


# Assessing Corporate Financial Health. Evidence from the Agricultural Sector in the Republic of Serbia

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## Original research paper

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**Abstract:** A large number of studies have been conducted examining certain aspects of the financial situation of agricultural enterprises in the Republic of Serbia. However, the overall situation of these companies has rarely been the subject of analysis in previous studies. Therefore, this paper represents an attempt to comprehensively assess the financial conditions of large and medium-sized agricultural enterprises in the Republic of Serbia. Three models (Emerging market scoring, DF Indicator and G-Index) were used to analyse the key areas of financial security (liquidity and debt) and business success of 38 agricultural enterprises in the period from 2017 to 2021. By classifying the total values recorded into zones of financial health, an assessment of their overall position was made. The companies studied at the group level showed a satisfactory financial situation, due to favourable performance in individual cases, while the majority of enterprises were at risk in all business dimensions studied, with the exception of debt. During the analysis period, most of the companies under review recorded low liquidity, which was often accompanied by low profitability. The results of this work provide an insight into the key specifics of the activity of agricultural companies from the point of view of financial analysis and, in this sense, represent an important additional tool in the process of their management, but also contribute to creating an adequate basis for comparison with other business activities in the Republic of Serbia.

**Keywords:** Financial Analysis; Agricultural Enterprises; Emerging Market Scoring; DF Indicator; G-Index.

## Introduction

A review of the relevant literature revealed that comprehensive assessments of the financial situation of agricultural enterprises in the Republic of Serbia were rarely performed, i.e. the subject of previous studies has more often tended to be individual aspects of the financial situation of enterprises, primarily liquidity, then debt, and business performance. The following review first presents researches in which the overall financial position of companies from the agricultural sector was analysed. Based on a sample of 50 financial reports of Serbian agricultural companies in 2008 and 2009, it was found that about 70% of companies had a poor financial position in both years (Jakšić et al., 2011). In the above study, various financial indicators were used to evaluate the debt level, solvency, ability to maintain the real value of equity, and the reproduction value of the company. The impact of the 2008 financial crisis on the activity of agricultural enterprises was studied by Andrić et al. (2011). Finally, the creditworthiness of the subjects from the sample of 30 observations was rated as poor, while the comparison of performance between different agricultural activities in the sample led to the conclusion that some enterprises recorded a significantly less favourable performance, which was attributed to worse production trends and insufficient support from the state. It was also pointed out that the creditworthiness of agricultural enterprises deteriorated in 2010 due to the lower volume and quality of sowing. Applying a set of commonly used financial indicators to a sample of active agricultural companies and enterprises undergoing restructuring (30 and 18 financial statements, respectively), it was found that both groups were characterized by a poor financial situation in the period from 2010 to 2012, i.e., impaired financial stability, threatened liquidity, acceptable debt and favourable state of solvency (Tomašević et al., 2014). The results of the study on the financial situation and profitability of 25 medium-sized agricultural enterprises from Zapadnobački district, which provided an overview of the main characteristics of profitable and unprofitable enterprises, are also considered an important contribution in the field of financial analysis of agricultural enterprises in the Republic of Serbia (Vučković, 2016). Among other things, profitable companies were found to have a similar speed of inventory turnover and a similar value of current and reduced liquidity ratios, which at the same time were significantly higher than the established reference values. However, the percentage of these companies varied from only 17% to 26% of the units in the sample, with a decreasing trend during the analysis period. According to the results of this research, unprofitable companies were also frequently insolvent.

