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Teodora Tica Ilić
Faculty of Economics in Subotica, University of Novi Sad, Subotica, Republic of Serbia

teodora.tica.ilic@ef.uns.ac.rs

Nikola Rakić
Faculty of Economics in Subotica, University of Novi Sad, Subotica, Republic of Serbia

nikola.rakic@ef.uns.ac.rs

Bojana Vuković
Faculty of Economics in Subotica, University of Novi Sad, Subotica, Republic of Serbia

bojana.vukovic@ef.uns.ac.rs

Dejan Jakšić
Faculty of Economics in Subotica, University of Novi Sad, Subotica, Republic of Serbia

dejan.jaksic@ef.uns.ac.rs

Nedeljko Tica
Faculty of Agriculture, University of Novi Sad, Novi Sad, Republic of Serbia

nedeljko.tica@polj.edu.rs

Participation (direct/virtual): direct
JEL: C23, Q12

THE ECONOMICS OF SOIL: DOES HIGHER PRODUCTIVITY GUARANTEE GREATER FARM PROFITABILITY?

Abstract: Agriculture plays a crucial role in Serbia's economy, with small and medium-sized farms forming the backbone of rural livelihoods. This study examines the nexus between productivity and farm profitability in Serbia. The sample consists of, on average, around 500 crop farms per year that have been actively operating over a period between 2018 and 2022, resulting in a total of 2,696 observations. Using financial data from the Farm Accountancy Data Network (FADN) and employing panel data analysis, this study will examine the impact of ten key variables on farm profitability, measured by Return on Assets (ROA), with a particular focus on three core determinants: land productivity, labor productivity, and total factor productivity (TFP). Based on previous research, we hypothesize that total, land and labor productivity have a positive and statistically significant effect on the farm profitability in the Republic of Serbia. The results indicate that land productivity has a positive and statistically significant effect on profitability, as higher land efficiency leads to increased revenue and lower per-unit production costs. Contributing factors include modern farming techniques, government support, and economies of scale. However, TFP does not exhibit a significant impact on profitability, likely due to rising input costs and the fragmented nature of Serbian farms, which limits the benefits of efficiency gains. Similarly, labor productivity does not significantly affect profitability, as small farms rely predominantly on low-cost family labor with limited mechanization. The findings emphasize the importance of improving land productivity as a key driver of farm profitability, suggesting that government policies should focus on expanding access to modern agricultural technologies, financial resources, and sustainable farming practices. Additionally, effective financial management strategies, such as optimizing external capital use and subsidies, could further enhance profitability. Despite these insights, the study acknowledges limitations, including potential data inaccuracies, the exclusion of other external profitability factors, and the relatively short timeframe analyzed. These findings hold significant implications for These findings are important for policymakers, agricultural experts, and farmers because they highlight that improving land productivity can boost farm income. Our study highlights the need for adaptive strategies and robust risk management frameworks to navigate through such turbulent times. Policymakers and industry stakeholders must work together to bolster the resilience and sustainability of the food sector in the face of ongoing and future uncertainties.

