Panel analysis of the impact of sales of agricultural products on profitability of agricultural companies

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Abstract

This paper presents the panel data analysis of the impact of sales of agricultural products on firm profitability. The research is based on a sample of 695 agricultural companies in Serbia during the 2018-2022 and include 3,475 observations. The profitability was measured as return on assets (ROA), while as independent variables were set the following: size, sales growth, current ratio, leverage and public as a proxy variable. The results indicate that sales growth of agricultural products has positive and significant impact on ROA. According to this, increasing sales growth can lead to the higher value of ROA. Furthermore, the results indicate that size and leverage have negative and significant impact on ROA, while the public companies achieve higher value of ROA. The results show the profile of agricultural companies, specific from the perspective of impact of sales of agricultural products on firm performance. The results can be of interest for the various stakeholders such as management and companies owners, potential investors, banks, suppliers and other users of financial statements for the purpose of adequate decision making process.

Keywords: Profitability. Sales of agricultural product. Panel data analysis.

1. Introduction

Agriculture including agriculture, forestry and fishing represents especially important economic activity worldwide. Its share in the global GDP in 2021 accounted around 4%, and employment 873 million or 27% of the total world workforce (FAO, 2023). It has a

particularly prominent role in the developing countries where its participations in their GDP, workforce and exports are more significant. As the agricultural growth deeply influence the growth of these economies, it helps them poverty reduction (Awan, 2015). The research results point out that 1% additional growth in agricultural GDP per capita reduces poverty by average 1.6 times more than 1% of additional growth in industry, and even 3 times more than 1% of additional growth in service sector (Christiaensen & Demery, 2007). In order to reduce the level of poverty, it is important to emphasize that there is a negative relationship between country's agricultural share of GDP and its unemployment rate (Bein & Ciftcioglu, 2017). The contribution of agriculture in national economies decline with higher levels of their development. In fact, there is "statistically significant negative relationship between agriculture's shares of GDP, employment and exports on the one hand, and income per capita on the other" (Anderson, 1987, p. 196).

Agriculture as primary sector of the economy is still of an immense importance in the Republic of Serbia, although it was neglected during the years of country`s transition. The Republic of Serbia reached the GDP level of 63.56 billion US dollars or GDP per capita 9,537.7 US dollars in 2022 (The World Bank, 2023). In the same year, agriculture participated in the GDP of this national economy with 6.75%, industry with 23.11%, and services with 52.41% (Statista, 2023a). Agricultural GVA recorded 478,758 million RSD in 2022 and contributed in the total country`s GVA with 8.2% (Ministry of Agriculture, Forestry and Water Management, 2023). Since membership in the European Union is Serbia's strategic goal, country`s economic growth must be fasten in order to become closer to the levels achieved in that economic integration. In the European Union the share of the agriculture in its total GDP in 2022 was 1.4% or 215.5 billion EUR (Eurostat, 2023).

Certainly, agriculture has a great impact to Serbian employment because of the fact that it engage a large part of the population as a workforce, especially in the rural areas. During 2022, there were 430,600 employees in this sector, 258,500 male and 172,100 female between the ages of 15 to 89. The labour age structure must be improved because only 14.8% are people from 15-34, while the rest of them are older than 35 (Statistical Office of the Republic of Serbia, 2023a). The contribution of the agricultural sector in the total employment of the country in 2021 was 13.92%, while the contribution of the industry was 28.93% and the service sector 57.14% (Statista, 2023b).

In the Serbian total agricultural output (without forestry and fishing), which amounted 841,685.3 million RSD in 2022, agricultural goods output dominated. They recorded the level of 821,507.6 million RSD in comparison to agricultural services that recorded the level of

20,177.7 million RSD. The share of crop production accounted 590,920.8, and the share of animal production 230,586.8 million RSD (Statistical Office of the Republic of Serbia, 2023b).

