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# INVESTORS' REACTION TO FINANCIAL REPORTING – EMPIRICAL STUDIES ON PRICE VOLATILITY ON THE BUCHAREST STOCK EXCHANGE

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**Rezumat:** *În acest studiu, impactul raportării financiare asupra deciziei de investiții este evaluat prin comportamentul investitorilor și măsurat prin variația prețului acțiunilor. Această cercetarea analizează rapoartele financiare preliminare, semestriale și trimestriale de la 24 de companii listate la BVB, respectiv companii din componența indicelui BET XT (14) și companii din structura indicelui BET AeRO (10), în perioadele de raportare 2018-2022. Principala constatare arată că investitorii, în loc să fie influențați de evoluția generală a pieței, au reacționat rațional în 47% dintre cazuri întrucât au acordat cea mai mare importanță fundamentelor prezentate în rapoartele preliminare. Pe baza rezultatelor obținute de la cei doi indicatori introduși în cercetare am concluzionat că, dintre raportarea financiară și sentimentul pieței, factorul cu cel mai ridicat nivel de influență asupra variației prețurilor a fost raportarea financiară.*

**Cuvinte cheie:** *raportarea financiară, variația prețurilor acțiunilor, comportament rațional, variația indicelui bursier, sentimentul pieței*

**Abstract:** *In this study, the impact of financial reporting upon investment decision is assessed through investors' behavior and measured by the stock price variation. This research analyzes preliminary, semestrial, and quarterly financial reports from 24 BSE listed companies, namely companies within the BET XT index (14) and companies within the BET AeRO index (10), over the reporting periods between 2018 and 2022. The main finding shows that investors, instead of being influenced by the market general trend, reacted rationally in 47% of the cases as they assigned the highest importance to the fundamentals from the preliminary reports. Based on the results obtained from the two indicators introduced in the research, we concluded that between financial reporting and market sentiment, the factor with the highest level of influence on price variation was financial reporting.*

**Keywords:** *financial reporting, stock price variation, rational behavior, stock index variation, market sentiment*

**JEL Classification: M41, G14, G41**



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## 1. INTRODUCTION

Numerous studies (Sunder, 2016) have shown that an essential source of information for the decision-making process in the capital market is financial reporting. The assessment of financial reporting impact on stock price variation at the level of the capital market constitutes a useful approach for testing investment behavior. Such an approach was necessary in our research for determining the importance that investors attach to the financial reporting process since quality financial reporting provides decision-useful information (Tasios & Bekiaris, 2012). Starting from these premises, if investors present appropriate interest in the study of the financial reports and if financial reports meet the standards of quality, it can be considered that financial reporting has an impact on investment behavior, and consequently, it can influence price variation.

On the other hand, if investors do not assign high importance to financial reports, other factors, such as the market general trend, could be used for the aim of fundamenting investment decisions. Some studies (Long et al., 1990) explain the influence of market sentiment based on two types of investors: rational investors (not influenced by the sentiment) and irrational investors (vulnerable to the sentiment). Also, recent studies (Li et al., 2020) have presented a relationship between market sentiment and stock price movements. However, market sentiment is well-recognized but difficult to measure since it requires the use of comprehensive indicators (Zhou & Huang, 2017).

## 2. DEFINING THE RESEARCH PROBLEM

### 2.1. Research objectives and methodology

The first objective of the study case was to establish which type of financial report generated the largest impact on price variation. Therefore, the impact was quantified through the number of significant changes recorded in the price variation. The second objective was to identify the situations in which price variation could be influenced by financial reporting or could be correlated with market sentiment. Taking into account the fact that price variation is a consequence of investors' behavior, as investors' behavior determines a price variation, the research methodology required the introduction of two hypotheses.

The first hypothesis (H1) tests the extent to which financial reporting influences investment behavior, assessing investors in terms of rational or irrational behavior. Specific to this hypothesis is the concept of "confirmation" identified between the variations of the key financial indicators of the issuer (also referred to as fundamentals from the financial reports) and the stock price variations. The purpose of the first hypothesis is to demonstrate that financial reporting is a strong factor that can influence price variation.

