

Profitability determinants of small agricultural and food companies in the Republic of Serbia

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Abstract

Bearing in mind the importance of small agricultural and food companies for the production of agri-food products, but also bearing in mind their role of employer for a large number of workers, the aim of this research is to assess the profitability of these entities and consider the determinants that affect the business success of these companies. Therefore, the paper analyzes the determinants of profitability of small agricultural and food companies that operated in the Republic of Serbia from 2010 to 2019. Using the panel regression analysis, the influence of different microeconomic and macroeconomic determinants on profitability, measured by the rate of return on assets, was examined. The following indicators were observed as microeconomic determinants of profitability: liquidity, financial leverage, indebtedness, tangibility, total asset turnover, the fixed asset turnover ratio, current asset turnover ratio, inventory turnover ratio, receivables turnover ratio, and the sales growth rate. Indicators of the gross domestic product (GDP) and inflation were observed as macroeconomic determinants of profitability. Based on the research results, it was determined that the profitability of agricultural companies is significantly influenced by indebtedness, tangibility, the total asset turnover ratio, current asset turnover ratio, receivables turnover ratio, the GDP, and inflation. The profitability of food industry companies is significantly influenced by liquidity, indebtedness, tangibility, total asset turnover, the GDP, and inflation. The results of the research contribute to the quality of information available to all stakeholders in agribusiness, company managers, creditors, as well as agricultural policy makers.

Key words: Profitability. Agricultural industry. Food industry

1. Introduction

In the past two decades, Serbia's economy has faced major challenges. Many of these challenges are particularly significant for the agri-food sector. First, the Serbian economy went through a period of transition that only morphed into the process of European integration, which requires radical changes in the agri-food sector. In addition, this period is characterized by global economic and political turbulence, such as the global economic crisis, the COVID-19 pandemic, and the current Ukrainian crisis. Each of these developments in turn has significant implications for the food supply chain and for food security. According to Matkovski et al. (2020) the lower level of food security in Serbia and the Western Balkans, compared to the European Union (EU), may become a significant problem in times of crisis in which small and medium-sized agricultural enterprises are of particular importance for the stability of the food supply on the local market. Certainly, small (and medium) enterprises are the basis for the development of any economy (Eggers, 2020). According to the European Commission (2022), these economic entities are key for economic growth, innovation, and

employment. Due to all the above, the focus of this research is the profitability of small agricultural and food companies in Serbia.

The profitability of a company is one of the basic indicators of business success. In practical terms, profitability reflects the ability of a company to generate profit in relation to investments (Mijić, Jakšić, 2017). For this reason, in business, this indicator is very important for all stakeholders. When analyzing business success, it is not enough to just assess the achieved profitability of the company, it is also necessary to determine the factors that affect it. The various determinants that affect the profitability of a company are always a current, important, and inexhaustible topic that attracts the attention of many researchers and practitioners (Pervan et al., 2019). These numerous determinants can, according to the economic literature, be divided into two groups, microeconomic (internal determinants) and macroeconomic (determinants that are beyond the control of the company). An adequate analysis of profitability and its determinants must be conducted, not only at the level of individual companies, but also at the industry level. In this regard, agricultural production as the carrier of the primary sector is of strategic importance for the economic system of the Republic of Serbia. Agricultural production is traditionally a very important economic activity in the Republic of Serbia, which is a consequence of relatively favorable agro-ecological conditions, as well as historical and developmental circumstances (Jakšić, et al., 2015). On the other hand, the agricultural production sector is followed by the food industry, which together with agricultural production provides food security for the entire population. From 2011 to 2020, the agricultural production share in the total gross domestic product (GDP) of Serbia was 7.03%. In the last decade, the food industry has had a share in the total GDP of about 3.5% (Vuković et al., 2017). The additional importance of these two industries is reflected in the number of employees, which in 2019 amounted to 24,603 in agricultural companies, and 71,283 in food companies. Agricultural and food companies also have significant capital, which in 2019 amounted to 2.89 billion EUR for agricultural companies and 3.84 billion EUR for food companies (The Serbian Business Registers Agency). Given the importance that companies from these two sectors have, as well as the large capital they possess, it is important to assess their business success, as well as the factors that affect it.

