

AN ANALYSIS OF INVESTORS' BEHAVIOR IN THE ROMANIAN CAPITAL MARKET

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ABSTRACT

In this paper, we examine investor reaction to the arrival of unexpected political and economic induced information in the Romanian equity market in a crucial era after a major transformation of the Romanian economy, the reopening of Romania's stock market in 1995 after 50 years of being closed, and the execution of several financial reform programs. Daily stock market returns from two major indexes (BET and BET-C) are employed to analyze the behavior of investors in the framework of three competing hypotheses: The Overreaction Hypothesis (OH), the Uncertain Information Hypothesis (UIH), and the Efficient Market Hypothesis (EMH). The findings suggest evidence of significant price reversals following the arrival of both favorable and unfavorable price innovations in the narrow BET index, as predicted by the OH. The implication of this result is that investors can exploit contrarian strategies to generate abnormal returns for the underlying stocks of the BET. However, for the BET-C a corrective trend of positive returns following the arrival of favorable shocks was documented, a result consistent with the prediction of the UIH. It follows that Romanian investors who participate in the broader BET-C composite index systematically place security prices below their fundamental values in reaction to the arrival of unexpected favorable economic and political news. The pattern of cumulative abnormal returns in the BET-C following the arrival of unexpected negative news is consistent with the EMH.



Romanian capital market, investors' behavior, efficient market hypothesis, overreaction hypothesis, uncertain information hypothesis

INTRODUCTION

Romanian stock market has undergone significant transformation since the reestablishment of the Bucharest Stock Exchange (BSE) in 1995 after being closed for 50 years. The post-communist Romanian governments have taken a number of initiatives in order to regulate the activities of the financial system and equity market. The objective of these initiatives primarily is to improve public confidence and to create more efficient trading activities. For instance, new stricter listing requirements were created and imposed and a number of stocks that displayed disclosure problems were delisted. As a result of these measures, public confidence has been restored and the volume of trading has grown considerably.

However, while all of the measures taken by the government and stock market authorities were necessary to increase overall efficiency and transparency, it remains an open question as to whether the Romanian equity market has developed enough to be efficient to the point where prices reflect all available information. One could hypothesize that investors in an environment detached from pure capitalism for such a long time, may behave irrationally and over-react or under-react to the arrival of unexpected information.

Consequently, it is very relevant to examine the behavior of investors in the Romanian capital market and to investigate their reactions to the arrival of unexpected favorable and unfavorable economic and political events. In order to conduct this analysis, we firstly identify those favorable and unfavorable economic and political events in Romania from 1998-2007 that had a major impact on equity prices. Secondly, we use daily returns from two major Romanian stock market indices, the Bucharest Exchange Trading (BET) Index and the BET Composite (BET-C) Index, to determine whether the reaction of Romanian investors to these events is consistent with the predictions of the Efficient Market Hypothesis (EMH), the Overreaction Hypothesis (OH), or Uncertain Information Hypothesis (UIH).

The EMH is based on the proposition that stock returns follow a random walk process, and while prices fluctuate at random, instantaneous reaction of investors to extreme price innovations cause the prices to regress to their fundamental values rapidly. This implies that stock prices reflect all available information and they revert to the mean of their intrinsic values. DeBont and Thaler (1985) proposed OH which suggests that investors due to emotion overreact to the arrival of unexpected information. That is, the investors price securities higher than their fundamental values in the case of favorable news, and lower than their fundamental values in the case of unfavorable news. As a result, the price movements after unexpected favorable news are downward and the price movements after unexpected unfavorable news are upward. Brown, Harlow and Tinic (1998, 1993) put forward the “uncertain information hypothesis” (UIH) to explain the reactions of investor following the arrival of unexpected price innovations. The UIH

suggests that the arrival of unexpected information, whether good or bad, raises uncertainty and risk in the equity markets. In responding to the increased risk, investors react rationally by initially setting stock prices below their fundamental values. An upward corrective trend in security prices will then follow as the initial uncertainty gradually subsides and prices rise to their fundamental values. This pattern in stock prices predicted by the UIH implies that abnormal returns are in general positive (or at least non-negative) during a corrective period following the arrival of both unfavorable and favorable news.

Appendix A displays a graphical representation of the corrective movements in stock prices following the arrival of unexpected favorable and unfavorable information as predicted by the EMH, OH and UIH. In Panel A, the patterns of investor reaction to the arrival of unexpected information is consistent with the EMH, where stock prices adjust instantaneously. In Panel B, investor reaction is consistent with the OH, where price adjustments exhibit a reversal following the arrival of unexpected information. Panel C displays a series of price adjustments consistent with the UIH, where price adjustments are positive or at least non-negative in reaction to the arrival of unexpected information.

While previous research has examined investor reaction to unexpected events in a number of advanced and emerging stock markets (see Brown *et al.*, 1988, 1993; DeBondt & Thaler, 1985, 1987; Kadiyala & Rau, 2004; Ajayi *et al.*, 2006; Mehdian *et al.*, 2008), no previous research has examined the behavior of investors in an Eastern European emerging market such as Romania. This paper is an attempt to fill that gap.

We identify 45 political and economic shocks from 1998-2007 that had a major effect on Romanian stock prices, either positively (22 events) or negatively (23 events). We then follow a Brown *et al.* (1988) and compute cumulative abnormal returns (CARs) during a 30-day window subsequent to each event to test whether investor reaction in Romania is consistent with either the OH, or UIH, or EMH.

Our empirical results show that: a) the volatility of stock returns in both Romanian stock indexes increases following the arrival of unexpected information, b) there is a significant price reversal in reaction of both favorable and unfavorable economic and political news for the BET index, a result consistent with the OH, c) the reaction of investors in the BET-C index is in line with the prediction of the UIH in the case of favorable news, while the reaction of investors in this index to unfavorable news is consistent with the EMH. These results suggest that in the case of the BET, a contrarian strategy of buying current losers and selling current winners may be effective to generate superior returns for Romanian investors. In the case of the BET-C, investors react rationally by pricing securities to reflect the higher risk generated by the uncertainty associated with the arrival of unexpected information. Therefore, no trading rule can be established by investors to achieve

abnormal returns for the BET-C stocks. The rest of the paper is organized as follows. Section II discusses the historical evolution of the Romanian stock market. Section III describes the dataset and methodology. Section IV presents the empirical results and Section V concludes the paper with a summary.

1. ROMANIAN CAPITAL MARKET EVOLUTION

The Romanian capital market was originally established in 1882 and functioned continuously up until 1948, when it was closed by the Communist regime. In 1995, the stock exchange in Romania was re-opened following the end of the Communist period, and played an important role in the development of the emerging market economy. For the first several years, trading was somewhat limited, since there were only nine companies listed in 1995 and seventeen in 1996. By 1997, the number of publicly traded companies increased to 76, and the transaction value and volume increased significantly. Currently there are 126 companies listed on the BSE, see Table 1.

