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DETERMINANTS OF THE OCCURRENCE OF FINANCIAL DISTRESS IN MEDIUM-SIZED AND BIG PUBLIC JOINT-STOCK COMPANIES

Dragomir Dimitrijević[1], Sunčica Milutinović[2] and Predrag Stanković[1]*
[1]*University of Kragujevac, Faculty of Economics, the Republic of Serbia*
[2]*University of Novi Sad, Faculty of Economics in Subotica, the Republic of Serbia*

Forecasting financial distress in companies is very significant bearing in mind the complexity and dynamics of the modern business environment. Accordingly, the subject matter of this research study is the determinants of the occurrence of the financial distress that may lead a company to bankruptcy. The study is aimed at determining the interdependence (correlation) between certain determinants of the occurrence of financial distress and the indicators of the probability of the occurrence of financial distress and considering the difference in the probability of the occurrence of financial distress before and after the onset of the COVID-19 pandemic in the Republic of Serbia. The research was conducted on a sample of 73 publicly traded companies, of which 22 belong to the group of big companies, and 51 to the group of medium-sized companies over the 2018-2022 period. The results have shown that there is a statistically significant negative correlation between the determinants of profitability, liquidity and solvency and the probability of financial distress. In addition, it was shown that there is a statistically significant positive correlation between leverage and the probability of financial distress, as well as between company growth and the Altman Z-score indicator. It is concluded that there is a statistically significant difference in the value of the Altman Z-score indicator before and after the onset of the pandemic caused by the COVID-19 virus.

Keywords: financial distress, bankruptcy, Altman Z-score, COVID-19

JEL Classification: M41, G32, G33

INTRODUCTION

Whatever a company's size and the activity it engages itself in, every company tries to predict its business and the conditions of the business activity from different aspects. What companies are particularly interested in is how successful they will be in eliminating the risks that threaten their business in the future. In other words, companies are very interested in predicting and managing the factors that could lead to business failure and, eventually, bankruptcy. Decisions to discontinue operations are based on

* *Correspondence to:* P. Stanković, University of Kragujevac, Faculty of Economics, Liceja Kneževine Srbije 3, 34000 Kragujevac, the Republic of Serbia;
email: predrag.stankovic@ef.kg.ac.rs

expected returns and the company's ability to cover its variable costs. It should be noted that a company can be in financial distress for many years, but it must never fail to pay its current obligations. If it is not able to pay its obligations upon maturity dates, then major financial problems may arise for the company (Altman & Hotchkiss, 1993). There are numerous reasons for the occurrence of business failure, of which A. S. Dewing (1926) states the four: excessive competition, unprofitable expansion, the cessation of demand for the company's products or services, and the excessive payment of capital expenditures. A slightly different understanding of the process of developing financial distress in companies implies that companies in financial distress go through the four stages of business deterioration before declaring bankruptcy, namely through incubation, a lack of cash, financial insolvency and complete insolvency (Newton, 1975).

It is very important to consider the statistical data on the number of active bankruptcy proceedings in the Republic of Serbia in the period from 2018 to 2022, because that period is covered in the paper. Namely, the data obtained from the Bankruptcy Trustee Licensing Agency indicate a large number of bankruptcy proceedings and a decrease in their number in the period from 2018 to 2022 as well (the number of bankruptcy proceedings was observed at the end of the business year). According to the website of the Bankruptcy Supervision Agency, there were 2,101 active bankruptcy proceedings at the end of 2018. In 2019, this number was 2,057; in 2020, there were 1,916 active bankruptcy proceedings; in 2021, there were 1,760, whereas at the end of 2022, there were 1,719 active bankruptcy proceedings.

The subject matter of the research study presented in the paper implies the key determinants of the occurrence of the financial distress that may lead a company to bankruptcy and the research covers all the medium-sized and big public joint-stock companies in the territory of the Republic of Serbia. The fact that it is a very complex issue to consider the factors that lead companies to an unfavorable financial position must not be forgotten, because there is a very large number of the factors that lead to financial distress, so it is almost impossible to include them all. However, it is possible to see the key determinants based upon which the occurrence of financial distress can be predicted.

In many studies conducted in the Republic of Serbia and its neighboring countries, the Altman Z-score was used in order to predict the occurrence of the financial distress of companies in various industries (Ivaniš & Popović, 2013; Milašinović, Knežević & Mitrović, 2019; Knežević Špiler, Milašinović, Mitrović, Milojević & Travica, 2021; Kozarević & Pirić, 2022; Milić, Tekić, Novaković, Zekić, Popov & Mihajlov, 2022). Yet, there is a significantly smaller number of papers dealing with the analysis of the determinants of the occurrence of financial distress in public joint-stock companies in the Republic of Serbia, as well as those dealing with the comparison of the probability of the occurrence of financial distress in these companies before and after the onset of the pandemic caused by the COVID-19 virus. The COVID-19 pandemic is known to have affected not only people's health, but also the operations of companies and the functioning of countries' economies, so it is very important to take into consideration the changes caused by the pandemic when speaking about the likelihood of financial distress for the observed companies. The aforementioned facts represent a certain research gap that the authors will try to eliminate with this research. Therefore, the paper is aimed at determining the interdependence (correlation) between certain determinants of the occurrence of financial distress and the indicators of the probability of the occurrence of financial distress and the difference in the probability of the occurrence of financial distress before and after the onset of the pandemic caused by the COVID-19 virus in the Republic of Serbia.

Based on the defined subject matter and the goal of the research study, the following research hypotheses were set in the paper:

H1: There is a statistically significant negative correlation between the probability of financial distress and profitability.

H2: There is a statistically significant negative correlation between the probability of financial distress and liquidity.

H3: There is a statistically significant negative correlation between the probability of financial distress and solvency.

H4: There is a statistically significant positive correlation between leverage and the probability of financial distress.

H5: There is a statistically significant negative correlation between the Altman Z-score and company growth.

H6: There is a statistically significant difference in the value of the Altman Z-score before and after the onset of the COVID-19 pandemic.

The research study carried out in the paper includes all big and medium-sized public joint-stock companies in the territory of the Republic of Serbia, i.e. 22 big and 51 medium-sized public joint-stock companies in the period from 2018 to 2022 (the size having been determined based on the criteria outlined in the Accounting Law). In addition to the quantitative methods (descriptive statistics, correlation statistical analysis, and the Wilcoxon signed rank test), the qualitative methods of induction, deduction, analysis, synthesis and abstraction were also used.

Except for the Introduction and Conclusion, the paper is structured into three more parts. The first part presents a literature review. The second part gives an overview of the methodology used in the work. The third part contains the results of the empirical research and the discussion of the results.