Based on the importance of these two industries, the subject of the research are small agricultural and food companies, which operated on the territory of the Republic of Serbia from 2010 to 2019. The primary aim of the research is to assess the profitability of small agricultural and food companies, as well as to consider the impact of microeconomic and macroeconomic determinants that affect the profitability of the studied companies. The

secondary aim of the research is to perform a comparative analysis of the profitability and the studied profitability determinants of companies from the agricultural industry and food industry.

The paper is structured as follows: Chapter 2 presents a review of the literature, Chapter 3 deals with the research methodology, Chapter 4 presents the empirical results of the research, and Chapter 5 presents the conclusions and suggestions.

2. Literature Review

Numerous authors the world over have studied the profitability determinants of companies in the agricultural and food industries. Some only studied microeconomic (internal) determinants of profitability, while others analyzed the impact of macroeconomic (external) determinants on profitability (Table 1).

Table 1: Review of the results of previous studies related to the determinants influencing the profitability of agricultural and food companies

Authors	Country	Examined determinants	Positive impact	Negative impact
Goddard et al. (2005)	Belgium, France, Italy and the United Kingdom	Size, market share, indebtedness and liquidity	Market share and liquidity	Size and indebtedness
Bhutta and Hassan (2013)	Pakistan	Financial leverage, tangibility, size, asset growth and inflation	Size	-
Pervan and Mlikota (2013)	Croatia	Industrial concentration, minimum efficiency, size, indebtedness, total asset turnover, risk and previous year profitability	Industrial concentration, size and previous year profitability	Indebtedness
Suardi and Noor (2015)	Indonesia	Financial leverage and indebtedness	-	Financial leverage and indebtedness
Singh et al. (2019).	USA	Uncertainty index, size, revenue growth, financial leverage and capital intensity	Revenue growth	Uncertainty index, size, financial leverage and capital intensity
Blažková and Dvouletý (2019)	Czech Republic	Financial leverage, productivity, size, age of company, dummy variable for new companies	Productivity, size and age of company	Financial leverage
Pervan et al. (2019)	Croatia	Age of company, liquidity, productivity, market concentration, capital intensity, inflation and GDP	Age of company, inflation and GDP	Productivity and market concentration
Sensini (2020)	Italy	Working capital cycle, indebtedness, interest coverage, working capital turnover ratio and total	Interest coverage, working capital turnover ratio and total asset turnover	Working capital cycle and indebtedness

		asset turnover		
Liu et al. (2020)	China	Size, liquidity, financial leverage, ratio of long-term liabilities and total assets, sales growth, capital intensity, development intensity, export intensity, ownership, inflation and GPD	Size, ratio of long-term liabilities and total assets and sales growth	Financial leverage, capital intensity and export intensity

Source: Authors' review

A group of authors studied the impact of various microeconomic and macroeconomic determinants on the profitability of agricultural and food companies from the Republic of Serbia. Dakić and Mijić (2018) identified internal determinants that affect the profitability of companies engaged in fruit and vegetable processing in the Republic of Serbia. Twenty-two companies engaged in the production and processing of fruit and vegetable products from 2007 to 2015 were analyzed. The impact of internal factors on profitability was analyzed using the panel regression model. Based on the results of the panel model, it was determined that the significant factors affecting the profitability of the studied companies are the size of the company, which has a negative impact on profitability, as well as the capital turnover ratio, while the sales rate has a positive effect on profitability. The same authors, Dakić and Mijić (2020), analyzed the influence of internal determinants on a company's profitability yet another time. This analysis included 24 companies that were engaged in meat processing in the Republic of Serbia from 2007 to 2016. Using the panel analysis, it was determined that a company's years of existence, indebtedness ratio, and capital turnover ratio have a statistically significant negative influence on profitability, measured by the return on assets, while sales growth and the current liquidity ratio have a statistically significant and positive impact on profitability. An analysis of the profitability determinants of companies from the food sector (meat, fruit and vegetable, and milk processing) from the Republic of Serbia was conducted by Dakić et al. (2019). Based on the data compiled from 657 companies, the authors conducted a panel regression analysis for the period from 2007 to 2015. The results of the panel analysis confirmed that sales growth has a positive and statistically significant impact on the profitability of companies from all three industries. The current liquidity ratio has a positive and statistically significant impact on the profitability of companies engaged in meat production and processing, while size, indebtedness, and the capital turnover ratio have a negative statistically significant impact on the profitability of these companies. The size of the company and the ratio of capital turnover have a statistically significant and negative impact on the profitability of companies engaged in the processing of fruits and vegetables. The