As mentioned above, the study of specific business dimensions, especially liquidity, has been more frequently the subject of research than the general assessment of the financial condition of agricultural enterprises. The state of liquidity of enterprises from the Autonomous Province of Vojvodina in the period from 2011 to 2015 was assessed as poor in 70% of enterprises, despite the satisfactory industry average (Vuković et al., 2018). The authors of this paper also conducted additional analyses of the differences in the recorded results by years of analysis (using the Friedman test) and concluded that they were not statistically significant, i.e. that the liquidity levels were relatively stable in the years under consideration (Vuković et al., 2018). According to the results of this research, between 2006 and 2015, based on the recorded values of the ratio of current liquidity, the percentage of companies with liquidity at risk (value less than two) ranged from 67.44% to 82.93% (Vuković et al., 2018). The analysis of the liquidity of 18 of the total 21 agricultural companies listed on the Belgrade Stock Exchange in the period from 2016 to 2019 leads to similar conclusions. The satisfactory level of liquidity of the studied group was accompanied by a large number of companies with unfavourable results, especially when the sources of total working capital were reduced to more liquid assets, as well as in the case of ratios based on net cash flow (Milašinović et al., 2021). The study of the structure of financing sources of three medium-sized agricultural companies in 2013-2015 highlighted the importance of accurately defining and ensuring a sufficient volume of permanent working capital, as these companies were often unable to cover fixed assets, long-term placements, and

parts of inventories (Vučković et al., 2017). An analysis of profitability and indebtedness of agricultural enterprises from AP Vojvodina, covering the period from 2006 to 2015, found that the observed changes in the level of debt were not statistically significant and that debt was generally relatively low (Mirović et al., 2019). It was also found that the companies under consideration were characterized by very low profitability, which increased significantly after 2013.

Based on previous research, this paper also examines the state of the elements of the financial situation considered so far. Therefore, the object of research of this paper is the financial position of agricultural enterprises in the Republic of Serbia, with the aim of its complete evaluation, i.e. taking into account the state of financial security (liquidity and debt) and business performance. In order to achieve the defined research goal, three models for assessing the financial health of companies (Emerging market scoring, DF Indicator and G-Index) are applied, which allow assessing the overall position of a given company based on predefined indicators describing specific company dimensions. By analysing the partial measurements that make up each model, an overview of the situation by individual company dimensions is provided. The study refers to the activity of agricultural enterprises in the Republic of Serbia in the period from 2017 to 2021.

## **Company Financial Health Assessment**

Financial health assessment and bankruptcy prediction models that quantify the overall financial health of a given company based on a certain number of weighted indicators are often used to assess the financial health of a company. The best-known models of this type, such as the models of Altman (Edward Altman), developed on the basis of the analysis of the business activity of industrial companies in the United States (Rodić et al., 2017), by Kralicek (Peter Kralicek) based on financial data of companies from Germany, Switzerland and Austria (Vlaović-Begošević, 2020), by Beaver (William Beaver) based on companies of different size and activity (Beaver, 1966) are the most widely used in business and research practice and were created by the procedure of discriminant analysis.

In the late 1960s, Edward Altman developed the Z-score model to predict bankruptcy of industrial firms using multiple discriminant analysis (Rodić et al., 2017). Among the selected firms, there were differences in size (measured by the value of total assets), with the smallest and largest firms missing (Altman, 1968). The exclusive representation of industrial firms in the sample studied meant that the original model was not commonly used to analyse the situation in non-manufacturing firms. In addition, the Z-score was intended only for publicly traded companies. Later models developed aimed to address these shortcomings and extend coverage to companies outside the United States. In 1983, Altman developed the new Z'-Score model with different weightings and a modified fourth indicator. The market value of capital was replaced by the book value of capital, in contrast to indicator  $X_4$ , adapting the model to companies whose shares are not traded on the stock market (Altman, 1983).

In 2005, Altman defined a special model that, in contrast to the original model, allows bankruptcy scoring for non-industrial firms in developing countries: EMS - Emerging market scoring (Altman, 2005). The previous model is considered the most appropriate alternative for assessing the financial condition of companies in the Republic of Serbia. Numerous studies have been conducted in the past with the aim of updating the original model and developing new models adapted to the specifics of companies in other countries (Bod'a, 2019). Following the example of Altman, who developed a model for predicting corporate insolvencies based on data from companies on the American market, Kralicek developed a model for European companies in the form of a discriminant function – the DF Indicator (Rodić et al., 2017). Specialized models based on samples of companies in a particular industry have also been developed. Using

a sample of 60 Slovak agricultural companies, Gurčik Lubomir (Gurčik Lubomír) in 2002 developed a specialized model to assess the financial health of agricultural companies, the G-Index (Gurčik, 2002). It can also be said that there are no better known and more frequently used models for this purpose in the agricultural sector (Bod'a, 2019).