LITERATURE REVIEW

The term "financial distress" is general and vague to some extent. Generally speaking, the term refers to the inability to pay obligations (for example a debt) when they are due (Gilson, Kose & Lang, 1990). Operational definitions of financial distress focus on two main events: bond default and bankruptcy, both being known to the public and the dates they occurred on being known with some precision (Beaver, Correia & McNichols, 2011). The continued development of conceptually richer and more accurate forecasting models is of importance to regulators, practitioners and academics (Shumway, 2001). Recently, with the development of informational technology, machine learning and artificial intelligence, a new field of digital data analysis has begun to emerge and develop rapidly, which has contributed to the accelerated development of the methods that can predict the financial distress of companies (Sun & Li, 2008).

The following is an overview of the individual determinants on the basis of which the research hypotheses were set in this paper, based on previously conducted research. As can be seen from the formulated hypotheses, each determinant simultaneously has a certain interdependence with the indicators that indicate the possibility of financial distress.

Profitability

Profitability can be defined as the ultimate measure of the economic success achieved by a company in relation to invested capital (Andriani, Nurnajamuddin & Rosyadah, 2021). Profitability is the primary goal of all companies and without profitability no company can survive for a long period of time (Khan & Raj, 2020). The ROA (Return on Assets) ratio is most often used to measure profitability (Ohlson, 1980; Lo, 1986; and Gombola, Haskins, Ketz, & Williams, 1987). However, it is also suitable to use the ROE (Return on Equity) ratio that measures the financial success achieved from the owner's point of view, which B. Kollár and Z. Sojková (2015) used in their research on financial distress. Return on assets represents the quotient of the net result and the total company's assets, whereas return on equity represents the quotient of the net result and the company's equity (Račić, Barjaktarović & Zeremski, 2011).

J. Y. Campbell, J. Hilscher and J. Szilagyi (2008) studied the determinants of corporate failure and the pricing of stocks in financial distress using statistical models and came to the conclusion that lower

profitability would lead to higher levels of financial problems that increase the chance that the company would find itself bankrupt. In the research conducted by C. K. Thim, Y. V. Choong and C. S. Nee (2011), the authors also came to the conclusion that there was a statistically significant negative correlation between profitability (measured through ROA) and the probability of financial distress (measured by the Altman Z-score). A study by E. Masdupi, A. Tasman and A. Davista (2018) which was carried out on a sample of Indonesian listed companies also shows that there is a negative correlation between profitability and the probability of financial distress. R. A. Dwiantari and L. G. S. Artini (2021) say in their paper that there is a negative correlation between the profitability indicators and the possibility of financial distress.

Liquidity

Liquid assets are generally considered to be a measure against crises as they allow companies to save funds by not having to sell assets in unfavorable situations in order for them to pay off their debt (Shleifer & Vishny, 1992). In this paper, liquidity is measured using three ratio numbers, namely the current, quick and liquid ratios. The *current ratio* (CR) represents the quotient of the current assets and short-term liabilities, while the *quick ratio* (QR) is obtained from the ratio of the current assets less the value of inventories (the so-called relatively liquid assets) and the amount of short-term liabilities, and the *liquid ratio* (LR) is represented by the quotient of the amount of cash and short-term liabilities (Saleem & Rehman, 2011).

Liquid funds can be said to allow companies to avoid higher costs of the other sources of funds for financing their activities and investment (Mikkelson & Partch, 2003). A. W. Butler, G. Grullon and J. P. Weston (2005) found that the fees charged by investment banks were lower for the companies with more liquid capital. The study showed that the costs of financial distress were inversely related to the holding of the liquid assets. The results of the research conducted by O. S. Desiyanti, W. Soedarmono, K. Chandra and K. Kusnadi (2019) clearly point to the fact that there is a statistically significant negative correlation between the liquidity ratios and the probability of financial distress. In the results of their paper, C. K. Thim *et al* (2011) state that they have also discovered a statistically significant negative correlation between liquidity and the probability of the occurrence of financial distress in the listed companies. In the research study conducted by N. Kim-Soon, A. A. E. Mohammed and F. K. M. Agob (2013) on a sample of listed companies, the authors found that there was a statistically significant negative correlation between the liquidity indicators and the possibility of financial distress.

Solvency

Given the fact that liquidity represents a company's ability to meet its obligations as they fall due, solvency is often referred to as "long-term liquidity". Namely, the ratio analysis of solvency basically implies an overview of the solvency which represents the long-term vitality of the company (Wild, Subramanyam & Halsey, 2007). The solvency ratio represents the quotient of own and borrowed capital (Obradović, 2021).

The solvency ratio can be used to measure the severity of financial distresses (James, 1996). M. Harris and A. Raviv (1990) suggest that leverage is inversely related to the solvency ratio and argue that an increase in debt will cause a higher probability of default. In their research done in the listed companies, C. K. Thim *et al* (2011) point out the fact that there is a statistically significant negative correlation between the ratio of the solvency indicators and the probability of financial distress in the companies. In the research study that included companies from the USA, K. Amoa-Gyarteng (2021) also states that a statistically significant negative correlation was identified between the ratio of the solvency indicators and the probability of the occurrence of financial distress. In their study, L. C. Megasanti and H. E. Riwayati (2023) state that they came to the conclusion that there was a negative correlation between the ratio of the solvency indicators and the probability of the occurrence of financial distress.

Leverage

Leverage shows the impact of a debt on investment rates and investment opportunities in companies where the level of the company's debt will indirectly affect investors' interest and confidence in the companies (Rohmadini, Saifi & Darmawan, 2018). A company's high or low debt will affect the size of the risk of financial distress that may occur in the company. The debt-to-equity ratio (DER) is a ratio used to assess a company's leverage. According to Dirman's interpretation, this ratio is obtained by comparing all debts, including the current debt, with the total capital, i.e. total liabilities, which is equal in amount to the total assets (Dirman, 2020).

If a company does not have sufficient revenue, it is very likely that the company will easily find itself in a situation where financial distress will occur (Gobenvy, 2014). In their research, among other things, A. Rohmadini *et al* (2018) came to the results that leverage affected financial problems in a sense that there was a positive correlation between leverage and the probability of financial problems. In their study including manufacturing companies, S. M. K. Rahman, M. K. Islam and M. M. Hossain (2021) also indicated the presence of a positive correlation between leverage and the probability of financial distress. Investigating the interdependence of leverage and the probability of the occurrence of financial distress, A. Dirman (2020) came to the conclusion that there was no negative correlation between leverage and the probability of the occurrence of financial distress, i.e. there was a positive correlation between leverage and the possibility of the occurrence of financial distress in the company.