current liquidity ratio has a positive statistically significant effect on the profitability of companies engaged in milk production and processing, and indebtedness has a negative impact on the profitability of those companies. Vuković and Jakšić (2019) analyzed how working capital management affects the profitability of food industry companies from South-East Europe. Based on a sample of almost 10,000 companies, from 2010 to 2014, using a probit regression analysis, the authors examined the impact of current liquidity, the ratio of current and total assets, the ratio of short-term liabilities and total assets, financial leverage, and company size on profitability (measured by return on assets). The results of the regression analysis indicated that all the observed independent variables, except financial leverage, had a significant impact on the profitability of the studied companies. Tica (2022) analyzed the impact of the ownership structure on the profitability of companies from the beverage industry, the analysis was conducted on a sample of 96 companies that operated in the Balkans in 2019. The author determined that there is no statistically significant influence of the company's ownership structure on profitability. Tekić et al. (2022) analyzed the profitability factors of mill companies that operated in the territory of Vojvodina, the analysis included 23 small and medium-sized companies that operated in 2019. Based on the results of the regression analysis, the authors determined that of all the observed factors, only indebtedness stands out as a factor that has a statistically significant impact on profitability.

3. Research Methodology

3.1. Sample

According to the Law on Accounting (Official Gazette of the RS, No. 73/2019), small companies are those with 10 to 50 employees, an operating income from EUR 700,000 to EUR 8,000,000, and a value of total assets from EUR 350,000 to EUR 4,000,000. The research is based on data from the company's financial statements. Based on data taken from the Serbian Business Registers Agency, at the end of 2019 there were 3,707 agricultural and 3,952 food companies operating in the Republic of Serbia. Of the total number of agricultural companies, 473 were small companies. Of the total number of food companies, 595 were small companies. Companies that did not operate in the defined time period were excluded from the basic set. Also, companies that had not submitted regular financial reports and those that were in bankruptcy or liquidation proceedings were excluded from the sample. In accordance with the above mentioned, a proportional sample was selected from the number of remaining companies in relation to their participation in the basic set. Following that,

companies with extreme values of profitability indicators were excluded from the sample. In total, 135 small companies remained in the sample of agricultural companies, and 123 small companies remained in the sample of food companies.

3.2. Variables

In previous research on profitability (Burca and Batrinca, 2014; Rehman et al., 2015; Jacob and Collins, 2016; Isik and Tasgin, 2017; Zouaghi et al., 2017; Apan and Islamoğlu, 2018; Dimitrić et al., 2019) the most commonly used indicator is the rate of return on assets (ROA), and this indicator will appear in this study as a dependent variable in the panel regression models.

As microeconomic determinants of profitability, various financial indicators of business performance were used, calculated on the basis of data from the financial statements of the studied agricultural and food companies. The GDP and inflation were considered the macroeconomic determinants of profitability. The list of variables used to form the panel regression models is shown in Table 2.

Table 2: List of variables

Variable	Notation	Measurement	Predicted sign
Return on assets	ROA	Net income/Average total assets	/
Liquidity	LIQ	Current assets-Inventories/Short-term liabilities	+/-
Financial leverage	LEV	Total liabilities/Total capital	+/-
Debt ratio	DEBT	Total liabilities/Total assets	+/-
Tangibility	TANG	Fixed assets/Total assets	+/-
Total asset turnover ratio	TOAT	Sales revenue/Average total assets	+/-
Fixed asset turnover ratio	FATR	Sales revenue/Average fixed assets	+/-
Current asset turnover ratio	CATR	Sales revenue/Average current assets	+/-
Inventory turnover ratio	ITR	Sales revenue/Average inventory	+/-
Receivables turnover ratio	RTR	Sales revenue/Average receivables	+/-
Sales growth	SG	Sales revenue from the current year-Sales revenue from the previous year/Sales revenue from the previous year	+/-
Gross domestic product	GDP	Growth rate of gross domestic product	+/-
Inflation	INF	CPI growth rate	+/-