The second hypothesis (H2) evaluates to what extent the investment behavior is influenced by the market sentiment, respectively by the sentiment of optimism or pessimism that occurred at the level of the capital market. Specific to this hypothesis is the concept of "correlation" identified between the price variation of issuers and the stock index variation, starting from the variation of the key financial indicators. The second hypothesis aims to prove that market sentiment is an important factor that can influence price variation.

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### 2.2. Sample selection and data collecting process

In the study, we analyzed the financial reports from a total of 24 BSE listed companies, from which: 14 companies listed on the Regulated Market within the structure of the BET XT index, referred to as the "REGS sample" and 10 companies listed on the Multilateral Trading System within the composition of the BET AeRO index named the "AeRO sample". The selection of the sample was based on three criteria: (i) the total value traded (having as a reference the period 01.07.-31.12.2022), (ii) the company's weight in the index (setting a 0.50% threshold in the index, based on the index structure of the first quarter of 2023), (iii) the company's best liquidity in each sector of activity.

The central point of interest in the present study has been financial reporting. Therefore, the research methodology consisted of analyzing preliminary financial reports, semestrial financial reports, and quarterly financial reports, for the period 2018-2022. Based on the information needed for the decision-making process, we selected five key financial indicators relevant for investors, namely: cash flow from operating activities, net profit, turnover, equity, cash, and cash equivalents.

A general perspective on the total number of financial reports published by issuers during the research period is presented in Table 1. Thus, for the REGS sample, a total of 210 reports were published, meaning a number of 70 reports (100%) for each type of report among the three analyzed. For the AeRO sample, the situation is different, as only 70 reports were published out of a total of 150 expected reports, respectively 24 preliminary reports (48%), 25 semestrial reports (50%), and 21 quarterly reports (42%). There is an imbalance between the number of reports published by REGS and AeRO samples because of the different requirements regarding financial reporting. According to BSE regulations, financial reporting obligations involve a higher level of rigor for REGS issuers due to the informational needs of investors.

**Table 1 - The synthesis of published financial reports**

| Report type | Preliminary Reports | | Semestrial Reports | | Quarterly Reports (Q3) | |
|---|---|---|---|---|---|---|
| Sample | REGS | AeRO | REGS | AeRO | REGS | AeRO |
| 2018 | 14/14 reports | 1/10 reports | 14/14 reports | 1/10 reports | 14/14 reports | 1/10 reports |
| 2019 | 14/14 reports | 2/10 reports | 14/14 reports | 2/10 reports | 14/14 reports | 1/10 reports |
| 2020 | 14/14 reports | 6/10 reports | 14/14 reports | 3/10 reports | 14/14 reports | 3/10 reports |
| 2021 | 14/14 reports | 7/10 reports | 14/14 reports | 9/10 reports | 14/14 reports | 6/10 reports |
| 2022 | 14/14 reports | 8/10 reports | 14/14 reports | 10/10 reports | 14/14 reports | 10/10 reports |
| TOTAL | 70/70 reports | 24/50 reports | 70/70 reports | 25/50 reports | 70/70 reports | 21/50 reports |

*Source: authors' projection*

### 2.3. Evaluation of investment behavior

The first stage consisted of analyzing investors' perception of financial reporting, measured through the variation of key financial indicators, based on the following methodology: (i) a positive variation of indicators resulted in the recording of "good news", respectively (ii) a negative variation of indicators resulted in the recording of "bad news". The second stage

involved determining the price variation that resulted from comparing the stock price from the reporting date and the average stock price over 10 days (5 days before and 5 days after the date the financial reports were published). The following formula has been used to calculate the stock price variation:

$$Stock\ price\ variation = \left(\frac{Stock\ price\ from\ the\ reporting\ date}{Average\ stock\ price} - 1\right) \times 100$$

Based on this formula, we considered that: (i) a positive price variation resulted if the stock price from the reporting date was higher than the average stock price, (ii) a negative stock price variation resulted if the stock price from the reporting date was lower than the average stock price.

