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TRENDOVI U POSLOVANJU
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KEY DETERMINANTS OF BUSINESS PERFORMANCE OF AGRICULTURAL ENTERPRISES IN THE REPUBLIC OF SERBIA

KLJUČNI FAKTORI POSLOVNE USPEŠNOSTI POLJOPRIVREDNIH PREDUZEĆA U REPUBLICI SRBIJI

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Abstract

The paper examines the significance of key macroeconomic and microeconomic factors on the business performance of agricultural enterprises in the Republic of Serbia. The research was conducted using panel data on a sample of 30 agricultural enterprises. Data were collected for the period from 2015 to 2023. Various estimators capable of addressing endogeneity in the data were employed to assess the dynamic panel data model. The research results show that the most significant factor is the success from the previous period, as well as policies and institutional support for agricultural enterprises. The results of the research also show that investment in fixed assets, human and structural capital, as well as the size of the agricultural enterprise, are significant factors in the success of agricultural enterprises. The research results show that strict employee protection regulations, complex credit procedures and committed capital have no impact on the success of these companies.

Sažetak

Rad istražuje značaj ključnih makroekonomskih i mikroekonomskih faktora na poslovne performanse poljoprivrednih preduzeća u Republici Srbiji. Istraživanje je sprovedeno korišćenjem panel podataka na uzorku od 30 poljoprivrednih preduzeća. Podaci su prikupljeni za period od 2015. do 2023. godine. Korišćeni su različiti estimatori sposobni da se bave endogenitetom podataka kako bi se procenio dinamički model panel podataka. Rezultati istraživanja pokazuju da je najznačajniji faktor uspeh iz prethodnog perioda, kao i politike i institucionalna podrška poljoprivrednim preduzećima. Rezultati istraživanja, takođe pokazuju da su značajni faktori uspeha poslovanja poljoprivrednih preduzeća ulaganje u fiksnu aktivu, ljudski i strukturni kapital, kao i veličina poljoprivrednog preduzeća. Rezultati istraživanja pokazuju da strogi propisi zaštite zaposlenih, kompleksne procedure za kredite i angažovani kapital nemaju uticaj na uspeh poslovanja ovih preduzeća.

Keywords*: macroeconomic and microeconomic factors, agricultural enterprises; panel data; Republic of Serbia*

Ključne reči: *makroekonomski i mikroekonomski faktori, poljoporvredna preduzeća, panel podaci, Republika Srbija*

Introduction

It is well known that agricultural production plays a significant role in creating GDP in developing countries, such as the Western Balkan countries [1]. This is evidenced by the fact that the contribution of agricultural enterprises to GDP creation in the Western Balkan countries has averaged between 6% and 8% over the past decade, whereas the contribution of agricultural enterprises in European countries characterized by highly productive agricultural production, such as the Netherlands, Denmark, and France, is below 2% of GDP. In the Republic of Serbia, the share of agricultural production in GDP has averaged around 6.8% in recent years [2]. The significance of this sector is further underscored by the fact that the high contribution of these enterprises to GDP is not primarily due to their high productivity, despite the completion or nearing completion of ownership transformation processes and privatization of large agricultural estates, as well as significant inflows of foreign direct investment into this sector. Instead, it is a consequence of the underdevelopment of other sectors. For this reason, it is crucial to preserve and strengthen the business performance of agricultural enterprises. Having in mind available natural and human resources invested in this sector, it extensively contributes both to the social and economic development of the country[52].

However, it is concerning that the growth rate of agricultural production in these countries has stagnated in recent years. An analysis of the business balance reveals that during the same period in which small and medium-sized agricultural enterprises in the EU report an average performance growth of about 7%, agricultural enterprises in the Western Balkan Countries (WBC) are experiencing a decline in their business performance [3]. The deterioration of business results is particularly evident among small and medium-sized agricultural enterprises. Thanks to successful privatization, large agricultural estates with a long tradition of operation have relatively maintained their business performance. However, the economic development strategy in the Republic of Serbia defines a key role for small and medium-sized enterprises. For this reason, strengthening their performance is crucial.

The causes of the weakening business performance of these enterprises can be primarily attributed to three groups of factors: natural, macroeconomic, and microeconomic factors. For this reason, it is necessary to understand the impact and significance of key macroeconomic and microeconomic factors on business performance, as well as their interplay.