Source: Authors' review (Ruland and Zhou, 2005; Gill et al., 2011; Burja, 2011; Kebewar, 2013; Akoto et al., 2013; Sekeroglu and Altan, 2014; Usman et al., 2017; Forte and Tavares, 2019; Dalci et al., 2019, Dimitrić et al., 2019, Vuković and Jakšić, 2019)

3.3. Methodology

For the purpose of assessing the impact of microeconomic and macroeconomic determinants on the profitability of small agricultural and food companies that operated on the territory of the Republic of Serbia from 2010 to 2019, the panel regression analysis method was used.

Panel data, longitudinal data or combined data of time series and cross section data, in econometrics and statistics, denote data sets that contain repeated observations on the choice of observations from a set of observation units, covering both time and space dimensions.

Which model will be applied in the analysis also depends on the fulfillment of certain assumptions about the heterogeneity between observation units, i.e. the degree of variability of the regression parameters. The choice of the appropriate model also depends on the nature of the data and the type of problem covered by the analysis. Panel data models differ, in the broadest sense, according to the degree of variability of the regression parameters. Therefore, the following cases occur: 1) All regression parameters are constant. 2) The intercepts differ by observation unit, and regression parameters are constant. 3) Regression parameters vary both by observation unit and by time period.

If the assumption that all regression parameters are constant is met, then one intercept and one regression coefficient are estimated for the whole sample, which means that all observation units react in the same way. This model is called the model with constant regression parameters (Pooled-effects model). In the case of classical panels, N is large and T is small, it is assumed that the intercepts vary and that the regression coefficients are constant. A model in which the intercepts vary only by unit of observation is also called a model with individual effects. A model whose intercepts vary in both observation units and time periods is called a model with individual and time effects. These individual and time effects can be treated as fixed (a Fixed-effects model) or as stochastic (a Random-effects model). When choosing an adequate panel model, it is necessary to determine the existence of individual and time effects in a fixed or stochastic specification. The Hausman specification test is most often used to compare models with fixed or stochastic effects. In this test the assumption is that individual effects do not correlate with the regressors. In case the null hypothesis is rejected, the model of fixed effects is appropriate (Das, 2019).

For all the formed models, the basic assumptions for the application of panel data were first checked, i.e. the existence of multicollinearity, heteroskedasticity, autocorrelation and dependence of cross-section data were tested in order to select the final model specification.

To examine the impact of microeconomic and macroeconomic profitability determinants of small agricultural and food companies, the following regression models were formed:

$$ROA_{it} = \beta_{it} + \beta_1 LIQ + \beta_2 LEV + \beta_3 DEBT + \beta_4 TANG + \beta_5 TOAT + \beta_6 FATR + \beta_7 CATR + \beta_8 ITR + \beta_9 RTR + \beta_{10} SG + \beta_{11} GDP + \beta_{12} INF + u_{it}$$

Where i is the label for each company ($i = 1,2,3, \dots, n$), and t is the label for each year ($t = 1,2,3, \dots, 10$).

Software R 4.1.2 was used for statistical data processing.

4. Results

4.1. Descriptive statistics and assumptions testing

The results of the descriptive statistical analysis for small agricultural and food companies from the Republic of Serbia are presented in the appendix (Table A1 and Table A2).

One of the first assumptions for the application of regression models is that independent variables do not correlate highly with each other, i.e. that there is no multicollinearity. For both models, correlation coefficients were first calculated, and the multicollinearity of the independent variables tested (Table 3).

