
ANALYSIS OF THE INFLUENCE OF THE PERFORMANCE OF THE PROFIT AND FINANCIAL POSITION IN THE PREDICTION OF BANKRUPTCY IN THE MEAT PROCESSING BRANCH

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ABSTRACT

The issue of solvency, i.e. the risk of bankruptcy of the company, is always a subject of concern for management and stakeholders, especially creditors and investors. Understanding the impact of indicators of profitability, liquidity and dynamic solvency on the risk of bankruptcy expressed by Altman's Z-score is the goal of the research, which is significant for both theory and practice. The research analyzes large companies from the branch of processing and preserving of meat of the Republic of Serbia for the five-year period 2018-2022. The findings for large companies for the processing and preserving of meat, based on regression analysis, show that ROA and Current Liquidity Ratio make a statistically significant contribution predicting the Altman Z score.

Introduction

Modern business is characterized by structural and dynamic changes, which implies uncertainty and a high risk of business loss for every market actor, which, as a condition of survival, orients companies to the minimization of risk in business. For rational business management, relying only on "feeling" is not a sufficient tool, but a continuous and systematic analysis of business risks is necessary, and in order to manage financial and operational risks for the sake of quick financial adjustment of

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the company. (Cavlin, et al, 2022). Namely, in order to maintain the vitality of the company, in addition to making a profit, the liquidity of cash flows and the security of financial maintenance in the long term must be respected, because otherwise the business-economic business slides into bankruptcy. Therefore, the methodological commitment of this platform of financial analysis of the company is oriented towards profit as a traditional, primary measure of maintaining vitality, i.e. factors of the profit position, and liquidity as a traditional, primary measure of the survival or disappearance of the company, i.e. factors of the financial position. (Malešević, Čavlin, 2020). Since there is no ideal performance measurement system, companies should strive to build an effective system that successfully connects critical success factors, goals and outcomes of work units and value streams with company goals and strategies (Todorović, Čupić, 2016). The identification of the performance of the profit and financial position, which significantly affect the possibility of predicting financial difficulties, aims to create an optimal analytical concept for predicting bankruptcy and maintaining the financial health of the company. In other words, the purpose of the analysis itself is to achieve a higher quality of the economy, ie. to look at the relationship between investment and results (Dončić et al., 2022; Dmitrović, 2015). Although the motives of the financial analysis can be focused on the analysis of the business capabilities of one's own company, the company's partner and the issuer of long-term securities, on the other hand, it should be borne in mind that insolvency and bankruptcy can have negative direct consequences for the company, as well as negative indirect consequences for social actors. The scope and dynamics of investment and financial decisions are determined by assessments and forecasts of bankruptcy, and good analytical practice, as suitable for a simple and quick assessment of the financial vitality of the company, is primarily highlighted by Altman's Z-core model (Čavlin, Tepavac, 2020). Financial vitality is the ability to ensure financial sustainability (liquidity) in crisis business conditions, which will not threaten the survival of the company (Čavlin, et al, 2022).

In accordance with the above, the following are the goals covered by this work, namely:

- ratio analysis of the profit and financial position of large enterprises in the meat processing industry in the Republic of Serbia, and
- analysis of the impact of key indicators of profit and financial position on the Altman Z score predictor of bankruptcy.

Our initial hypothesis is that there is an influence of financial performance on the prediction of bankruptcy, but there is no consensus on the direction and intensity of the influence of certain influencing factors, so the focus of the research is on large companies from the Branch - 101 Processing and preservation of meat and meat products of the Republic of Serbia, in order to create practical basis for system analysis and management of financial health of companies.

In order to achieve the goal of the paper, along with the analysis of relevant literature, in theoretical aspects, typical indicators of profitability indicators (ROA), liquidity indicators (Current liquidity, net cash flow), solvency indicators (dynamic solvency

ratio) and bankruptcy (Altman Z score) for companies from the meat processing industry sample in the Republic of Serbia has been analyzed, using data from official financial reports for the period from 2018 to 2022. The authors have performed the analysis of the quality of the impact of key financial performance indicators on the Altman Z score, using descriptive and statistical methods. The paper is structured as follows: an overview of the literature is presented below. The research method is then described, followed by results and discussion. The last section contains concluding remarks.

Literature review

The history of the development of models for bankruptcy forecasting begins with the univariate model, which is Beaver (1966), and the initial multivariate model for bankruptcy forecasting was developed by Altman (1968), who provided a key contribution to the development of bankruptcy forecasting, as evidenced by the fact that the article on platform Google Scholar collected more than 22,000 citations, and almost 5,000 citations on the Web of Science platform. (Srhoj, 2022).