When discussing the key macroeconomic factors affecting the business performance of agricultural enterprises, in addition to those that are common to all participants in the economic sphere, the quality of the macroeconomic environment [4], literature often examines the impact of policies and institutional support that encourage agricultural production [5-9]. Furthermore, the state and conditions of the financial market [10-12], the labor market and the conditions pertaining to labor protection in agriculture (Employment Protection Regulation - EPR) are also analyzed [13-16]. EPR includes aspects such as severance pay, collective agreements, social and pension insurance, stipulations regarding the minimum wage, probation periods, payment for overtime work, the methods and conditions for dismissing employees, the possibility of engaging seasonal workers, and so forth [17]. Also, a growing number of studies highlight the significance of infrastructure development [18,19], emphasizing that agricultural productivity is greatly influenced by infrastructure such as roads, information and communication technology (ICT), electricity supplies, telecommunications, and other related infrastructures. The significance of these factors is justified by the specific characteristics of agricultural production, which primarily stem from its seasonal nature. This seasonal aspect dictates the cyclical engagement of physical, financial, and human resources, along with all the implications that such engagement entails.

When discussing key microeconomic factors affecting business operations, an increasing number of studies in recent years have emphasized intellectual capital (IC) [20-22]. This is because dividing sectors into those intensively based on high technology and knowledge is becoming increasingly less meaningful, as even the so-called traditional sectors, such as

agriculture and the food industry, are now reliant on knowledge and the outputs of both tangible and intangible technological knowledge [23, 24]. Unlike the situation in the 1980s, when 60% of a company's value was attributed to tangible assets and the remainder to intellectual resources (intangible property), the current landscape has changed significantly. The prevailing global trend has led to the company's value being predominantly associated with intangible assets, specifically intellectual resources, which account for between 70% and 84% of the total value [25]. Today's most successful companies possess an intellectual capital (IC) value that is 10 to 20 times greater than the value of their tangible assets [26]. A review of the period from 1975 to 2005 shows that the proportion of the book value of intangible assets in the total book value of assets increased from 1.9% to 43.2%, while during the same period, the share of the book value of intangible assets in market capitalization rose from 1.6% to 15.5%. The proportion of intangible assets has doubled approximately every 10 years, highlighting the significance of IC in a company's successful business operations [27].

Thus, it has been posited that in modern business conditions, intellectual capital serves as the most important source of competitive advantage for companies. Knowledge is a basic factor in achieving economic growth and development as well as increasing productivity [53]. In addition to IC, numerous studies have explored the impact of firm size [23], age [23] and finance indicators [28] on the business performance of agricultural enterprises.

Despite the possibility of identifying a range of macroeconomic and microeconomic factors whose influence is predominantly studied in relation to the business results of agricultural enterprises, there is no consensus in the literature regarding the significance and direction of their impact. Furthermore, many studies have not adequately addressed the potential issue of endogeneity, due to the possible existence of correlation between the regressors and the errors of the model, or the presence of simultaneity. Therefore, the primary objective of this work is to examine the impact and significance of various macroeconomic and microeconomic factors on the business performance of agricultural enterprises in the Republic of Serbia.

In addition to being the first study that employs a dynamic panel analysis model to simultaneously examine the impact of macro and microeconomic factors in the Republic of Serbia, this study contributes to the literature in that, unlike previous studies, it is not restricted to publicly quoted firms or a minimum firm size criterion. The study is based on data with almost no firm size restrictions, allowing for a more accurate representation of the industry. However, the study does not include micro and small agricultural enterprises that are not subject to double-entry bookkeeping. The justification for conducting such a differentiated examination of agricultural enterprises lies in the specific characteristics of agricultural production in comparison to other sectors.

Materials and Methods

The research was conducted on a sample of 32 agricultural enterprises operating in the Republic of Serbia. The study covers the period from 2015 to 2023. Data were collected from various sources. Specifically, data related to macroeconomic factors were gathered from the World Bank database, the Employment database of the OECD, and the database of the World Economic Forum, while data pertaining to microeconomic factors were collected through the Business Registers Agency and the Chambers of Commerce of Republic of Serbia. The paper utilizes balanced panel data consisting of a sample of 32 agricultural enterprises. Utilizing panel data techniques enables the adjustment for bias introduced by potential heterogeneity [29]. The linear model for panel data is represented as follows:

$$y_{i,t} = \alpha + \beta_1 y_{i,t-1} + \sum_{n=1}^{n} \beta_n x_{t,n} + \sum_{k=1}^{K} \beta_k x_{i,t,k} + \varepsilon_{i,t} \qquad (1)$$

where are:

$y_{i,t}$ - dependent variable representing business performance
$y_{i,t-1}$ - dependent variable from the previous period (t-1)
β_1 - parameter of dependent variable from the previous period
$x_{t,n}$ - independent macroeconomic variables
β_n - parameter of independent macroeconomic variables
$x_{i,t,k}$ - independent microeconomic variables
β_k - parameter of independent microeconomic variables
$\varepsilon_{i,t}$ - term error of model