However, the results of a large number of authors point to the limited applicability of these models to significantly different conditions, whether due to differences between business activities or changes due to the passage of time (Kovacova and Tomas, 2017). Consequently, models based on financial indicators are not exempt from general limitations related to mutual (in)comparability of ratio analysis results. Particular emphasis is placed on the differences between companies' accounting data resulting from the use of different depreciation methods, the valuation of inventories and other assets, and the contributions of price changes and inflation (Engler, 1978). The way this information is presented and later interpreted critically influences the managerial decisions made by current and potential investors (Ionescu and Alin Haralambie, 2023). Part of the impact of the mentioned factors can be reduced by a longer period of analysis, but also by comparing the individual performances recorded with the trends at the industry level. In this context, their correct evaluation is the starting point to which the results of this analysis will contribute.

## Methodology

The study sample consists of 38 companies from the agricultural sector in the Republic of Serbia. The analysis includes all large and about 35% of medium-sized enterprises in the sector. The financial situation is assessed for the period from 2017 to 2021. In terms of enterprise size, the Serbian Accounting Law distinguishes between micro, small, medium and large companies (legal entities and entrepreneurs), with the classification made while taking into account the average number of employees, the value of business income and total assets in a given year (*Official Gazette of the Republic of Serbia, 2021*). The average number of employees that a company must have in order to be classified as a small, medium or large company is 10, 50 and 250, respectively. The annual business income for each of the groups must be at least 700,000, 8,000,000 and 40,000,000 euros, respectively, while the book value of total assets must exceed 350,000, 4,000,000 and 20,000,000 euros, respectively. A company that meets the thresholds for at least two of the three criteria is classified in a specific size group. For example, a company whose average business income and balance sheet total exceed eight and four million euros, respectively, on the balance sheet date is classified as a medium-sized company. The average number of employees is estimated on the basis of the mean number of employees in the company during a given month (*Official Gazette of the Republic of Serbia, 2021*).

Depending on their size, companies are subject to different accounting obligations relating to the application of international accounting standards, the scope of regular financial reporting, the obligation to audit financial statements and non-financial reporting. Large and medium-sized companies are subject to the greatest responsibility, and therefore their financial reports are assumed to be more reliable, which is why micro and small companies were not included in the sample for this study. The Altman model for Emerging market, the DF Indicator, and the G-Index are presented in more detail below and then applied. The Emerging market scoring consists of four indicators each representing the share of balance sheet and income statement items in total assets:

$$EMS = 6.56 \cdot X_1 + 3.26 \cdot X_2 + 6.72 \cdot X_3 + 1.05 \cdot X_4 + 3.25 \quad (1)$$

The first indicator ( $X_1$ ) is the share of working capital (net current assets) financed from long-term sources in total assets, while other indicators in the numerator include retained earnings ( $X_2$ ), profit before tax ( $X_3$ ), and sales ( $X_4$ ). Kralicek's DF Indicator and Altman's models assess the impact of the indicators on overall financial security by weighting them and comparing the sum of the corrected indicators with reference values (Alihodžić, 2013):

$$DF = 1.50 \cdot X_1 + 0.08 \cdot X_2 + 10.00 \cdot X_3 + 5.00 \cdot X_4 + 0.30 \cdot X_5 + 0.10 \cdot X_6 \quad (2)$$