In addition to Altman, in the past period, Ohlson (1980), Taffler (1983), Zmijevski (1984), Aziz et al. (1988), Koh (1992), Mossman et al., (1998), Hillegeist et al. (2004), Agarwal and Taffler (2008), Wu et al. (2010) and others tried to crystallize a late model for forecasting the risk of insolvency or bankruptcy.

Research attention relies on the formulation of classical balance-based models, which have in common that they mainly include measures of liquidity, leverage and profitability. The methodology of analytical models is based on the prevailing theoretical position that inadequate liquidity and profitability results in a high degree of leverage, which is directly related to a high probability of company bankruptcy. The essential differences in the construction of balance models for bankruptcy prediction are based on the number of selected variables and the application of certain statistical techniques for their testing. Namely, researchers are burdened, on the one hand, with the desire to use as few variables as possible without jeopardizing the representativeness of the outcome, and on the other hand, with the desire that an excessive number of selected variables in the model implies significant multicollinearity. The findings show that the prognostic reliability of the model is not primarily determined by the number of selected variables, because some analytical models built on the basis of 2 variables have very similar prognostic reliability as some prognostic models with 21 variables.

In fact, the primary challenge of the subject research is the identification of the most meritorious indicators in the function of creating an analytical platform for bankruptcy prediction, which focus on the following three aspects: stability of financial indicators over time, variation in financial indicators due to industry characteristics and creation of an information-focused financial indicator. (Sayari, et al, 2017). Namely, a significant number of authors (Ezzamelet al., 1987; Dašić, 2022; Pinches et al., 1973) find that financial indicators can be used to predict financial difficulties/bankruptcy if they show stable values over time. Then the authors (Gupta and Huefner, 1972; Johnson, 1979)

identify specific differences or variations in the value of financial indicators due to industry characteristics. While the authors (Chen and Shimerda, 1981; Pohlman and Hollinger, 1981) strive to reduce the level of multicollinearity between financial indicators to acceptable levels in building the model.

Therefore, the key support of the rational methodology of applying the analysis is the selection of an adequate system of relevant indicators that indicate the realization of the crisis, both according to individual business sub-criteria and for the entire company. Rational business decision-making requires an elaborate information system in which the analyst's profile plays a significant role. Namely, the analyst must possess the competencies and abilities to analyze and diagnose business disruptions at the earliest possible stage and to create reasoned proposals for a possible solution, inevitably relying on selected indicators as a meritorious information-analytical basis. Accordingly, theoretical and practical research, support for forecasting and predictors of bankruptcy are found in the performance of the company's profit and financial position (Savić & Milojević, 2022; Li & Du, 2011), of which the performance of profitability and liquidity, i.e. solvency, are most often used. In the principled theoretical approach and research related to the impact of profitability on financial health, it is very unlikely that a profitable company will have financial problems, and the most significant factor is return on asset-ROA (Putri & Dhini, 2019), although (Ananto) et al, 2017), (Curry & Banjarnahor, 2018) and (Dirman, 2020) find a negative impact of profitability on financial problems. The findings of a multiple linear regression analysis, show that the ratio of long-term sources and fixed assets in the group of processing and preserving of meat and meat products makes a statistically significant contribution predicting the return on assets (Čavlin et al., 2021).

When we analyze the impact of liquidity on financial health (Gamayuni et al., 2012) they find that if liquidity is higher, it is unlikely that company to have financial problems, while in (Dirman, 2020), testing of the relevant variables did not establish a statistically significant impact. In addition to the previously mentioned statements, the subject of attention is the impact on the financial the health of the size of assets, which results in the relationship that larger assets mean better financial health and the coverage of interest costs as an expression of dynamic solvency, which results in the relationship that the greater the coverage of interest and thus the greater the financial power, and vice versa.

