

## The value relevance of financial distress risk in the case of RASDAQ companies

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**Abstract:** The financial distress risk concept has been referred as follow: negative net assets, insolvency, bond default, overdraft, unpaid dividends for the preferred stocks, bankruptcy etc. From all the stakeholders, investors are interested in the financial position and performance of a company and its ability to continue as a going concern, without knowing the appearance of financial distress status. The purpose of this study aims to test the value relevance of the appearance of distress risk on investors' decisions on the purchase or sale of stock, with impact on stock return, for the Romanian listed companies in RASDAQ section. In order to reach the objective, the study was carried on upon a sample of 70 Bucharest Stock Exchange (BSE) listed companies, between 2008 and 2014, using statistical methods like analysis of variance (ANOVA), simple linear regression and ANCOVA models. Through the obtained results, it was demonstrated the difference between financial distressed companies and performant companies and the influence of belonging to a company in the high risk category on the stock return.

**Keywords:** value relevance, distress risk, financial ratios, ANOVA, ANCOVA, RASDAQ

**JEL codes:** B23, C58, G14, G33, M41

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## 1. Introduction

Starting with 2007, alongside with the show up of the global financial crisis, the number of companies, both listed and unlisted, with financial difficulties or even bankrupt has grown significantly. This situation has generated shifting the focus of financial statement users to the companies' ability to continue as a going concern in a predictable future. On a capital market, a category of users that are interested in the development of distress risk is represented by investors.

Investors want to know information regarding the companies' financial position and performance based on the financial statements, in order to make the most adequate investment decisions. Information provided by the investors through the stock price regarding the anticipation of future cash flows can be used in order to determine how early the market players recognize the appearance of distress risk of the company and its financial defacement (Aharony *et al.*, 1980).

Within the decision making process, investors must take into account the macroeconomic information such as the general economic situation, the monetary policy, the price levels and international activity (Tangjitprom, 2012), and especially the factors that are specific for each country, mainly reflected by the financial statements. These represent the main communication way between companies and actual or potential investors (Vijitha & Nimalathan, 2014). The financial information gathered from the financial statements issued according to the rules in force can be considered a credible information source on which investors can trust in the decision making process (Ragab & Omran, 2006). The main objective of the financial reporting is providing useful information to the financial statements users regarding the financial position and performance of a company (IASB, 2013).

The purpose of this study aims to test the value relevance of the appearance of distress risk on investors' decisions, with impact on stock return, for the Romanian listed companies in RASDAQ section. Stock return is quantified by the relative variation of stock prices from one period to another.

In order to reach the objective, the study was carried on upon a sample of 70 Bucharest Stock Exchange (BSE) listed companies, between 2008 and 2014, using statistical methods like analysis of variance (ANOVA), simple linear regression and ANCOVA.

Through the obtained results, it was demonstrated the difference between financial distressed companies and performant companies and the influence a company belonging to a high risk category on the stock return.

## 2. Literature review and hypothesis development

Alongside with Ball's and Brown's (1968), respectively Beaver's (1968) studies, the concept of value relevance of the financial statements has been developed, though it barely appeared in 1993 (Barth *et al.*, 2001). According to Beisland (2009) and El-Sayed Ebaid (2012), by analyzing the relevance of financial information, it is studied the relation between the information and the market, representing the ability of the financial information to influence the stock price or stock return, as a result, the decision making process.

Although the *value relevance* concept focuses on the information provided by financial reporting, the development of the concept implies alongside with the analysis of the information, the analysis of the influence of other non-financial factors that regard the financial statement or not, such as: the affiliation to a certain activity field (Lin & Jin, 2006; Chou *et al.*, 2012), the application of certain accounting standards (Dumontier & Raffournier, 2002; Barth *et al.*, 2008; Barth *et al.*, 2012), the existence of corporate governance (Lacker *et al.*, 2011), the report issuance and the audit opinion issuance (Gómez-Guillmón, 2008; Lee & Lee, 2013), the existence of risk and especially of the financial distress risk and bankruptcy (Katz *et al.*, 1985; Griffin & Lemmon, 2002).

