XXIX International Scientific Conference

Strategic Management

and Decision Support Systems
in Strategic Management

SM2024

Subotica (Serbia), 17-18 May, 2024

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PROFITABILITY DETERMINATS OF AGRICULTURAL SMES FROM REPUBLIC OF SERBIA

Abstract: This research focuses on small and medium-sized agricultural enterprises, serving as the vital contributors to the agricultural sector in the Republic of Serbia. The aim of the study is to analyze the profitability and factors influencing profitability of the observed enterprises based on a sample of 220 companies operating from 2014 to 2021. By applying panel regression analysis, it was concluded that financial leverage, company size, tangibility, and the ratio of total asset turnover have a statistically significant impact on the profitability of observed enterprises.

Keywords: Profitability, agriculture, panel analysis, SME.

1. INTRODUCTION

Understanding and analyzing the profitability indicators of a company are key elements for assessing business success, especially in a sector such as agriculture, which is of vital importance to the economy of the Republic of Serbia (Jakšić, et al. 2015). Profitability is not only an indicator of the current financial status of a company but also a marker of its ability to sustain and develop in the long term. Information about a company's performance, especially its profitability, is useful in supporting managerial decisions regarding potential changes in the economic resources the company will be able to control in the future (Burja, 2011). By analyzing indicators like the Return on Assets (ROA), we can understand not only the financial state of the company but also its ability to respond to market and economic changes.

Agriculture in the Republic of Serbia represents a foundation of economic stability and development. Favorable climatic conditions and quality agricultural land in the Republic of Serbia are important factors for the successful operation of agricultural companies (Andrašić et al., 2018). Despite its significance, the sector faces a number of challenges, including variable market conditions, climate change, and increasingly strict regulations. Therefore, it is essential to carefully analyze how internal factors, as well as external factors such as market trends, economic conditions, and political changes, affect the profitability of small and medium-sized agricultural enterprises.

Given the importance of agriculture for the overall development of the economy of the Republic of Serbia, the subject of this research is small and medium-sized agricultural enterprises that operated in the period from 2014 to 2021. The aim of the research is to assess profitability and identify factors that influence the profitability of small and medium-sized agricultural enterprises in the Republic of Serbia. Through this analysis, we hope to provide valuable insights that can help in creating strategies to support the growth and sustainability of this sector, not only in terms of individual companies but also in the context of the wider contribution of agriculture to the overall economy and food security.

2. THEORETICAL BACKGROUND

Numerous authors, both globally and in our region, have analyzed the determinants of profitability in agricultural enterprises.

Suardi and Noor (2015) analyzed the impact of capital structure on the financial performance of agricultural enterprises in Indonesia. Their research included a sample of 16 agricultural enterprises operating in Indonesia from 2010 to 2014. Using multiple regression, the authors concluded that capital structure indicators significantly affect the profitability of the observed companies when profitability is measured by the return on equity, with both indicators negatively impacting profitability. Jacob and Collins (2016) focused on the profitability determinants of agricultural enterprises in Kenya, analyzing 7 enterprises from 2006 to 2014. Their findings showed that liquidity and company size positively and significantly impact the profitability of Kenyan agricultural enterprises, while the asset structure indicator negatively affects profitability. Shamsuddin et al. (2017) examined the factors influencing the financial performance of agricultural cooperatives in Malaysia from 2010 to 2014, analyzing 128 cooperatives using panel regression analysis. They found that the fixed asset turnover ratio, dividends, and company size had a significant impact on Return on Assets (ROA), while liquidity, fixed asset turnover ratio, and investments impacted Return on Equity (ROE).

Singh et al. (2019) conducted an analysis of the profitability determinants of agricultural cooperatives in the United States from 2009 to 2017, covering 37 cooperatives. The study revealed that only revenue growth had a positive and significant impact on the profitability of agricultural cooperatives, while the uncertainty index, size, and capital intensity had a negative significant impact. Sensini (2020) explored how working capital management affects the profitability of companies in the agricultural-food sector of Italy. Based on a sample of 112 small and medium enterprises from 2010 to 2016, the study analyzed how the working capital cycle, debt ratio, interest coverage, and the ratio of current and total assets impact gross profit margin. The results indicated that working capital management has a negative and significant impact on profitability, with less profitable companies having a longer working capital cycle. The study also found that the debt ratio negatively affects profitability, while interest coverage and the ratio of current and total assets have a positive impact. Xu et al. (2021) analyzed the impact of capital structure on the profitability of agricultural enterprises in China, examining 39 enterprises from 2013 to 2019. Using panel regression analysis, they concluded that financial leverage, the ratio of short-term liabilities to total assets, negatively impacts profitability, with company size and sales rate being the only positive and significant indicators.