Then, research also deals with the impact on financial health and bankruptcy risk of cash flows, in which Sayari & Mugan (2017) and Bernardin & Tifani (2019) found that a more generous net cash flow implies financial well-being health, while in (Dirman, 2020) no statistically significant impact was determined by testing the relevant variables. It can be further summarized that the disruption of financial health is significantly influenced by macroeconomic conditions (e.g. COVID, financial crises,...), and especially certain features of the company's context, such as performance, financial leverage and previously achieved financial results, while company size and activity they do not have a significant relationship with the impairment of financial health (Yazdanfar &

Öhman, 2020). While, according to research related to software activity, research and development costs are the most important predictor of company failure, followed by net sales and total revenue (Roumani et al., 2020). At the end of the review, it should be noted that the model was trained and validated using 27 selected financial variables from 2016 to predict the financial distress statement in 2017, and five variables were selected as significant predictors in the model: current ratio, return on equity, return on assets, debt ratio, and net working capital, and which shows that the value-added of the prediction model is its interpretability and high-performance accuracy (Pavlicko et al., 2021). Opting for profit and liquidity as the starting point of financial analysis and adhering at the same time to the general principle that there are relationships of mutual influence and mutual correlation between profit, liquidity and other performances of the company's financial system - it follows that the following indicators and norms of financial analysis are crystallized, which is a rational research format as follows:

Table 1. Overview of key indicators and norms of the company's profit and financial position

Rentability	
Return Operating Assets – “ROA”	net profit/ average business assets
Desirable theoretical norms: the higher the value of ROA, the better, and it depends on the activity of the company, although in principle, an ROA value of over 5% is generally considered good, and over 20% an excellent outcome.	
Static liquidity indicators	
Current liquidity ratio “CLR”	Current assets/Current liabilities
Desirable theoretical norms: the higher the value of CLR, the better, and it depends on the activity of the company, although in principle a CLR value of around 2 is generally considered an excellent outcome, while lower values are treated as bad outcomes, and neither higher values are considered good because they show inefficient use of funds	
Dynamic liquidity indicators - “cash flow”	
Net cash flow “NCF”	operating activity cash flow (CFO) + investment activity cash flow (CFI) + financing activity cash flow (CFF)
Desirable theoretical norms: in principle, a positive NCF value is better, and it depends on the company's activity, and a negative NCF is worse;	
Solvency	
Dynamic solvency-interest coverage “DSIC”	Operating profit/Interest expenses (by third parties)
Desirable theoretical norms: the higher the DSIC value, the better, and it depends on the company's activity, although in principle a DSIC value below 1.5 is generally considered questionable, around 2 is acceptable, and over 3 is an excellent outcome	
Altman Z score	$Z = EM \text{ Score} = 3,25 + 6,56X_1 \text{ (Current assets-Current liabilities/Total assets)} + 3,26X_2 \text{ (retained profit/loss/Total assets)} + 6,72X_3 \text{ (Operating profit/Total assets)} + 1,05X_4 \text{ (Equity/(Total liabilities-equity))}$
Desirable theoretical norms: $Z \text{ EMS} \geq 2.6$ “Safe zone” - the risk of bankruptcy and unfavorable financial position is very small; $Z \text{ EMS} \leq 2.39 \leq 2.59$ “Grey zone” - a zone of concern, but it is very likely that bankruptcy and an extremely unfavorable financial position will not occur in the next two years; $Z \text{ EMS} \leq 1.11 \leq 2.38$ “Grey zone” - zone of high risk of bankruptcy and extremely unfavorable financial position; $Z \text{ EMS} \leq 1.10$ “Unsafe zone” - risk of bankruptcy and extremely bad financial position according to the forecast 70% in within two years, or 95% within one year.	

Source: Authors' elaboration

Materials and methods

The research in the paper includes the analysis of key indicators of the financial position of large companies in branch 1011 - Meat processing and preservation (hereinafter: meat processing) in the Republic of Serbia for the period from 2018 till 2022. For the purposes of the research, a sample of companies was formed, classified by size as large and distributed in the meat processing branch - 1011 according to the methodology of the Republic Institute of Statistics of Serbia. The indicators were derived from publicly available information, i.e. official financial reports, which the companies in question submitted to the Agency for Economic Registers of the Republic of Serbia, and from direct inspection of the company's reports. In this research, a multiple regression analysis shall be used to determine what percentage of the variability of the dependent variable was explained by a particular set of independent variables and the relative contribution of each independent variable included in the regression analysis (Rosner, 2011; Radović Marković, Hanić, 2018). The independent variables taken into analysis for the period from 2018 till 2022 are the mean values of: Net cash flow, Current Liquidity Ratio, ROA, Solvency Ratio, Total assets. The dependent variable are the values of Altman Z score.