Company growth

Where company growth is concerned, different types of growth, such as market growth, financial growth, growth in terms of the size or profitability, and other types can be discussed. In this paper, company growth is exclusively discussed as growth from the aspect of profitability. According to the statement, growth will be quantified by considering change in the operating profit in the current year compared to the previous year, which C. K. Thim *et al* (2011) used in their paper.

O. Yosha (1995) suggested that companies with potentially valuable future growth projects would not raise a debt by issuing securities (the debt) because of the high costs of disclosing sensitive information. Also, J. K. MacKie-Mason (1990) explains that the companies that work intensively on research and development should avoid issuing debt securities. Therefore, there should be a negative relationship between growth and financing by debt, which means that high-growth companies will face a lower Altman Z-score indicator (a negative correlation between growth and the Altman Z-score) because they employ less financing by debt. Thus, the current borrowing alleviates the immediate situation, but worsens the company's future position, which is the reason why the fifth research hypothesis posits that the companies experiencing certain growth have a higher likelihood of facing financial distress in the future, as indicated by lower Altman Z-score values. Assuming that companies are unique in terms of future, as well as current financial problems, there is a good chance that companies with highly expected growth opportunities will maintain a low-risk debt capacity to avoid financing future investments through equity offerings or missed investments (Morri & Cristanziani, 2009). C. K. Thim *et al* (2011) point out the fact that company growth has a statistically significant negative correlation with the Altman Z-score indicators.

The COVID-19 pandemic

The companies that have experienced the financial distress caused by the COVID-19 pandemic require the corrective steps that are adapted to the conditions of the crisis caused by the pandemic, as well as those that will allow those companies to continue to operate and improve their business, in order to improve their performance in the future (Marginingsih, 2022). Restrictions on community activities due to the COVID-19 pandemic restrictions have caused economic losses at the national level (Hadiwardoyo, 2020).

According to the results of a survey conducted on a sample of 27 companies from Indonesia (Rahmah & Novianty, 2021), it was concluded that there were statistically significant differences in the Z-score value between the period before and during the COVID-19 pandemic. A similar research study conducted on the listed companies in China generated similar results, namely that the COVID-19 pandemic had a significant impact on the business of the analyzed companies (Rababah, Al-Haddad, Sial, Chunmei & Cherian, 2020). Based on the research study on companies in Nigeria conducted by H. O. Aifuwa, A. Saidu and S. A. Aifuwa (2020), it can be concluded that the linear regression results of this study revealed the fact that the COVID-19 pandemic was detrimental to the financial and nonfinancial performance of private companies in Nigeria. The results of the research study conducted by R. Marginingsih (2022) indicate an increased probability of financial distress (a decrease in the Z-score indicators) in the period after the onset of the pandemic. N. Fitria, H. Putri, K. Shabirin and O. T. Doumbouya (2022) present the results of their research study, in which they found that there was a certain difference in the Altman Z-score indicators before and during the COVID-19 pandemic.

RESEARCH METHODOLOGY

The criteria for classifying companies by size were based on the standards outlined in the Accounting Law of the Republic of Serbia, as presented in Table 1. It is important to note that a company must meet two out of the three specified conditions so as to be classified into a particular group.

Therefore, the joint-stock companies listed on the Belgrade Stock Exchange, i.e. those whose shares can be traded on the stock exchange, are included. The period covered by the research study spans from 2018 to 2022, (namely, five-year period), in which all the companies' performances are observed at the end of the year, bearing in mind the fact that the subject matter of the analysis is the financial statements of the companies published at the end of the business years. All financial reports were downloaded from the website of the Business Registers Agency, and the data presented in them were processed in the SPSS statistical program for social sciences. For the companies included, consolidated financial statements were used, as it is more appropriate to review the financial statements of the entire group rather than only of the parent company. The consolidated financial statements provide a better basis for analysis.

The qualitative methods of analysis, synthesis, induction, deduction, and abstraction are used in the paper. In terms of quantifying the probability of the occurrence of financial distress in the companies, the most famous and potentially the most acknowledged model known as the Altman Z-score is used. This model is based on the calculation of certain ratio indicators (from X_1 to X_5), based on which the Z-indicators are calculated to sublimate the effect of all the five mentioned variables (except for the Z'' indicator that sublimates the effect of the four

Table 1 The criteria for classifying companies by size

The size	The average number of employees	Business revenues	Total assets
Micro	≤ 10 employees	≤ 700.000 euros	≤ 350.000 euros
Small	> 10 and ≤ 50 employees	> 700.000 and ≤ 8.000.000 euros	> 350.000 and ≤ 4.000.000 euros
Medium-sized	> 50 and ≤ 250 employees	> 8.000.000 and ≤ 40.000.000 euros	> 4.000.000 and ≤ 20.000.000 euros
Big	> 250 employees	> 40.000.000 euros	> 20.000.000 euros

Source: Authors. Calculation is based on the Accounting Law of the Republic of Serbia

variables). So, based on the results of the Z-indicators, the examiner draws a conclusion about the probability of bankruptcy in companies. The model is represented by the following formula (Altman, 1968):

$$Z = 1,2\ X_1 + 1,4\ X_2 + 3,3\ X_3 + 0,6\ X_4 + 0,999\ X_5 \quad (1)$$

where Z is the Altman Z-score, and the other elements marked with an X are calculated as follows:

X_1 = The net current assets / Total assets

X_2 = The net current assets / Total assets

X_3 = EBIT (Earnings before interest and taxes) / Total assets

X_4 = The market value of equity / The book value of the total liabilities (hereinafter, this calculated variable is marked as "X4.1")

X_5 = Sales revenue / Total assets

For the company whose Z-score value is lower than 1.80, there is a high probability of bankruptcy. If the Z-score value is greater than 3.00, the probability of bankruptcy is very low. The range between 1.80 and 3.00 represents the so-called "zone of ignorance" or "uncertainty zone," where it is difficult to determine the probability of bankruptcy.

Since the Z-score was only applicable to public companies, not to private ones (because of the X_4 indicator), Altman developed a new model with new weights, which can be applied to the companies whose shares are not traded (Altman, Iwanicz-Drozdowska, Laitinen & Suvas, 2017):

$$Z' = 0,717\ X_1 + 0,847\ X_2 + 3,107\ X_3 + 0,420\ X_4 + 0,998\ X_5 \quad (2)$$

where X_4 represents the ratio of the book value of own capital and the book value of total liabilities (hereinafter, this calculated variable is marked as "X4.2").