Table 1. Bucharest Stock Exchange Characteristics 1995-2007

Year	No. shares traded per year (mil.)	Transactions total value (mil. USD)	Market capitalization (mil. USD)	Market capitalization /GDP (%)	BET (YTY)	BET-C (YTY)	Market volatility (*)
1995	0,043	0,964	100,4	0,36%	-	-	-
1996	1,142	5,3	60,8	0,21%	-	-	-
1997	593,9	263,6	632,4	2%	-	-	-
1998	986,8	213,6	357,1	1,05%	-50,2%	-	25.60%
1999	1.057,6	89,5	316,8	1,05%	18,7%	-3,3%	20.51%
2000	1.806,6	86,9	415,9	1,35%	21%	8%	19.09%
2001	2.277,5	132,02	1.228,5	3,34%	39%	-5%	24.88%
2002	4.085,1	213,7	2.717,5	6,05%	120%	127%	21.71%
2003	4.106,4	302,2	3.710,2	6,40%	31%	26%	13.03%
2004	13.007,6	748,2	11.937,6	13,86%	101%	104%	15.53%
2005	16.934,9	2.672,7	18.184,8	19,52%	51%	38%	28.66%
2006	13.677,5	3.514,6	28.204,04	21,42%	22%	28%	19.44%
2007	14.234,9	5.680,6	35.326,04	21,24%	22,05%	32,6%	20.51%

(Data sources: www.bvb.ro, www.bnr.ro, www.insse.ro)

(*) Annualized daily volatility of BET-C index (calculated as $\sigma_{year} = \sigma_{day} \times \sqrt{no.trading\ days}$)

The Bucharest Exchange Trading (BET) Index was launched on September 22, 1997 to monitor the ten most liquid and largest companies (by market capitalization), while the BET-C (Composite) Index, was later introduced in April 1998 to track the performance of the entire Romanian stock market (except for the five Financial Investment Companies (SIFs)). In 2000, the BSE started a third index called the BET-FI, which monitors the performance of the five Financial Investment Companies.

Just as the new Romanian stock market began functioning in the late 1990s, there was a period from 1998 to 2000 when the trading activity on the BSE decreased sharply due to political events, including a major controversy surrounding the decision of the Romanian Government to close unproductive coal mines, and the suspension of the "IMF's standby agreement" due to the lack of progress on structural reforms. The weak conditions of the struggling Romanian economy in 1999 also decreased stock market investor confidence and trading activities (real GDP growth rate was -1.2%, inflation rate was 55% and the unemployment rate 11.8%).

By 2001 the Romanian economy has recovered and investor confidence improved, largely because the BSE adopted important measures that enhanced the transparency of the Romanian capital market and its liquidity (more than 50 companies with low capitalization and transaction values were delisted). Further regulatory improvements of the Romanian capital markets continued in the following years (e.g. the Romanian Parliament passed the new Consolidated Law of the Capital Market) and investor interest and confidence for this market improved substantially. For example, in 2004 the number of transactions and the market capitalization tripled compared to the previous year, and the BET-C increased by more than 100 percent in 2004 and another 40% in the first two months of 2005. Subsequently, the later part of 2005 was characterized by increased market volatility as investors became more cautious and bearish.

In 2005, the stock market transaction value tripled again, due to falling interest rates and evermore increased investor confidence. In 2006, market volatility continued to stay elevated at high levels: a 19.4% annualized standard deviation. In addition, in this year, there was the first noticeable sign of BSE being highly correlated with the other East European capital markets. All of these markets were simultaneously affected by the rise in inflation and interest rates in the European Union and United States of America. The Romanian stock market also started showing a high degree of correlation with China's stock market during this period. For example, when the Shanghai Composite Index dropped 9 percent in a single day in February 2007, Romania stock market like other emerging markets in the region declined as well.

Since the re-opening of the Romanian stock exchange in 1995, only ten initial public offerings (IPOs) have been launched on the BSE. The majority of these IPOs were oversubscribed, reflecting the investors' interest in IPOs of companies that are at growth and development status. From this perspective, the Romanian stock market is not yet a main source used by newer companies to get capital, and as a result the deepness of the BSE remains somewhat limited. Several other factors that have had an impact on BSE volatility are: a) the relatively low level of free-float market capitalization, and b) the high percentage represented by only two companies in the total Romanian stock market capitalization (Petrom and BRD-

GSG had 35% and 16% of the Romanian stock market capitalization, respectively in 2007, see *Table 2*).

Table 2. Capitalization and liquidity of the most important issuers listed at BSE (2006)

Issuer	Activity Sector	Free-float*	Liquidity (mil.EUR)	Capitalization (mil. EUR)	Capitalization (%)	Free-float capitalization (mil. EUR)
SIF Banat Crisana	Financial Investments	75,4%	175	522	1,7%	394
SIF Moldova	Financial Investments	89,6%	414	496	1,6%	444
SIF Transilvania	Financial Investments	84,1%	284	475	1,9%	400
SIF Muntenia	Financial Investments	54,6%	156	434	1,5%	237
SIF Oltenia	Financial Investments	81,2%	421	598	2,0%	486
BRD-GSG	Banks	11,4%	208	3765	15,9%	430
Banca Transilvania	Banks	70,9%	262	1160	4,5%	822
Petrom	Oil&Gas	34,5%	155	539	35,0%	186
Rompetrol Rafinare	Oil&Gas					
Antibiotice	Pharmaceutics	29,3%	21	228	0,9%	67
Biofarm	Pharmaceutics	61,3%	48	90	0,4%	55
Transelectrica	Utilities	10%	44	723	3,8%	72
Flamingo International	Retail	29,6%	16	81	n/a	24
Impact Developer& Contractor	Real estate	58,5%	31	171	0,9%	100
Tubormecanica	Engineering	31,8%	22	81	n/a	26

(Data sources: www.bvb.ro, BCR Research)

There are several important sectors of the Romanian economy that are not yet well represented on the BSE. For example, there are very few listed companies (or in some cases no companies) in utilities, telecommunications, constructions materials, and information technology. From this viewpoint, investors can not completely diversify their stock portfolios to reflect the structure of the Romanian economy and its dynamics. In other words, the market risk (systematic risk) of the investments on the BSE does not completely represent the risk of Romanian economy.

Table 3. Capitalization and average annual return of more liquid issuers listed at BSE for each field of activity (at March 31, 2007)

Activity Sector	Capitalization (mil. EUR)	Capitalization (%)	Annual Return
Oil&Gas and Energy services	10.333	44,6%	15,07%
Banks	5.840	25,2%	21,47%
Financial Investments Companies	2.423	10,5%	30,8%
Utilities	1.033	4,5%	n/a
Pharmaceutics	569	2,5%	39,6%
Chemicals	517	2,2%	12,2%
Real Estate	234	1,0%	129,75%
Tourism	177	0,8%	n/a
Manufacturing	141	0,6%	n/a
Retail companies	86	0,4%	-8,9%
Other financial services	71	0,3%	4,83%
Agro-chemical products	44	0,2%	-53,4%
Other sectors	1.698	7,3%	n/a

(Data sources: www.bvb.ro, BCR Research)

As we can see from *Table 3*, the oil and gas sector and the financial services sector both have a major impact on Romanian stock market risk (see also *Table 4*).