Table 3: Multicollinearity testing

Agricultural companies			Food companies		
Variable	VIF	TOL	Variable	VIF	TOL
TOAT	6.840	0.146	CATR	2.600	0.385
CATR	5.740	0.174	TOAT	2.500	0.400
TANG	1.960	0.509	TANG	1.790	0.560
DEBT	1.410	0.709	DEBT	1.440	0.692
ITR	1.110	0.897	LIQ	1.310	0.762
RTR	1.110	0.903	FATR	1.190	0.842
INF	1.090	0.918	ITR	1.110	0.902
LEV	1.080	0.928	RTR	1.100	0.909
GDP	1.070	0.932	INF	1.090	0.918
LIQ	1.040	0.961	LEV	1.080	0.925
FATR	1.020	0.980	GDP	1.070	0.932
SG	1.010	0.989	SG	1.000	0.998

Source: Authors' calculation

Based on the results of the VIF and TOL ($1 / VIF$), it can be noticed that the coefficient is not higher than 10 for any variable value of VIF, i.e. the value of TOL is not

below 0.1. It can be concluded that the problem of multicollinearity is not present in the formed models.

Table 4: Tests of heteroskedasticity, autocorrelation and dependence of cross-section data

Test	Agricultural companies		Food companies	
	Test statistics	p-value	Test statistics	p-value
Wald test	348.205	0.000	1,736.260	0.000
Wooldridge test	97.923	0.000	155.920	0.000
Pesaran's CD test	5.421	0.000	7.419	0.000

Source: Authors' calculation

A modified Wald test was applied to test the existence of heteroskedasticity, and based on the results of this test it can be seen that at the level of 1% the null hypothesis of homoskedasticity is rejected and an alternative for the existence of heteroskedasticity is accepted for both models. The presence of autocorrelation was tested using the Wooldridge test, and the presence of autocorrelation was confirmed in both formed models at a significance level of 1%. The presence of autocorrelation is expected, given the nature of the data, i.e. the results from the previous year are expected to have an effect on the results in the following year. The results of Pesaran's CD test show that there is a statistically significant dependence of the cross-section data, i.e. there are common factors that have an impact on the dependent variable in both formed models.

4.2. Model specification

In the next step of the analysis, testing for the existence of individual and time effects was performed. The existence of individual and time effects was tested using the F-test for fixed specification, while stochastic specification was tested using the Breusch Pagan LM test (Table 5).

Table 5: Tests for individual and time effects

Test	Agricultural companies		Food companies	
	Test statistics	p-value	Test statistics	p-value
F-test (individual effects)	3.226	0.000	8.699	0.000
F-test (time effects)	1.252	0.271	1.693	0.107
Breusch-Pagan LM test (individual effects)	159.840	0.000	666.710	0.000
Breusch-Pagan LM test (time effects)	0.075	0.783	0.166	0.684

Source: Authors' calculation

The results of the F-test of individual effects for both groups of companies confirm the existence of individual effects at the significance level of 1% ($p < 0.01$). The results of the F-test of time effects for both models showed that there are no significant time effects in the model and that the initial hypothesis was accepted ($p > 0.05$). The results of the Breusch-Pagan LM test of individual effects for both models confirm the existence of individual effects in the model ($p < 0.01$), while the results of the Breusch-Pagan LM test of time effects indicate that these effects are not significant in both formed models ($p > 0.05$).

In the next step, it was necessary to examine the nature of the individual effects, i.e. examine whether these effects are fixed or stochastic. In order to select an adequate model specification, the Hausman test was applied. Given the violation of the basic assumptions of the panel model, a modified Hausman test was applied to select an adequate model specification. The value of Hausman's statistic of 59.034 ($p = 0.000$) indicates that at the level of significance of 1%, the initial hypothesis was rejected, i.e. that a fixed specification of individual effects was chosen for the model of agricultural companies. The value of Hausman's statistic for food companies of 118.890 ($p = 0.000$) also indicates the choice of the fixed effects model.

4.3. Regression models and discussion

In order to overcome the violation of the basic assumptions of the model, an alternative specification of the model of fixed effects with corrected standard errors (PCSE - linear regression with panel-corrected standard errors) was applied. The results of the alternative specification are presented in the following table (Table 6).