Regarding the Romanian stock market, as an emerging one that offers higher growth rates and profitability (Albu & Albu, 2012), the literature is based on identifying the relevant financial information for investors in terms of earnings (Filip & Raffournier, 2010), the impact of applying IFRS on the value relevance of earnings (Filip, 2010). These studies are considered, according with Holthausen and Watts (2001), relative association studies and incremental association studies, identifying, on one side, the explanatory power of the financial information through the  $R^2$  coefficient and, on the other side the most relevant information through regression coefficients. Studying the same problem of the influence of the financial information on stock market, Turdor (2012) and Jaba *et al.* (2013) applied event study through panel analysis, identifying a strong link between earnings and stock market. All these studies focus on the financial information, not taking into consideration other factors which can influence the decisions of investors.

### 2.1 The concept of financial distress risk and how it is measured

The financial distress risk concept has been referred to as various concepts. Karels and Prakas (1987) make a synthesis of several definitions of this concept according to different empirical studies from Beaver (1966) and Altman (1968) to Taffler and Tisshaw (1982): negative net assets, insolvency, bond default, overdraft, unpaid dividends for the preferred stocks, bankruptcy etc. Turetsky and McEwen (2001) also start from a series of previous studies, focusing on the meaning of economic concept characterized by various continuous inauspicious financial statuses,

respectively on the moment when the assets of a company are not sufficient in order to cover its debts. Moreover, they consider that a decreasing of the cash flow corresponding to operational activities represents a signal from the beginning of the financial distress risk, subsequently characterized by dividends payment decrease, loan non-payment or debts reorganization (Turetsky & McEwen, 2001).

The specialized literature has most frequently stopped, in the analysis of the financial/business failure on the insolvency or bankruptcy meaning (Beaver, 1966; Altman, 1968; Deakin, 1972; Ohlson, 1980).

In the past, statistical methods have been mainly used by deciders in order to evaluate the insolvency and bankruptcy risk, such as: discriminant analysis (Altman, 1968; Deakin, 1972), the logistic regression analysis (Ohlson, 1980; Zavgren, 1985), the probabilistic regression analysis (Zmijewski, 1984; Theodossiou, 1991) and the surviving analysis (Lane *et al.*, 1986; Luoma & Laitinen, 1991). From the econometric approach, Aziz and Dar (2006) consider that the specialized literature is dominated by the discriminant analysis and the logistical regression analysis. Alongside these methods, other methods based on artificially intelligence have been recently added: artificial neural networks, decision trees and genetic algorithms (Olson *et al.*, 2012). These methods can be used by all financial statements users, inclusively by auditors, in order to test the going concern (Robu *et al.*, 2012).

As for Romania, the main models which have been elaborated are C. Mânecuță and M. Nicolae model in 1996, Băileșteanu in 1998 and Ivonciu in 1998, or Anghel model in 2002 (Mironiuc, 2006) and Robu-Mironiuc model ( $Z_{RM}$ ) in 20012 using multiple discriminant analysis (Robu *et al.*, 2012).

## 2.2 Market Reactions to financial distress risk

Most times, the financial distress risk was seen through the insolvency and the bankruptcy state. Companies that reach the insolvency or bankruptcy state are characterized by decreasing total assets, revenues and net accounting shares value and growing debts and financial expenditures (Barniv *et al.*, 2002; Mironiuc, 2006).

Regarding the influence of bankruptcy appearance probability on the market, Aharony *et al.* (1980) have emphasized a clear phenomenon, the fact that stock price significantly decreases around the moment of the announcement of the bankruptcy status. Zavgren *et al.* (1988) see bankruptcy as “bad news”, and, as a result, the decrease of the stock prices is to be expected. Though, capital market actors have useful means to anticipate bankruptcy by evaluating the information corresponding to the previous period to its emergence. Chen and Church (1996) assume that the market reacts less to the announcements regarding bankruptcy

emergence when the auditor has previously issued an opinion regarding the company's activity continuity.

Barniv *et al.* (2002) suggests that investors of the companies that are heading for financial business failure lose significant values on the market sixty days before the emergence of the phenomenon. This situation is caused by the previous evaluation of the market regarding the probability of each company to become bankrupt (Green & Dawkins, 2000). Altman (1971) has, in turn, proved the emergence of an investor afferent loss of approximately 26% in a month before and after the occurrence of bankruptcy.