Table 4. The residents and non-residents investors on BSE (2004-2007)

Year	Type of trades	Residents Trades		Non-residents trades	
		Natural Persons	Legal persons	Natural Persons	Legal persons
2004	Purchases (% in total)	49,77%	20,99%	6,51%	22,73%
	Sales (% in total)	60,12%	21,6%	3,39%	14,89%
2005	Purchases (% in total)	51,6%	20,21%	4,04%	24,15%
	Sales (% in total)	58,38%	20,05%	6,91%	14,66%
2006	Purchases (% in total)	44,2%	25,7%	4,3%	25,8%
	Sales (% in total)	50,3%	25,6%	4,1%	20,00%
2007	Purchases (% in total)	34,65%	25,69%	2,95%	36,71%
	Sales (% in total)	45,14%	21,17%	2,69%	31,00%

(Data source: www.bvb.ro)

An analysis of BSE data from 2005-2007 indicates a shift in volume of stock trading by Romanian residents and nonresidents. Compared to 2005, the most volatile year for the BSE, by 2007 the percentage of stock trading by the non-residents (legal persons) increased. This phenomenon may be due to the fact that these investors are globally diversified and are probably less concerned about the unsystematic risk of the BSE investments. Consequently, one may expect the BSE volatility to decline in the subsequent period (see *Table 4*).

The volatility of the Romanian stock market will also potentially decrease because of the expected increase in the number of IPOs in the near future for state-owned companies including companies in which the Propriatea Fund holds a stake. The Propriatea Fund was established by the Romanian Government to compensate citizens whose property was confiscated in the past by the communist party, and it holds stakes in Romanian companies formerly controlled by the state. Several new legislative measures, passed in 2005 and 2007 by the Romanian Government, will result in the listing of all of the individual companies in Propriatea Fund on the BSE. This in turn may increase stock market liquidity and potentially reduce volatility.

2. DATA AND METHODOLOGY

The data in this study consist of daily returns from the closing values of two major Romania stock indices. The first index is the Bucharest Exchange Trading (BET) Index, which was the initial index of the new Bucharest Stock Exchange, and was designed with the assistance of the Austrian Institute for Advanced Studies in Vienna. The major purpose of the BET Index is that it reflects the price movements of the ten most liquid and actively traded stocks of the BSE, and it is the equivalent of the Dow Jones Industrial Average in the U.S. These ten stocks are selected from those listed at the Bucharest Stock Exchange, excluding the sectorial investment funds (SIFs), taking into account the diversification criterion regarding the activities of the corresponding companies. The BET Index, in addition, is believed to offer an instrument for derivatives trading (index options and futures contracts) in order to provide hedging opportunities for investors. The second index that we use is the Bucharest Exchange Trading Composite Index (BET-C). This index has been launched to reflect the price movements of all stocks listed on the BSE, except for the SIFs. The increasing number of BSE listed stocks motivated the creation of the BET-C composite index as a more comprehensive alternative index to the BET. The period under study is from January 4, 1999 to July 9, 2007 for the BET Index and from April 16, 1998 to July 9, 2007 for the BET-C.

In this paper we classified unexpected economic and political induced price innovations as favorable or unfavorable surprises in Roman that we believe should considerably influence the prices of all companies indiscriminately. Therefore, analyzing investor reaction to specific surprises justifies the use of the returns from major stock market indexes rather than individual securities.

The daily return for each Romanian stock index is computed as follows:

$$K_{it} = \ln (I_{it} / I_{it-1}) \times 100 \quad (1)$$

where K_{it} is the daily return of stock index i on day t , I_{it} and I_{it-1} are the closing values of stock index i on days t and $t-1$ respectively, i is either the BET Index or

the BET-C Index, and \ln is the natural logarithm. Table 5 presents the summary statistics of daily stock returns for both Romanian indexes, along with summary statistics of the major stock indexes of a few neighboring East European emerging market countries (Bulgaria, Czech Republic, Hungary, Poland, Russia, Slovak Republic, and Ukraine), and a sample of developed countries (France, Germany, U.K. and U.S.), for comparison purposes. As the summary statistics indicate, the average stock market returns for the emerging markets of Eastern European were much higher than the returns of the advanced countries, and the average stock market returns of Romania (0.167% for the BET), Russia (0.181%), Bulgaria (0.180%) and Ukraine (0.172%) were the highest of the sample group. For each Romanian index, we conducted four separate augmented Dickey-Fuller (ADF) tests, including from one to four lags. Results from these unit root tests show that daily stock returns are stationary for both Romanian stock indexes.

Table 5. Summary statistics for the BET and BET-C Indexes, and a set of selected Stock Market Indexes

Stock Market Index	Days	Mean Return	Std. Dev.	Max.	Minimum
Romania: BET	2116	0.167%	1.57%	9.371%	-11.221%
Romania: BET-C	2298	0.094%	1.38%	10.042%	-9.776%
Bulgaria: SE SOFIX	1668	0.180%	1.84%	23.458%	-18.85%
Czech Republic: Prague SE PX	2314	0.067%	1.285%	7.302%	-6.833%
France: CAC 40	2349	0.040%	1.422%	7.254%	-7.391%
Germany: DAX	2348	0.022%	1.599%	7.844%	-8.486%
Hungary: Budapest Stock Exchange	2301	0.066%	1.676%	14.586%	-14.381%
Poland: Warsaw SE 20	2310	0.049%	1.765%	9.418%	-9.922%
Russia: MICEX	2299	0.181%	2.998%	31.653%	-17.306%
Slovak Republic: Bratislava SE SAX	2243	0.059%	1.34%	6.141%	-10.849%
U.K.: FTSE-100	2176	0.025%	1.198%	6.751%	-6.397%
Ukraine: PFTS OTC	2032	0.172%	2.359%	22.147%	-14.342%
U.S.: S&P 500	2321	0.027%	1.138%	5.734%	-6.801%

To empirically test the reaction of investors in the Romanian stock market to new information, we follow a qualitative approach. Based on this approach, we identify 12 favorable and 12 unfavorable economic and political surprises for the BET index, and 10 favorable and 11 unfavorable economic and political surprises for the BET-C index, as listed and described in Table 6. An example of “unexpected favorable economic news” was an upgrade from all three credit rating agencies (Standard & Poor’s, Moody’s and Fitch-IBCA) on Romania’s financial condition on January 3, 2005, that led to a 5.79% increase in the BET. An example of “unexpected unfavorable political news” was the concern on January 13, 1999 about Romania’s creditworthiness after negotiations with International Monetary Fund broke down that day, and the BET fell by -3.16%.