Although the business performance of agricultural enterprises can be expressed through various indicators that are not always and fully linked to financial metrics, they are most often represented in terms of financial results, namely realized profit. This is because organizations are only sustainable if they are financially solvent and demonstrate profit growth [30]. However, for the purposes of this paper, the Technical Efficiency Gap was used because it is a measure of success that takes into account all inputs and outputs [31], which can be expressed mathematically in the following way:

$$\hat{\delta}_i = \max_{\hat{\delta}_i \lambda}\left\{\delta > 0 \middle| \hat{\delta}_i, y_i \leq \sum_{i=1}^{n} y_i \lambda : x_i \geq \sum_{i=1}^{n} x_i \lambda; \sum_{i=1}^{n} \lambda = 1;\ \lambda \geq 0\right\} \qquad (2)$$

The Technical Efficiency Gap can be represented using various quantitative methods, typically involving efficiency scores derived from models such as Data Envelopment Analysis (DEA) or Stochastic Frontier Analysis (SFA). These methodologies assess the relationship between inputs (resources used such as labor, materials, etc.) and outputs (services rendered, revenue generated, etc.) in order to determine how efficiently a firm is operating compared to the best performers in the industry. For the purposes of this paper, the DEA double bootstrapping procedure suggested by [32] was utilized. The method involves replacing the bootstrap estimates from the regression phase to calculate the standard errors of the estimates.

In accordance with the analyzed literature, as independent macroeconomic variables in the model, policies and institutional support for the development of agricultural production, the quality of overall infrastructure, employment protection regulation (EPR) and the development of the financial market, specifically the availability of financial resources for funding current liquidity, were utilized.

The specificities of agricultural production, in the sense that the need for engaging and "freezing" various resources is determined by the seasonal nature of agricultural activities, as well as the distinct methods of reproduction, imply that policies and institutional supports, primarily in the form of various subsidies and grants, play a crucial role in agricultural production in any country. Furthermore, the liberalization of agricultural markets as preparation for EU accession (alignment of regulations and legislations, the legal administrative framework, and the EU support system, i.e., the Common Agricultural Policy - CAP) results in agricultural enterprises facing highly productive competition from the EU. This accentuates the importance of effective policies and institutional support as macroeconomic factors influencing business success. In the Republic of Serbia, policies and institutional support for agricultural enterprises are most commonly reflected through four types of assistance: direct payments, rural development measures, special incentives, and credit support. According to research (33-36], direct payments represent the most widely used measure. For this reason, the Product support estimate (PSE) indicator is employed as a proxy for policies and institutional support, expressed in logarithm form, DP. The PSE indicates the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, expressed at the producer level, resulting from agricultural policy measures, regardless of their nature, objectives, and effects on production volume and income in agriculture [37]. This means that PSE does not represent additional income for agricultural enterprises but rather a political effort to provide support, while additional revenues are the result of support and the influence of numerous other factors. Therefore, although it is expected that PSE has statistical significance and a positive impact on business performance, different outcomes are also possible.

The existence of adequate agricultural infrastructure, as a typical public good, which facilitates the connection of various stakeholders along the entire agricultural value chain, is a significant factor for the business success of agricultural enterprises. Economic development theorists have identified infrastructure as critical to agricultural productivity [38]. Therefore, it is expected that improvements in infrastructure will lead to enhanced performance of agricultural enterprises. This expectation is based on the view that infrastructure helps to make goods available at relatively lower costs. Research results show that different types of infrastructure have varying effects on the performance of agricultural enterprises. The lack of available aggregate data related to overall agro-infrastructure, in the paper the investment in fixed assets (IFA) indicator is utilized, as proxy for overall infrastructure. In the paper logarithm form of total the investment in fixed assets in agriculture is used.