The  $X_1$  indicator represents the inverse of the debt factor, i.e. the ratio of free cash flow to total liabilities. Another indicator is the ratio of total assets to total liabilities and also relates to the company's leverage ratio, i.e. a higher value indicates lower debt, as the company's total assets form a larger base to cover its liabilities. The  $X_3$  ratio is an indicator of the company's return on assets. The ratio of profit before taxes to total revenues ( $X_4$ ) is an indicator of the company's success. The ratio of inventories to total revenues ( $X_5$ ) is a measure of liquidity, as inventories are one of the items of working capital that may be characterized by difficult conversion into cash as a result of a stoppage in the production cycle (Krasulja and Ivanišević, 2005). The last ratio included in Kralicek's DF-Indicator is the ratio of business revenues to total assets, which is a measure of the profitability of the company ( $X_6$ ). The structure of the G-Index is shown below:

$$G = 3.412 \cdot X_1 + 2.226 \cdot X_2 + 3.277 \cdot X_3 + 3.149 \cdot X_4 + 2.063 \cdot X_5 \quad (3)$$

The first ( $X_1$ ) and second ( $X_2$ ) indicators measure the profitability of the company based on the share of retained earnings, i.e. pre-tax profit in total operating assets. The third indicator ( $X_3$ ) shows the achieved profitability, as it is a short-term performance indicator, which represents the share of profit before taxes in total sales. The fourth ratio ( $X_4$ ) can be classified as a dynamic liquidity measure, as it uses the achieved effect on the level of cash flow of the current year for the sources of financing of total assets. The common feature of the four indicators is the positive effect on the financial health of the company, i.e. the growth of the indicator value contributes to the increase of the Index and vice versa. The share of inventories in total sales ( $X_5$ ) only needs to be minimized, as a high share indicates a production or business cycle standstill, hence the negative weighting (Krasulja and Ivanišević, 2005).

**Table 1.** Presentation of applied models for evaluation of financial health of agricultural enterprises in the Republic of Serbia

Model	Indicator
EMS	$X_1 = \text{Net working capital/Total assets}$ $X_2 = \text{Retained earnings/Total assets}$ $X_3 = \text{Profit before tax/Total assets}$ $X_4 = \text{Sales revenue/Total assets}$
	$EMS = 6.56 \times X_1 + 3.26 \times X_2 + 6.72 \times X_3 + 1.05 \times X_4 + 3.25$
DF Indicator	$X_1 = (\text{Profit before tax} + \text{Depreciation}) / \text{Total liabilities}$ $X_2 = \text{Total assets/Total liabilities}$ $X_3 = \text{Profit before tax/Total assets}$ $X_4 = \text{Profit before tax/Total revenues}$ $X_5 = \text{Inventories/total revenues}$ $X_6 = \text{Business revenues/Total assets}$
	$DF = 1.50 \times X_1 + 0.08 \times X_2 + 10.00 \times X_3 + 5.00 \times X_4 + 0.30 \times X_5 + 0.10 \times X_6$
G-Index	$X_1 = \text{Retained earnings/Total assets}$ $X_2 = \text{Profit before tax/Total assets}$ $X_3 = \text{Profit before tax/Total revenues}$ $X_4 = \text{Net cash flow/Total Assets}$ $X_5 = \text{Inventories/Total Sales}$
	$G = 3.412 \times X_1 + 2.226 \times X_2 + 3.277 \times X_3 + 3.149 \times X_4 - 2.063 \times X_5$

Source: Author's systematization.

The calculated overall model measure is compared to reference values to make a final statement about the state of financial health (Table 1). If the value of EMS is below 4.50, the company is considered to be ripe for bankruptcy. Values between 4.50 and 5.85 are the gray zone, i.e. there is a financial threat and the company is at risk of bankruptcy but can recover, while a value of the indicator above 5.85 is characteristic of prosperous companies (Altman, 2005). However, some authors point out that the application of this model may or may not indicate the presence

of structural dysfunction in the organization (Rodić et al., 2017). The DF Indicator knows eight different scores, which are combined into three larger intervals for further analysis, mainly for reasons of comparability of the assessment results with the Altman model and the G-Index. A DF Indicator value of more than 1.5 is interpreted as a sign of good financial stability, while a negative value indicates impaired stability, i.e. insolvency. Values between the indicated limits are interpreted as a state of satisfactory stability. The calculated value of the G-Index can also be divided into three zones of financial health. Companies whose index value is below -0.60 are classified in the red (poor) zone, gray (medium) if the value is in the interval from -0.60 to 1.80, i.e. green (good) if the Index is above 1.80 (Gurčik, 2002). The following is an overview of the defined zones of financial health (Table 2).