The two stages previously described have allowed us to evaluate investment behavior. Thus, in this study, rational investment behavior assumed an association between "good news" and a positive stock price variation, implicitly an association between "bad news" and a negative stock price variation. In the cases where investors did not pay enough attention to financial reports, we considered that they presented irrational investment behavior, associating "good news" with negative stock price variation and "bad news" with positive stock price variation.

### 2.4. Market reaction analysis

In order to analyze the market reaction, issuers with a significant weight were excluded because their price variation would directly influence the stock index variation. Therefore, to ensure the accuracy of our findings, we only considered issuers with a modest weight (lower than 5.50% in the stock index). Consequently, the first four issuers (SNP, FP, TLV, SNG) from the BET XT index and the first three issuers (AROBS, SMTL, SAFE) with significant weights from the BET AeRO index were removed from the initially selected samples.

In this stage, were recorded "correlations", which materialized either in the "sentiment of pessimism" or in the "sentiment of optimism". Thus, "correlations" were identified in the following two situations: (i) according to a rational expectation the release of "good news" was supposed to generate a positive price variation for issuers, but instead, the actual value of the issuer resulted in a negative price variation because the stock index recorded a negative variation, reflecting a "sentiment of pessimism" at the level of the capital market, respectively (ii) according to a rational expectation the release of "bad news" was supposed to generate a negative price variation for issuers, but instead, the actual value of the issuer resulted in a positive price variation because the stock index recorded a positive variation, indicating a "sentiment of optimism" at the level of the capital market.

Throughout the study, we have analyzed the two situations presented above which strongly confirm the second hypothesis that investors do not assign high importance to financial reports. Instead, they make investment decisions based on the overall context of the capital market, which is directly reflected in the movement of stock prices.

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## 3. PRESENTING THE RESEARCH FINDINGS

### 3.1. Analysis of significant changes in stock price

The study's first objective was to identify the type of financial report that generated the most significant price changes. In order to conduct a detailed analysis of the impact that each type of financial reporting had on the stock price variation, it was necessary to define the concept of "significant change". Therefore, within the study, it was considered a "significant change" in stock price when the closing price from the reporting date recorded a positive or negative variation of at least 2% compared to the average stock price.

In addition, to obtain relevant conclusions, we calculated aggregate average values (at the level of the two markets of the BSE) by consolidating the results from the REGS and AeRO samples. The consolidation method, applied for all three types of financial reports, was based on the following model:

$$Aggregate\ average\ value = \frac{REGS\ sample + AeRO\ sample}{2}$$

The ranking of financial reports according to the share held by the significant changes in stock prices as a result of the release of financial reports is presented in the following table:

**Table 2 - The ranking of reports based on significant changes**

| Rank | Report type | REGS sample | AeRO sample | Aggregate average value |
|---|---|---|---|---|
| 1. | Preliminary Reports | 31.42 % | 58.33 % | 45 % |
| 2. | Semestrial Reports | 25.71 % | 36 % | 31 % |
| 3. | Quarterly Reports (Q3) | 15.71 % | 42.85 % | 29 % |

*Source: authors' projection*

The preliminary financial reports, published in mid-February, rank first in the classification as they produced a significant impact on the stock price variation. For the REGS sample, the share held by the significant changes in stock prices was 31.42% (22 changes out of 70 published reports) and for the AeRO sample, it was 58.33% (14 changes out of 24 published reports), by consequence, the aggregated average value was 45%.

Therefore, our findings show that out of the total price variations recorded at the time when preliminary financial reports were published, in 45% of the cases, were identified significant changes that exceeded the threshold of 2%.