Keywords: FADN, productivity, profitability, farms, Serbia

1. INTRODUCTION

Agricultural production represents one of the most important segments of the economy of the Republic of Serbia, which is confirmed by the fact that agriculture, forestry, hunting, and fishing (economic sector A) contributed 6.3% to the GVA (Gross Value Added) of the Republic of Serbia in 2023 (Ministry of Agriculture, Forestry and Water Management, 2024). In addition to its share in GVA, it is important to highlight the share of this sector in total employment, which amounted to 13.1% or 373,200 employees in 2023. The agri-food sector significantly contributes to the overall foreign trade of the Republic of Serbia and represents the only sector that achieves a positive foreign trade balance. The share of the agri-food sector in the total trade of the Republic of Serbia in 2023 was 12.2%, while the sector's share in total exports was 16.2% (Ministry of Agriculture, Forestry and Water Management, 2024). In addition to its direct impact, agriculture also has a significant indirect impact on the level of economic development through the development of other economic branches. Agricultural products are often used as raw materials in manufacturing and processing industries (Tomić & Tomić, 2011). In 2023, the Statistical Office of the Republic of Serbia (2024) conducted the agricultural census, which revealed the following facts in its preliminary results: according to the 2023 census, the total number of agricultural holdings was 506,323, of which 99.6% were family agricultural holdings, 1,623 were legal entities, and 419 referred to entrepreneurs. The average size of an agricultural holding was 11.8 ha, with a significant regional difference between Northern Serbia, where the average size was 19.1 ha, and Southern Serbia, where it was 8.3 ha. In terms of average utilized land, farms specialized in crop production stand out, using on average 17.9 ha, as land is their main production resource. The largest percentage of used available land is related to arable land and gardens, accounting for 77.32% or 2,518,369 ha, of which 67% is used for grain production, 19% for industrial crops, 9% for forage crops, and 4% for other uses (Ministry of Agriculture, Forestry and Water Management, 2024). The dominant entities in the Republic of Serbia, as well as in all of Europe, are small agricultural holdings, which represent the foundation for agricultural development. The economic sustainability of these farms can be assessed through the analysis of their productivity and profitability (Miljatović & Vukoje, 2022). Due to the size of agriculture's contribution to Serbia's GDP and the share of crop production in total agricultural production, this paper will focus on the analysis of productivity as determinants of profitability in agricultural holdings engaged in crop production. The sustainability, growth, and development of agricultural holdings, which form the backbone of Serbian agriculture, are only possible if these holdings operate profitably. Long-term operation is the main goal of every enterprise. In order to achieve this goal, enterprises must successfully carry out their business activities, and business success is most commonly measured by profitability. In addition to measuring profitability, enterprise management must identify the factors that significantly affect profitability (Dakić & Mijić, 2020). Various indicators can be used to assess profitability or the earning capacity of a company, with the most commonly used being return on assets (ROA) and net profit margin (Jakšić, 2019). Global food security largely depends on increasing agricultural productivity. Reducing the amount of land, labor, and other necessary resources while maintaining or increasing the same output level represents productivity growth. Higher agricultural productivity makes food cheaper and more accessible to a larger portion of the population, directly reducing poverty (Fuglie, 2018). Indeed, the improvement of agricultural productivity was the world's main defense against the Malthusian crisis—a theory that predicted that food demand, due to continuous population growth, would face the problem of limited natural resources, resulting in widespread famine (Fuglie et al., 2012).

1. LITERATURE REVIEW

There is a significant number of papers in which authors investigated the impact of various factors on profitability, and indirectly on the sustainability of agricultural holdings and enterprises. ROA (return on assets) and ROE (return on equity) as profitability indicators can, in a certain way, summarize the overall performance in all areas of an enterprise; if the production offer is poor or efficiency is low, it will be reflected in profitability (Apalia, 2017). Besides being an important indicator of profitability for internal stakeholders, ROA also has a statistically significant and positive impact on the market value of the company (Asiri, 2015). A key question for all stakeholders, apart from the level of profitability, are the factors leading to that level. Identifying the profitability factors and undertaking actions that will increase the impact of positive and reduce the influence of negative factors is what differentiates successful from unsuccessful business entities. Tekić et al. (2023) analyzed the determinants of profitability on a sample of 167 micro-agricultural enterprises operating in the period from 2010 to 2019. Using the panel regression analysis method, the influence of microeconomic (liquidity, financial leverage, indebtedness, asset structure, total asset turnover ratio, fixed asset turnover ratio, current asset turnover ratio, inventory turnover ratio, accounts receivable turnover ratio, sales growth rate) and macroeconomic determinants (GDP growth rate and inflation) on the return on assets was examined. The authors found that total asset turnover, current asset turnover, and GDP growth rate had a positive and statistically significant impact on profitability, while indebtedness, asset structure, and fixed asset turnover had a negative and statistically significant impact. Liu, Xu, and Shang (2020) explored the impact of internal and external factors on the profitability of 39 agricultural companies listed on the Chinese Stock Exchange during the period from 2013 to 2018. Profitability was measured using indicators: return on sales (ROS), return on assets (ROA), and return on equity (ROE), and independent variables included two groups of factors: internal (company size, current ratio, debt ratio, long-term liabilities ratio, sales growth rate, capital intensity, R&D intensity, export intensity, and ownership) and external factors