**Table 2.** Reference values of the individual zones of the financial health of the company

State of financial health	EMS	DF Indicator	G-Index
High (Green zone)	>5.85	>1.50	>1.80
Moderate (Gray zone)	4.50-5.85	0.00-1.50	-0.60-1.80
Low (Red zone)	<4.50	<0.00	<-0.60

Source: Author's systematization.

The assessment of the general situation in the companies under consideration represents the final step in the evaluation of their financial health. By comparing the results between the models, a better insight into the weaknesses and strengths manifested in certain dimensions that characterize the financial situation of agricultural enterprises in the Republic of Serbia is gained.

## Results and Discussion

The results of the analysis were considered at the level of the overall values of the model and the sub-indicators. The results of the application of the EMS model are first presented (Table 3).

**Table 3.** Application of the EMS model for Serbian agricultural enterprises in the period 2017 to 2021

Year	Desc. statistics	X <sub>1</sub> Liquid.	X <sub>2</sub> Rentab.	X <sub>3</sub> Rentab.	X <sub>4</sub> Rentab.	EMS
2017	<b>Mean</b>	<b>0.14</b>	<b>0.31</b>	<b>0.05</b>	<b>0.84</b>	<b>6.41</b>
	Median	0.13	0.24	0.04	0.56	6.17
	Std. dev.	0.1957	0.2673	0.0572	0.8220	2.4947
2018	<b>Mean</b>	<b>0.13</b>	<b>0.32</b>	<b>0.04</b>	<b>0.83</b>	<b>6.25</b>
	Median	0.11	0.24	0.03	0.51	6.16
	Std. dev.	0.1718	0.2751	0.0369	0.8105	2.3520
2019	<b>Mean</b>	<b>0.12</b>	<b>0.32</b>	<b>0.03</b>	<b>0.78</b>	<b>6.15</b>
	Median	0.10	0.24	0.02	0.56	5.89
	Std. dev.	0.1756	0.2810	0.0438	0.7096	2.3967
2020	<b>Mean</b>	<b>0.14</b>	<b>0.30</b>	<b>0.04</b>	<b>0.74</b>	<b>6.22</b>
	Median	0.11	0.23	0.03	0.54	6.00
	Std. dev.	0.1592	0.2837	0.0400	0.6392	2.3354
2021	<b>Mean</b>	<b>0.14</b>	<b>0.30</b>	<b>0.04</b>	<b>0.74</b>	<b>6.21</b>
	Median	0.15	0.24	0.04	0.60	6.23
	Std. dev.	0.2063	0.3085	0.0568	0.7394	2.7920

Source: Author's own calculation based on the data from publicly available financial statements of the selected agricultural companies published by the Serbian Business Registers Agency.

EMS consists of one indicator of static liquidity ( $X_1$ ) and three indicators of company's rentability ( $X_2$ ,  $X_3$  and  $X_4$ ). The results of the analysis show that net working capital represents 12-14% of total assets (median 10-15%). The recorded values of the static liquidity ratio ( $X_1$ ) are due to low debt. The ratio of retained earnings to total assets ( $X_2$ ) ranges from 30% to 32% (indicator value from 0.30 to 0.32) during the period of analysis, with a significantly lower median of 23% to 24%, which is due to the influence of individual companies that achieve higher business performance than the rest of the sample. The same is observed when analysing the distribution of the values of the other business success indicators that make up the model EMS, and it is also found that in 25 cases out of 190 (13.2%) the companies considered had a negative financial result. The percentage of profit before tax (indicator  $X_3$ ) varies significantly at the level of individual units of the sample, ranging on average between 3% and 5% (median between 2% and 4%). Relatively high values are also observed in the indicators measuring the share of sales in total assets, with a slight tendency to decrease, as the recorded values range from 0.74 in 2020 and 2021 to 0.84 in 2017. The instability of income in enterprises from the agricultural sector can be attributed to the seasonal nature of agricultural production, but also to the great dependence of the level of yields on climatic conditions in a given year, especially in conditions of open-air farming. The results of the authors who studied the impact of seasonality on the price of agricultural products confirm this, which is an additional constraint in planning the long-term development of these enterprises (Ionuț et al., 2022).