Results and discussion

The sample includes large enterprises from Branch - 101 Processing and preservation of meat and meat products, Area -10 Production of food products and Sector - C Processing industry. Out of a total of 2776 registered companies in the meat processing branch, 822 companies or 29.70% are active, and the sample includes large companies (8 in total) from Branch - 101 processing and preservation of meat and meat products, which make up 1.34% of the companies in the subject branch. According to published data, large enterprises in the meat processing branch that submitted annual financial reports for 2022 achieved a total of 80,291,077.00 dinars in total revenue, which represents 62.58% of the total revenue in the Branch - 101 Processing and preservation of meat and products, 6.91% of the total income of Area -10 Production of food products and 1.59% of the total income of Sector - C Manufacturing industry. The companies from the sample have 73,715,533.00 dinars in total assets, which represents 79.25% of the total assets of all active companies Branch - 101 Processing and canning of meat and products, 7.56% of the total assets of Area -10 Production of food products and 1.53% of total assets of Sector - C Manufacturing industry. The situation is similar throughout the researched period. Given that, the obtained results can be considered representative for the adoption of conclusions.

Developing analyzes of the financial position of the observed companies is based on the following statements:

- individual and average values of profitability indicators (ROA), liquidity indicators (Current illiquidity, net cash flow), solvency indicators (dynamic solvency ratio and Altman Z score) for companies from the meat processing industry sample.

Table 2. Overview of ROA indicator values in the meat processing industry

“ROA”	2018	2019	2020	2021	2022
Carnex d.o.o. IM Vrbas	0.04	0.03	0.04	0.05	0.05
IM Matijević, d.o.o.,Novi Sad	0.14	0.04	0.04	0.06	0.09
Mitros Fleischwaren d.o.o., S.Mitrovica	0.00	0.00	0.00	0.00	0.00
Neoplanata, do.o., IM Novi Sad	0.00	0.00	0.00	0.01	0.03
Vindija, d.o.o., Lajkovac	0.00	0.00	0.01	0.00	0.09
Yuhor, a.d., Jagodina	0.00	0.00	0.01	0.02	0.03
Zlatiborac, d.o.o., Beograd	0.05	0.01	0.03	0.03	0.06
ZZ Trlič, Ub	0.08	0.06	0.06	0.12	0.21
Mean value	0.04	0.02	0.02	0.03	0.07

Source: Authors' calculations

By analyzing the obtained results, it is possible to highlight the following profitability ratings in Table 1:

- the analysis of profitability indicators shows a significant representation of companies with worse values of the indicated indicators than the desired norms,
- only IM Matijević-Novu Sad and ZZ Trlič-Ub during the entire period have above-average values of the ROA indicator, while the values fluctuate for other precincts;
- further analysis shows a certain dynamics of profitability improvement, except for Mitros Fleischwaren-S.Mitrovica, which gives a somewhat better picture of the generally insufficient profitability of the company in the analyzed sample, and in the observed period.

Table 3. Overview of the value of the indicator “Current liquidity” in the meat processing industry

“Current liquidity”	2018	2019	2020	2021	2022
Carnex d.o.o. IM Vrbas	4.42	4.77	3.54	2.05	2.11
IM Matijević, d.o.o.,Novi Sad	1.46	1.44	1.48	1.61	2.30
Mitros Fleischwaren d.o.o., S.Mitrovica	1.18	0.90	0.65	0.66	0.62
Neoplanata, do.o., IM Novi Sad	1.91	2.41	1.79	1.68	1.69
Vindija, d.o.o., Lajkovac	1.32	1.39	1.52	1.59	2.14
Yuhor, a.d., Jagodina	0.65	0.60	0.63	0.64	0.74
Zlatiborac, d.o.o., Beograd	1.03	0.99	0.96	1.05	1.07
ZZ Trlič, Ub	2.06	1.90	1.75	1.69	1.28
Mean value	1.75	1.80	1.54	1.37	1.49

Source: Authors' calculations

Table 4. Overview of the value of the indicator “Solvency - dynamic ratio” in the meat processing industry

“Solvency - dynamic ratio”	2018	2019	2020	2021	2022
Carnex d.o.o. IM Vrbas	19.48	24.81	8.59	12.62	10.11
IM Matijević, d.o.o.,Novi Sad	188.74	173.25	2,789.89	135.23	590.14
Mitros Fleischwaren d.o.o., S.Mitrovica	0.00	2.06	0.00	1.67	0.00
Neoplanata, do.o., IM Novi Sad	12.19	3.42	0.00	20.86	19.13
Vindija, d.o.o., Lajkovac	5.52	18.22	20.69	7.01	46.09
Yuhor, a.d., Jagodina	1.61	1.75	4.91	5.38	6.21
Zlatiborac, d.o.o., Beograd	5.70	2.61	4.40	3.73	6.90
ZZ Trlič, Ub	227.17	131.20	90.78	89.66	84.82
Mean value	57.55	44.66	364.91	34.52	95.42