(GDP growth rate and CPI growth rate). The authors concluded that company size, long-term liabilities ratio, and sales growth rate positively impacted financial performance, while debt ratio, capital, and export intensity had a negative impact. External factors showed no statistically significant impact on observed performance. Milošev (2023) investigated the influence of firm-level factors (lagged profitability, indebtedness, labor costs, size, liquidity, sales growth) and industry-level factors (market share and capital intensity) on profitability (ROA) of 115 agricultural enterprises operating in the Republic of Serbia from 2017 to 2021. The results indicate that previous profitability positively affects current profitability, while indebtedness, labor costs, and industry capital intensity negatively influence ROA. The study also highlights that internal determinants play a key role in agricultural enterprise performance. Novaković et al. (2024) analyzed the profitability factors in 220 small and medium agricultural enterprises in the Republic of Serbia for the period from 2014 to 2021. Using panel regression analysis, they concluded that financial leverage, company size, fixed assets, and total asset turnover have a statistically significant effect on profitability measured by ROA.

Although there are numerous studies analyzing a wide range of determinants affecting the profitability of agro-sector business entities, there is a noticeable lack of research focusing on the impact of productivity on profitability in agricultural holdings and enterprises. Productivity represents the capacity of production factors to generate output and is expressed as a ratio between output and input. It can be presented as partial productivity (output to one input) or as total factor productivity (Latruffe et al., 2016). Total factor productivity allows a broader productivity analysis as it considers all inputs and technological progress, overcoming the limitations of partial productivity which doesn't account for factor substitution, such as labor being replaced by capital or changes in output structure (Latruffe, 2010). This paper aims to analyze the impact of productivity on farm profitability, specifically the impact of total factor productivity as well as land and labor productivity—being the primary inputs in agricultural production. It is necessary to assess the relationship between productivity and profitability since both are essential prerequisites for the survival, growth, and development of farms and agricultural enterprises, and the well-being of entire nations given that agriculture is the main food source for a growing population. Productivity focuses on the efficiency with which people combine resources to produce goods and services and is thus considered one of the key drivers of wealth creation and employment (Kalai & Helali, 2020). Total factor productivity uses a systemic approach to productivity, comparing total agricultural output to the combined quantity of land, labor, capital, and all other inputs used in production. With an increase in TFP, each unit of output is produced with fewer total inputs (Fuglie, 2018). Mugera et al. (2016) explored the sources of profitability change at 256 farms in Kansas for the period from 1993 to 2010 and concluded that changes in profitability mainly arise from changes in TFP. Hadley and Irz (2008) examined profit changes over time on cereal farms in England and Wales from 1982 to 2000 by decomposing changes into price and quantity effects. The quantity effect was then further split into productivity and activity effects. The productivity effect was divided into technical efficiency and technical change effects, while the activity effect included scale, resource mix, and product mix effects. Their analysis showed a decline in profit, mainly due to a negative price effect, although this was partially offset by the positive impact of technical change (i.e., productivity). That an increase in production relative to farm capital plays a crucial role in profitability growth was also confirmed by authors who analyzed the impact of farm size on profitability (measured with ROA) on a sample of 477 EU farms for the period from 2007 to 2018 (Kryszak et al., 2021). A study conducted in the southwest of Australia on 47 large-scale farms for the period from 1998 to 2008 confirmed that productivity growth was the main source of profitability (Islam et al., 2014). Guided by the assumption that increased TFP leads to more output being sold in the market, thereby generating higher revenue while input costs remain constant, the following research hypothesis was defined:

H1: Total productivity has a positive and statistically significant effect on the farm profitability in the Republic of Serbia in the time period from 2018 to 2022.