Apart from the aforementioned decrease in the value of the  $X_4$  indicator, the values of the other sub-measures remained stable over the period of analysis. Satisfactory liquidity conditions and relatively high values of short-term profitability indicators influenced the approximately equal contribution of indicators  $X_1$ ,  $X_2$  and  $X_4$  to the formation of the final value of EMS, which follows the dynamics of changes in indicator  $X_4$  (on average from 6.41 in 2017 to 6.21 in 2021).

In contrast to Altman's model, Kralicek's DF Indicator also includes measures of capital structure ( $X_1$  and  $X_2$ ) and profitability ( $X_4$ ). In addition to indicator  $X_3$ , which is the identical third measure from the Altman model, and  $X_6$ , which uses business income instead of sales revenue from the numerator of the fourth indicator, the DF Indicator also includes the ratio of inventory value to total revenue as a measure of liquidity. The recorded values of the ratios  $X_1$  and  $X_2$  confirm the low indebtedness of the studied companies (Table 4).

**Table 4.** Application of the DF Indicator for Serbian agricultural enterprises in the period 2017 to 2021

Year	Desc. statistics	$X_1$ Capital struct.	$X_2$ Capital struct.	$X_3$ Rentab.	$X_4$ Profit.	$X_5$ Liquid. (static)	$X_6$ Rentab.	DF Indicator
2017	Mean	<b>0.41</b>	<b>5.37</b>	<b>0.05</b>	<b>0.10</b>	<b>0.41</b>	<b>0.97</b>	<b>2.61</b>
	Median	0.17	2.87	0.04	0.06	0.38	0.65	2.06
	Std. dev.	1.1374	6.3340	0.0572	0.1402	0.3051	0.8320	2.6871
2018	Mean	<b>0.40</b>	<b>5.95</b>	<b>0.04</b>	<b>0.08</b>	<b>0.41</b>	<b>0.97</b>	<b>2.39</b>
	Median	0.12	3.19	0.03	0.04	0.31	0.60	1.38
	Std. dev.	1.2137	7.9835	0.0369	0.1057	0.3487	0.8255	2.7497
2019	Mean	<b>0.34</b>	<b>5.65</b>	<b>0.03</b>	<b>0.06</b>	<b>0.38</b>	<b>0.91</b>	<b>2.08</b>
	Median	0.09	3.06	0.02	0.04	0.38	0.66	1.36
	Std. dev.	0.8075	6.6583	0.0438	0.0775	0.2899	0.7196	2.2290
2020	Mean	<b>0.40</b>	<b>6.58</b>	<b>0.04</b>	<b>0.10</b>	<b>0.39</b>	<b>0.89</b>	<b>2.66</b>
	Median	0.14	3.57	0.03	0.06	0.36	0.65	1.80
	Std. dev.	0.7623	8.9422	0.0400	0.1322	0.2652	0.6442	2.2455
2021	Mean	<b>0.40</b>	<b>6.58</b>	<b>0.04</b>	<b>0.10</b>	<b>0.39</b>	<b>0.87</b>	<b>2.85</b>
	Median	0.18	3.29	0.04	0.09	0.38	0.70	2.26
	Std. dev.	0.9411	11.0407	0.0568	0.1232	0.2308	0.7494	2.6995

Source: Author's own calculation based on the data from publically available financial statements of the selected agricultural companies published by the Serbian Business Registers Agency.