For country`s agricultural production, orientation towards export markets is key. During 2022, the value of exports of agricultural and food products amounted to 4.8 billion EUR, representing a share of 17.2% in the total export of goods from the Republic of Serbia (the lowest share so far). At the same time, the realized value of imports of agricultural and food products amounted to 3.3 billion EUR, representing a share of 8.3% in the total import of goods from abroad, which is at the level of the multi-year average (Ministry of Agriculture, Forestry and Water Management, 2023). It must be emphasized that the Republic of Serbia suffers a continuously growing long-term total trade deficit, and that the agricultural and food sector is the only sector of the economy that for many years records a constant surplus in the country`s foreign trade exchange. However, the Serbian structure of exports of agricultural and food products is still unfavourable, considering that it is dominated by primary agricultural products, which share is in average around 70%. The share of processed agricultural products in the export structure is about 30%, while the share of fish and fishery products is very small (multi-year average less than 0.5%).

The sales of agricultural products is the main business activities which provide income for agricultural producers. Therefore, stable sales rate and sales growth should ensure the good performance of agricultural companies. The aim of this paper is to examine the impact of sales growth of agricultural products and other factors on profitability as main determinant of business performance.

2. Literature Review

When analysing 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. 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 (Tekić et al., 2022). There are numerous scientific papers which investigate the impact of internal and external factors on companies' performance. Special attention is paid to the study of the relationship between product sales trends and profitability.

Determinants of profitability of food industry in India was analysed from the perspective of the companies' size (Azhagaiah, Deepa, 2012). The research sample consists of

1,747 food product manufacturing firms in India. Authors used the regression analysis in order to identify which factors have significant impact on profitability. The results indicate that sales have positive and significant impact on firm profitability among medium-sized companies.

Odalo et al. (2016) investigated the relationship between sales growth and financial performance in agricultural firms. The research was based on a sample of 76 agricultural companies at Nairobi Securities Exchange in Kenya during the 2003-2013. The financial performance was measured as return on assets, return on equity and earnings per share. The results of pooled OLS regression analysis indicate that the sales growth has positive and significant impact on financial performances measured by return on assets and return on equity.

Ghozali et al. (2018) investigated the role of sales growth to increase firm performance in Indonesia. The research was based on a sample of 194 manufacturing companies listed on the Indonesia Stock Exchange in 2010-2016. They conclude that investment, firm size and sales growth have positive impact on firm performance. Furthermore, the authors emphasize that the increased sales volume is the most appropriate indicator to describe the company's win against competitors.

Callen and Fernandez (2019) provide the results of panel data analysis of profitability determinants of Spanish manufacturing companies during the pre-crisis (2000-2007) and the crisis (2008-2014) period. Profitability was measured as return on assets. The research results indicate that sales growth, employees` growth and liquidity have positive effect on profitability.

Huang and Chen (2021) analysed possibilities of incorporating the big data and machine learning technology for marketing of agricultural products in order to achieve sales growth. The authors indicated that developing internet technologies for marketing can increase the sales of high-quality agricultural product, which leads to achievement of better business performance. The same conclusion is made by Shija (2019). One of the conclusions of the investigation of the effects of e-marketing on sales of agricultural products in rural areas was that the benefits that can be achieved from e-marketing are very huge sales growth and cost reduction.

Kim et al. (2021) investigated the determinants of financial performance, measured by return on equity and return on sales, of listed firms manufacturing food products in Vietnam. The research is based on a sample of 30 listed food processing companies in Vietnam during

the period 2014 – 2019. Based on the results of regression analysis, authors concluded that total assets turnover ratio and sales growth significantly influence profitability.

Impact of indicators on a prediction of business performance was measured by Kuster (2022). The research results indicate that sales growth is one of the main determinants in the prediction of business failure. Companies with the negative sales growth have more chance of business failure.

Impact of sales growth and firm size on firm performance measured by return on assets was investigated in Indonesia. The research was based on a sample of the consumer goods companies which was listed on the Indonesia Stock Exchange market from 2015 to 2020. The results of regression analysis indicated that sales growth has not the significant impact on firm performance (Goh et al, 2022).

Investigation the effect of sales growth and leverage on company profitability was conducted on infrastructure sector companies listed on the Indonesia Stock Exchange for 2020-2022. The authors used a panel data regression analysis. The results indicate that sales growth and leverage simultaneously had a positive effect on company profitability, measured as return on assets (Marella et al., 2023).