Table 6: Estimated model of fixed individual effects for the profitability of small agricultural companies

ROA	Coefficients	Standard error	t-statistics	p-value
Constant	9.233	2.475	3.731***	0.001
LIQ	-0.001	0.002	-0.724	0.470
LEV	0.001	0.006	0.078	0.938

DEBT	-11.829	3.552	-3.330***	0.001
TANG	-7.309	2.839	-2.574**	0.011
TOAT	-1.720	0.775	-2.220**	0.028
FATR	-0.001	0.001	-0.410	0.682
CATR	2.520	0.635	3.970***	0.000
ITR	-0.008	0.009	-0.881	0.380
RTR	0.004	0.002	2.358**	0.019
SG	-0.026	0.048	-0.533	0.595
GDP	0.169	0.094	1.800*	0.074
INF	-0.321	0.059	-5.446***	0.000
n	135			
t	10			
N	1350			
R^2	0.178			
F test	14.47			
p-value (F)	0.000			

Source: Authors' calculation

Note: *** - level of significance 1%; ** - level of significance 5%; * - level of significance 10 %

The panel regression model for agricultural companies was formed on the basis of data for 135 companies and a time period of 10 years. Based on the F-test results, it can be concluded that the formed model is highly statistically significant ($p < 0.01$), and based on the value of the coefficient of determination, it can be seen that profitability is explained with 17.8% by the examined determinants. Significant determinants of profitability are indebtedness, the tangibility ratio, total asset turnover, the current asset turnover ratio, the receivables turnover ratio, the GDP, and inflation. The indebtedness ratio has a significant negative impact on the profitability of the studied agricultural companies, which is in accordance with the results obtained by Pervan and Mlikota (2013). The tangibility ratio also has a statistically significant and negative impact on the profitability of the studied agricultural companies, which is confirmed by the results obtained by Mijić and Jakšić (2017) in their study of the profitability determinants of agricultural companies from South-East

Europe. The total asset turnover has a negative and statistically significant impact on the profitability of the studied companies. These findings are contrary to the results of Denčić-Mihajlov (2014) who investigated the determinants of profitability of companies operating on the Belgrade Stock Exchange. The fixed asset turnover ratio also has a statistically significant and negative impact on profitability, which explains the impact of the previous indicator, because this result may be a consequence of the low-quality management of the fixed assets of the company. The negative impact of the fixed asset turnover ratio on profitability was also determined by Burja (2011) in his research, when analyzing various determinants of profitability of Romanian companies. The current asset turnover ratio has a positive and statistically significant impact on the profitability of the studied agricultural companies, which shows that with the increase in current asset turnover, an increase in profitability is expected. Akoto et al. (2013) reached the same conclusion. The receivables turnover ratio also has a positive and statistically significant impact on the profitability of the studied companies. Macroeconomic determinants, the GDP, and inflation have a statistically significant effect on the profitability of the studied agricultural companies, with the growth rate of the GDP having a positive impact, and inflation having a negative impact. The positive impact of the growth rate on profitability was also determined by Pervan et al. (2019). Dalci et al. (2019) also found a negative effect of inflation on profitability in their research.

For the sample of food companies, also, due to the violation of the basic assumptions of the panel model, an alternative specification of the model of fixed effects was applied, which is a model with corrected standard errors (PCSE - linear regression with panel-corrected standard errors). The results of this model are presented in the following table (Table 7).

Table 7: Estimated model of fixed individual effects for the profitability of small agricultural companies

ROA	Coefficients	Standard error	t-statistics	p-value
Constant	13.287	1.924	6.904***	0.000
LIQ	-0.224	0.081	-2.758***	0.007
LEV	0.002	0.016	0.106	0.916
DEBT	-16.194	2.084	-7.769***	0.000
TANG	-7.825	2.036	-3.844***	0.000
TOAT	3.361	0.435	7.728***	0.000

FATR	-0.007	0.005	-1.547	0.124
CATR	-0.299	0.255	-1.176	0.242
ITR	-0.009	0.007	-1.213	0.227
RTR	0.002	0.003	0.802	0.424
SG	0.001	0.007	0.009	0.992
GDP	-0.308	0.124	-2.487**	0.014
INF	0.345	0.069	5.006***	0.000
n	123			
t	10			
N	1230			
R^2	0.273			
F test	32.939			
p-value (F)	0.000			

Source: Authors' calculation

Note: *** - level of significance 1%; ** - level of significance 5%; * - level of significance 10 %