Jakšić et al. (2016) analyzed the profitability of agricultural enterprises in Southeast European countries from 2012 to 2014, covering 3022 companies. Using a t-test, they investigated whether there were differences in profitability levels between EU member countries and others, and variance analysis to see if profitability differed among the countries in the sample. The research showed that EU member countries' companies were significantly more profitable and that there were significant differences in profitability among the countries observed. Andrašić et al. (2018) analyzed factors affecting the profitability of medium and large agricultural enterprises in AP Vojvodina from 2006 to 2015, including 420 companies. They concluded that all observed factors significantly impact profitability, with company size and financial leverage negatively affecting it, while other factors positively influence profitability. This research is significant for including insurance and export factors in the analysis. Milašinović and Mitrović (2020) focused on the internal determinants of profitability of agricultural enterprises in the Republic of Serbia, covering 15 companies registered under the group 0111 - growing of cereals (except rice), leguminous crops, and oilseeds from 2016 to 2018. Panel regression analysis revealed that only total asset efficiency and capitalization rate significantly impact profitability, with total asset efficiency positively influencing profitability, while the capitalization rate negatively affects it. Tekić et al. (2022) analyzed the determinants of profitability of small agricultural and food sector enterprises in the Republic of Serbia from 2010 to 2019. Their panel regression models showed that indebtedness, tangibility, total asset turnover ratio, current asset turnover ratio, receivables turnover ratio, GDP, and inflation significantly influence the profitability of agricultural enterprises, while liquidity, indebtedness, tangibility, total asset turnover ratio, GDP, and inflation impact the profitability of food enterprises.

3. METHODOLOGY

3.1. Sample selection

The sample includes small and medium-sized agricultural enterprises that operated in the territory of the Republic of Serbia from 2014 to 2021. After a detailed analysis and removal of companies with missing data, companies with outliers, and companies that did not operate during the period specified for this research, the sample comprised 220 enterprises. The data were obtained from financial reports available on the website of the Business Registers Agency of the Republic of Serbia.

3.2. Variables

As the dependent variable, or the indicator of profitability, the Return on Assets (ROA) was used, while various internal and external indicators were observed as independent variables. For internal determinants of profitability, different financial indicators were used, calculated based on data from the companies' financial reports. As external determinants, GDP and inflation (CPI) were utilized (Table 1).

Table 1: List of variables

Variable	Notation	Measurment	Predicted sign
Return on assets	ROA	Net income/Average total assets	/
Financial leverage	LEV	Total liabilities/Total capital	+/-
Size	SIZE	logTotal assets	+/-
Liquidity	LIQ	Current assets-Inventories/Short-term liabilities	+/-
Tangibility	TANG	Fixed assets/Total assets	+/-
Total asset turnover ratio	TOAT	Sales revenue/Average total assets	+/-
Gross domestic product	GDP	Growth rate of gross domestic product	+/-
Inflation	CPI	CPI growth rate	+/-

Source: Author's calculation

3.2. Method

To evaluate the influence of internal and external determinants on the profitability of small and medium-sized agricultural enterprises, we will employ panel regression analysis. In econometrics and statistics, panel data, also known as longitudinal data or a combination of time series and cross-sectional data, refer to data sets that include repeated observations of a selection of observation units across both time and space dimensions.

Initially, the formulated model's fundamental assumptions for the application of panel data were examined, including tests for multicollinearity, heteroskedasticity, autocorrelation, and the dependence of cross-sectional data, in order to select the final model specification.