From the reorganization process perspective, the investors of the purchased companies or of the ones that have merged have reported significant positive yields from the emergence to the ending of the phenomenon, while investors of the liquidated companies have had significant negative yields (Green & Dawkins, 2000; Barniv *et al.*, 2002).

Opinions regarding the existing relation between the probability of financial distress emergence and the capital market do not just hint at the opposite relation between them. For example, Vassalou and Xing (2004) consider that companies with a high risk of financial failure determine growing profitability just in the case of small enterprises characterized by growing *book-to-market ratio*. This situation is explained by the shareholders' negotiating power (Apergis *et al.*, 2011).

### **2.3 Research hypotheses**

Starting from the specialized literature regarding the influence of the financial distress risk emergence on the capital market investors' reaction, reflected through stock return, the present study aims at testing the following work hypotheses:

*H<sub>1</sub>*: For the Romanian listed companies in RASDAQ, there are significant differences between the mean values of the financial ratios afferent to the performant and the financial distress companies.

*H<sub>2</sub>*: For the Romanian listed companies in RASDAQ, there are significant differences between the mean values of stock return depending on the influence of the distress risk, estimated based on the financial data.

*H<sub>3</sub>*: For the Romanian listed companies in RASDAQ, the financial distress risk, estimated based on financial data, has a significant influence on the investors' reaction (calculated based on the stock return), classified in performance and company's risk group affiliation categories.

## **3. Research methodology**

The study aims at analysing the influence of the financial distress risk on the investors' decision, expressed by the stock return, quantified through the relative variation of stock price from a reporting period to another. In order to reach this objective, a positivist logical research approach is proposed, by using a deductive-

inductive intercession in formulating, testing and validating the work hypotheses (Smith, 2003).

### 3.1 Target population and analysed sample

The target population is represented by the BSE listed companies between 2008 and 2014. A sample of RASDAQ listed companies is extracted from this population in order to be analysed, according to the principle of rational chose (Jaba, 2002). The main activity field of these companies is the industrial one.

The sample is divided in two different sub samples. The first sample includes those companies that have been initiated in the insolvency procedure (preliminary stage of bankruptcy). Out of the 123 identified companies for which the insolvency procedure has begun since 2008, 24 companies were eliminated, companies for which information provided by the financial statements have not been identified and 53 companies for which there is no information regarding the stock price in the analysed period. The number of the implied insolvent companies for the analysis is 46.

The second sub sample includes performant companies. These companies were selected from the list of the *Major Companies in Romania* study, 2013 edition, Top 300 most important companies, study that has been carried out by using an Ernst & Young developed methodology, that also takes into account the companies' performances. Out of the 33 performant RASDAQ listed companies from the field of industry, 9 companies were excluded final number of performant companies remaining at 24. The final sample is made of 46 insolvent companies and 24 performant companies.

### 3.2 Analysed variables and data source

The variables chosen in order to assess the objective of the research are the financial ratios that were used in the Robu-Mironiuc model (Robu *et al.*, 2012). Financial ratios can be used in order to draw conclusions on the current status of the companies (Istrate, 2007), and those that were included in Robu-Mironiuc model model are specific to the analysis of bankruptcy risk for the Romanian quoted companies and has the following form:

$$Z_{RM} = 0.333 - 0.012FL + 0.525RAF + 0.027ROE - 0.425DR - 0.126NM + 3.573ROA - 0.663ITR + 0.022 CFR \quad (1)$$

For this model, the ranges for the bankruptcy risk categories are: *high bankruptcy risk*  $Z_{RM} \in (-5; 0)$ , *moderate bankruptcy risk*  $Z_{RM} \in [0; 0.6)$  and *low bankruptcy risk*  $Z_{RM} \in [0.6; 2.5]$ . Variables in this model are presented in table 1 together with the formula for each variable.