In addition to total factor productivity, it is essential to assess the impact of the productivity of the two most dominant inputs in agriculture—land and labor—on farm profitability. Land productivity expresses the relationship between the amount of output and the amount of land used in production. It can be expressed as the ratio between the value of agricultural products and the amount of land on which they were produced, or between the physical quantity of agricultural products and the land area used (Food and Agriculture Organization of the United Nations, 2017). To quantify the relationship between land productivity and the success of a farm (measured by ROA), the following hypothesis was defined:

H2: Land productivity has a positive and statistically significant effect on the farm profitability in the Republic of Serbia in the time period from 2018 to 2022.

In addition to land, labor is also a key factor in agricultural production. Labor productivity is the ratio between output quantity and labor input used in production. Labor input can be expressed as the number of active workers on the farm, time units spent working (hours, days, months), or full-time equivalent units (Food and Agriculture Organization of the United Nations, 2017). A positive impact of labor productivity on profitability was also confirmed in a study on Polish farms for the period 2009–2015, which analyzed the effect of labor productivity on profitability using a balanced panel

of 5,865 farms, divided into two groups: one with dominant family labor and the other with dominant paid labor (Pawłowska & Jaroszewska, 2020). The third research hypothesis concerns the impact of labor productivity on farm profitability (measured by ROA), leading to the following hypothesis:

H3: Labour productivity has a positive and statistically significant effect on the farm profitability in the Republic of Serbia in the time period from 2018 to 2022.

By testing the defined hypotheses, the aim is to analyze the impact of productivity one of the most important economic principles on profitability, which is a necessary condition for the survival, growth, and development of crop-producing farms in the Republic of Serbia. This research aims to provide support to farm management and other stakeholders in identifying key determinants of farm success to inform which factors to focus on, thereby enabling farms to develop and operate successfully.

2. DATA & METHODOLOGY

The financial data utilized in this study are obtained from the Farm Accountancy Data Network (FADN). The sample comprises, on average, approximately 500 crop farms per year that were actively engaged in agricultural production during the period from 2018 to 2022, forming a total of 2,696 observations. The profitability, as a dependent variable, would be measured using return on assets (ROA). As independent variables, we use a set of 10 determinants. Our analysis focuses on three productivity measures – total factor productivity, land and labor productivity. The subsequent table summarizes the variables classified as dependent and independent in the analyzed model.

Table 1: Overview of Research Variables

Variable	Name	Computation	FADN code
Dependent	Profitability	Farm Net Income / Total assets closing valuation	SE420/SE436
Independent	Total factor productivity	Total Output / Total input	SE131/SE270
	Land productivity	Total Output / Utilized Agricultural Area	SE131/SE025
	Labor productivity	Total Output / Total Labor Hours	SE131/SE020
	Equity turnover	Total Output / Net worth	SE131/SE501
	Debt-to-asset ratio	Total liabilities / Total assets closing valuation	SE485/SE436
	Current-to-total-assets ratio	Total current assets / Total assets closing valuation	SE465/SE436
	Share of external costs	Total external factors / Total input	SE365/SE270
	Share of farming overheads	Total farming overheads / Total input	SE336/SE270
	Subsidy rate	Balance subsidies and taxes on investment / Total Output	SE405/SE131
	Share of rural development payments	Total support for rural development / Total subsidies - excluding on investments	SE624/SE605

Source: Authors' computations

In order to fulfill this objective, the research will utilize panel data techniques as its main analytical approach. This method, often referred to as longitudinal analysis, is a powerful statistical tool ideal for tracking variations over time among multiple subjects. Before applying panel regression analysis, it is necessary to test the basic assumptions—such as autocorrelation, heteroscedasticity, and dependence of panel data. Statistical tests were employed to ensure the robustness of our analysis, and the results indicate that all basic assumptions are violated. Accordingly, this paper employs panel regression analysis with corrected standard errors, specifically the panel-corrected standard error (PCSE) method, to evaluate the model.