The effect of sales growth, inventory turnover rate and growth opportunities on profitability was investigated by Asadifard et al. (2023). The authors used a sample of 171 companies listed on Tehran Stock Exchange during the period 2014-2022. Based on the results of multiple regression analysis they find that sales growth has a positive and significant relationship with the profitability of company measured as return on equity. On the other side, inventory turnover ratio has negative and significant impact on profitability of company.

Mo and Yang investigated the impact of independent factors on firm performance in alcohol industry in China. The research used the panel data set and a sample of 30 Chines publicly traded alcoholic drinks firms for the period 2016-2021. Among others, the research results indicate that sales growth has the positive and significant impact on return on equaty as a profitability measurement.

Table 1 presents the summarizing research of the direct impact of sales on firm performance. Most research papers use the profitability as a proxy of firm performance. Profitability is measured as ROA, less often as ROE. Besides that, some authors use Tobin Q and business failure as firm performance, but this is not the often case. The largest number of research papers are based on the use of regression models, and the results indicate that sales have positive and significant impact on the profitability as a firm performance.

Table 1: Summarizing research papers of the impact of sales on company performance

Firm performance	Impact of sales	Methods	Authors
Profitability – ROA	Significant and positive	Regression analysis	Azhagaiah, Deepa, 2012 Odalo et al., 2016 Callen and Fernandez, 2019 Kim et al., 2021 Marella et al., 2023
Profitability – ROE	Significant and positive	Regression analysis	Odalo et al. 2016 Kim et al. 2021 Mo, Yang, 2023
Tobin Q	Significant and positive	Regression analysis	Ghozali et al. 2016
Business failure	Significant and negative	Factor analysis	Kuster 2022
Profitability – ROA	Non-significant	Regression analysis	Goh et al. 2022

Source: Authors` illustration

3. Data and Methodology

This paper presents the panel data analysis of the impact of sales of agricultural products on firm profitability. The profitability was measured as return on assets (ROA), while as independent variables were set the following: size, sales growth, current ratio, leverage and public as a proxy variable. The analysis includes a sample which consist of 3,475 observations. The research is based on a sample of 695 agricultural companies in Serbia that were monitored from 2018 to 2022 (5 years period). The data were collected from the register of companies of the Serbian Business Registers Agency (Serbian Business Registers Agency, 2023). Data were processed in Gretl software.

In accordance with the subject and the aim of the research, the following hypothesis was set up:

H_1: Factors, such as sale growth, size of company, leverage ratio, current ratio (liquidity ratio) and public listing on the stock exchange have a significant impact on return on assets (ROA).

In empirical analysis in order to test the hypothesis, panel data are also used, which refer to multidimensional data that generally include measurements over a certain period. Panel data consists of a spatial and a temporal component since they show the same cross-sectional unit observed over time. The reason for using the panel data analysis is the numerous advantages that panel data offers us, which according to Hsiao (2003) are the following:

- better control of individual heterogeneity,

- the greater amount of information, more variability, less collinearity among variables with greater efficiency and more degrees of freedom,
- better exploration of adaptation dynamics,
- better way to identify and measure effects that cannot be identified using time series or comparative data.

We distinguish between balanced and unbalanced panel data. Balanced panel data implies that each comparative observation unit has the same number of time series observations, that is, the time series are of the same length. Due to the absence of problems due to lack of data, a balanced panel model was applied in the work.

Panel data models provide information about the behaviour of individual subjects through the very characteristics of the subject, but also through time. Panel data and models related to they contain comparative data, characteristics, and time intervals within which they are the same observe.

If we observe the dependent variable, which is explained using the independent variables as well as random variation that represents the stochastic part of the model, a general regression model describing panel data can be represented by the following equation:

$$Y_{it} = \beta_{1it} \cdot xX_{1it} + \beta_{2it} \cdot X_{2it} + \cdots + \beta_{Kit} \cdot X_{Kit} + u_{it} = \beta_{1it} + \sum_{k=2}^{K} \beta_{kit} \cdot X_{kit} + u_{it};$$

$$i = 1,2,..,N; \qquad 1)$$

$$t = 1,2,\dots,T;$$

$$k = 1,2,\dots K;$$

The parameters that figure in the shown equation are the following:

- Y_{it} - represents the value of the dependent variable for the *i*th unit of observation in period t,
- X_{kit} -represents the value of the kth independent variable for that unit observations in the period t,
- X_{1it} – 1 for each *i* and *t*.
- β_{kit} - represents the value of unknown regression parameters that are variable by the *ith* observation unit and period *t*

- u_{it} - represents the random error with the assumption that its expectation is equal zero $(E(u_{it}) = 0)$, i.e. that its arithmetic mean is equal to zero, and that its variance constant $D(u_{it}) = \sigma^2$, for each *i* and *t*.