Source: Authors’ calculations

Table 5. Overview of the value of the “Assets” indicator in the meat processing industry

“Assets”	2018	2019	2020	2021	2022
Carnex d.o.o. IM Vrbas	15,173,338.00	16,242,649.00	14,999,039.00	13,918,594.00	16,530,916.00
IM Matijević, d.o.o.,Novi Sad	22,407,327.00	22,206,687.00	24,263,772.00	28,400,793.00	27,840,240.00
Mitros Fleischwaren d.o.o., S.Mitrovica	4,954,852.00	5,597,137.00	4,683,897.00	4,822,211.00	4,972,824.00
Neoplanata, do.o., IM Novi Sad	5,911,614.00	5,033,951.00	5,305,730.00	5,527,787.00	6,581,223.00
Vindija, d.o.o., Lajkovac	3,112,171.00	3,121,604.00	3,085,132.00	2,995,851.00	3,214,882.00
Yuhor, a.d., Jagodina	4,135,741.00	4,442,159.00	4,624,762.00	5,087,724.00	6,626,940.00
Zlatiborac, d.o.o., Beograd	4,910,187.00	5,320,256.00	5,031,516.00	5,020,046.00	5,601,654.00
ZZ Trlič, Ub	2,094,976.00	2,268,616.00	1,991,235.00	2,241,484.00	2,346,854.00
Mean value	7,837,525.75	8,029,132.38	7,998,135.38	8,501,811.25	9,214,441.63

Source: Authors’ calculations

Table 6. Overview of the value of the “Net cash flow” indicator in the meat processing industry

“Net cash flow”	2018	2019	2020	2021	2022
Carnex d.o.o. IM Vrbas	1,913,767.00	3,405,011.00	-2,117,362.00	-1,097,486.00	-498,482.00
IM Matijević, d.o.o., Novi Sad	2,262,186.00	-1,414,950.00	1,072,647.00	627,506.00	1,304,565.00
Mitros Fleischwaren d.o.o., S.Mitrovica	163,083.00	102,179.00	356,435.00	103,454.00	243,669.00
Neoplanata, do.o., IM Novi Sad	-36,313.00	129,664.00	41,293.00	282,876.00	381,904.00
Vindija, d.o.o., Lajkovac	40,872.00	99,830.00	131,884.00	84,776.00	362,123.00
Yuhor, a.d., Jagodina	140,069.00	134,951.00	149,316.00	233,414.00	309,035.00
Zlatiborac, d.o.o., Beograd	69,249.00	151,518.00	223,034.00	170,377.00	352,129.00
ZZ Trlič, Ub	169,874.00	31,353.00	19,054.00	247,439.00	332,270.00
Mean value	590,348.38	329,944.50	-15,462.38	81,544.50	348,401.63

Source: Authors’ calculations

By analyzing the obtained results, it is possible to highlight the following ratings of the financial or cash position (liquidity and solvency) in Tables 2, 3, 4, 5 and 6, namely:

- the values of the liquidity indicators for Mitros Fleischwaren-S.Mitrovica, Yuhor-Jagodina and Zlatiborac-Beograd during the entire period are below the average value of the branch and the desired theoretical norms, while for the other companies, except for Carnex, there are companies with worse values of the indicated indicators than the desired theoretical norms, which further implies a relatively unfavorable rating liquidity and solvency of the company.
- given an unfavorable assessment of the company’s liquidity and solvency, the realized dynamics of the net cash flow and the dynamics of asset growth improve financial health;
- the values of the nominal solvency of the coverage of interest costs show significant differences in financial power, i.e. the degree of generating operating cash for the payment of interest on loans, at Mitros during the entire period they are below the average value of the branch and the desired theoretical norms, while in other companies, except for Yuhor-Jagodina and Zlatiborac-Beograd, there is a favorable assessment of financial strength.