Total assets are 5.37 to 6.58 times higher than total liabilities ( $X_2$ ), which corresponds to a debt share of 15.2% to 18.6% of total assets. The relatively low debt ratio also influenced the higher value of the ratio of total profit before taxes and depreciation from 0.34 in 2019 to 0.41 in 2017. The recorded values of both indicators are characterised by a pronounced deviation of the average from the median, which is due to the presence of several cases of companies with a particularly high proportion of debt (over 70%).

In addition to the  $X_3$  indicator, which is also represented in the previous model, a particularly high share of income in total sources is also observed (from 0.97 in 2017 to 0.87 in 2021), also with a slight downward trend, which corresponds to the dynamics of the  $X_4$  indicator of the Altman model. Profit before tax as a percentage of total revenues ( $X_4$ ), as a measure of profitability, has extremely low values ranging from 6% to 10% over the period of analysis, due to low performance of the company. The recorded value of inventories accounts for 38% to 41% of total revenues.

The first three financial indicators that make up the G-Index are also included in the previous two models, namely the  $X_1$  indicator as the second indicator in the EMS model,  $X_2$  as the third indicator in both models, and  $X_3$  as the fourth indicator of the DF Indicator (Table 5). The ratio of net cash flow to total assets ( $X_5$ ), as a dynamic measure of liquidity, shows negligible average values.

**Table 5.** Application of the G-Index for Serbian agricultural enterprises in the period 2017 to 2021

Year	Desc. statistics	$X_1$ Rentab.	$X_2$ Rentab.	$X_3$ Profit.	$X_4$ Liqid.	$X_5$ Liqid.	G-Index
2017	Mean	<b>0.31</b>	<b>0.05</b>	<b>0.10</b>	<b>-0.01</b>	<b>0.41</b>	<b>0.61</b>
	Median	0.24	0.04	0.06	0.00	0.38	0.41
	Std. dev.	0.2673	0.0572	0.1402	0.0581	0.3051	1.3890
2018	Mean	<b>0.32</b>	<b>0.04</b>	<b>0.08</b>	<b>0.00</b>	<b>0.41</b>	<b>0.59</b>
	Median	0.24	0.03	0.04	0.00	0.31	0.53
	Std. dev.	0.2751	0.0369	0.1057	0.0312	0.3487	1.4243
2019	Mean	<b>0.32</b>	<b>0.03</b>	<b>0.06</b>	<b>-0.01</b>	<b>0.38</b>	<b>0.55</b>
	Median	0.24	0.02	0.04	0.00	0.38	0.42
	Std. dev.	0.2810	0.0438	0.0775	0.0722	0.2899	1.4170
2020	Mean	<b>0.30</b>	<b>0.04</b>	<b>0.10</b>	<b>0.00</b>	<b>0.39</b>	<b>0.65</b>
	Median	0.23	0.03	0.06	0.00	0.36	0.54
	Std. dev.	0.2837	0.0400	0.1322	0.0561	0.2652	1.3304
2021	Mean	<b>0.30</b>	<b>0.04</b>	<b>0.10</b>	<b>0.00</b>	<b>0.39</b>	<b>0.74</b>
	Median	0.24	0.04	0.09	0.00	0.38	0.49
	Std. dev.	0.3085	0.0568	0.1232	0.0000	0.2308	1.3647

Source: Author's own calculation based on the data from publicly available financial statements of the selected agricultural companies published by the Serbian Business Registers Agency.

Once the total value of the model had been calculated for each company, a comparison was made with previously established reference values, based on the basis of which the companies were divided into individual financial health zones (Table 6). The companies under consideration were assessed using three models in each of the five years of analysis.

The results for each year show a changing structure of representation of each zone, being the most favourable in the first year (2017). In the following two years, the number of companies in the gray and red zones increases as there are fewer cases in the green zone of financial health. From 2017 to 2019, the percentage of cases in the green zone decreases from 45.6% to 35.1%, while the percentage in the gray zone increases from 42.1% to 50.9%. After that, by 2021, there is an improvement in the overall result to a similar level as in 2017, with an increase in the percentage of cases in the red zone (12.3% in 2017 and 19.3% in 2021).