**Table 1. Numerical variables implicated in the analysis, taken from the  $Z_{RM}$  model**

Numerical Variables	Formula
$X_1$ =Financial Leverage Ratio (FL)	Total Debt / Shareholders Equity
$X_2$ =The Financial Autonomy Ratio (FAR)	Shareholders Equity / Total Assets
$X_3$ =Return on Equity (ROE)	Net Income /Shareholders Equity
$X_4$ =Debt Ratio (DR)	Total Debt / Total Assets
$X_5$ =Net Margin (NM)	Net Income / Turnover
$X_6$ =Return on Assets (ROA)	Operating Income / Total Assets
$X_7$ =Interest to Turnover Ratio (ITR)	Total interest / Turnover
$X_8$ =Cash Ratio (CFR)	Cash / Current debts

A model of bankruptcy risk prediction was chosen on the grounds that, bankruptcy is a situation of financial distress and follow the insolvency of a company. Robu-Mironiuc model selection is primarily determined by the timeliness of this model and the specific companies that were the basis for obtaining it, to the detriment of C. Măneacă and M. Nicolae, Băileşteanu, Ivonciu or Altman. The information from the financial statements of these companies is for the period of crisis, period selected for study. Whatever the time when models were obtained for predicting the state of financial distress, it is necessary to review and improve them to be permanently viable. Secondly, Robu-Mironiuc model was chosen mainly due to the homogeneity of the sample (companies in the industry). Regarding Anghel model, this is characterized by diversity of activity fields of the companies analysed. Smith and Liou (2007) points out, activity fields can have sub-domains in their structure, activities of national economy characterized by differences in legislation, operating system and product life cycles with significant influence on financial conditions.

In order to test the relevance of the information regarding the distress risk, gathered based on the Robu-Mironiuc model, table 2 presents the numerical variables that were included in the analysis.

**Table 2. Numerical variables implicated in the analysis, taken from The Robu-Mironiuc model**

Numerical Variables	Formula
$Z_{RM}$	Calculated with formula (1)
CGY= Capital Gains Yield	$(Price_1 - Price_0) / Price_0^*$

\*where  $P_0$  = represents the stock price, after five month from the moment of the financial statements issuance previous the year the companies were initiate in insolvency;

$P_1$  = represents the stock price at the time of opening insolvency proceedings for companies in financial distress, after one year of registration  $P_0$ , for companies considered performant.

In order to evaluate the bankruptcy risk influence, on different risk categories calculated based on the Robu-Mironiuc model, as well as the influence of the company status on the investors' reaction, table 3 displays the main variables that have been used in the relevance analysis model.

**Table 3. Categorical variables included in the relevance analysis of Robu-Mironiuc model on investors**

Categorical Variables	Categories
Status	1: Distress; 2: Performante 1: high distress risk $Z_{RM} \in ( 5; 0)$ : HDR
Interval $Z_{RM}$	2: moderate distress risk $Z_{RM} \in [0; 0.6)$ : MDR 3: low distress risk $Z_{RM} \in [0.6; 2.5]$ : LDR

The data needed to calculate the financial ratios for each company were obtained from the annual financial statements presented on the BSE website - [www.bvb.ro](http://www.bvb.ro). The data necessary to compute the CGY were selected from the website – [www.kmarket.ro](http://www.kmarket.ro).

### 3.3 Methods for data analysis and proposed models

In order to obtain the research results, the study proposes the use of *Analysis of variance* (ANOVA), as well as the use of simple linear regression models or ANCOVA.

ANOVA is a statistical analysis procedure of a quantitative variable variation, result type, in comparison to one or more explanatory categorical variable (Jaba, 2002). In order to verify if one factor type variable ( $X$ ), taken into consideration in the study, has a significant influence on the variable variation ( $Y$ ), a test is carried out to see if there are significant differences between the estimated  $Y$  means for each group (category) defined based on the  $X$  factor (Jaba *et al.*, 2012). Testing the existence of significant differences between the estimated means within each group can be carried out by using multiple *post hoc* comparisons, based on *Bonferroni*, *Tukey* tests and *LSD* tests (Jaba *et al.*, 2012). Use of *LSD* test is proposed in this study.

In order to estimate the influence of the distress risk emergence on the variation of the stock price of the RASDAQ listed companies, the study uses the linear regression analysis. The proposed model uses the variables in table 2, as following:

$$CGY = \beta_0 + \beta_1 Z_{RM} + \varepsilon \quad (2)$$

Where,  $CGY$  represents the dependent variable,  $Z_{RM}$  represents the independent variable,  $\beta_0$  and  $\beta_1$  represent the regression model parameters, and  $\varepsilon$  a random variable. By using  $\beta_1$ , we are testing the influence of  $Z_{RM}$  on  $CGY$ . Based on the values of  $\beta_1$ , we can estimate the direction and the intensity of the  $Z_{RM}$  factor influence on  $CGY$ .