Furthermore, the release of preliminary financial reports created a favorable context in which a significant number of extreme price variations were recorded among the issuers within the sample, as they are presented in the following table:

**Table 3 - The top of extreme price variations from preliminary reports**

| Issuer | Year | Stock price at release ( lei/share ) | Average stock price ( lei/share) | Variation (%) |
|---|---|---|---|---|
| | | REGS sample | | |
| LION | 2019 | 2.55 | 2.76 | -7.60 |
| FP | 2019 | 1.27 | 1.34 | -5.47 |
| TRP | 2020 | 0.56 | 0.53 | 5.30 |
| | | AeRO sample | | |
| NRF | 2020 | 28.4 | 26.14 | 8.64 |
| SAFE | 2020 | 31.6 | 34.52 | -8.45 |
| NRF | 2021 | 8.66 | 8.02 | 7.92 |

*Source: authors' projection*

The significant number of extreme variations identified at the time when preliminary reports were published confirms that through this type of report, investors first come into contact with the financial results of a reporting period. In theory, the high impact of preliminary reports on price variation is mainly due to reasons related to the actuality and opportunity of presenting financial information since timely information available to investors has an impact on price (Owusu, 2000). For this reason, it is considered that the less timely, the less useful the information is for decision-making.

### 3.2. Influence of financial reporting on investment behavior (H1)

Behavioral finance theories (Kholdy & Sohrabian, 2014) suggest that rational investors will not be "blindly" affected by external information, such as the overall tone of the market. However, a series of studies (Yang & Zhou, 2015) have shown that most investors are actually behavioral investors, but their investment behavior is not always rational.

Therefore, the analysis of rational behavior has been a priority within the framework of our first hypothesis because this behavior demonstrates that financial reports constitute a relevant source of information for investors in their decision-making process. Thus, to obtain relevant results, it was necessary to introduce an indicator through which rational behavior could be credibly evaluated. Consequently, the introduced indicator is named the "rational behavior rate" abbreviated as "$R_{RB}$" and its calculation formula is explained below.

$$\text{Rational Behavior Rate} = \left(\frac{\text{Total number of confirmations}}{\text{Total number of observations per type of report}}\right) \times 100$$

where:

Total number of confirmations = the totality of cases in which rational behavior has been recorded

Total number of observations per type of report = the totality of observations recorded in the financial reports published by issuers within a specific time interval

Based on the above formula and the methodology described in subsection 2.3., in our research, a "confirmation" meant that the variations of the key financial indicators of the issuer were in line with the stock price variations. For example, in the case of the Romgaz issuer (SNG

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symbol) at the release of the preliminary report for the financial year 2021, more favorable results were noticed in 2021 compared to the results of 2020. Therefore, a "confirmation" was recorded between "good news" (obtained due to the increase in cash flow from operating activities by 26%, net profit by 51%, turnover by 44%) and the 3.73% positive variation in the stock price. The ranking of financial reports based on the results obtained from applying the formula of the rational behavior rate is presented in the following table:

**Table 4 - The ranking of reports based on rational behavior**

| Rank | Report type | REGS sample | AeRO sample | Aggregate average value |
|---|---|---|---|---|
| 1. | Preliminary Reports | 41.07 % | 52.17 % | $R_{RB}$ = 47% |
| 2. | Semestrial Reports | 46.42 % | 45.83 % | $R_{RB}$ = 46% |
| 3. | Quarterly Reports (Q3) | 50 % | 35 % | $R_{RB}$ = 43% |

*Source: authors' projection*

The preliminary financial reports rank first in the classification because this type of report recorded the highest rate. Therefore, investors reacted rationally in 47% of the cases, as they took into consideration in their investment decisions the fundamentals presented through the preliminary reports. The rational behavior rate, $R_{RB}$ = 47%, is considered even more relevant as it reflects an aggregate average value obtained from the rational behavior rate of the REGS sample (41.07%) and the rate corresponding to the AeRO sample (52.17%).