If the value of Z' is lower than 1.23, there is a high probability of bankruptcy, whereas in a situation where the value of Z' is greater than 2.90, there is a very low probability of bankruptcy. When the Z'-score value is between 1.23 and 2.90, the probability of bankruptcy cannot be determined with certainty (the so-called "uncertainty zone").

In order for there to be no influence of the activity on the bankruptcy prediction model, a four-variable model was developed, in which the X_5 variable was excluded (Altman & Hotchkiss, 1993), namely:

$$Z'' = 3,25 + 6,56\ X_1 + 3,26\ X_2 + 6,72\ X_3 + 1,05\ X_4 \quad (3)$$

where the X_4 variable is determined as in the Z' model (hereinafter, this calculated variable is marked as "X4.2"), and for the companies with the negative value of Z", the probability of financial distress is very high.

The ROA and ROE indicators were calculated in order to assess profitability, whereas the current, quick and liquid ratios were calculated so as to assess liquidity, and the X_4 Altman Z-score indicator was taken as the solvency indicator. On the other hand, leverage was calculated as the ratio of the total liabilities to the total assets, whereas company growth was measured as the chain index of change in the operating profit in the current year compared to the previous year.

All the analyzed data were statistically processed in the SPSS program. At the same time, descriptive statistical analysis was first used, whereas correlational statistical analysis was used to examine the interdependence between the individual determinants and the probability of the occurrence of financial distress (the Altman Z-score). For the purpose of analyzing the differences in the Altman Z-score values before and after the onset of the COVID-19 pandemic, the Wilcoxon signed rank test was used, preceded by the Shapiro-Wilk test which was used to test the normality of the distribution.

EMPIRICAL RESEARCH RESULTS

First, the results of the descriptive statistics are presented in Table 2, where the results of the mean, minimum, maximum, standard deviations and medians for individual indicators, as well as the sublimated indicators of the Altman Z-score, are

Table 2 The descriptive statistics of the used ratio indicators and the Z-score

Year		ROA	ROE	CR	QR	LR	Solvency	Leverage	Growth	Z-score
2018	Mean	0.023	0.072	1.925	1.264	0.330	1.963	0.503	-0.058	2.754
	Median	0.016	0.034	1.317	0.893	0.066	0.582	0.459	-0.150	2.096
	Std. deviation	0.072	0.135	1.724	1.320	0.633	4.520	0.345	3.137	3.086
	Minimum	-0.328	-0.288	0.066	0.041	0.000	0.010	0.041	-15.014	-1.400
	Maximum	0.223	0.716	9.371	6.825	3.164	33.935	1.704	14.273	22.068
2019	Mean	0.027	0.105	1.980	1.288	0.403	2.149	0.478	1.193	2.881
	Median	0.017	0.025	1.405	0.859	0.108	0.596	0.426	0.180	2.190
	Std. deviation	0.173	0.436	1.948	1.396	0.785	4.931	0.316	4.124	3.250
	Minimum	-1.032	-0.241	0.058	-1.011	0.000	0.006	0.042	-4.685	-1.648
	Maximum	0.897	3.690	12.326	6.093	3.975	36.754	1.500	22.551	23.565
2020	Mean	0.006	-0.165	2.027	1.343	0.459	2.074	0.482	-3.995	2.679
	Median	0.013	0.027	1.587	0.962	0.136	0.580	0.411	0.040	2.097
	Std. deviation	0.103	1.430	1.650	1.311	0.708	4.787	0.341	35.373	3.143
	Minimum	-0.384	-11.784	0.052	0.033	0.000	0.004	0.055	-296.146	-2.077
	Maximum	0.281	0.440	7.884	6.237	2.874	35.622	1.701	31.432	22.793
2021	Mean	0.007	-0.018	1.876	1.237	0.413	1.908	0.495	0.899	2.596
	Median	0.014	0.030	1.521	0.895	0.127	0.599	0.426	-0.009	2.174
	Std. deviation	0.092	0.438	1.450	1.224	0.776	4.384	0.361	7.305	2.865
	Minimum	-0.471	-3.570	0.049	0.032	0.001	0.011	0.055	-14.860	-1.939
	Maximum	0.190	0.319	7.139	6.489	5.528	32.681	1.697	38.541	20.710
2022	Mean	0.014	0.003	1.891	1.211	0.359	2.511	0.523	-0.113	3.077
	Median	0.014	0.025	1.443	0.888	0.097	0.665	0.443	-0.009	2.081
	Std. deviation	0.082	0.220	1.471	1.187	0.640	7.142	0.512	1.546	4.350
	Minimum	-0.254	-1.449	0.035	0.025	0.000	0.015	0.048	-5.698	-2.117
	Maximum	0.316	0.351	7.376	5.755	3.937	55.367	3.663	4.121	33.587

Source: Authors

accounted for. Certain factors that influence the values of the Altman Z-score that were determined by the hypotheses are also given.

The data necessary to conduct the research study and calculate the indicators were collated from the financial reports of the analyzed companies from the Business Registers Agency's website and processed using the SPSS statistical program for social sciences. The confidence levels $\alpha = 0.05$ and $\alpha = 0.01$ were used to determine statistical significance.

Table 2 shows the results of the descriptive statistics of the individual determinants and the Altman Z-score, since the Z-score for the selected sample (the listed joint-stock companies) is the most suitable measure of the occurrence of financial distress.

According to the data shown in Table 2, it can be clearly concluded that, in all observed years, the result of the Altman Z-score (used for the listed companies) is in the so-called "uncertainty zone" for the companies from the observed sample, since the values of the mean and the median of the Altman Z-score are in all observed years between the lower and upper limits, i.e. between 1.80 and 3.00. In 2022, however, the mean was 3.077, which means that the observed companies mostly had a low probability of financial distress, which speaks in favor of the hypothesis H6, since it is a year in which the pandemic had a weak effect. The minimum values of the Altman Z-score refer to the company *Politika*, which means that this company is extremely exposed to financial distress and there is a high probability of opening bankruptcy proceedings.

In order to test the hypothesis H1 it is necessary to analyze the results of the correlation analysis presented in Table 3. At the same time, Spearman's correlation coefficient was used because it was established through the box-plot diagram that it was not a normal distribution. In such a situation, Spearman's correlation coefficient is a more suitable measure for determining interdependence between variables. The fact that the Altman Z-score values are interpreted inversely, i.e. the higher values of the Z-score indicate a lower probability of the occurrence of financial distress, whereas the lower values of the Z-indicator indicate a greater probability of the occurrence of financial distress, should not be forgotten and the interpretation of the results should be done according to that fact.

