the GARCH and EGARCH models. The first model incorporates the volatility clustering property, specific to the returns of financial assets. The disadvantage of this model is that it cannot capture the leverage effect that represents one of the statistical properties of the stock returns. Because the model uses the squares of the residuals, the impact of the positive/negative shocks is symmetrical. In order to be able to capture the leverage specific to the stocks and shares compound indices, asymmetric GARCH models have been formulated that allow negative shocks to have a stronger impact than positive shocks on the conditional variance. Such a model is the EGARCH type. It has the advantage of not imposing restrictions of non-negativity on the coefficients. Results determined by the application of the models indicate the presence of the effect of Tuesday and of the effect of Friday, statistically significant results for a confidence level of 99%. Also, there was an effect of Monday, but for a significance threshold of 5% and 10%, only for the GARCH model. The results obtained by Țilică and Oprea (2014) and partially those obtained by Țițan (2017) are confirmed.

In the second study I tested the existence of the group effect on the Romanian stock market. The period analyzed is January 2016 – December 2018. I applied the CSAD (cross-sectional absolute deviation) model developed by CCK (2000). I estimated the regression using the OLS and QREG methods. The obtained results indicate that there is no group effect on the capital market. I also tested how investors react when the market is rising / falling. This time, herd behavior among investors has not been identified. It seems that the actors on the Romanian stock market base their decisions on their own knowledge, skills and experiences and avoid imitation. This study confirms the results obtained by Pop (2012) and Pochea (2015), who tested the Romanian stock market between 2003-2012 and did not detect the group effect.

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