After identifying 24 economic and political surprises for the BET, and 21 surprises for the BET-C, we then track daily stock returns for each Romanian index during a 30-day post-event window to empirically investigate whether investor reaction is consistent with the OH, the UIH or EMH. In this framework, it should be noted that the qualitative approach of identifying major economic and political events that significantly impact stock returns is an alternative and perhaps superior method to the strictly quantitative approach that has been used in previous studies on investor reaction to surprises. The quantitative approach identifies favorable and unfavorable surprises on the basis of some arbitrary daily percentage change in stock prices, without linking these surprises to any specific positive or negative news. Consequently, a possible criticism of a strictly quantitative approach is that the outcome of the analysis may be sensitive to the extent of the daily percentage change in stock prices that is arbitrarily determined by the researcher.

Appendix A contains the specific dates of the major events, a description of the event(s) that resulted in a significant market reaction, and the daily percentage change in each index on the event days. We next make out a 30-day, post-event window following each favorable or unfavorable event, and daily stock returns are tracked during these windows to empirically investigate investor reaction to the arrival of unexpected information. Accordingly, we are able to identify a total of 720 post-event days for the BET index, out of which 360 days are post-favorable event days, and 360 days are post-unfavorable event days. The remaining 1,329 days of the sample, which do not fall within any of the 30-day windows following major events, are classified as non-event days. For the BET-C index, we classify a total of 629 days as post-event days that include 300 post-favorable event days and 329 post-unfavorable event days, and 1,668 days as non-event days.

In order to test whether the arrival of unexpected information increases the volatility of the stock market in Romania, we calculate the variance of daily stock returns for the post-event days (following both favorable and unfavorable news) and for the non-event days using the following formula:

$$Var = \left(\sum_{t=1}^{N_j} \left(K_{it} - \bar{K}_{ij} \right)^2 \right) (1/N_j - 1) \quad (2)$$

where

N_j = number of days in each category (post-event or non-event days)

K_{it} = daily return of stock index i on day t

\bar{K} = the average return of each category (post-event or non-event days)

$j = 1$ for unfavorable events, 2 for favorable events, and 3 for non-events.

We conduct an F-test of the null hypothesis that the variance of returns during post-event window-days (event days) is equal to the variance of returns for the non-event days, in order to contrast volatility in the post-event periods to the volatility

of the non-event periods. To the extent that unexpected events increase market volatility and risk, we would expect the variance of returns in post-event windows to be significantly higher than the variance of returns in non-event days. The rejection of the null hypothesis will provide evidence that there is a statistically significant difference between the level of risk during post-event periods and the risk during non-event periods.

We can also perform the similar test to examine the differences between market volatility during post favorable news and post unfavorable news. The rejection of the null hypothesis will provide evidence to indicate that there is a statistically significant difference between the level of risk during post-favorable periods and the risk during post event-unfavorable periods.

After testing for differences in volatility during post-event windows and non-event periods, we next calculate cumulative abnormal returns (CARs) for each favorable and unfavorable event periods, which will allow us to conclude whether the pattern of stock returns following surprises are consistent with the predictions of either the OH or the UIH. Following a procedure outlined by Mehdian, Nas and Perry (2008), the calculation of CARs involves several steps. In the first step, the abnormal return is calculated, defined as the deviation of each return from the mean return, for each index i (where $i = \text{BET or BET-C}$) on day t ($t = +1 \dots +30$) following an unexpected event d as follows:

$$AR_{itd} = K_{itd} - \overline{K_{i3}} \quad (3)$$

where

AR_{itd} = Abnormal return for stock index i on day t , given event d

$d = 1 \dots n$, and n denotes the number of favorable (14) or unfavorable events (14) in the Romanian stock market index i

K_{itd} = Return of index i on day t for event d

$\overline{K_{i3}}$ = Mean return of index i for non-event days

Therefore, the abnormal return AR_{itd} measures the difference between stock returns on the 30 days following a favorable or unfavorable event and the mean stock return for all non-event days.

In the second step we calculate the mean abnormal return $\overline{AR_{it}}$ on day t as:

$$\overline{AR_{it}} = (1/n) \left(\sum_{d=1}^n AR_{itd} \right), \quad t = +1 \dots +30 \quad (4)$$

Finally, the CARs are generated by summing up the mean abnormal returns over 30 days as:

$$CAR_{it} = CAR_{i(t-1)} + \overline{AR_{it}} \quad (5)$$

In order to test whether or not the calculated CARs are statistically different from zero, we perform a standard t-test, where the t-statistic is obtained as:

$$t = \frac{CAR_{it}}{[Var(CAR_{it})]^{\frac{1}{2}}} \quad (6)$$

The statistically significant positive (or at least non-negative) value of CARs following good news suggests that the reaction of investors is consistent with the prediction of the UIH. On the other hand, if the CARs exhibit a statistically significant corrective price reversal pattern [negative (positive) CARs following favorable (unfavorable) events], then investor reaction is consistent with the prediction of the OH.

3. EMPIRICAL RESULTS

Table 7 displays the mean daily stock return for each Romanian index on: a) non-event days, b) all post-event days, c) post-event days after favorable news, and d) post-event days after unfavorable news, along with the sample size for each category. The results in Table 7 show that the average daily stock return during the post-event days is higher than returns during the non-event days for both the BET, and lower for the BET-C. For both indexes, returns during the 30-day window following favorable event days are higher than the returns of all non-event days. Returns in the 30-day period following unfavorable events are lower for both indexes than the returns during non-event days, and for the BET-C, the post-favorable event returns are actually negative.

Table 6. Mean returns for non-event days, all post-event days, post-favorable event days and post-unfavorable event days: BET and BET-C Indexes

	All	Post	Post
INDEX	Post-Event	Favorable	Unfavorable
	Days	Event Days	Event Days
BET	0.1626%	0.1835%	0.1017%
	(1396)	(720)	(360)
BET-C	0.1284%	0.0525%	0.1919%
	(1669)	(629)	(329)

(Number of days is in parentheses)

Table 7 displays the variance of Romanian stock market returns for: a) non-event days, b) all post-event days, c) post-favorable event days, and d) post-unfavorable event days for both indexes. As can be seen, the market volatility of returns is higher during all post event-days as a group 4.03% and 3.24% for the BET and

BET-C respectively than during non-event days (1.28% and 1.06% for the BET and BET-C respectively) in the Romanian stock market, as would be expected. In addition, the first F-test reported in Table 7 of the null hypothesis that the variance of returns for event days as a group is equal to the variance of returns during non-event days is rejected at the 1% level (F-statistics are 3.75 and 3.06 for the two indexes), confirming that market volatility is significantly higher during post-event days for both indexes. These findings are consistent with the UIH, which predicts that market volatility increases following the arrival of unexpected information.