3. RESULTS & DISCUSSION

A descriptive statistical examination is performed on all variables included in the model, and the results are presented in Table 2. In analyzing the central tendency of the data, the median is used as the primary statistical measure rather than the arithmetic mean. This decision is driven by the presence of extreme values and skewed distributions in several variables, which could distort the mean and lead to misleading interpretations. Standard deviations and large gaps between minimum and maximum values further confirm the variability and asymmetry present in the data. The dependent variable, profitability has a median of 13% and a mean of 25%. The difference between these two values, combined with a relatively high standard deviation and extreme values (ranging from -3.18 to 10.81), suggests that while most farms operate with satisfactory profitability, a small number report exceptionally high returns, skewing the mean. Among the independent variables, Total factor productivity shows a high level of dispersion. The median value is 1.92, which is slightly below the mean of 2.26, while the maximum reaches over 183. This suggests that most farms are moderately efficient, but some display extremely high productivity, potentially due to intensive, technology-driven

production systems. Land productivity and labor productivity both show significant differences between mean and median (e.g., median labor productivity is 2,665.07, while the mean is 4,266.04), along with large standard deviations. This implies high variation in land and labor efficiency across farms, possibly reflecting differences in scale, mechanization, and labor organization. Equity turnover has a median of 0.30, suggesting that for most farms, each euro of equity generates around 30 cents of output. Debt-to-asset ratio has a median of 0, indicating that many farms operate debt-free. This aligns with traditional agricultural practices in some regions that prioritize low financial risk. However, a maximum of 0.54 shows that some farms do rely more heavily on borrowed capital. Current-to-total-assets ratio has a low median of 0.055, meaning that current assets make up a small portion of total assets in most farms. This may indicate limited liquidity and potential vulnerability to short-term financial shocks. Finally, the share of external costs has a median of 0.14, suggesting that farms generally rely moderately on outsourced services or external production factors (e.g., hired labor, contract services, etc.), although the maximum value of 0.93 shows considerable variability. The Share of farming overheads has a median of 0.2515. This indicates that, for most farms, roughly a quarter of their input costs are allocated to overheads - expenses such as maintenance, utilities, administrative costs, and similar indirect production costs. The subsidy rate reflects the relative weight of public investment support in overall production. The median value is 0.0183, showing that for the majority of farms, the net effect of subsidies (after taxes) on investment contributes modestly to output. The share of rural development payments has a median of 0, indicating that most farms in the sample do not receive this type of support. However, the mean of 0.0297 and the maximum of 1.00 suggest that a minority of farms are highly dependent on rural development funds, receiving their entire subsidy support through this channel. This is further illustrated by the standard deviation of 0.1213, confirming that the distribution is heavily skewed.

Table 2: Descriptive statistical examination

Variable	Mean	Minimum	Maximum	Median	St. deviation
Profitability	0.2486	-3.1808	10.8089	0.1295	0.5679
Total factor productivity	2.2552	0.0951	183.1129	1.9154	3.8146
Land productivity	261,562.7000	36,000.000	10,800,000	162,863.7000	399,947.7000
Labor productivity	4,266.0410	30.0000	80,108.3300	2,665.0650	5,119.3510
Equity turnover	0.4712	0.0163	11.9697	0.2988	0.7123
Debt-to-asset ratio	0.0071	0.0000	0.5386	0.0000	0.0338
Current-to-total-assets ratio	0.0814	0.0000	1.0000	0.05467	0.0968
Share of external costs	0.1546	0.0000	0.9296	0.1412	0.1293
Share of farming overheads	0.2678	0.0171	0.8597	0.2515	0.1019
Subsidy rate	0.0330	0.0000	15.3673	0.0183	0.2970
Share of rural development payments	0.0297	0.0000	1.0000	0.0000	0.1213

Source: Authors' computations

Prior to beginning the panel data assessment, it is imperative to assess the underlying assumptions intended for the implementation of the selected methodology. Table 3 presents the results of diagnostic tests for the panel regression model. The Wooldridge test confirms the presence of autocorrelation ($p = 0.000$), while the Modified Wald test indicates heteroskedasticity across panels ($p = 0.000$). The Pesaran test reveals significant cross-sectional dependence ($p = 0.000$), suggesting that unobserved common factors may influence the units. Finally, the Hausman test strongly favors the fixed effects model over the random effects alternative ($p = 0.000$), implying correlation between individual effects and explanatory variables. Given these results, the fixed effects model with robust standard errors is the appropriate specification.