General regression model panel data represents the most general content of linear models. There are a large number of different panel models, which in the broadest sense can be classified into the following three: Ordinary Least Squares model (Pool OLS), Fixed Effects model and Random (stochastic) Effects Model (Random Effects Model). The choice of model depends on the degree of variability of the regression parameters.

Return on assets (ROA) as indicator of company's ability to generate earnings from its assets is dependent variable in panel regression model. The explanatory variables are sale growth, size of company, current ratio, leverage ratio and public which indicates whether the company is listed on the stock exchange or not. List of variables used in panel model with a detailed explanation and expected impact on dependent variable is given in *Table 2*.

Table 2: List of variables used in panel analysis

Variables	Type of variables	Indicator	Explanation	Expected Impact
Return on assets (ROA)	Dependent	Indicates company's ability to generate earnings from its assets.	ROA = Net Income / Total Assets	-
Sales growth	Explanatory	Shows increase (decrease) in sales between two time periods.	Sales Growth = (Current Period Sales – Previous Period Sales) / Previous Period Sales	Positive
Size	Explanatory	Indicates the size of company	Size = Natural log of Total Assets	Positive or negative
Current ratio	Explanatory	Indicates company's ability to pay short-term obligations at time	Current Ratio = Current Assets / Current Liabilities	Positive
Leverage ratio	Explanatory	Indicates the structure of source of funding	Leverage ratio= Total debts/ Total Assets	Negative
Public	Explanatory	Indicates whether the company is listed on the stock exchange or not.	"1" means that company is listed on the stock exchange. "0" means that company isn't listed on the stock exchange.	Positive

Source: Authors' illustration (based on Chandrapala and Knapkova, 2013; Nuševa, Mijić, Jakšić, 2017; Walsh, 2003; Hasanaj, 2019.)

4. Empirical Results

4.1 Descriptive statistics

Descriptive statistics of the variables used in the panel regression model are given in *Table 3*, and a graphical representation of the movement of the mean value of the dependent variable (ROA) is given in *Figure 1*. The results indicate that agricultural companies in Serbia have an average positive profitability (0.0232) during the observed period. Furthermore, the sales of agricultural products have also positive trend. An average sales growth rate is 17%. Agricultural companies do not have problem to pay short-term liabilities based on the level of current ratio which is higher than 2. Based on the leverage ratio it can be concluded that agricultural companies have the higher level of liabilities, than owner capital, in the structure of funding. Higher level of liabilities can be justified if it is used for the realization of business activities, and not to pay existing liabilities.

Table 3: Descriptive statistics

Variable	Mean	Median	S.D.	Min	Max	Observations
ROA	0.0232	0.0188	0.107	-0.980	0.854	695
Size	18.0	17.9	2.13	8.52	23.9	695
Sales growth	1.17	1.03	1.00	0,00	27.1	695
Current ratio	2.67	1.32	4.60	0,00600	64.8	695
Leverage	0.599	0.573	0.453	0.000961	7.26	695
Public	0.0388	0.00	0.193	0.00	1.00	695

Source: Author's calculation.