To investigate the impact of internal and external determinants on the profitability of small and medium-sized agricultural enterprises, regression models were formed with the following structure:

$$ROA_{it} = \beta_{it} + \beta_{1\,LEV} + \beta_{2\,SIZE} + \beta_{3\,LIQ} + \beta_{4\,TANG} + \beta_{5\,TOAT} + \beta_{6\,GDP} + \beta_{7\,CPI} + u_{it}$$

where i represents each company (i = 1,2,3,...,220), and t represents each year (t = 1,2,3,...,8).

4. RESULTS AND DISCUSSION

In the following table, the results of the descriptive statistical analysis for the variables used in the panel regression model are presented (Table 2).

Table 2: Descriptive statistics for business indicators used in the panel regression model

Variable	Median	Minimum	Maximum	Standard deviation	Coefficient of variation
ROA	2.32	-13.67	250.33	0.50	38.39
LEV	0.61	0.00	136.91	7.04	2.76
SIZE	2.46	0.48	6.99	1.65	0.54
LIQ	1.33	0.00	5117.60	124.14	16.34
TANG	0.41	0.00	140.97	4.87	6.52
TOAT	0.80	0.00	1334.60	58.75	14.49
GDP	2.10	-1.60	7.50	2.78	1.06
CPI	2.00	1.10	4.10	0.92	0.43

Source: Author's calculation

The median value of the ROA indicator, during the observed period, was 2.32%. A median ROA value of 2.32% for the observed agricultural enterprises indicates a very low level of profitability for these companies, as it is generally considered that enterprises are profitable if they achieve an ROA value above 5%. The standard deviation of the ROA indicator is very high, suggesting significant differences between individual enterprises in the sample. The median value of financial leverage is 0.61, indicating a dominant participation of capital in liabilities. The size of the enterprises, measured by the logarithm of total assets, has a median value of 2.46, with a somewhat lower degree of variation, which is expected as the sample only includes small and medium-sized enterprises. The median value of the liquidity indicator is 1.33, which is above the usual norm for this indicator of 1. It can be noted that the liquidity indicator has the highest variability compared to all other observed indicators. The median value of the tangibility is 0.41, meaning that fixed

assets constitute 41% of the total asset value. The median value of the total business asset turnover ratio is 0.80, indicating that the total assets are turned over only once a year through sales revenue. The minimum value of total asset turnover is 0, which is expected in insolvent companies, and the maximum value is 140.97. Gross Domestic Product (GDP) and inflation are usually interpreted on an annual basis but not per individual companies, so each company was assigned the same value of these indicators for each year. The median value of the GDP during the observed period was 2.1%, and the average inflation rate was 2.0%. The lowest GDP rate was recorded in 2014 at -1.6%, and the highest in 2021 at 7.5%. The lowest inflation rate was recorded in 2016 (1.1%), and the highest in 2021 (4.1%).

For the variables featured in the panel regression model, an initial check for multicollinearity among the independent variables was conducted (Table 3).

Table 3: Multicollinearity testing

Variable	VIF	TOL
CPI	1.33	0.75
GDP	1.33	0.75
LEV	1.21	0.83
TANG	1.12	0.89
SIZE	1.09	0.91
LIQ	1.00	0.99
TOAT	1.00	0.99

Source: Author's calculation

Based on the results of the Variance Inflation Factor (VIF) and the Tolerance (TOL, which is 1/VIF) coefficients, it can be observed that for none of the variables is the VIF value greater than 10, nor is the TOL value below 0.1. Therefore, it can be concluded that there is no problem of multicollinearity in the formed model.

In the next step, tests were conducted to check for the presence of heteroskedasticity, autocorrelation, and cross-sectional dependence of data (Table 4).

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

Test	Test statistics	p-value
Breusch-Pagan/Cook-Weisberg test	3,210.12	0.00
Wooldridge test	82.57	0.00
Pesaran's CD test	57.58	0.00

Source: Author's calculation

To test for the presence of heteroskedasticity, the Breusch-Pagan / Cook-Weisberg test for heteroskedasticity was applied. Based on the results of this test, it can be noted that at the 1% significance level ($p<0.01$), the null hypothesis of homoskedasticity is rejected and the alternative hypothesis of the existence of heteroskedasticity is accepted. The presence of autocorrelation was tested using the Wooldridge test, and autocorrelation was confirmed to be present at the 1% significance level ($p<0.01$). The results of the Pesaran CD test indicate that there is a statistically significant dependency in cross-sectional data ($p<0.01$), suggesting the existence of common factors that influence the dependent variable.