Table 3: Statistical Tests for Panel Model Validity and Specification

Test	Test Value	p value
Wooldrige test	19.49	0.000
Modified Wald test for groupwise heteroskedasticity	11.87	0.000
Pesaran cross-section independence test	35.28	0.000
Hausman test	130.88	0.000

Source: Authors' computations

Table 4 presents the results of the panel regression model estipating the impact of various farm-level characteristics on profitability. The coefficient estimates, along with robust standard errors and p-values, are reported for each explanatory variable. Among the statistically significant predictors, land Productivity shows a positive and significant relationship with profitability ($p = 0.001$), indicating that farms with higher land efficiency tend to achieve greater returns. Similarly, equity turnover has a strong positive effect (coefficient = 0.63, $p = 0.000$), suggesting that more efficient use of equity capital is associated with increased profitability. In contrast, debt-to-asset ratio and current-to-total-assets ratio exhibit significant negative effects on profitability ($p = 0.000$ and $p = 0.015$, respectively), implying that higher financial leverage and lower liquidity are detrimental to farm performance. The share of external costs is also negatively associated with profitability ($p = 0.000$), which may reflect inefficiencies or over-reliance on outsourced inputs and

services. The subsidy rate has a significant positive effect on profitability (p = 0.000), highlighting the role of public financial support in enhancing farm income. The share of farming overheads is marginally significant (p = 0.075), with a positive coefficient, suggesting a possible link between structured overhead investment and improved performance, though this requires cautious interpretation. On the other hand, total factor productivity and labor productivity are not statistically significant (p = 0.841 and p = 0.902, respectively), which may indicate that their effects on profitability are already captured by more direct financial or operational variables. Similarly, the share of rural development payments does not show a statistically significant impact (p = 0.238). Overall, the results point to the importance of capital efficiency, cost structure, financial stability, and subsidies in explaining variations in farm profitability.

Table 4: Coefficient Estimates from the Panel Regression Model

Variable	Coefficient value (Std. Error)	p value
Total factor productivity	0.0006755 (0.0033737)	0.841
Land productivity	1.45e-07 (4.39e-08)	0.001
Labor productivity	1.68e-07 (1.36e-06)	0.902
Equity turnover	0.6296179 (0.0488497)	0.000
Debt-to-asset ratio	-0.500938 (0.0806733)	0.000
Current-to-total-assets ratio	-0.5271919 (0.2161649)	0.015
Share of external costs	-0.295918 (0.0492009)	0.000
Share of farming overheads	0.0924738 (0.0519583)	0.075
Subsidy rate	0.3529639 (0.00354)	0.000
Share of rural development payments	0.0281613 (0.0238682)	0.238

Source: Authors' computations

In this respect, hypothesis 1 is rejected. Total factor productivity does not statistically influence profitability. There could be several reasons why. Firstly, rising costs of input such as seeds, fertilizers, and labor can offset the gains from productivity improvements. If input costs increase faster than productivity, profitability may not improve. Serbian agriculture is characterized by small and fragmented farms. These small-scale operations may not benefit from economies of scale, limiting the impact of TFP improvements on overall profitability. Regarding hypothesis 2, it is accepted. Higher land productivity significantly boosted farm profitability by increasing output and efficiently using resources, resulting in higher revenue and lower per-unit production costs. The adoption of modern farming techniques and government support also played crucial roles in enhancing productivity and profitability. This synergy allowed farmers to better manage risks, achieve economies of scale, and meet strong market demand, solidifying the positive impact of land productivity on their financial outcomes. Last, but not least, hypothesis 3 is rejected. It could be due to the small scale of farms which rely on family labor, limited mechanization, low wage costs, traditional agricultural practices, and the fact that external factors can negate the benefits of increased labor efficiency.