The estimation of the influence of the distress risk emergence, estimated by using the calculated  $Z_{RM}$  score on  $CGY$ , on companies categories (*financial distressed/performant* or presenting different bankruptcy risk degrees: *HDR*, *MDR* or *LDR*) is realized by using the linear regression analysis which uses ANCOVA models, such as:

$$Y = \delta_0 + \delta_1 X + \delta_2 \text{Dummy} + \delta_3 \text{Dummy} \cdot X + \varepsilon \quad (3)$$

The study proposes the analysis of two ANCOVA linear regression models. The first used model is:

$$CGY = \delta_0 + \delta_1 Z_{RM} + \delta_2 \text{DummyDistress} + \delta_3 \text{DummyDistress} \cdot Z_{RM} + \varepsilon \quad (4)$$

Where, *DummyDistress* represents an alternative variable that has value 1 for financial distress companies and 0 in the other case (of performant companies). The influence of  $Z_{RM}$  on  $CGY$ , for insolvent companies, is tested by using  $\delta_3$ , corresponding to the  $\text{DummyDistress} \cdot Z_{RM}$ .

The second model used in the study is:

$$CGY = \delta_0 + \delta_1 Z_{RM} + \delta_2 \text{DummyHDR} + \delta_3 \text{DummyMDR} + \delta_4 \text{DummyHDR} \cdot Z_{RM} + \delta_5 \text{DummyMDR} \cdot Z_{RM} + \varepsilon \quad (5)$$

Where, *DummyHDR* represents an alternative value, which has value of 1 for the low financial distress risk companies. *DummyMDR* represents an alternative value which has value of 1 for medium financial distress risk companies and 0 in the opposite case. *LDR* category is set as reference point and is not included in the model. The influence of  $Z_{RM}$  on  $CGY$ , on companies categories with different financial distress risk levels is tested by using the estimations of  $\delta_4$  and  $\delta_5$  parameters in the equation (5), associated to the  $\text{DummyHDR} \cdot Z_{RM}$  and  $\text{DummyMDR} \cdot Z_{RM}$  products.

In order to analyse the data and obtain the results of the research, SPSS 20.0 software was used in the study.

### 3. Results and discussions

The objective of this study is to test the relevance of the information regarding the distress risk emergence on the investors' decisions for the Romanian stock exchange listed companies, RASDAQ section. The main objectives of the study aim at estimating the distress risk emergence for the companies in the analysed sample, calculated based on the  $Z_{RM}$  model (Robu *et al.*, 2012). Once the risk has been estimated, the study estimates and tests the influence of the risk on the variation of the stock price.

The emergency risk of the distress risk is estimated for each company in the analysed sample, considering the values of the financial ratios in the  $Z_{RM}$  model in the formula used in equation (1). Within the sample, the descriptive statistics afferent to the calculated ratios, as well as the ones of the estimated risk are displayed in table 4.

**Table 4. Descriptive statistics within the analysed sample**

Variables	Mean	St. Deviation	Variables	Mean	St. Deviation
FL	0.85	6.52	ROA	-0.13	0.51
FAR	0.21	0.64	ITR	0.11	0.21
ROE	-0.01	1.40	CFR	0.14	0.52
DR	0.74	0.62	$Z_{RM}$	-0.41	3.28
NM	-0.33	0.89	CGY	9.04	47.98

Taking into account the fact that the analysed sample contains a number of 46 insolvent companies and 23 performant companies, the descriptive statistics in table 2 must be separately estimated for each company category. Once the mean values of the analysis ratios have been estimated, it should test if there are any significant differences within the studies population between the mean values for the company categories, with financial distress and performant ones.

Testing and estimating the existence of significant differences between the mean values of the analysed ratios is made through the ANOVA, the main results being presented in table 5.