### 3.3. Influence of market sentiment on investment behavior (H2)

Various studies (Pandey & Sehgal, 2019) have shown that the existence of market sentiment cannot be denied, but the difficulty consists in how to identify and measure this factor. For this reason, in the second hypothesis, we developed a method for measuring and quantifying the situations in which investors were driven by the general performance of the capital market without presenting proper care to financial reporting in their decision process. The method was based on the introduction of another indicator that is called "market sentiment rate", abbreviated as "$R_{MS}$", and presents the following calculation formula:

$$\text{Market Sentiment Rate} = \left(\frac{\text{Total number of correlations}}{\text{Total number of observations per stock index}}\right) \times 100$$

where:

Total number of correlations = the totality of cases in which the stock price variation is in line with the stock index variation, but is in opposition to the rational expectation that should have resulted from financial reporting

Total number of observations per stock index = the totality of issuers included in the structure of the stock index, but with a modest weight within it

According to the above formula and the methodology described in subsection 2.4., market sentiment manifested among investors only in cases where the stock price variation was in line with the stock index variation but in contradiction to the variation of the key financial indicators. Thus, the price variations that were identified are not in line with how prices should have varied starting from the fundamentals of the financial reports.

The ranking of financial reports based on the values that resulted from applying the formula of the market sentiment rate is presented in the following table:

**Table 5 - The ranking of reports based on the influence of market sentiment**

| Rank | Report type | REGS sample | AeRO sample | Aggregate average value |
|---|---|---|---|---|
| 1. | Semestrial Reports | 32.5 % | 57.14 % | $R_{MS}$ = 45% |
| 2. | Preliminary Reports | 32.5 % | 40 % | $R_{MS}$ = 36% |
| 3. | Quarterly Reports (Q3) | 20 % | 42.85 % | $R_{MS}$ = 31% |

*Source: authors' projection*

The semestrial reports ranked first since they presented the highest market sentiment rate. Thus, investors took into account the market sentiment in 45% of the cases instead of showing proper interest in the fundamentals from the financial reports. Therefore, the market sentiment rate, $R_{MS}$ = 45%, was obtained by consolidating the rate of the REGS sample (32.5%) and the rate of the AeRO sample (57.14%). For the semestrial reports of the REGS sample, 13 "correlations" were found out of a total of 40 observations, thus the market sentiment rate was 32.5%. From the total correlations identified, 11 correlations reflected the "sentiment of optimism", since the price variation was supposed to be negative due to the "bad news", but instead, the price variations were positive because of the positive BET XT index variations. The other 2 correlations reflected a "sentiment of pessimism", as "good news" should have determined a positive variation, but the actual price variation was in line with the negative BET XT index variation. For the semestrial reports of the AeRO sample, in the period 2021-2022, only 4 "correlations" were found from a total of 7 observations, therefore the rate was 57.14%.

## 4. CONCLUSIONS

Based on the results of our research, starting with the first objective, we can assert that out of the three types of financial reports analyzed over the period 2018-2022, preliminary reports have determined the highest impact on price variation, as significant price changes were identified in 45% of the cases. Regarding the second objective the hypotheses tested allowed us to make a comparison between (H1) the rational behavior rate, $R_{RB}$= 47%, which reflects the relevance of financial reporting in the investors' decision-making process, and (H2) the market sentiment rate, $R_{MS}$= 45%, which captures the lack of interest that investors present towards financial reporting. In consequence, since the rational behavior rate was higher, we can affirm that out of financial reporting and market sentiment, the factor with the highest level of influence on price variation was financial reporting.

The research limitations identified throughout the case study present the following structure: (i) limitations in sample selection - due to the absence of financial information, some

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issuers couldn't remain in the sample although they had met the selection criteria, (ii) limitations regarding financial reporting - issuers either did not publish reports (in the case of AeRO sample), or the published reports did not include the financial indicators necessary for our research, (iii) limitations regarding price variations - due to the lack of prices at the time when financial reports were made public, (iv) limitations in market sentiment analysis - due to the launch date of the BET AeRO index, the analysis was possible only for the period 2021-2022.

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