Table 7. Variance of returns for non-event days, all post-event days, post-favorable event days, and post-unfavorable event days

Stock Index	Sample	Days	Variance (stdev)	F-Value
BET Index	Non-Event Days	1396	0,0128%	
	All Post-Event Days	720	0,0403%	a) 3,75***
	Post Favorable Event Days	360	0,0580%	b) 4,53*** d) 2,57**
	Post Unfavorable Event Days	360	0,0226%	c) 1,77*
BETC Index	Non-Event Days	1669	0,0106%	
	All Post-Event Days	629	0,0324%	a) 3,06***
	Post Favorable Event Days	300	0,0303%	b) 2,86*** d) 1,10
	Post Unfavorable Event Days	329	0,0334%	c) 3,25***

- a) The F-statistic marked a tests the null hypothesis that the variance of returns for non-event days is equal to the variance of returns for all post-event days.
- b) The F-statistic marked b tests the null hypothesis that the variance of returns after unexpected favorable events is equal to the variance of non-event returns.
- c) The F-statistic marked b tests the null hypothesis that the variance of returns after unexpected unfavorable events is equal to the variance of non-event returns.
- d) The F-statistic marked d tests the null hypothesis that the variance of returns after unexpected favorable events is equal to the variance of returns after unexpected unfavorable events.

Note: Post-event periods contain the days after both favorable and unfavorable events.

*** indicates statistical significance at the 1% level, ** at the 5% level and * at the 10% level.

The entire F-statistics and corresponding levels of significance are reported in Table 7 for both indexes. These findings suggest that: a) the variance of returns during post -event days is significantly higher then to the variance of returns for all non -event days(F-statistic marked “a” in Table 7, b) the variance of returns in the period following unexpected favorable events is significantly higher than the variance of non-event periods for both indexes (F-statistic marked “b” in Table 7), c) the variance of returns following unexpected unfavorable events is significantly higher than the variance of non-event days (F-statistic marked “c”) for both indexes, and d) the variance of returns following the arrival of unexpected unfavorable information is significantly higher than the variance of returns

following unexpected favorable information for the BET, but not for the BET-C (F-statistic marked “d”).

These F-tests in Table 7 further demonstrate that market volatility in the Romanian stock market significantly increases following the arrival any economic or political news, whether favorable or unfavorable, as hypothesized by the UIH, for the entire set of 45 information events taken as a group.

Appendix B presents the post-event cumulative abnormal returns (CARs) for each stock index, calculated using Equation (5), for a 30-day window following the arrival of unexpected favorable and unfavorable political and economic information. The table also contains t-statistics of the null hypothesis that the CARs are equal to zero, based on Equation (6). For the BET Index, the CARs exhibit an upward trend following the arrival of both favorable and unfavorable news following the events. After favorable news, the CARs reach their highest level of 4.961% on Day 15 for the BET, and that CAR is significantly positive. Following favorable news, the CARs are significantly positive between Day 5 and 22, and reach a peak on Day 15 of 3.022%. For the BET-C Index, the pattern of CARs is similar following favorable news, but is significantly positive slightly later, from Day 19 to Day 30, with the highest level of 3.375% on Day 23. However, the BET-C exhibits a much different pattern following unfavorable events than the BET, with negative returns instead of positive returns. The CARs fall immediately following negative news, and continue falling for the entire 30-day post-event period, with significantly negative returns from Day 19 to Day 30. At Day 29 after an unfavorable event, CARs fall to a low of -9.875%.

The daily CARs during a 30-day window after favorable and unfavorable events for both Romanian stock indices are shown in Appendixes D and E. The CARs displayed graphically in Appendix D, along with the empirical evidence presented earlier, generally suggest that the arrival of unexpected information, whether favorable or unfavorable, induces an overreaction in the case of the BET index. The overreaction is then followed by significant price reversals in the BET as predicted by the OH.

In the case of the BET-C index, the CARs in Appendix E suggest that for the arrival of favorable information initially increases the volatility and risk of returns. Over time, further clarification of the initial uncertainty about the new information results in an upward corrective pattern as equity prices in the BET-C converge to their fundamental values, a process explained by the UIH. For unfavorable news affecting the BET-C, there is an immediate downward adjustment in security prices, which is consistent with the EMH. One implication of these empirical results is that the reaction of investors following the arrival of unexpected news for stocks in the BET-C is not characterized by subsequent price-reversals, so that a contrarian trading rule of buying current losers and selling current winners will not

generate abnormal returns. However, the pattern of price reversals in the BET does suggest that a contrarian trading strategy could be implemented to earn superior returns for those stocks.

SUMMARY AND CONCLUSIONS

This study examines the behavior of Romanian investors in reaction to the arrival of unexpected economic and political news from 1998-2007. Daily stock returns of the two major Romanian stock market indices, the BET Index and the BET-C Index, are used to empirically test three competing hypotheses concerning the response of investors to the arrival of unexpected information: the Overreaction Hypothesis (OH), the Uncertain Information Hypothesis (UIH), and the Efficiency Market Hypothesis (EMH). While investor behavior and market efficiency have been studied extensively for the U.S. and other developed markets, this paper makes contribution to the current literature by providing some new insights regarding investor behavior and market efficiency in an emerging East European stock market. Specifically, this paper empirically investigates whether or not security prices in Romania adjust instantaneously in reaction to unexpected economic and political induced price innovations or they follow a pattern of adjustments.

The empirical results suggest significant price reversals following the arrival of both favorable and unfavorable economic and political news for securities in the narrow BET index, as predicted by the OH. This means that investors who are involved in trading the stocks underlying this index systematically set security prices below (in the case of bad news), or above their fundamental values (in the case of good news), in response to unexpected political and economic information. The implication of this result is that investors may be able to exploit contrarian strategies to generate abnormal returns for the underlying stocks of the BET.

However, for the BET-C index, a corrective trend of positive returns following favorable shocks was documented, a result consistent with the prediction of the UIH. It follows that Romanian investors who participate in the stocks of the broader BET-C composite index systematically place security prices below their fundamental values in reaction to the arrival of unexpected favorable economic and political news. Such behavior is rational according to the UIH, since the arrival of unexpected positive information makes the equity market a more risky environment. The pattern of cumulative abnormal returns for stocks in the BET-C index following the arrival of unexpected negative news displays instantaneous price adjustment: a result that is consistent with the EMH. An important implication of this finding is that prices of stocks underlying the BET-C index react efficiently to the arrival of unexpected information and therefore trading rules such as short-term contrarian strategies will not generate any superior market returns trading the stocks of this index.