**Table 5. Variation testing of the mean values of the analysed ratios depending on the company status**

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Variable	Mean depending on company status			Variation test	
	Distress	Performant	Difference	F Test	Sig.
(0)	(1)	(2)	(3) = (1) - (2)	(4)	(5)
FL	0.99	0.59	0.40	0.06	0.81
FAR	0.07	0.49	-0.42	7.47	0.01
ROE	-0.03	0.01	-0.04	0.01	0.92
DR	0.89	0.46	0.43	8.42	0.01
NM	-0.46	-0.07	-0.39	3.26	0.08
ROA	-0.20	0.01	-0.19	2.59	0.11
ITR	0.14	0.07	0.07	1.58	0.21
CFR	0.02	0.36	-0.34	7.43	0.01
Z <sub>RM</sub>	-0.76	0.23	-0.99	1.47	0.23
CGY	5.73	15.38	-9.65	0.63	0.43

Based on the data in table 5, we can observe that, within the analysed sample, in comparison to the performant companies, the financial distress ones have on averaged a higher indebtedness degree (FL = 0.99 and DR = 0.89), a low financial autonomy (FAR = 0.07), they record loses of return on equity, net margin and return on assets (ROE = -0.03, NM = -0.46 and ROA = -0.20) and low liquidity levels (CFR = -0.02). Contrary, performant companies report on an average a lower indebtedness degree (FL = 0.59 and DR = 0.46), a high financial autonomy (FAR = 0.49), lower losses of the net margin (NM = -0.07), positive values of the return on equity and return on assets (ROE = 0.01 and ROA = 0.01) and a high liquidity level (FR = 0.36). Low values of the profitability ratios, for the performant companies, are determined by effects of financial crisis, which are still present. These all lead to the obtaining of capital gains yield that are far more higher for the performant companies (CGY = 15.38), compared with the ones with financial difficulty (CGY= 15.38).

Depending on the mean estimated values within the sample, one can estimate, within the population, if there are significant differences between the recorded values of the companies in the two considered categories (with financial distress and performant). Within the studied population, using ANOVA and *post-hoc* (LSD) tests, with a 10% degree, the existence of significant differences between the mean values corresponding to the insolvent and performant companies was estimated and tested, regarding the financial autonomy, global indebtedness, net margin and general liquidity. As for the CGY values, one can notice that there are no significant differences within the studied population between the mean estimated values for the insolvent and performant companies.

Depending on the distress risk emergence estimated based on the Robu-Mironiuc model and the risk categories determined through the associated intervals, means ratios were estimated in the study on different risk categories. Once the means have been calculated, the existence of differences between the average registered values

for the companies in the *HDR*, *MDR* and *LDR* categories was estimated and tested. The obtained results after the ANOVA testing are displayed in tables 6 and 7.

**Table 6. Mean values variation testing of the analysed ratios depending on the  $Z_{RM}$  risk interval**

Variables	Variation Test		Variables	Variation Test	
	F	Sig.		F	Sig.
FL	33.36	0.00	ROA	5.37	0.00
FAR	15.08	0.00	ITR	2.07	0.13
ROE	6.51	0.00	CFR	0.63	0.54
DR	13.63	0.00	$Z_{RM}$	34.15	0.00
NM	8.06	0.00	CGY	1.35	0.27

The ANOVA results in table 6 show the existence of a significant influence of the company affiliation to one of the three different risk category calculated based on the  $Z_{RM}$ , on the average values of the analysed ratios. With 95% confidence, excepting ITR, CFR and CGY, the variation of the financial ratios values in table 6, is strongly influenced by the companies' affiliation to one of the three risk categories of distress risk emergence, determined based on the  $Z_{RM}$  values.

By using the *post-hoc (LSD)* tests, the groups with significant differences were identified and the values of the differences within the studied population were estimated. The results of the analysis are presented in table 7.

**Table 7. Testing of the significant differences existence between the analysed ratios depending on the  $Z_{RM}$  risk interval**

Variable	Average value depending on $Z_{RM}$ risk interval									
	HDR	MDR	LDR	Difference Sig		Difference Sig		Difference Sig		
	(0)	(1)	(2)	(3)	(4)=(1)-(2)	(5)	(6)=(1)-(3)	(7)	(8)=(2)-(3)	(9)
FL	-5.15	0.78	6.40		-5.93	0.0	-11.54	0.0	-5.61	0.0
FAR	-0.28	0.59	0.24		-0.87	0.0	-0.51	0.0	0.36	0.0
ROE	0.74	-0.04	-0.67		0.78	0.0	1.41	0.0	-0.62	0.1
DR	1.12	0.37	0.76		0.81	0.0	0.42	0.0	-0.39	0.0
NM	-0.92	-0.08	-0.07		-0.85	0.0	-0.85	0.0	0.00	1.0
ROA	-0.41	0.00	-0.02		-0.41	0.0	-0.40	0.0	0.02	0.9
ITR	0.19	0.09	0.07		0.11	0.1	0.12	0.1	0.01	0.9
CFR	0.03	0.19	0.18		-0.16	0.3	-0.15	0.3	0.01	1.0
$Z_{RM}$	-3,83	0.38	1.81		-4.21	0.0	-5.64	0.0	-1.43	0.0
CGY	-0.21	4.94	22.11		-5.15	0.7	-22.33	0.1	-17.18	0.2