Table 7. Overview of the value of the indicator “Solvency-Altman ems score” in the meat processing industry

“Solvency- Altman ems score”	2018	2019	2020	2021	2022
Carnex d.o.o. IM Vrbas	11.83	9.50	8.84	7.16	6.95
IM Matijević, d.o.o.,Novi Sad	9.48	7.75	7.83	7.85	9.99
Mitros Fleischwaren d.o.o., S.Mitrovica	3.18	2.39	1.19	1.00	0.19
Neoplanata, do.o., IM Novi Sad	8.69	10.76	8.40	8.05	7.92
Vindija, d.o.o., Lajkovac	6.51	6.58	7.05	7.21	8.86
Yuhor, a.d., Jagodina	2.17	2.07	2.20	2.31	2.74
Zlatiborac, d.o.o., Beograd	5.46	4.90	5.27	5.64	6.01
ZZ Trlič, Ub	9.12	8.95	8.91	9.24	7.76
Mean value	7.06	6.61	6.21	6.06	6.30

Source: Authors’ calculations

By analyzing the obtained results, it is possible to highlight the following solvency ratings in terms of the risk of bankruptcy in Table 7, namely:

- the Altman Z Score values of Mitros Fleischwaren-S.Mitrovica and Yuhor-Jagodina show worse values than the average and desired theoretical norms, and for the rest of the listed companies, a favorable assessment of the financial stability of the meat processing industry can be given.

- the representation of companies whose value of the Altman Z score indicator is above the value of the desired theoretical norms is significant, which implies a favorable assessment of the solvency of the analyzed companies.

Therefore, the further subject of the research focuses on the analysis of interdependence and the impact of Net cash flow, Current Liquidity Ratio, ROA, Solvency Ratio, Total assets on the Altman Z score.

Table 8. Overview of the model summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.841	.707	.663	1.752056734866454

Source: Authors’ calculations

The Table 8 above shows that the coefficient of determination that shows the value of the R-square of 0.707. This means that 70% variation in Altman Z score can be explained significantly by variations in the given predictors: Net cash flow, Current Liquidity Ratio, ROA, Solvency Ratio, Total assets.

Table 9. Overview of the ANOVA results

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	251.252	5	50.250	16.370	.000
	Residual	104.370	34	3.070		
	Total	355.622	39			

Source: Authors' calculations

Based on the data above (Table 9), a significant value of 0.000 is obtained. Because the significance is less than 0.05 or 5% then H_0 is rejected and H_a is accepted, so it can be concluded together net cash flow, current liquidity ratio, ROA, solvency ratio, total assets affect Altman Z score.

Table 10. Overview of the coefficients

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.893	.595		3.182	.003
	ROA	23.061	6.496	.343	3.550	.001
	Current Liquidity Ratio	2.425	.343	.750	7.075	.000
	Solvency Ratio	.001	.001	.156	1.449	.156
	Total assets	-2.201E-008	.000	-.055	-4.474	.638
	Cash flow	-3.976E-007	.000	-.115	-1.145	.260

Source: Authors' calculations

From the above test results (Table 10), it can be concluded as follows:

1. ROA has a positive influence on the Altman Z score.
2. Current Liquidity Ratio has a positive influence on the Altman Z score.
3. Solvency Ratio has no influence on the Altman Z score.
4. Total assets has no influence on the Altman Z score.
5. Net Cash flow has no influence on the Altman Z score.

It was found that [predictor variable 1 - ROA] significantly predicted [Altman Z score] ($\beta = [.343]$, $p = [.001]$).

It was found that [predictor variable 2 - Current Liquidity Ratio] significantly predicted [Altman Z score] ($\beta = [.750]$, $p = [.000]$).

The findings show that there is a significant and direct influence of ROA profitability indicators and “Current liquidity” on the Altman Z score predictor of solvency. In other words, increasing the value of ROA increases the value of Altman Z score, that is, increasing the value of “Current liquidity” increases the value of Altman Z score, and a higher value of Altman Z score means a lower risk of bankruptcy. On the other hand, the results of the analysis show that indicators of dynamic solvency, size of assets and net cash flow have no effect on the Altman Z Score, so starting from the prevailing theoretical views, it is advisable to expand the research to other branches and sectors from the domestic and global market.

Conclusions

The risk of bankruptcy of a company is influenced by numerous factors, and among other things, it is important to shed light on the influence of certain indicators of profitability, liquidity and solvency. Previous research has shown the connection between these categories in various economic activities. Analysis of meat processing activity in the Republic of Serbia in the period 2018-2022 gives an unfavorable assessment of the financial position, and a slightly more favorable assessment of the profit position.

The findings of the conducted regression analysis show a statistically significant and positive influence of the ROA and current liquidity indicators on the Altman Z score.

The obtained results justify the analytical approach to create a platform for rational management of the company’s financial health.

The further course of research on the issue of factors affecting the risk of bankruptcy should be focused on other activities and types of companies on the one hand, and on the other hand on a wider range of indicators of the company’s financial and profit position.

Conflict of interests

The authors declare no conflict of interest.