The panel regression model was formed on the basis of data for 123 food companies over a period of 10 years. Based on the results of the F-test, it can be concluded that the formed model is highly statistically significant ($p < 0.01$). Based on the value of the coefficient of determination, profitability is explained by the influence of the examined determinants with 27.3%. Significant determinants of profitability, expressed by the return on assets, are liquidity, indebtedness, the tangibility ratio, total asset turnover, the GDP, and inflation. Based on the obtained results, liquidity has a statistically significant and negative impact on profitability, which is in line with the results obtained by Vuković and Jaksić (2019) while analyzing companies from the food industry in South-East Europe. The indebtedness ratio also has a negative and statistically significant impact on profitability. Pervan and Mlikota (2013), Sensini (2020) and Dakić and Mijić (2020) came to the same conclusion in their research. The tangibility ratio stands out as a statistically significant determinant of profitability, which has a negative sign, i.e. with an increase in the share of fixed assets the in total assets there is a decrease in profitability. The same result was reached by Nunes et al. (2009), Kebewar (2013), and Pratheepan (2014). Total asset turnover has a statistically significant and positive effect on profitability. This result is consistent with the findings of

Denčić-Mihajlov (2014). Both macroeconomic variables have a statistically significant impact on the profitability of the studied food companies. That the GDP has a positive impact was also the conclusion of Pervan et al. (2019). Inflation has a negative impact on profitability, which confirmed the results of a previous study conducted by Dalci et al. (2019).

4.4. Comparative analysis of agricultural and food companies

Agricultural companies had a median value of the profitability indicator ROA of 2.33%. This indicates a low level of profitability of these companies, since they did not reach the limit of 5% which is considered necessary for companies to operate successfully. Food companies had a median profitability indicator of 4.27%, which is relatively close to the limit of 5%. The higher profitability of food companies is expected, given that the food industry relies on agricultural production, and that food companies sell products of higher stages of processing compared to agricultural companies.

In relation to the studied microeconomic determinants of profitability, it can be noted that in both groups of companies' indebtedness stands out as the determinant with the highest negative regression coefficient, i.e. this variable significantly affects the profitability of both groups of companies. Liquidity emerges as a significant variable only in food companies, while the current asset turnover ratio and the receivables turnover ratio are significant determinants only for the profitability of agricultural companies. Total asset turnover stood out as a significant determinant of profitability of companies from both sectors, with agricultural indicators having a negative impact on profitability, and food companies having a positive impact on profitability. Macroeconomic determinants of profitability have a statistically significant impact on companies from both sectors. The GDP has a significant negative impact on the profitability of both agricultural and food companies, while inflation has a positive impact on the profitability of both groups of companies.

It is necessary to point out the importance of planning agricultural policy in the long run which must be directed towards the creation of a better market (Matkovski, Radovanov, Zekić, 2018). Also, it is necessary to take into account the specifics of small agricultural and food companies, but also changes in the agricultural policy itself, which is increasingly moving towards environmental sustainability. To achieve that, the ecological education of production units is necessary (Zekić et al., 2018), in order for them to operate in accordance with the principles of sustainable development. Precisely because of this, the basic policy implications of this research arise. Namely, this research presents a useful overview of

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microeconomic and macroeconomic factors that affect the profitability of small agricultural and food enterprises. This is extremely important for the entities themselves to know in which domain they can improve their profitability, but also for agricultural policy makers, bearing in mind that these companies have proven to be more stable in times of crisis, such as those present on the international food market.

5. Conclusion

Based on the profitability analysis of small agricultural and food companies from the Republic of Serbia, from 2010 to 2019, on a sample of 135 agricultural and 123 food enterprises, the research results determined that the median value of profitability of agricultural enterprises in the studied period was 2.33%, while the median value of the profitability of food companies in the studied period was 4.27%.