Employment Protection Regulation (EPR) indirectly contributes to the improvement of business performance primarily through the reduction of employee turnover rates [39-41] and the establishment of long-term relationships between employees and enterprises [42,43]. These regulations are particularly important for countries with relatively high unemployment rates and abundant labor supply, such as the Western Balkans (WBC). On the other hand, stringent protective measures can lead to increased costs as a result of the inability to implement downsizing strategies and other consequences of the strengthened bargaining power of workers [44], such as paying severance in cases of unfair dismissals, which may negatively impact the business outcomes of agricultural enterprises. The literature does not present a clear position regarding the impact of this factor. Research conducted by Bai et al. (2020) suggests a positive effect, while studies by [44] indicate a negative effect. Considering the need for temporary engagement of additional labor for the success of agricultural enterprises, regulations concerning temporary worker engagement may play a particularly important role. However, studies by authors such as [45, 46] reveal that stricter regulations negatively affect business outcomes due to the low productivity of temporary workers. For this reason, a negative impact of this factor on the business performance of agricultural enterprises in the Republic of Serbia is anticipated. As a proxy for EPR, this study utilizes the Strictness of Employment Protection indicator defined by the OECD, which represents a synthetic indicator that integrates the effects of the strictness of regulations on dismissals and the utilization of temporary contracts.

The specificities of agricultural production, stemming from the characteristics of agricultural activities and the effects of natural conditions on the one hand, and the implications of the external environment on agricultural production on the other, certainly influence the cash flow dynamics of agricultural enterprises and the means of securing necessary financial resources for funding current liquidity. For this reason, numerous authors, such as [4] have identified favorable conditions in the economic and credit markets as an important macroeconomic factor for the business success of agricultural enterprises. In this study, the Broad Money Growth Rate (BM) is utilized as a proxy for the development and accessibility of favorable financial conditions for financing current liquidity. The underlying assumption is that an increase in the BMGR implies more favorable conditions for acquiring funds to support the current liquidity of agricultural enterprises, which positively reflects on the business performance of these enterprises.

Intellectual capital (IC), the size and age of the enterprise were employed as microeconomic variables. There is also no consensus in academic and professional circles regarding the impact and significance of Intellectual Capital (IC) on the business performance of agricultural enterprises. More specifically, consensus has not been reached concerning the influence of various elements of IC on the business performance of agricultural enterprises [47]. For the purposes of this study, the Value Added Intellectual Coefficient (VAIC) is utilized as a proxy for IC, which measures the extent to which IC contributes to the business performance of the enterprise in comparison to tangible assets. Specifically, three of its elements are employed: Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), and Employed Capital Efficiency (CEE). Despite the differing findings from various studies, it is anticipated that all three elements will have a positive effect on business performance.

Although there is a common belief that as firms grow, their strength also increases, and that firm size, measured through the Amount of Total Assets, can be a limiting factor for the entry of smaller enterprises into the market—thereby further enhancing profitability - research conducted over the last 30 years suggests that there are numerous exceptions [48, 49]. Regardless of the studies, the analysis of the income statements of agricultural enterprises indicates an expectation that size has a significant positive impact on profitability. For the purposes of this study, firm size is expressed as the logarithm of the Amount of Total Assets.

It is expected that enterprises with a longer lifespan will achieve better performance due to accumulated experience and knowledge [48]. However, the experiences of agricultural enterprises in the Western Balkans (WBC) significantly contrast with these expectations. For the purposes of this study, the age of the enterprise is expressed as the natural logarithm of the number of years since the company's establishment up to 2023.

Leverage, defined as the ratio of total liabilities to total assets of an enterprise, serves as a good indicator that encapsulates the quality of management, specifically its attitude towards obligations, assets, risk, and moral hazard, including the propensity of the enterprise to over-indebt itself. From that reason in the paper, it is used as proxy for the quality of management. It is expected that there is a negative correlation between the value of leverage and business performance. This expectation is based on the belief that more successful enterprises finance their operations with their own revenues. However, there are numerous examples of successful enterprises that may have a leverage ratio higher than the sector average. The tax treatment of interest on debt can be one justification for why profitable enterprises might exhibit a slightly higher value of this ratio compared to the sector average.

Given that the results of past performance influence current performance [49], it was necessary to include the performance metrics from previous periods in Model 1. Consequently, this necessitates the use of a dynamic panel data model in this study. In accordance with the selected variables, model 1 can be expressed in a more specific form:

$$\hat{\delta}_{i,t} = \alpha + \beta_1 \hat{\delta}_{i,t-1} + \beta_2 PSE_t + \beta_3 EPR_t + \beta_4 BM_t + \beta_4 ITI_t + \beta_5 ITI_t + \beta_6 HCE_{i,t} + \beta_7 SCE_{i,t} + \beta_8 CEE_{i,t} + \beta_9 Age_{i,t} + \beta_{10} Size_{i,t} + \beta_{11} LEV_{i,t} + \varepsilon_{i,t} \quad (3)$$