References

1. Agencija za privredne registre (APR). Preuzeto 23.09.2023. sa <http://www.apr.gov.rs>[in English: Serbian Business Registers Agency (APR). Retrieved on 09/23/2023. from <http://www.apr.gov.rs>]
2. Agarwal, V., & Taffler, R. (2006). Comparing the performance of market-based and accounting-based bankruptcy prediction models, *Journal of Banking and Finance*, 32, 1-37.
3. Altman, E. (1968). Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy, *Journal of Finance*, 23, 589-609.
4. Aziz A., Emanuel D.C., Lawson G.H., (1988). Bankruptcy prediction – an investigation of cash flow based models. *J. Manag. Stud.* 25(5), 419–437.

5. Bernardin, D. E. Y., & Tifani, T. (2019). Financial Distress Predicted By Cash Flow and Leverage with Capital Intensity as Moderating. *Jurnal Apresiasi Ekonomi*, 7(1), 18–29. <https://doi.org/10.31846/jae.v7i1.188>
6. Beaver, W.H. (1968). Market Prices, Financial Ratios, and the Prediction of Failure, *Journal of Accounting Research*, 6(2), 179-92.
7. Chen, K.H. and Shimerda, T.A. (1981) An Empirical Analysis of Useful Financial Ratios. *Financial Management*, 10, 51-60.
8. Čavlin, M., Đokić, A., & Miletić, V. (2022). Influence of liquidity and solvency on profitability of agro industrial companies in the conditions of COVID-19, *Economics of Agriculture*, 69(2), 441-453.
9. Čavlin, M., Vapa Tankosić, J., & Mirković, Z. (2022). Analysis of factors of financial and profit position as a method of integrated risk management in the mining sector, *Ekonomija: teorija i praksa*, 15(3), 56-73. <https://doi.org/10.5937/etp2203056C>
10. Čavlin, M., Vapa Tankosić, J., Miletić, V., Ivaniš, M. (2021). Analysis of the impact of liquidity on the profitability of assets of medium and large enterprises in the meat production activity of the Republic of Serbia, *Economics of Agriculture*, 68, (3), pp. 789-803. ISSN 2334-8453.
11. Čavlin, M., & Tepavac, R. (2020). Mogućnost primene klasičnih bilansnih modela za prognozi solventnosti – primer MSP u ruralnim područjima Republike Srbije. U: *Turizam i ruralni razvoj* (str. 506-523). Univerzitet Kragujevac, Vrnjačka Banja. [in English: 11. Čavlin, M., & Tepavac, R. (2020). The possibility of applying classic balance models for solvency forecasts - an example of SMEs in rural areas of the Republic of Serbia. In: *Tourism and Rural Development* (pp. 506-523). University of Kragujevac, Vrnjačka Banja]
12. Dašić, M. (2022). The influence of the quality of logistics services on user satisfaction in Serbia. *Oditor*, 8(2), 109-138. <https://doi.org/10.5937/Oditor2202108D>
13. Dirman, A. (2020). Financial distress: the impacts of profitability, liquidity, leverage, firm size, and free cash flow. *International Journal of Business, Economics and Law*, 22(1), 17-25.
14. Dmitrović, V. (2015). *Intelektualni kapital kao strateška performansa organizacije*. FON Univerzitet u Beogradu, doktorska disertacija. [in English: 13. Dmitrović, V. (2015). *Intellectual capital as a strategic performance of the organization*. FON University in Belgrade, doctoral dissertation]
15. Dončić, S., Pantić, N., Lakićević, M., & Radivojević, N. (2022). Expected shortfall model based on a neural network. *Journal of Risk Model Validation*, 16(2), <https://doi.org/10.21314/JRMV.2022.016>
16. Ezzamel M., Mar-Molinero C., Beecher A., (1987). On the distributional properties of financial ratios., *J. Bus. Financ. Account.* 14(4), 463–481.