Considering the results accounted for in Table 3, it can be said that, until 2020, there was a statistically significant strong positive correlation (Spearman's correlation coefficient is over 0.6 and Sig.=0.000 < α = 0.01) between ROA and the Altman Z-score, which is more relevant than Z' and Z''. Then, in 2020 and 2021, there was a statistically significant moderate positive correlation (Spearman's correlation coefficient was between 0.4 and 0.6, and Sig.=0.000 < α = 0.01) between the profitability ratios (ROA and ROE) and the Altman Z-score. Finally, in 2022, there was a statistically significant weak positive correlation (Sperman's correlation coefficient was between 0 and 0.4, and Sig.=0.000 < α = 0.01).

The hypothesis H2, as well as the hypothesis H1, will be tested performing correlation analysis. The results of the correlation analysis between the liquidity indicators are presented in Table 4. At the same time, the number of the observation units remains unchanged (n=73).

Based on the data presented in Table 4, it is clear that there is a statistically significant strong positive correlation, or interdependence, between liquidity and the Altman Z-score in the public joint-stock companies included in the sample, which indicates a statistically significant strong negative correlation between liquidity and the probability of bankruptcy. It should be noted that the positive correlation between liquidity and the Altman Z-score signifies a negative correlation between liquidity and the likelihood of financial distress, due to the inverse interpretation of the Altman Z-score values (the

Table 3 The results of Spearman's correlation between the profitability indicators and the Altman Z-score

Year	Ratio		Z	Z'	Z''	Year	Ratio		Z	Z'	Z''
2018	ROA	*Spearman's coef. cor.*	0.602**	0.567**	0.544**	2019	ROA	*Spearman's coef. cor.*	0.619**	0.542**	0.558**
		Sig. (2-tailed)	0.000	0.000	0.000			Sig. (2-tailed)	0.000	0.000	0.000
		n	73	73	73			n	73	73	73
	ROE	*Spearman's coef. cor.*	0.506**	0.458**	0.327**		ROE	*Spearman's coef. cor.*	0.578**	0.473**	0.433**
		Sig. (2-tailed)	0.000	0.000	0.000			Sig. (2-tailed)	0.000	0.000	0.000
		n	73	73	73			n	73	73	73
2020	ROA	*Spearman's coef. cor.*	0.482**	0.457**	0.404**	2021	ROA	*Spearman's coef. cor.*	0.557**	0.452**	0.334**
		Sig. (2-tailed)	0.000	0.000	0.000			Sig. (2-tailed)	0.000	0.000	0.004
		n	73	73	73			n	73	73	73
	ROE	*Spearman's coef. cor.*	0.451**	0.383**	0.279*		ROE	*Spearman's coef. cor.*	0.493**	0.342**	0.232*
		Sig. (2-tailed)	0.000	0.001	0.017			Sig. (2-tailed)	0.000	0.003	0.048
		n	73	73	73			n	73	73	73
2022	ROA	*Spearman's coef. cor.*	0.379**	0.412**	0.267**						
		Sig. (2-tailed)	0.001	0.000	0.022						
		n	73	73	73						
	ROE	*Spearman's coef. cor.*	0.316**	0.321**	0.179						
		Sig. (2-tailed)	0.006	0.006	0.129						
		n	73	73	73						

**Correlation is significant at the level of Sig.=0.01 (2-tailed) *Correlation is significant at the level of Sig.=0.05 (2-tailed)

Source: Authors

Table 4 The results of Spearman's correlation between the liquidity indicators and the Altman Z-score

Year	Ratio		Z	Z'	Z''	Year	Ratio		Z	Z'	Z''
2018	CR	*Spearman's* coef. cor.	0.695**	0.670**	0.909**	2019	CR	*Spearman's* coef. cor.	0.669**	0.609**	0.808**
		Sig. (2-tailed)	0.000	0.000	0.000			Sig. (2-tailed)	0.000	0.000	0.000
	QR	*Spearman's* coef. cor.	0.742**	0.734**	0.833**		QR	*Spearman's* coef. cor.	0.710**	0.700**	0.758**
		Sig. (2-tailed)	0.000	0.000	0.000			Sig. (2-tailed)	0.000	0.000	0.000
	LR	*Spearman's coef. cor.*	0.629**	0.689**	0.724**		LR	Spearman's coef. cor.	0.594**	0.626**	0.598**
		Sig. (2-tailed)	0.000	0.000	0.000			Sig. (2-tailed)	0.000	0.000	0.000
2020	CR	*Spearman's* coef. cor.	0.663**	0.688**	0.875**	2021	CR	*Spearman's* coef. cor.	0.537**	0.725**	0.831**
		Sig. (2-tailed)	0.000	0.000	0.000			Sig. (2-tailed)	0.000	0.000	0.000
	QR	*Spearman's* coef. cor.	0.659**	0.706**	0.816**		QR	*Spearman's* coef. cor.	0.643**	0.768**	0.786**
		Sig. (2-tailed)	0.000	0.001	0.000			Sig. (2-tailed)	0.000	0.000	0.000
	LR	Spearman's coef. cor.	0.683**	0.779**	0.770**		LR	*Spearman's coef. cor.*	0.574**	0.653**	0.611**
		Sig. (2-tailed)	0.000	0.000	0.000			Sig. (2-tailed)	0.000	0.000	0.000
2022	CR	*Spearman's* coef. cor.	0.640**	0.700**	0.933**						
		Sig. (2-tailed)	0.001	0.000	0.000						
	QR	*Spearman's* coef. cor.	0.635**	0.712**	0.865**						
		Sig. (2-tailed)	0.000	0.000	0.000						
	LR	*Spearman's coef. cor.*	0.671**	0.744**	0.713**						
		Sig. (2-tailed)	0.000	0.000	0.000						

**Correlation is significant at the level of Sig.=0.01 (2-tailed)

Source: Authors

lower values indicate a higher probability of financial distress and vice versa). Only in 2021 was there a moderate correlation, however, the value of the coefficient itself being extremely close to the limit of 0.6, which also indicates an almost strong correlation between liquidity and the Altman Z-score indicator. All the obtained values are statistically significant at the 99% level (Sig.=0.000 or $0.001 < \alpha = 0.01$). On the other hand, if the correlation between liquidity and the Z' and Z'' indicators is observed, the values of Spearman's correlation coefficient can be seen, which indicates an extremely strong positive correlation (correlation coefficient > 0.8), statistically significant at the level of reliability of 99% (Sig.=0.000 or $0.001 < \alpha = 0.01$).

To test the hypothesis H3 that refers to the interdependence of solvency and the possibility of financial distress in the companies, correlational statistical analysis was also carried out in the SPSS statistical program for social sciences. As in the testing of the previous hypotheses, the sample simultaneously remains unchanged, i.e. n=73. It should be known that the positive correlation of solvency and the Altman Z-score indicates negative correlation between solvency and the probability of financial distress due to the inverse interpretation of the value of the Altman Z-score (the smaller values indicate a greater probability of financial distress and vice versa).