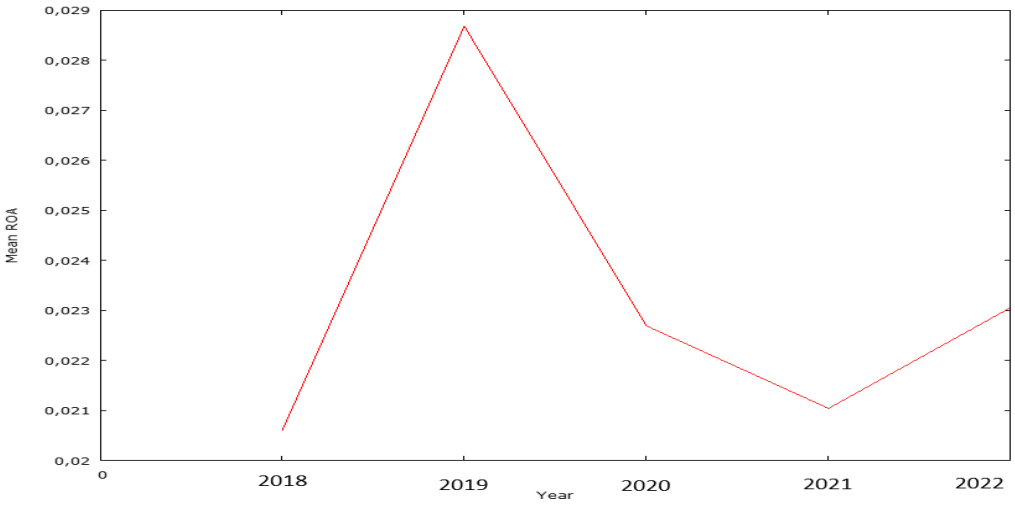

Figure 1: Mean ROA trends in the period 2018-2022 in selected companies in Serbia
Source: Authors` illustration

As we can see in Figure 1, on the x-axis, the years of the observed period are marked. The lowest average value of ROA was in 2018, and the highest in 2019. In the period from 2019 to 2021 (the pandemic caused by the Covid-19 virus), the average value of ROA was decreasing, so that in 2022, an upward trend would begin.

4.2 Panel regression analysis

Before analysing a panel model, it is necessary to carry out certain tests, that is, to check whether any problems may appear in the set of data used to create a panel model, which essentially belongs to linear regression models. Here, above all, we mean multicollinearity, heteroskedasticity and autocorrelation.

There are two ways to identify multicollinearity. Based on the correlation matrix it is possible note weak, medium or strong association between repressors. The multicollinearity problem is tested by the correlation of independent variables. The presence of multicollinearity may be the cause of the high correlation between individual variables. If the correlation between variables is over 0.80, we can say that the problem of multicollinearity exists. Table 4 clearly presents that all correlations are well below 0.80, so we can make conclusion that there is no problem with multicollinearity.

Table 4: Pearson correlation coefficient

	ROA	Size	Sales growth	Current ratio	Leverage	Public
ROA	1.0000					
Size	0.0348	1.0000				
Sales growth	0.0914	-0.0141	1.0000			
Current ratio	0.0425	0.0268	-0.0309	1.0000		
Leverage	-0.2118	-0.2308	0.0461	-0.3653	1.0000	
Public	0.0915	0.0785	0.0040	-0.0070	-0.0355	1.000

Source: Authors` calculation

On the other hand, we can determine the association of two or more independent variables through VIF test (Variance Inflation Factor test). The VIF test shows whether one independent variable has a strongly linear relationship with other independent variables. If the VIF value is greater than 10 (Marquardt, 1970), there is a strong presence of multicollinearity (see *Table 5*).

Table 5: Collinearity Statistics

Variable	Variance impact factors of variables

	(VIF)
Size	1.066
Sales Growth	1.002
Current ratio	1.059
Leverage	1.225
Public	1.007

Source: Authors` calculation

As we can see in Table 5 VIF values are not even close to the threshold value of 10, so we can conclude, again, that there is no problem with multicollinearity.

In regression models, heteroskedasticity is described as a case in which the error variance (random deviation) of the model changes concerning the observation.

An important assumption of the classic linear regression model is that random errors that appear in the regression function are homoscedastic, that is, they all have the same variances. If the random error is considered homoscedastic, when it is heteroskedasticity, the estimated coefficients obtained by regression will still be consistent, but will not be effective. Also, the standard error of these estimated values will be biased and non-objective (Baltagi, 2005).

The most commonly used tests for testing heteroskedasticity are White's test and Breush-Pagan test.