17. Hillegeist, S. A., Keating, E. K., Cram, D. P., & Lundstedt, K. G. (2004). *Assessing the probability of bankruptcy*, Review of Accounting Studies, 9, 5-34.
18. Gupta M.C., Huefner R.J., (1972). A cluster analysis study of financial ratios and industry characteristics, *J. Account. Res.* 10(1), 77-95.
19. Johnson W.B., (1979). The cross sectional stability of financial ratio patterns, *J. Financ. Quant. Anal.* 14(5), 1035-1048.
20. Koh H.C., (1992). The sensitivity of optimal cutoff points to misclassification costs of type I and type II errors in the going-concern prediction context, *J. Bus. Financ. Account.* 19(2), 187-197.
21. Li, J., & Du, W. (2011). An empirical study on the corporate financial distress prediction based on logistic model: Evidence from China's manufacturing Industry. *International Journal of Digital Content Technology and Its Applications*, 5(6), 368-379. <https://doi.org/10.4156/jdcta.vol5.issue6.44>
22. Malešević, Đ., & Čavlin, M., (2020). *Poslovna analiza*. FIMEK, Novi Sad. [in English: 20. Malešević, Đ., & Čavlin, M., (2020). Business analysis. FIMEK, Novi Sad]
23. Mossman C.E., Bell G.G., Swartz L.M., Turtle H., (1998). An empirical comparison of bankruptcy models. *Financ. Rev.* 33(2), 35-54.
24. Ohlson, J. A. (1980). Financial ratios and the probabilistic prediction of bankruptcy, *Journal of Accounting Research*, 18, 109-131.
25. Pavlicko, M., Marek D., and J. Mazanec (2021). Ensemble Model of the Financial Distress Prediction in Visegrad Group Countries, *Mathematics* 9 (16), 1886. <https://doi.org/10.3390/math9161886>
26. Pinches G.E., Mingo K.A., Caruthers J.K., (1973). The stability of financial patterns in industrial organizations, *J. Financ.* 28(2), 389-396.
27. Pohlman R.A., Hollinger R.D., (1981). Information redundancy in sets of financial ratios. *J. Bus. Financ. Account.* 8(4), 511-528.
28. Putri H.R. and A. Dhini, (2019) "Prediction of Financial Distress: Analyzing the Industry Performance in Stock Exchange Market using Data Mining," *16th International Conference on Service Systems and Service Management (ICSSSM)*, Shenzhen, China, pp. 1-5, doi: 10.1109/ICSSSM.2019.8887824.
29. Radović-Marković, M., & Hanić, H. (2018). *Metodologija istraživanja u ekonomskim naukama*. Beogradska bankarska akademija, Fakultet za bankarstvo, osiguranje i finansije, Institut ekonomskih nauka, Beograd. ISBN 978-86-7852-038-9 [in English: Radović-Marković, M., & Hanić, H. (2018). *Research methodology in economic sciences*. Belgrade Banking Academy, Faculty of Banking, Insurance and Finance, Institute of Economic Sciences, Belgrade. ISBN 978-86-7852-038-9]
30. Roumani, Y.F., Nwankpa, J.K. & Tanniru, M. Predicting firm failure in the software industry. *Artif Intell Rev* 53, 4161-4182 (2020). <https://doi.org/10.1007/s10462-019-09789-2>

31. Rosner, B. (2011). *Fundamentals of Biostatistics*, 7th Edition. Brooks/Cole, Boston.
32. Savić, B., & Milojević, I. (2022). Challenges of targeted formation of financial reports in modern business conditions. *Oditor*, 8(2), 30-53. <https://doi.org/10.5937/Oditor2202030S>
33. Sayari, N., & Muga, C. S. (2017). Industry specific financial distress modeling. *BRQ Business Research Quarterly*, 20(1), 45–62. <https://doi.org/10.1016/j.brq.2016.03.003>
34. Srhoj, S. (2022). Omega Score model for predicting firm default: Application in the Republic of Croatia, *Poslovna izvrsnost*, 16(2), 53-73.
35. Taffler R.J., (1983). The assessment of company solvency and performance using a statistical model, *Account. Bus. Res.* 13(52), 295–308.
36. Todorović, M., & Čupić, M. (2016). *Merenje performansi u lean poslovnom okruženju*. XXI Internacionalni naučni skup SM 2016, Strategijski menadžment i sistemi podrške odlučivanju u strategijskom menadžmentu, 1203-1211. [*in English*: 33. Todorović, M., & Čupić, M. (2016). *Performance measurement in a lean business environment*. XXI International Scientific Conference SM 2016, Strategic Management and Decision Support Systems in Strategic Management, 1203-1211.]
37. Wu, Y., Gaunt, C., & Gray, S. (2010). A comparison of alternative bankruptcy prediction models, *Journal of Contemporary Accounting & Economics*, 6, pp 34-45.
38. Yazdanfar, D. and Öhman, P. (2020). Financial distress determinants among SMEs: empirical evidence from Sweden, *Journal of Economic Studies*, 47 (3), 547-560. <https://doi.org/10.1108/JES-01-2019-003>
39. Zmijewski, M., E. (1984). Methodological Issues Related to the Estimation of Financial Distress Prediction Models, *Journal of Accounting Research*, 22, 59-82.