In Table 5, the X_4 Altman model indicator is used as the solvency indicator, because the formula for calculating X_4 is identical to the formula for calculating the solvency ratio. At the same time, X4.1 is used when calculating the Z-score (for the listed joint-stock companies), while X4.2 is adapted for calculating the indicators Z' and Z'' (for the companies that are not listed). With the risk of error (p-value) of 1% (Sig.=0.000 $< \alpha = 0.01$) and the confidence level of 99%, it can be argued that there is a moderate positive correlation between the indicator X4.1 and the indicator Z, which tends towards strong correlations (in each observed year, the value is closer to 0.6 than to 0.4), while there is a strong positive correlation between the indicator X4.2 and the indicators Z' and Z'' (Sig. $< \alpha = 0.01$). If observation is carried out in the opposite way, it is clearly seen that the indicator X4.1 is mostly weakly correlated with the indicators Z' and Z'' (especially with Z'), and also that the indicator X4.2 is moderately

and, in terms of its value, almost weakly correlated with the indicator Z, which additionally justifies the claim that X4.1 is suitable for calculating the Z indicator, and X4.2 for calculating the indicators Z' and Z''.

In order to test the hypothesis H4, the results of the correlation analysis between leverage and the Altman Z-score indicators are shown in Table 6. The hypothesis was tested on all 73 public joint-stock companies included in the sample. As before, simultaneously bear in mind the fact that the positive correlation of this determinant with the Z-indicators indicates a negative correlation with a probability of the occurrence of financial distress, i.-e. a negative correlation with the Z-indicators implies a positive correlation with a probability of the occurrence of bankruptcy and financial distress in the observed companies.

Based on the data shown in Table 6, it can be claimed at the confidence level of 99% (Sig. < α = 0.01) that there is a statistically significant negative (inverse) correlation between leverage, which indicates the degree of indebtedness, and the Altman Z-score. For the most part, this interdependence is of a moderate character (moderate negative correlation), throughout the observation period. However, it is

Table 5 The results of Spearman's correlation between the solvency indicators and the Altman Z-score

Year	Ratio		Z	Z'	Z''	Year	Ratio		Z	Z'	Z''
2018	X4.1	*Spearman*'s coef. cor.	0.546**	0.314**	0.659**	2019	X4.1	*Spearman*'s coef. cor.	0.565**	0.401**	0.645**
		Sig. (2-tailed)	0.000	0.007	0.000			Sig. (2-tailed)	0.000	0.000	0.000
	X4.2	*Spearman*'s coef. cor.	0.422**	0.593**	0.878**		X4.2	*Spearman*'s coef. cor.	0.432**	0.601**	0.844**
		Sig. (2-tailed)	0.000	0.000	0.000			Sig. (2-tailed)	0.000	0.000	0.000
2020	X4.1	*Spearman*'s coef. cor.	0.564**	0.389**	0.632**	2021	X4.1	*Spearman*'s coef. cor.	0.546**	0.406**	0.647**
		Sig. (2-tailed)	0.000	0.001	0.000			Sig. (2-tailed)	0.000	0.000	0.000
	X4.2	*Spearman*'s coef. cor.	0.438**	0.683**	0.895**		X4.2	*Spearman*'s coef. cor.	0.404**	0.664**	0.910**
		Sig. (2-tailed)	0.000	0.000	0.000			Sig. (2-tailed)	0.000	0.000	0.000
2022	X4.1	*Spearman*'s coef. cor.	0.586**	0.399**	0.636**						
		Sig. (2-tailed)	0.000	0.000	0.022						
	X4.2	*Spearman*'s coef. cor.	0.452**	0.611**	0.896**						
		Sig. (2-tailed)	0.000	0.000	0.000						

** Correlation is significant at the level of Sig.=0.01 (2-tailed)

Source: Authors

Table 6 The results of Spearman' s correlation between the leverage and the Altman Z-score

Year	Ratio		Z	Z'	Z''
2018	Lever.	*Spearman*'s coef. cor.	-0.416**	-0.590**	-0.873**
		Sig. (2-tailed)	0.000	0.007	0.000
2019	Lever.	*Spearman*'s coef. cor.	-0.422**	-0.595**	-0.838**
		Sig. (2-tailed)	0.000	0.000	0.000
2020	Lever.	*Spearman*'s coef. cor.	-0.427**	-0.678**	-0.889**
		Sig. (2-tailed)	0.000	0.001	0.000
2021	Lever.	*Spearman*'s coef. cor.	-0.395**	-0.662**	-0.903**
		Sig. (2-tailed)	0.001	0.000	0.000
2022	Lever.	*Spearman*'s coef. cor.	-0.427**	-0.590**	-0.884**
		Sig. (2-tailed)	0.000	0.000	0.022

** Correlation is significant at the level of Sig.=0.01

Source: Authors

interesting that the correlation with Z'-score is in the domain of a moderate, even strong negative (a strong negative correlation was seen in 2020 and 2021), while the negative correlation of leverage and the Z''-indicator in each observed year is extremely strong (the correlation coefficient < -0.8). In other words, the simpler the model for predicting the occurrence of financial distress in companies, the stronger the negative correlation between leverage and the Altman model. In any case, it is clear that there is a statistically significant negative correlation between leverage and the Altman Z-score indicator, which further means that there is a positive correlation between leverage and a probability of financial distress.

In order to test the hypothesis H5 Table 7 presents the results of the correlation analysis between the growth index and the Altman Z-score indicators. This hypothesis required certain corrections in terms of excluding some observation units from the sample, so not all the companies that had initially been included in the sample were tested because the existence of the outliers, i.e. the observation units with pronounced extreme values, was observed.

Considering the results of the correlation analysis shown in Table 7, it can be seen that, in most years of the observation period, there is a weak correlation between the growth indicators and the Altman Z-score indicators. Namely, in 2018, 2019 and 2022, the confidence level of 95% (Sig. < α = 0.05) was noticed, based upon which fact it can be claimed that there was a statistically significant weak positive correlation (the correlation coefficient > 0; < 0.4) between growth and the Altman Z-score of the observed companies. On the other hand, with the confidence level of 99% (Sig. < α = 0.01), it can be claimed that, in 2020 and 2021, there was a statistically significant moderate positive correlation between the growth index and the Altman Z-score indicator, which further means that there is a statistically significant negative interdependence between the growth of the company and a probability of financial distress. What can also clearly be seen in the table is the fact that, for the purposes of testing H5, the number of the observation units (n) was reduced, since the existence of the extreme values (outliers) that could hinder the research to some extent was noticed, and the obtained results are unreliable. Therefore, the companies that had the extreme values (either positive or negative) of the growth index were excluded from the research study.