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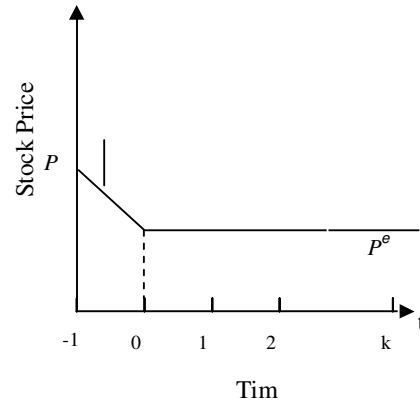
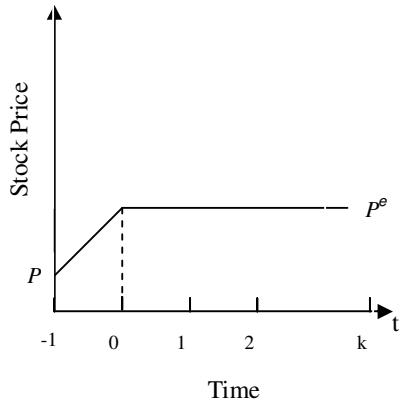
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Appendix A. Stock price patterns in reaction to the arrival of unexpected political and economic news

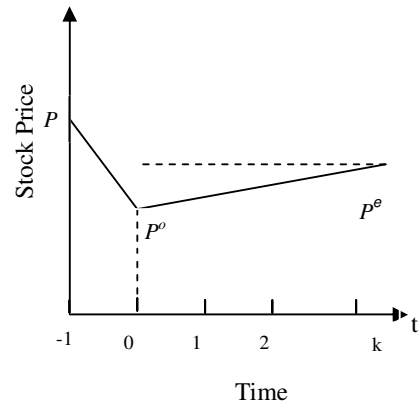
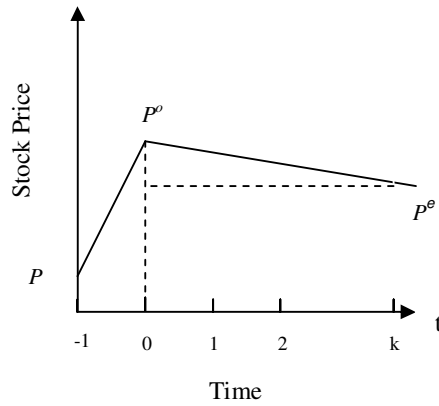
Positive Events

Negative Events

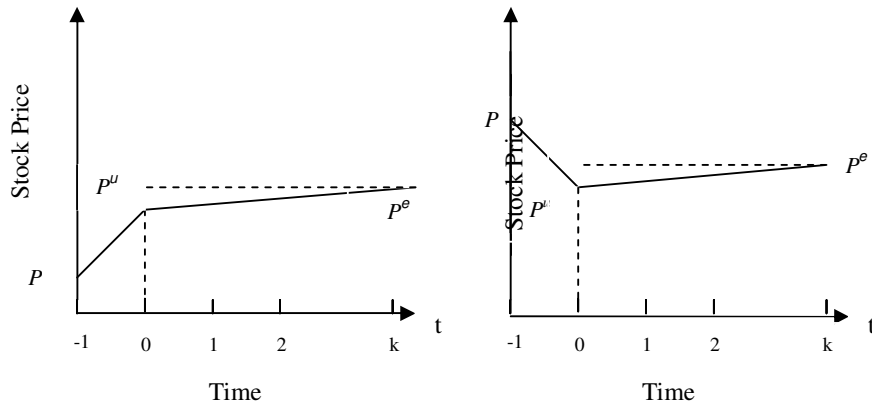
Panel A: EMH



Panel B: OH



Panel C: UIH



$t = 0$ is event day

P^e, P^o, P^u are respectively equilibrium, overreaction, and uncertain information pri

Appendix B. Dates and Sources of Unexpected Positive and Negative News in Romanian Equity Market: Bucharest Exchange Trading Index (BET) and Bucharest Exchange Trading –Composite Index (BET-C)

i) Bucharest Exchange Trading Index (BET)

Date	Daily Return (%)	News	Event
1) 13-Jan-99	-3.16%	Negative	Foreign investors are worried concerning the payment incapacity risk of Romania regarding its debt (the negotiations with IMF (International Monetary Fund) had failed)
2) 10-May-99	5.5%	Positive	One of the companies included in BET, Policolor (PCL) has decided to repurchase its stocks. During the period 6-11 May the company's stock price had increased with 49%. As the Romanian capital market was narrow, favorable evolution of prices for few companies had an impact on market indexes.
3) 24-Jun-99	8.85%	Positive	Many companies had registered increases of stock prices. This could be caused by the fact that one of the foreign investment funds (Romanian Investment Company Cyprus) wanted to report favorable evolution of the stocks included in its portfolio at the end of June. Another reason could be represented by government decision to grant subsidies for the companies in chemical sector to buy methane gas.
4) 4-Nov-99	-4.20%	Negative	After 2 November, the last day to subscribe at the shares issues of Terapia (TER), one important companies of BET Index, this index has decreased.
5) 6-Jan-00	5.07%	Positive	The law regarding profit tax (OUG 217/1999) in force (at that moment) beginning with 1 January 2000 promoted a reduction in the profit tax from 38% to 5% in case of profit from export activities.
6) 8-Mar-00	-5.35%	Negative	
7) 20-Apr-00	-3.01%	Negative	
8) 4-Jul-00	5.81%	Positive	
9) 4-Jan-01	5.35%	Positive	Increase of the investments on capital market caused by optimist expectation regarding the evolution of Romanian economy (during 2000 important macroeconomic indicators like: inflation rate, Romanian currency devaluation rate, unemployment rate etc. had improved comparing with their level in 1999, and this trend continued in the next years.)
15) 10) 27-Mar-01	4.27%	Positive	
11) 15-May-01	4.15%	Positive	

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Date	Daily Return (%)	News	Event
12) 9-Aug-01	4.32%	Positive	
13) 15-Apr-02	6.19%	Positive	
14) 4-Oct-02			
15) 9-Dec-02	-3.97%	Negative	Negative correction of the returns on capital market. Many investors have closed their long position after a period of increases.
16) 19-Apr-04	-5.01%	Negative	The BET Index decrease didn't have an economical or political cause. The principal reason of this decrease was represented by the decline of the TLV (Banca Transilvania) stock prices at the end of the period established to offer free shares to its shareholders.
17) 3-Jan-05	5.79%	Positive	An increase of the country rating is announced by the all three agency (S&P, Moody's Fitch-IBCA). After The Romanian legislative election held on November 28, 2004, the first measure of the new government was to replace the former personal income tax and profit tax with the 16% flat tax (smaller than the previous ones).
18) 23-Feb-05	4.46%	Positive	Many companies traded on BSE announced good financial performances that determine a higher interest of Romanian investors in stock placement.
19) 20-Apr-05	-4.02%	Negative	Three companies had announced capital increases by offering free shares to their shareholders which motivated them to buy. Other some important transactions with two capital market blue chips had had visible impact on indexes.
20) 14-Feb-06	-3.47%	Negative	A negative correction of the Romanian capital market after a period of increases. The index level after this decrease is higher than it level at the end of year 2005.
21) 23-May-06	-5.37%	Negative	Foreign investors had withdrawn a part of their capital and place it on less risky capital markets. Similar decrease of the index was registered in the same day on the capital markets from Czech Republic, Poland, Hungary and Russia. Other possible explanation of the indexes decrease could be the country rapport (released in 16 th May 2006) that condition the adhesion of Romania at EU at 1 st January 2007 on solving some important problems. There were four red flags that de EU Commission marked with the chapters of Agriculture (3 red flags) and Taxation (1 red flag). The new modifications of Fiscal Code announced by the Romanian Government could be another reason for some investors to consider the Romanian Capital market too volatile for them.