In accordance with the results indicating a violation of the initial assumptions of the panel model, it is not feasible to use the classical Hausman test. Instead, a modified version of this test is applied. The results of the Hausman test statistics at 27.088 ($p=0.016$), indicate that at the 5% significance level, the null hypothesis is rejected and the alternative hypothesis is accepted, leading to the selection of the fixed effects model.

Due to the compromised assumptions of the panel model, specifically the identified presence of heteroskedasticity, autocorrelation, and cross-sectional dependence of data, an alternative specification of the fixed effects model was employed (Table 5). This alternative represents a model with panel-corrected standard errors (PCSE - linear regression with panel-corrected standard errors).

Table 5: Estimated model of fixed effects for the profitability of small and medium-sized agricultural companies from Republic of Serbia (2014-2021)

Variable	Coefficient	Standard error	t-statistics	p-value
Constant	-0.0779	0.0415	-1.878	0,0617
LEV	-0.0046	0.0024	-2.902	0.0485
SIZE	0.0285	0.0134	2.135	0.0339
LIQ	-0.0023	0.0001	-1.622	0.1063
TANG	0.0028	0.0001	2.801	0.0431
TOAT	0.0001	0.0001	2.819	0.0053
GDP	0.0030	0.0037	0.0814	0.4238

CPI	0.0022	0.0101	0.2223	0.8243
n	220			
t	8			
N	1760			
R²	0.5780			
F-test	9.9459			
p-value (F)	0.000			

<div align="right">Source: Author's calculation</div>

The panel regression model was formed based on data from 220 companies over an 8-year period, resulting in a total of 1760 observations. From the F-test results, it can be concluded that the formed model is highly statistically significant ($p<0.01$). The coefficient of determination reveals that 57.8% of the variability in the return on assets rate is explained by the influence of the examined factors. The indicator with a statistically significant ($p<0.05$) and negative impact on profitability is financial leverage, suggesting a slight decrease in profitability by 0.005% with a 1-point increase in this indicator. Similar findings, i.e., a negative impact of financial leverage on profitability, were reported in the studies by Andrašić (2018), Sensini (2020), and Xu et al. (2021). The size of the company also showed a statistically significant impact ($p<0.05$) on the profitability of the observed agricultural companies. An increase in company size can be expected to lead to an increase in profitability, a finding consistent with Jacob and Collins (2016), who analyzed agricultural companies in Kenya. Tangibility also had a positive and statistically significant impact on the profitability of the observed companies ($p<0.05$), suggesting that fixed assets in these companies are used effectively to increase profitability. Another indicator determined to significantly ($p<0.05$) influence profitability is the total business assets turnover ratio. The positive impact of this indicator on profitability, as indicated by the regression coefficient, confirms the results obtained by Sensini (2020), Milašinović and Mitrović (2020), and Tekić et al. (2022).

4. CONCLUSION

From the examination of profitability among small and medium-sized agricultural enterprises in the Republic of Serbia, for the period from 2014 to 2021, the research results have determined that the average profitability of the observed companies was 2.32%. Using panel regression analysis, the impact of internal and external determinants on the profitability of these companies was investigated, and it was noted that financial leverage, company size, tangibility, and the total business asset turnover ratio had a statistically significant impact on profitability. Financial leverage had a negative impact on profitability, which can be attributed to the high level of indebtedness of these companies, suggesting that future additional borrowings should be avoided. Company size had a positive and statistically significant impact on profitability; being measured by the logarithm of total assets, it can be concluded that as assets increase, so does the profitability of the company, indicating that medium-sized companies are more profitable. Tangibility also stood out as a significant determinant with a positive impact on profitability, which can be seen as effective utilization of existing fixed assets. The total business asset turnover ratio also had a statistically significant and positive impact on profitability. The research results also revealed that none of the observed external determinants had a statistically significant impact on profitability. These findings could be particularly valuable in the future for managers of agricultural companies, guiding them towards profitability-oriented management, as well as for policymakers in agricultural policy who can glean insights into the strengths and weaknesses of the agricultural sector based on these results.

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