Tables 8 and 9 show the results of testing the last hypothesis H6, which refers to the differences in the value of the Altman Z-score indicators before

Table 7 The results of Spearman's correlation between the growth index and the Altman Z-score

Year	Ratio		Z	Z'	Z''
2018	Growth	*Spearman*'s coef. cor.	0.311*	0.181	0.117
		Sig. (2-tailed)	0.020	0.181	0.391
		n	56	56	56
2019	Growth	*Spearman*'s coef. cor.	0.335*	0.295*	0.406**
		Sig. (2-tailed)	0.015	0.034	0.003
		n	52	52	52
2020	Growth	*Spearman*'s coef. cor.	0.384**	0.246	-0.011
		Sig. (2-tailed)	0.004	0.067	0.937
		n	56	56	56
2021	Growth	*Spearman*'s coef. cor.	0.410**	0.182	0.165
		Sig. (2-tailed)	0.001	0.167	0.213
		n	59	59	59
2022	Growth	*Spearman*'s coef. cor.	0.251*	-0.165	-0.206
		Sig. (2-tailed)	0.044	0.190	0.100
		n	65	65	65

** Correlation is significant at the level of Sig.=0.01 (2-tailed) * Correlation is significant at the level of Sig.=0.05 (2-tailed)

Source: Authors

and after the onset of the pandemic caused by the COVID-19 virus, where one year before the onset of the pandemic (2019) and one year after the onset of the pandemic (2020) are observed. At the same time, the three companies that represented the extreme values were eliminated from the sample. For the purpose of testing this hypothesis, only the Z-score values (not the Z′ and Z″ values) were used as the most reliable measure since all the companies are listed on the Belgrade Stock Exchange. Given the fact that the subject matter of the observation in 2019 and 2020 are the same companies and that the change in the value of one variable (the Z-score) is observed before and after the onset of the COVID-19 virus pandemic, the dependent samples with repeated measurements are concerned. In order to determine whether the t-test of paired samples (parametric) or the Wilcoxon signed rank test (nonparametric) will be applied, it is necessary to test the normality of the differences in the values of the variable before and after the onset of the pandemic, which was done through the Shapiro-Wilk test, the results of which are presented in Table 8. In the same way, I. Rahmah and I. Novianty (2021) tested the hypothesis of differences in the value of the Altman Z-score indicators before and after the onset of the pandemic caused by the COVID-19 virus (in 2019 and 2020).

Table 8 The results of the Shapiro-Wilk test

	Shapiro-Wilk		
	Statistic	n	Sig.
Z(2019) – Z(2020)	0.939	70	0.002

Source: Authors

The results of the Shapiro-Wilk test of the normality of the distribution of the differences of the observed variables at the confidence level of 99% (Sig.=0.002 < α=0.01) indicate that the difference of the observed variables does not follow normal distribution. Therefore, the further course of research is aimed at conducting the Wilcoxon signed rank test. Thanks to the box-plot diagram, the presence of the three real outliers (the extreme values) was observed, so it was decided to eliminate them from the sample due to extremely high values, simultaneously ensuring the representativeness of the sample itself.

Table 9 The results of the Wilcoxon signed rank test

	Asymp. Sig. (2-tailed)	n	Median
Z (2019)	/	70	2.200
Z (2020)	/	70	2.053
Z (2019) – Z (2020)	0.019	/	/

Source: Authors

By conducting the Wilcoxon signed rank test at the confidence level of 95% (Sig.=0.019 < α=0.05), it can be concluded that there is a statistically significant difference between the median values of the Altman Z-score before and after the pandemic of the COVID-19 virus in the set of the observed listed joint-stock companies (both medium-sized and big) on the Belgrade Stock Exchange, in which context the fact that the median value of the Altman Z-score decreased in 2020 compared to 2019 (from 2.200 to 2.053) should be emphasized, which on its part means that there was an increase in the probability of financial distress in the observed companies.

CONCLUSION

The research study conducted in this paper included 51 medium-sized and 22 big public joint-stock companies listed on the Belgrade Stock Exchange as a part of the Prime Listing or Open Market in the period from 2018 to 2022 and based on the financial reports publicly available on the website of the Business Registers Agency, whose data were then processed in the SPSS statistical program for social sciences. As has already been said at the beginning of the paper, the research study was aimed at observing the connections between certain factors representing the determinants of the occurrence of financial problems

in companies and the Altman Z-score indicator, which predicts a probability of the occurrence of financial problems in companies.

Based on all the obtained results presented in this paper, conclusions can be drawn about the set hypotheses. *The first hypothesis* was confirmed, since the research results showed a statistically significant positive correlation between profitability and the value of the Altman Z-score, which means that there is a statistically significant negative correlation between profitability and a probability of financial distress, since the lower levels of the Z-indicators mean a higher probability of financial distresses and vice versa. Thus, the findings of the research study are in agreement with the results of earlier research (Campbell *et al*., 2005; Thim *et al*, 2011; Masdupi *et al*, 2018; Dwiantari & Artini, 2021), i.e. the research in the interdependence of profitability and the probability of the occurrence of financial distress done in this paper was confirmed by previous relevant research.

The second hypothesis was confirmed because, there was a statistically significant strong positive correlation between the liquidity indicator and the Z-score throughout the observation period (five years), which leads to the conclusion that there is a statistically significant negative correlation between liquidity and a probability of the occurrence of financial distress, bearing in mind the fact that the higher values of the Z-score indicate a lower probability of financial distress and vice versa. Therefore, it can be said that the results of the research study presented in this paper are in agreement with the conclusions of previous research (Mikkelson & Partch, 2003; Butler *et al*, 2005; Desiyanti *et al*, 2019; Thim *et al*, 2011; Kim-Soon *et al*, 2013).

The third hypothesis was confirmed, since there is a positive correlation between the solvency indicator and the Altman Z-score, which leads to the conclusion that there is a negative correlation between solvency and a probability of the occurrence of financial distress (the lower Z-indicator indicates a higher probability of the occurrence of financial distress and vice versa). Therefore, the results presented in the research study carried out in this paper coincide with the results of previous research (Harris & Raviv, 1990; Thim *et al*, 2011; Megasanti & Riwayati, 2023; Amoa-Gyarteng, 2021).