An analysis of investors' behavior in the Romanian capital market

Date	Daily Return (%)	News	Event
22) 3-Jan-07	4.96%	Positive	1 January 2007 was the moment of Romania's adhesion to the European Union. As consequence investors were more confident regarding the positive evolution of Romanian economy. The same positive evolution was registered on Sofia Stock Exchange (Bulgaria's adhesion to EU was also in 1 January 2007).
23) 5-Mar-07	-5.19%	Negative	China's stock market tanked on February 27, with the Shanghai Composite Index dropping 9 percent in a single day. One possible cause was the announcement of China Premier Wen Jiabao that expects GDP to grow at 8 percent this year, which would be a major decline from last year level of 10.7 percent. The decrease of the China capital market had had a grater impact on emerging capital market.
24) 9-May-07	-4.04%	Negative	

ii) Bucharest Exchange Trading –Composite Index (BET-C)

Date	Daily Return (%)	News	Event
1) 29-May-98	-4.575%	Negative	In 20 May S&P decrease Romania rating from BB- to B+ caused by the negotiations' deadlock with IMF and the country risk of payment incapacity. Overall financial crises on emergent market.
2) 15-Jul-98	-3.524%	Negative	Evident signs of Russia financial crisis: in 2 weeks the government expended 4 billions dollars in its attempt to prevent ruble devaluation.
3) 26-Aug-98	-9.296%	Negative	Peak of financial and economic crisis in Russia (on August 17, 1998, Russia government decided to wide the trading band of the ruble, to impose a 90-day moratorium on the repayment of private external debt and announced its plan to restructure official debt obligations due to the end of 1999). Rumors about illicit transaction on NYSE (Dow Jones falls in 4 and 31 august with 299.43 and 554 points respectively)
4) 5-Nov-98	3.840%	Positive	In November options on futures were implemented at SMFCE (Sibiu Monetary – Financial and Commodities Exchange) State Ownership Fund (SOF) re-launch a campaign to accelerate the privatization of major companies traded on BVB: Rompetrol (RRC), BRD, Automobile Dacia Pitesti (DAC)

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Date	Daily Return (%)	News	Event
5) 24-Jun-99	6.565%	Positive	Many companies had registered increases of stock prices. This could be caused by the fact that one of the foreign investment funds (Romanian Investment Company Cyprus) wanted to report favorable evolution of the stocks included in its portfolio at the end of June. Another reason could be represented by government decision to grant subsidies for the companies in chemical sector to buy methane gas.
6) 29-Sep-99	-6.840%	Negative	One of the important companies included in BET-C at that time, Banca Agricola (AGR) has decided to offer 10 free stock for one owned and after that the company had split its stock in a rapport 1:16. As a result on the market AGR stock prices had decreased with 96% and consequently determined the a fall of BET-C index.
7) 7-Jan-00	6.031%	Positive	The law regarding profit tax (OUG 217/1999) in force (at that moment) beginning with 1 January 2000 promoted a reduction in the profit tax from 38% to 5% in case of profit from export activities.
8) 9-Aug-00	4.257%	Positive	
9) 4-Jan-01	4.266%	Positive	Increase of the investments on capital market caused by optimist expectation regarding the evolution of Romanian economy (during 2000 important macroeconomic indicators like: inflation rate, Romanian currency devaluation rate, unemployment rate etc. had improved comparing with their level in 1999, and this trend continued in the next years.)
10) 20-Mar-01	-6.193%	Negative	
11) 4-Sep-01	-3.880%	Negative	
12) 4-Feb-02	5.236%	Positive	
13) 15-Apr-02	5.358%	Positive	
14) 6-Dec-02	-2.964%	Negative	Negative correction of the returns on capital market. Many investors have closed their long position after a period of increases.
15) 2-Dec-04	3.836%	Positive	This increase is due to the upward trend of the main shares listed on the stock markets, especially those of oil sector (which have developed their activities). Other possible reason: in December Bucharest Stock Exchange (BSE) signed a Memorandum of Understanding with Wiener Boerse AG (WBAG), which establishes the basis of a co-operation between the two institutions.
16) 24-Jan-05	4.788%	Positive	Many companies traded on BSE announced good financial performances that determine a higher interest of Romanian investors in stock placement.