4. CONCLUSION

Agriculture is a vital sector in Serbia, with numerous small and medium-sized farms playing a significant role in the country's economy and rural livelihoods. It plays a fundamental role in ensuring food stability and economic growth. This study investigates the relationship between different measures of productivity and farm profitability in Serbia, focusing on crop farms between 2018 and 2022. The analysis employed panel regression techniques with panel-corrected standard errors to account for autocorrelation, heteroskedasticity, and cross-sectional dependence. The findings of our study led us to some conclusions. Firstly, our results suggest that there is a positive and statistically significant relationship between land productivity and farm profitability. The results confirm that land productivity is a key determinant of profitability. Efficient land use, supported by modern technologies and favorable policy instruments, significantly enhances farm income. This finding underlines the importance of supporting structural improvements and technological adoption in land management practices to improve financial performance. Conversely, total factor productivity and labor productivity do not demonstrate statistically significant effects on profitability. This may reflect the fragmented structure of Serbian agriculture, reliance on low-cost family labor, and rising input costs, which diminish the potential impact of productivity gains on profitability. Additional factors, such as equity turnover and subsidy rate, positively affect profitability, while debt-to-asset ratio, current-to-asset ratio, and external cost share have significant negative impacts. These findings highlight the importance of sound financial management and suggest that profitability is shaped not only by physical productivity but also by capital structure, liquidity, and support mechanisms. Our study highlights the need for adaptive strategies and robust risk management frameworks to navigate through such turbulent times. Policymakers and industry stakeholders must work together to bolster the resilience and sustainability of the food sector in the face of ongoing and future uncertainties. These results are crucial for policymakers, agricultural economists, and farmers, as they highlight the importance of enhancing land productivity to improve farm incomes and overall economic sustainability. However, the study's limitations include potential data inaccuracies, the exclusion of other factors influencing profitability, and the specific timeframe analyzed. Future research should address these

limitations by incorporating broader datasets, exploring additional macroeconomic determinants of profitability, and extending the analysis over longer periods to capture trends and fluctuations more comprehensively.

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REFERENCES

Apalia, E. A. (2017). The role of micro finance institutions in the Kenyan economy: A case of Kisii town, Nyanza. *International Academic Journal of Procurement and Supply Chain Management, 2*(1), 16-33. https://www.iajournals.org/articles/iajef_v2_i3_16_33.pdf

Asiri, B. K. (2015). How investors perceive financial ratios at different growth opportunities and financial leverages. *Journal of Business Studies Quarterly, 6*(3), 1. https://media.proquest.com/media/hms/OBJ/EUPMV?_s=gjkQM3G%2BINARb9YLYYLlgWjINYE%3D

Dakić, S., & Mijić, K. (2020). Regression analysis of the impact of internal factors on return on assets: a case of meat processing enterprises in Serbia. *Strategic Management, 25*(1), 29-34. https://doi.org/10.5937/StraMan2001029D

Food and Agriculture Organization of the United Nations. (2017). *Productivity and Efficiency Measurement in Agriculture: Literature Review and Gaps Analysis.* https://openknowledge.fao.org/server/api/core/bitstreams/dcd4edfc-f7d5-4872-8996-5612c87446d6/content

Fuglie, K. O. (2018). Is agricultural productivity slowing? *Global Food Security, 17*, 73-83. https://doi.org/10.1016/j.gfs.2018.05.001

Fuglie, K. O., Wang, S. L., & Ball, V. E. (Eds.). (2012). *Productivity Growth in Agriculture: An International Perspective.* CABI Books. https://doi.org/10.1079/9781845939212.0000

Hadley, D., & Irz, X. (2008). Productivity and farm profit - A microeconomic analysis of the cereal sector in England and Wales. *Applied Economics, 40*(5), 613-624. https://hal.science/hal-00581975v1