The fourth research hypothesis was confirmed according to the presented research results. Such findings are related to the correlation between leverage and the probability of the occurrence of financial distress are in accordance with the results of previous research (Harris & Raviv, 1990; Thim *et al*, 2011; Amoa-Gyarteng, 2021; Megasanti & Riwayati, 2023), which is due to the fact that, in the cases of the increased indebtedness of the company, there may be a temporary decrease in the probability of financial distress due to a new inflow of funds into the company. However, the source of those funds, i.e. the fact that it is the debt that needs to be repaid in the future, interest included, should not be forgotten. In the initial stages of borrowing, shortly after having borrowed funds, a company may positively perform, as expected, since it has received an inflow of a large amount of money at one point, and its debt repayment is made periodically. Therefore, the obtained results are completely justified, since, if the company borrows, that may have long-term consequences in terms of the inability of the company to repay the debt (mainly bank loans), which leads it to bankruptcy.

Based on the presented results, it is concluded that the *fifth hypothesis* was not confirmed because there was a positive correlation between the growth index and the Altman Z-score indicator with different reliability levels in the observation period. These results contradict the conclusions of previous research (MacKie-Mason, 1990; Yosha, 1995; Morri & Cristanziani, 2009; Thim *et al*, 2011). The reason for such findings lies in the fact that the companies that have an evident growth in the operating profit, i.e. developing companies, have a smaller chance of facing financial distress in the future (the positive correlation of growth in the operating profit and the Altman Z-score), because they have accumulated profits from performing their activities. On the other hand, if a company (i.e. its operating profit) decreases, certain financial distress may arise in the future, because the company does not have an accumulated

profit from performing its regular activities. In fact, that profit has been decreasing from year to year, and the company will not be able to meet its financial obligations timely, which may lead to financial distress and bankruptcy. Companies and their management should always think in a way that is oriented towards the future. It is necessary to anticipate that certain sudden circumstances may occur (as was the case with the COVID-19 pandemic) and create an adequate response to those circumstances, which is the accumulation of the profit from regular business in this case, accompanied by the assessment of the optimal level of that accumulation, which leads to more stable company operations.

The sixth hypothesis was confirmed, according to the presented research results, since it was concluded that there was a statistically significant difference in the Altman Z-score indicators before and after the onset of the pandemic caused by the COVID-19 virus, for which reason the results can be said to be consistent with previous research (Rababah *et al*, 2020; H. O. Aifuwa *et al*, 2020; Rahmah & Novianty, 2021; Marginingsih, 2022; Fitria *et al*, 2022).

The results presented in the paper have certain theoretical and practical implications, i.e. they make certain theoretical and practical contributions. The theoretical contribution of the paper reflects in the expansion of the theoretical knowledge of the importance of looking at the future of companies through the prism of the possibility of financial distress. Namely, the theoretical aspects of the paper point to the determinants that can be extremely important for predicting the occurrence of financial distress, as well as the possibility of quantifying them and bringing them into relationship with the Altman Z-score indicators. The theoretical implications can help to gain new knowledge in the field of forensic accounting and auditing, since the Altman Z-score is broadly accepted in these accounting disciplines. On the other hand, the practical implications of the paper reflect in the paper's contribution to company management, especially the management of the public joint-stock companies whose shares are traded on the securities markets, bearing in mind the fact that medium-sized and big public joint-stock companies are included in the observed sample. Accounting and financial managers can benefit from the results of this study in order to adequately and timely review all financial distress determinants and make right decisions, so that the company does not end up facing financial distress or even bankruptcy. They can try to timely prevent financial distress and influence these determinants, which will have a positive effect on the company's operations. Also, the results can be useful to the current and potential investors and the company's creditors in terms of making decisions on investing in a particular company by taking into consideration the analyzed determinants. Current investors will withdraw their funds from the companies that, based on the analysis of the described determinants, are perceived as having a high probability of financial distress, whereas future investors will avoid investing in such companies. For financial and business analysts, the findings obtained in this paper can be extremely useful in terms of the determinants that should be considered when analyzing the success and adequacy of certain companies' operations. Since many stakeholders rely on the conclusions reached by financial analysts, it is necessary that these analyses should be of exceptional quality. Therefore, the results presented in this paper can help them choose the determinants to be considered when predicting the future of the company. By analyzing the probability of financial distress with their business partners, customers and suppliers can also make decisions on the beginning, continuation or termination of cooperation with them. If there is a high probability of financial distress in a company, its customers will not want to purchase its goods, and suppliers will not want to deliver the requested goods to that company due to the possibility of uncollectible claims. Since companies may decide to illegally avoid paying taxes (tax evasion) in the conditions of financial distress, the results of this research study are also useful for tax authorities because they can timely identify such moves made by such companies and prevent them through the analysis of the presented variables.

However, the research presented in this paper has certain limitations. Namely, the analysis was conducted on a sample of 73 public joint-stock companies over a five-year period. Also, the growth

determinant was measured as change in the operating profit in the current year compared to the previous year. It is possible that the results of the research study would be different if, instead of the growth of the company measured in this way, that growth was observed as change in the number of employees in the current year compared to the previous year, or as change in the profit (the net result), or change in the business assets (total assets), or in turn as change in the market share in the current year compared to the previous year.

Future research in this topic may include a broader sample, whereby the sample would include all public joint-stock companies listed on the Belgrade Stock Exchange in the Prime Listing and Open Market (including micro- and small enterprises) and the inclusion of the companies operating in foreign, neighboring countries in the sample may also be considered. The observation period could be longer, since the period of five years was used in the paper. When speaking about the determinants, it is possible to include additional determinants of the occurrence of financial distress, especially when the company growth indicator is concerned, whereby this indicator could be calculated in one of the alternative ways mentioned in the previous paragraph. On the other hand, further steps in the research in this issue may concern the application of more complex statistical methods, such as multiple regression analysis, because it is important to investigate the influence of each individual determinant on the indicators of the probability of the occurrence of financial distress, i.e. the Altman Z-score indicator. Thus, it is possible to reveal the strength of the influence of individual determinants and single out those with the strongest influence on the occurrence of financial distress.

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Dragomir Dimitrijević is an Associate Professor at the Faculty of Economics of the University of Kragujevac, where he graduated and received his doctorate. He is the author and co-author of a numerous works in the field of financial accounting, forensic accounting and financial reporting.

Sunčica Milutinović is an Associate Professor at the Faculty of Economics in Subotica, University of Novi Sad. She is the (co)author of more than a hundred scientific papers in the field of accounting, financial reporting and international accounting regulation. He speaks English and Hungarian.

Predrag Stanković is a PhD student and a research trainee at the Faculty of Economics of the University of Kragujevac, where he completed his undergraduate and master's academic studies. The key areas of his scientific research interest are financial accounting, forensic accounting, auditing, and financial statement analysis.