The White's test is a special case of the Breusch-Pagan test. The Null hypothesis in this test states that all error variances are equal, while the alternative hypothesis states that they are error variances different:

$$H_0: var(\varepsilon_i) = \sigma^2$$

$$H_1: var(\varepsilon_i) \neq \sigma^2$$

The White's test for heteroskedasticity in panel data was conducted (null hypothesis: heteroskedasticity not present). Because p-value = 0.069593 is higher than 5% (0.05), the null hypothesis is accepted and we can conclude that there is no problem of heteroskedasticity.

As a potential problem, the term autocorrelation is related to time series, and therefore, for panel analysis. The presence of autocorrelation means that the random error related to one observation is dependent on the random error related to the second observation. In other words, the presence of autocorrelation means the presence of correlation between random errors between periods.

Wooldridge test for autocorrelation in panel data is used to detect first-order autocorrelation in the errors of a panel data model (null hypothesis: No first-order

autocorrelation (rho = 0)). We accepted the null hypothesis because p-value = 0.0624527 is higher than 5% (0.05), and we made conclusion that there is no problem of autocorrelation.

Table 6 shows all three models based on processed data from the sample.

Table 6: Panel models

Explanatory variables	Coefficient		
	Model 1	**Model 2**	**Model 3**
Const.	0.0648866	0.279175	0.0892166
	(<0.0001)***	(<0.0001)***	(<0.0001)***
Size	−0.00115357	−0.0128933	−0.00247229
	(0.1739)	(<0.0001)***	(0.0063)***
Sales growth	0.0106730	0.00813802	0.0100570
	(<0.0001)***	(<0.0001)***	(<0.0001)***
Current ratio	−0.000886743	−0.000498719	−0.000835211
	(0.0308)**	(0.2556)	(0.0402)**
Leverage	−0.0548031	−0.0562145	−0.0548289
	(<0.0001)***	(<0.0001)***	(<0.0001)***
Public	0.0466273	0.0361321	0.0461303
	(<0.0001)***	(0.0002)***	(<0.0001)***

Source: Authors` calculation
Note: - Model 1: Pooled OLS; Model 2: Fix-effects model; Model 3: Random-effects; (GLS);
- *, **, *** indicate statistical significance at the 90% and 95% and 99% level of confidence.

A question that is often asked in panel regression analysis is which model is better to use - a fixed or random effect model. Based on panel diagnostic the answer to this question is presented in Table 7.

Table 7: Panel model diagnostic

Diagnostics	Null hypothesis	p value	Decision
Joint significance of differing group means:	The pooled OLS model is adequate	F(39, 113) = 3.2945 with p-value 0,000	A p-value less than 5% (0.05) counts against the null hypothesis that the pooled OLS model is adequate, in favour of the fixed effects alternative.
Breusch-Pagan test statistic	The pooled OLS model is adequate	LM = 13.1729 with p-value = prob(chi-square(1) > 13.1729) = 0.000284031	A p-value less than 5% (0.05) counts against the null hypothesis that the pooled OLS model is adequate, in favour of the random effects alternative.
Hausman test statistic	The random effects model is adequate	H = 27.4303 with p-value = prob(chi-	A p-value less than 5% (0.05) counts against the null hypothesis

	square(7) > 27.4303) = 0.000278768	that the random effects model is adequate, in favour of the fixed effects alternative.

Source: Authors` calculation

As we can see in Table 7, answer on our question is that the most appropriate model according to conducted panel diagnostic is the fixed model. Table 8 shows the selected fixed effects model.

Table 8: Fixed-effects model (Dependent variable: ROA)

Variable	Coefficient	Std. Error	t-ratio	p-value	
const.	0.279175	0.0262122	10.65	<0.0001	***
Size	−0.0128933	0.00140933	−9.149	<0.0001	***
Sales growth	0.00813802	0.00185031	4.398	<0.0001	***
Current ratio	−0.000498719	0.000438624	−1.137	0.2556	
Leverage	−0.0562145	0.00454673	−12.36	<0.0001	***
Public	0.0361321	0.00973233	3.713	0.0002	***

Mean dependent var	0.023214	S.D. dependent var	0.106739
Sum squared resid	26.66056	S.E. of regression	0.098017
LSDV R-squared	0.326408	Within R-squared	0.080619
LSDV F(699, 2775)	1.923759	P-value(F)	0.000
Log-likelihood	3531.099	Akaike criterion	−5662.198
Schwarz criterion	−1354.853	Hannan-Quinn	−4124.398
rho	−0.274964	Durbin-Watson	2.007666

Source: Authors` calculation

Note: - *, **, *** indicate statistical significance at the 90% and 95% and 99% level of confidence.