Data in table 7 present the estimations of the analysed ratios means depending on the companies' affiliation to one of the three risk groups that were obtained based on the  $Z_{RM}$ .

The results of the *post-hoc* tests (namely, the *LSD* test) show that there are significant differences between the average values of the ratios that were used in the analysis for the companies with high, medium and low distress risk emergence. With 90% confidence, significant differences can be noticed between the companies in *HDR* and *MDR* categories for the *FL*, *FAR*, *ROE*, *DR*, *NM*, *ROA*, *ITR* and  $Z_{RM}$  ratios. Significant differences can be observed within the same ratios, plus *CGY*, and also in the case of companies in *HDR* and *LDR* categories. But changes appear between the companies in *MDR* and *LDR* risk groups, where the existence of significant differences was tested and estimated just for the *FL*, *FAR*, *ROE*, *DR* and  $Z_{RM}$  ratios.

Testing the information relevance regarding the distress risk emergence on the investors' decisions supposes the analysis of the  $Z_{RM}$  influence on the variation of the stock price (*CGY*) variation. It considers the estimation of the coefficients of the three regression models in equations (2), (4) and (5).

For each regression model the ( $R^2$ ) coefficient of determination and each of them was tested using ANOVA, displaying the results in table 8.

**Table 8. Test of the regression models proposed in the study**

Model	R <sup>2</sup>	ANOVA/ANCOVA	
		F test	Sig.
Model 1	0.039	2.767	0.101
Model 2	0.159	3.709	0.016
Model 3	0.150	2.258	0.059

*Model 1:*  $CGY = \beta_0 + \beta_1 Z_{RM} + \varepsilon$

*Model 2:*  $CGY = \delta_0 + \delta_1 Z_{RM} + \delta_2 DummyDistress + \delta_3 DummyIDistress \cdot Z_{RM} + \varepsilon$

*Model 3:*  $CGY = \delta_0 + \delta_1 Z_{RM} + \delta_2 DummyHDR + \delta_3 DummyMDR + \delta_4 DummyHDR \cdot Z_{RM} + \delta_5 DummyMBR \cdot Z_{RM} + \varepsilon$

From table 8, the results of the analysis show an increase of the *CGY* variation as a result of the influence of the information regarding the distress risk emergence, knowing that such information come along with a company classification in performance categories (insolvent/performant or based on the risk categories resulted from the  $Z_{RM}$ ). The distress risk emergence in *Model 1* has a low influence on investors' reaction regardless of the financial position and performance of the company. When willing to differentiate the companies in different performance groups, an increase of the information relevance is registered, regarding the distress risk emergence, on the investors' reaction (from *Model 2* and *Model 3*).

After processing the data, the results of the estimation and testing of the regression models coefficients are presented in tables 9, 10 and 11.

**Table 9. Estimations of the regression parameters for model 1**

Model 1*	$\beta$	t test	Sig.
Intercept	10.228	1.792	0.078
$Z_{RM}$	2.890	1.663	0.100

\*CGY = dependent variable

According to data in table 9, with a 90% confidence, we can notice that the information regarding the emergence of the financial distress status has a significant influence on the stock price variation. This phenomenon indicates an increased relevance of the information provided to RASDAQ investors by  $Z_{RM}$ .

Depending on the company affiliation to one of the two categories (regarding the financial distress or performance) table 10 displays the estimations of the second regression model.