An analysis of investors' behavior in the Romanian capital market

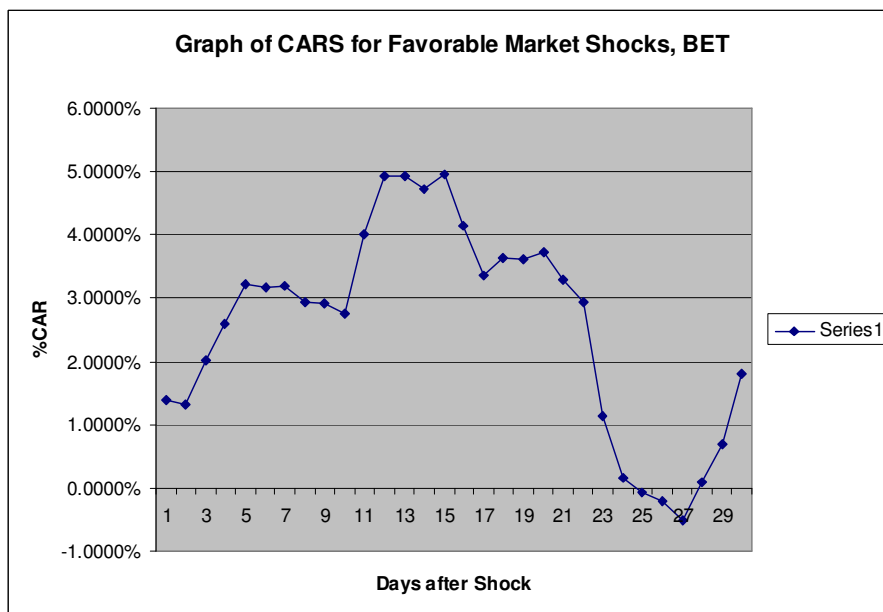
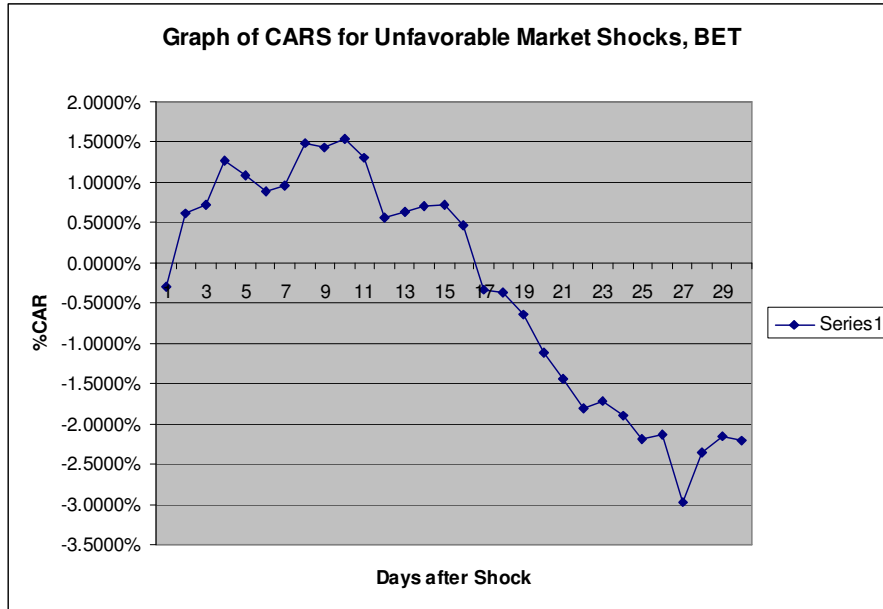
Date	Daily Return (%)	News	Event
17) 17-Mar-05	-6.968%	Negative	One of the important companies included in the index, Petrom (SNP) has decided not to distribute dividends and as a result the price of the companies' stocks fell with 8.24% in that day.
18) 30-May-05	-4.766%	Negative	One possible reason of the BET-C Index decrease is the decline of the market capitalization of the Petromidia Refinery, one of the most liquid companies traded on the Bucharest Stock Exchange. The actions taken by institutions of the state against the group's chairman Dinu Patriciu has damaged its image and caused several hundred million dollars losses for the group. Other reasons could be: the vote against EU constitution of the French people or more important, the lack of explanation about the methodology of taxation of the capital gain get on transactions made on Romanian capital market.
19) 23-May-06	-5.494%	Negative	Foreign investors had withdrawn a part of their capital and place it on less risky capital markets. Similar decrease of the index was registered in the same day on the capital markets from Czech Republic, Poland, Hungary and Russia. Other possible explanation of the indexes decrease could be the country rapport (released in 16 th May 2006) that condition the adhesion of Romania at EU at 1 st January 2007 on solving some important problems. There were four red flags that de EU Commission marked with the chapters of Agriculture (3 red flags) and Taxation (1 red flag). The new modifications of Fiscal Code announced by the Romanian Government could be another reason for some investors to consider the Romanian Capital market too volatile for them.
20) 3-Jan-07	5.047%	Positive	1 January 2007 was the moment of Romania's adhesion to the European Union. As consequence investors were more confident regarding the positive evolution of Romanian economy. The same positive evolution was registered on Sofia Stock Exchange (Bulgaria's adhesion to EU was also in 1 January 2007).
21) 5-Mar-07	-5.052%	Negative	China's stock market tanked on February 27, with the Shanghai Composite Index dropping 9 percent in a single day. One possible cause was the announcement of China Premier Wen Jiabao that expects GDP to grow at 8 percent this year, which would be a major decline from last year level of 10.7 percent. The decrease of the China capital market had had a grater impact on emerging capital market.

*Appendix C. Post-event cumulative abnormal returns,
BET and BET-C Indexes*

Days	Unfavorable Events		Favorable Events		Unfavorable Events		Favorable Events	
	BET CAR	BET t-value	BET-C CAR	BET-C t-value	BET CAR	BET t-value	BET-C CAR	BET-C t-value
1	0.296%	0.206	-0.848%	-0.276	1.377%	0.839	0.729%	0.553
2	0.615%	0.427	-0.587%	-0.191	1.308%	0.797	0.039%	0.029
3	0.728%	0.505	-1.105%	-0.359	2.012%	1.226	0.349%	0.264
4	1.280%	0.889	-1.373%	-0.446	2.598%	1.583	0.664%	0.504
5	1.083%	0.752	-1.134%	-0.368	3.225%	1.964	1.507%	1.142
6	0.884%	0.614	-0.806%	-0.262	3.180%	1.937	2.013%	1.526
7	0.959%	0.666	-1.851%	-0.601	3.196%	1.947	1.926%	1.460
8	1.491%	1.035	-1.986%	-0.645	2.930%	1.785	2.173%	1.647
9	1.439%	1.000	-1.990%	-0.647	2.928%	1.784	1.876%	1.422
10	1.541%	1.070	-1.801%	-0.585	2.752%	1.676	1.815%	1.376
11	1.306%	0.907	-2.429%	-0.789	4.000%	2.437	1.462%	1.108
12	0.568%	0.395	-3.109%	-1.010	4.936%	3.007	0.857%	0.650
13	0.642%	0.446	-3.631%	-1.180	4.933%	3.005	1.671%	1.267
14	0.712%	0.494	-4.124%	-1.340	4.730%	2.881	1.025%	0.777
15	0.733%	0.509	-4.080%	-1.326	4.961%	3.022	0.635%	0.481
16	0.478%	0.332	-4.222%	-1.372	4.154%	2.531	1.036%	0.785
17	0.335%	0.233	-4.596%	-1.493	3.361%	2.048	1.402%	1.063
18	0.376%	0.261	-4.970%	-1.615	3.629%	2.211	1.779%	1.349
19	0.645%	0.448	-5.238%	-1.702	3.618%	2.204	2.937%	2.227
20	1.113%	0.773	-5.701%	-1.852	3.719%	2.266	3.309%	2.509
21	1.440%	1.000	-6.255%	-2.032	3.288%	2.003	3.845%	2.915
22	1.810%	1.257	-6.712%	-2.181	2.941%	1.792	4.415%	3.347
23	1.714%	1.190	-7.575%	-2.461	1.142%	0.696	4.451%	3.375
24	1.901%	1.320	-8.214%	-2.669	0.149%	0.091	3.446%	2.613
25	2.197%	1.525	-8.548%	-2.777	0.074%	0.045	3.620%	2.745
26	2.128%	1.478	-8.797%	-2.858	0.210%	0.128	3.412%	2.587
27	2.976%	2.067	-9.252%	-3.006	0.515%	0.314	3.268%	2.478
28	2.345%	1.629	-9.087%	-2.952	0.095%	0.058	3.586%	2.719
29	2.151%	1.494	-9.875%	-3.208	0.688%	0.419	3.830%	2.904
30	2.209%	1.534	-9.537%	-3.099	1.797%	1.095	3.983%	3.020

(Note: T-statistics in bold indicate statistical significance at the 10% level or higher.)

Appendix D.



Appendix E.