As we can see in *Table 8*, there are four of five independent variables included in panel analysis that show statistically significance impact on Return on asset as dependent variable, at the level of significance of 1%: a) *size* (−0.0128933) shows negative impact; b) *sale growth* (0.00813802) shows positive impact; c) *leverage ratio* (−0.0562145) shows negative impact; d) *public*/ indicator whether the company is listed on the stock exchange or not (0.0361321) shows positive impact. Using a simple F test the justification for using the fixed effect model was tested. As we can see in Table 8 we reject the null hypothesis (p- value (F) = 0.000), which means that the use of this model is justified. According to the model, not all variables (current ratio) included in the model showed a statistically significant effect on ROA as a dependent variable, so we can say that the alternative hypothesis was partially accepted. Only variable *current ratio* didn't show statistically significance impact on dependent variable.

5. Conclusions

Considering the levels of its economic indicators, agricultural sector plays a prominent role in the Republic of Serbia. This middle-income economy has a great potential due to its natural resources. According to Đurić and Prodanović "with land melioration, it is believed that only AP Vojvodina is such a fertile plain that it could feed half of Europe" (Ljubojević et al., 2022, p. 898). However, Serbian agricultural sector potentials are not fully exploited, so it is non-competitive. One of the main causes of its uncompetitiveness is the inadequate agricultural policy which results in low levels of productivity (Birovljev et al., 2017).

The country must implement innovations and advanced technology to improve the competitive position of its agricultural sector on the global market. Export orientation would improve efficiency or productivity gains known as "learning by exporting" (Erbahar, 2020, p. 314). Although it should strive to enter new markets with high-value-added agricultural and food products, it primarily focus should be on markets with which it has free trade agreements that insure customs-free export, such as the European Union and CEFTA (a regional market of Southest European countries). These markets are of a particular importance, not only because they are the main trade partners for Serbian agricultural and food products, but also because the country achieves a constant surplus. Free trade agreements also generate new exporting companies, products and markets, as well as sales growth of existing companies` products on gained foreign markets (Turkcan et al., 2022).

The Serbian government should take more initiatives to promote export and financial assistance programmes, sustainable supply chains, environmental protection, livestock production, etc. It must improve cooperation and coordination with the private sector, and especially to help agricultural companies because of their limited resources. Among the biggest challenges faced by agricultural companies` management are implementation of contemporary strategic marketing and management skills and techniques, creative power values and innovative vision, in order to make decisive decisions regarding detecting production costs and support prices of agricultural products (Saglam et al., 2022). Furthermore, efficient investment in R&D positively contribute to the enhancement of various financial performance (Rađenović et al., 2023).

The research results show that sales growth of agricultural products has positive and significant impact on ROA. According to this, increasing sales growth can lead to the higher value of profitability as one of the main performance indicators of stability and possible future development. Beside this, findings indicate that size and leverage ratio have significant negative impact on ROA. According to this it can be conclude that larger companies have

lower level of profitability and that companies with higher level of obligation have lower level of ROA. Larger companies achieve net income at higher absolute amount and have higher amount of total assets, and therefore the ROA as relative ratio is at lower level. Furthermore, the results indicate that public agricultural companies achieve better profitability ratio.

The limitation of this study can be explained by the fact that forestry and fishing are not taken into consideration because their values are not significant in the overall sales of agricultural products in Serbia. Future studies should involve other countries form the region or Europe in order to investigate the similarities and difference in agricultural policy in analysis of impact of sales growth on profitability. The research results show the characteristics of agricultural companies, specific from the perspective of impact of sales of agricultural products on firm performance. The results can be of interest for the numerous internal and external users such as management and companies owners, potential investors, banks, suppliers and other users of financial statements for the purpose of adequate decision making process.

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