**Table 10. Estimations of the regression parameters for model 2**

Model 2*	$\beta$	t test	Sig.
Intercept	10.904	1.175	0.244
$Z_{RM}$	18.269	3.370	0.001
Dummy $Insolvency$	-4.328	-0.377	0.707
Dummy $Insolvency \cdot Z_{RM}$	-17.148	-3.010	0.004

\*CGY = dependent variable

Data in table 10 indicates the relevance of the information regarding the distress risk emergence reported to investors' decisions in the case of performant and non-performant companies. In the case of performant companies, one can appreciate that the  $Z_{RM}$  score significantly contributes to the investors' decision supporting and thus leads to a growth of the registered capital gains yield of the RASDAQ listed companies. In the case of companies with a significant risk of financial failure, the  $Z_{RM}$  values significantly determine the decrease of the capital gains yield of the RASDAQ listed companies. Based on the two findings, one can appreciate that the obtained values of the  $Z_{RM}$  score function are relevant for the investors especially when the performance category a company can be integrated is known.

In the case of the Romanian RASDAQ listed companies, the performance categories can be also obtained by using the  $Z_{RM}$ , based on the reference intervals associated to the calculated scores. The relevance of the information regarding the distress risk emergence, evaluated by using the  $Z_{RM}$  score, can be differently estimated on performance/risk categories. The results of the regression model 3 estimations are displayed in table 11.

Table 11. Estimations of the regression parameters for model 3

Model 3*	$\beta$	t test	Sig.
Intercept	-13.959	-0.887	0.378
$Z_{RM}$	19.928	2.891	0.005
DummyHDR	13.986	0.664	0.509
DummyMDR	20.981	0.741	0.461
DummyHDR· $Z_{RM}$	-19.865	-2.702	0.009
DummyMDR· $Z_{RM}$	-25.375	-0.443	0.659

\*CGY = dependent variable

In this case, for the companies that present no financial distress risk (affiliated to the *LDR* category), one may notice that the information provided to the investors based on the  $Z_{RM}$  score calculation are relevant and lead to a growth the profitability of RASDAQ listed shares (evaluated by using CGY). In the case of companies that show a medium distress risk emergence, information that is provided to the investors that were calculated based on the  $Z_{RM}$  do not indicate any relevance within RASDAQ. But, for the companies with a high degree reaching the failure status, one can appreciate that the calculated  $Z_{RM}$  score determines a significant decrease in the share profitability of the RASDAQ listed companies. Thus, we can appreciate that the calculated values of the  $Z_{RM}$  model are relevant for the investors only in the case of companies that present a high or very low probability to reach the failure status.

## 5. Conclusions

After processing the data using analysis of variance (ANOVA), simple linear regression and ANCOVA, the results led to the validation of the proposed working hypothesis regarding the existence of significant differences between the mean values of financial ratios of the performant companies and insolvent, and according to the influence of the distress risk estimated based on financial data (computed on the stock return basis). Validation of these assumptions determine to achieve the goal proposed of testing the relevance of information on the distress risk on the investors decisions, regarding the purchase or sale of shares, with impact on stock return, for Romanian listed companies on RASDAQ.

The results are consistent with the views expressed by Aharony *et al.* (1980) and Zavgren *et al.* (1988) that considers the phenomenon of financial distress as a “bad sign”, which act in reverse. Although adverse event is the occurrence of insolvency, which can be completed either by reorganizing companies, either through bankruptcy and liquidation, investors who act on the Romanian capital

market, notes rather the unfavourable state of insolvency often followed by bankruptcy.

From the variables presented in Robu-Mironiuc model, the variables analysed differ from the point of view of performant companies and financial distress companies, as well as from the point of view of the three risk categories. These results again validate the model Robu-Mironiuc. Regarding the econometric models obtained,  $Z_{RM}$  score and membership of a company in the high risk category influence CGY and therefore investors' decisions CGY, result considered to be somewhat expected. No investor, no matter how rational is, will accept the possibility of disappearance of the company.

The necessity of such a study is determined by the existence in the Romanian literature, especially statistical models that can be applied to determine the state of difficulty, without taking into account their impact on stock return. For a potential investor, knowing the probability distress risk, characterized by insolvency, bankruptcy or significant losses is important, always reflecting their decisions.

The limits of this study relate mainly to the size and nature of the sample which contains 46 companies with financial difficulties, from industry, in the period 2008-2014. At the same time, the study was focused only on the analysis of the influence of financial factors on investors' decisions without taking into question a number of non-financial factors as control variables. However, future research directions aimed precisely at reducing or eliminating these limitations, focusing on the influence of audit opinion on going concern.

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