Using the panel regression analysis, the influence of microeconomic and macroeconomic determinants on the profitability of the studied companies was examined, and it was noted that indebtedness has the greatest impact on companies from both sectors. It has a negative impact on profitability, which can be explained by the fact that the level of indebtedness of these companies is high, and that additional borrowing should be avoided in the future. Liquidity does not have a significant impact on the profitability of agricultural companies, but it does significantly affect the profitability of food companies. Financial leverage does not significantly affect the profitability of companies from the agricultural or food industry. The tangibility ratio stood out as a significant determinant in both groups of companies, and has a negative impact on profitability. The reason for the negative impact can be found in the overinvestment of companies in fixed assets or the inefficient use of fixed assets. Total asset turnover has a statistically significant impact on the profitability of companies from both sectors. In the case of agricultural companies this indicator has a negative impact on profitability, while in the case of food companies this indicator has a positive impact on profitability. The fixed asset turnover ratio and the inventory turnover ratio do not have a statistically significant impact on the profitability of companies from both studied sectors. The current asset turnover ratio and the receivables turnover ratio have a positive and statistically significant impact only on the profitability of agricultural companies, while the profitability of food companies is not significantly affected by these variables. The sales rate did not significantly affect either the profitability of agricultural or the profitability

of food companies. Macroeconomic determinants, the GDP, and inflation have been singled out as significant determinants of the profitability of companies from both sectors. The growth rate of the GDP has a negative impact on profitability, and inflation has a positive impact on profitability in both sectors.

The results of the research contribute to the quality understanding of the situation and prospects for further development of small agricultural and food companies in the Republic of Serbia. It is expected that the results obtained will be useful to all stakeholders in the agribusiness, from company managers to agricultural policy makers, all with the aim of improving the business of the studied companies.

Certain limitations of this research should also be taken into account. It should first be pointed out that the subject of this research were small enterprises of the agricultural and food industry, and future studies should include micro, medium, and large enterprises in order to gain a clearer picture of the impact of certain factors on profitability. In addition to the analyzed internal and external factors, there is a large group of factors that were not the subject of research (e.g. ownership, years of existence of the company, the unemployment rate, etc.), which could affect the profitability of the studied companies. For these reasons, future research on this issue will be focused on including other entities in this sector, but also the inclusion of a number of factors that affect business, in order to obtain a more complete picture of business in the field of agricultural and the food industry.

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8. Appendix

Table A1: Descriptive statistics for business indicators of small agricultural companies from the Republic of Serbia, from 2010 to 2019

Indicator	Median	Minimum	Maximum	Standard deviation	Q1	Q3
ROA	2.325	-38.855	135.329	7.986	0.685	5.958
LIQ	0.714	0.000	3,387.125	100.915	0.435	1.101
LEV	1.318	0.000	652.458	31.264	0.439	3.979
DEBT	0.579	0.000	1.056	0.287	0.314	0.812
TANG	0.344	0.000	1.000	0.259	0.163	0.562
TOAT	1.355	0.000	17.078	1.695	0.661	2.642
FATR	4.206	0.000	11,824.750	349.799	1.284	13.105
CATR	2.062	0.000	20.581	2.279	1.112	3.536
ITR	2.122	0.000	564.539	37.528	0.886	5.313
RTR	6.901	0.000	5,266.903	216.577	3.858	12.841
SG	0.038	-1.000	203.380	5.651	-0.157	0.247
GDP	2.069	-1.590	4.495	1.887	0.731	3.339
INF	2.607	1.122	11.137	3.274	1.849	7.330

Source: Authors' calculation

Table A2: Descriptive statistics for business indicators of small agricultural companies from the Republic of Serbia, from 2010 to 2019

Variable	Median	Minimum	Maximum	St. dev	Q1	Q3
ROA	4.275	-14.593	70.796	9.264	1.807	10.029
LIQ	10.854	-60.700	5,567.000	184.787	4.658	22.314
LEV	0.832	0.008	53.134	4.528	0.458	1.612
DEBT	0.997	0.000	483.684	18.825	0.464	2.271
TANG	0.502	0.001	1.000	0.246	0.321	0.699
TOAT	0.384	0.000	0.988	0.219	0.238	0.547
FATR	1.503	0.000	10.844	1.439	0.933	2.372
CATR	4.065	0.000	775.220	37.387	2.245	8.309
ITR	2.716	0.000	43.922	3.739	1.680	4.231
RTR	6.749	0.000	379.010	30.790	3.755	14.799
SG	6.671	0.000	2,471.067	79.839	4.103	14.792
GDP	0.078	-1.000	464.747	13.311	-0.033	0.263
INF	2.069	-1.590	4.495	1.887	0.731	3.339
ROA	2.607	1.122	11.137	3.274	1.849	7.330

Source: Authors' calculation