**Table 6.** Comparison of model application results by caseload in specific financial health zones from 2017 to 2021

Year	Financial stability/health	EMS	DF Indicator	G-Index	Total (per year)
2017	<i>High</i>	25	21	6	<b>52 (45.6%)</b>
	<i>Moderate</i>	5	16	27	<b>48 (42.1%)</b>
	<i>Low</i>	8	1	5	<b>14 (12.3%)</b>
2018	<i>High</i>	22	17	7	<b>46 (40.4%)</b>
	<i>Moderate</i>	6	20	26	<b>52 (45.6%)</b>
	<i>Low</i>	10	1	5	<b>16 (14.0%)</b>
2019	<i>High</i>	19	14	7	<b>40 (35.1%)</b>
	<i>Moderate</i>	10	23	25	<b>58 (50.9%)</b>
	<i>Low</i>	9	1	6	<b>16 (14.0%)</b>
2020	<i>High</i>	18	20	6	<b>44 (38.6%)</b>
	<i>Moderate</i>	8	18	28	<b>54 (47.4%)</b>
	<i>Low</i>	12	0	4	<b>16 (14.0%)</b>
2021	<i>High</i>	21	23	10	<b>54 (47.4%)</b>
	<i>Moderate</i>	6	12	20	<b>38 (33.3%)</b>
	<i>Low</i>	11	3	8	<b>22 (19.3%)</b>
<b>Total (per model)</b>	<i>High</i>	<b>105 (55.3%)</b>	<b>95 (50.0%)</b>	<b>36 (18.9%)</b>	
	<i>Moderate</i>	<b>35 (18.4%)</b>	<b>89 (46.8%)</b>	<b>126 (66.4%)</b>	
	<i>Low</i>	<b>50 (26.3%)</b>	<b>6 (3.2%)</b>	<b>28 (14.7%)</b>	

Source: Author's own systematization.

## Conclusions

The analysis of the results of the assessment according to the individual models, as well as the values of the sub-indicators, leads to the following conclusions about the financial situation of agricultural companies in the Republic of Serbia:

- the largest number of cases in the green and red range was recorded by the assessment of the value of the model EMS (105 cases or 55.3% and 50 cases or 26.3% of the sample); favourable values of the aggregated function are mostly a consequence of the high value of net working capital, which is largely determined by the low representation of current liabilities, and contributes to higher values of the liquidity indicator, as well as high business income; in the cases where the value of the function was recorded in the red zone, extremely low profitability was observed, which, together with the often low business income, contributes to a decrease in the value of the three indicators of business success;
- the results of the evaluation according to the DF Indicator are characterized by the lowest percentage of cases in the red zone (3.2%), with almost equal participation in the green and gray zones (50.0% and 46.8%); favourable ratings according to the model are in most cases due to low debt and high value of inventories, which increases the contribution of the first two and the fifth sub-indicator; extremely high values of the indicators using these items ultimately led to positive ratings, while the measures of corporate success record a low contribution;
- when applying the G-Index, the largest number of cases was found in the gray zone (66.4%), with a roughly equal share of companies in the green and red zones (18.9% and 14.7%, respectively); most of the value of the Index is the first indicator of the ratio of retained earnings to total assets. The value of inventories has significantly affected the reduction of the value of the model in individual cases through the fifth indicator, while the measurement of dynamic liquidity has practically not affected the value of the model due to

the relatively low net cash flow. The performance indicators representing profit before tax also had a negligible impact.

The results of this analysis also show that there are significant differences in the financial situation between the individual cases of the large and medium-sized agricultural enterprises considered. A smaller number of companies record high business success along with high liquidity. The largest number of cases has extremely low profitability ratios and low liquidity. Most of the analysed companies recorded low levels of indebtedness, especially in the case of long-term debt. In summary, the financial situation of most of the companies studied is at risk, even though the results at group level are mostly satisfactory.

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