Islam, N., Xayavong, V., & Kingwell, R. (2014). Broadacre farm productivity and profitability in south-western Australia. *Australian Journal of Agricultural and Resource Economics, 58*(2), 147-170. https://doi.org/10.1111/1467-8489.12040

Jakšić, D. (2019). Profitability analysis and profitability factors of companies on the Banja Luka Stock Exchange in the period 2017 - 2018. *Financing*, 02/19, 45-53. https://doi.org/10.7251/FIN1902045J

Kalai, M., & Helali, K. (2020). Total factor productivity growth, technological progress and technical efficiency changes: Productivity change dimensions in Tunisia. *Journal of Quantitative Methods, 4*(2), 76-100. https://doi.org/10.29145/2020/jqm/04204

Kryszak, L., Guth, M., & Czyzewski, B. (2021). Determinants of farm profitability in the EU regions. Does farm size matter? *Agricultural Economics - Czech, 67*(3), 90-100. https://doi.org/10.17221/415/2020-AGRICECON

Latruffe, L. (2010). *Competitiveness, productivity and efficiency in the agricultural and agri-food sectors.* OECD Food, Agriculture and Fisheries Papers, No. 30, OECD Publishing, Paris, https://doi.org/10.1787/5km91nkdt6d6-en

Latruffe, L., Diazabakana, A., Bockstaller, C., Desjeux, Y., Finn, J., Kelly, E., et al. (2016). Measurement of sustainability in agriculture: a review of indicators. *Studies in Agricultural Economics, 118*(3), 123-130. https://doi.org/10.7896/j.1624

Liu, L., Xu, J., & Shang, Y. (2020). Determining factors of financial performance of agricultural listed companies in China. *Custos e Agronegocio online, 16*(4), 297-314. http://www.custoseagronegocioonline.com.br/numero4v16/OK%2012%20financial%20english.pdf

Milošev, I. (2023). Determinants of profitability in the agricultural sector in Serbia. *Ekonomika poljoprivrede, 70*(4), 953-966. https://doi.org/10.59267/ekoPolj2304953M

Miljatović, A., & Vukoje, V. (2022). Assessment of economic viability of small-scale farms in Serbia. *Contemporary Agriculture, 71*(1-2), 65-72. https://doi.org/10.2478/contagri-2022-0010

Ministry of Agriculture, Forestry and Water Management. (2024). *Report on the State of Agriculture in the Republic of Serbia in 2023, Book 1: Horizontal Overview*. http://www.minpolj.gov.rs/download/ZK-2023-I-knjiga.pdf?script=lat

Mugera, A. W., Langemeier, M. R., & Ojede, A. (2016). Contributions of productivity and relative price changes to farm-level profitability change. *American Journal of Agricultural Economics, 98*(4), 1210-1229. https://doi.org/10.1093/ajae/aaw029

Novaković, D., Milić, D., Novaković, T., & Tomaš Simin, M. (2024). Profitability Determinats of Agricultural Smes From Republic of Serbia. *International Scientific Conference Strategic Management and Decision Support Systems in Strategic Management*, 267-272. https://doi.org/10.46541/978-86-7233-428-9_392

Pawlowska, A., & Jaroszewska, J. (2020). Impact of the labour productivity on farm income in Poland. *Problems of Agricultural Economics, 362*(1), 99-108. https://doi.org/10.30858/zer/116660

Statistical Office of the Republic of Serbia (2024), Brochure: Agriculture Census 2023, 1-11. https://popispoljoprivrede.stat.gov.rs/media/31092/brosura-srpski-sa-koricom.pdf

Tekić, D., Mutavdzić, B., Milić, D., Zekić, V., Novaković, T., & Popov, M. (2023). Profitability determinants of micro agricultural enterprises from the Republic of Serbia. *Economics: Theory and Practice, 16*(2), 62-78. https://doi.org/10.5937/etp2302062T

Tomić, R., & Tomić, D. (2011). Production Potential of Serbian Agroeconomy – Factor of Increasing Competitiveness. *Škola biznisa, 3*, 1-10. https://www.vps.ns.ac.rs/SB/2011/7.1.pdf