If the structure of Model (3) favors estimators capable of addressing endogeneity, primarily due to the inclusion of the logged dependent variable on the right side of the model, which is likely correlated with the model's error term, like GMM estimators, the subsequent analysis involves testing for the endogeneity of microeconomic variables. The reason for this is to highlight potential endogeneity issues in models that have examined the impact of microeconomic factors, such as IC, specifically HCE, SCE and CEE, as well as the size and age of enterprises on business performance. Indeed, despite the warnings from authors like [29] regarding the potential endogeneity problem of these variables in studying their impact on the business results of agricultural enterprises, many studies (most of which are referenced in this work) have not accounted for this issue. They primarily used Fixed Effects (FE) models. The choice of estimator is justified by the fact that FE can accommodate what is referred to as "unobserved time-invariant heterogeneity," while noting that the choice was confirmed by formal tests for selecting the best panel estimator, such as the F-test, Breusch-Pagan test, and Hausman test. In examining macroeconomic variables, particularly the impact of Employment Protection Regulation (EPR), Random Effects (RE) estimators were generally used, justified by the fact that estimates obtained by the fixed-effects method will probably be imprecise because they do not consider the cross-section variation. In other words, this means that these estimates do not consider the cross-country variation in the strictness of EPR. Additionally, the choice of estimator was confirmed through formal tests. However, in the presence of endogeneity, both estimators generate biased estimates, which calls into question the validity of the research findings. Therefore, for the purposes of this study, Hausman's test was employed to test for endogeneity. The results are presented in Table 1. All microeconomic variables were tested.

Endogeneity testing has indicated that the variables HCE, SCE, and SIZE are endogenous. The presence of endogeneity in these variables necessitates the identification of appropriate instrumental variables (IV) that are strongly correlated with HCE, SCE, and SIZE while remaining uncorrelated with the error term of the model [23]. Since HCE is dependent on investments in training and development of human resources (IHR), investment in human resources as a percentage of total revenue can serve as an IV for HCE. Higher investments in human resources are likely to enhance the exploitation of these resources as unique assets of the enterprise. However, substantial costs in human resource investments do not guarantee a positive impact on business performance, suggesting that they are not correlated with the model's error term. Given that the effects of investments in human resources cannot be immediately reflected in business outcomes, it is important to employ this variable with a specific lag, meaning it is necessary to determine the optimal lag duration. Similarly, for SCE, which accounts for the effects of intangible investments and knowledge, the innovation growth rate (IGR) can be used as an IV. Regarding the SIZE variable, market share (MS) may serve as an IV, as previous research shows a significant correlation between firm size and MS, while also indicating that a large MS does not guarantee high profits [30]. The use of the modified Okui (2005) method [50], which is grounded in higher-order asymptotic theory within the framework of double asymptotics, justifies the selection of these IV and indicates that IHR should be used with a lag of 3. The study employed four different estimators: Two-Stage Least Squares (TSLS), one-step difference GMM, Fixed-effects TSLS, and the Panel Limited Information Maximum Likelihood (PLIML) method, all of which address dynamic effects and endogenous variables while accounting for individual effects concurrently. The choice of these estimators was guided by their asymptotic properties.

Results and discussion

Descriptive statistics of selected variables are presented in Table 1.

Table 1. Descriptive statistics

Variable	Mean	St. Dev.	Min	Max
$\hat{\delta}_i$	0.023	1.336	0.001	0.862
PSE	23.913	0.147	23.740	24.188
EPR	0.342	0.032	0.271	0.441
BM	10.608	4.332	3.567	18.105
ITI	9.966	0.154	9.703	10.259
HCE	1.870	2.110	0.321	6.800
SCE	0.341	2.010	-10.600	8.673
CEE	0.120	0.311	0.089	2.250
AGE	3.611	2.381	2.19	4.17
SIZE	2.690	5.543	0.693	4.060
LEV	0.568	0.403	0.002	2.240

Source: Authors calculation

It can be seen from Table 1 that there are significant discrepancies both in operational results and in the values of microeconomic factors. His suggests that an adequate sample was chosen that co-opts a wide spectrum of business success of the company. The small differences in macroeconomic factors indicate a relatively stable environment, which certainly favors the operations of agricultural enterprises.

The initial phase of analyzing time series data involves assessing the stationarity of the panel by employing a unit root test. In this study, the Levin-Lin-Chu pooled ADF test was utilized,

with the √T rule applied to determine the maximum lag length. When conducting the ADF test, care was taken to consider whether the series exhibited a trend and whether it fluctuated around a constant value. The outcomes of the test are presented in Table 1A in appendix. All non-stationary variables became stationary after the first differentiation. In further analysis, their first-order differential values were used.

Since the next step involves examining the correlation between variables, this is feasible. The results are shown in Table 2. There is no high correlation between variables, so all are retained in further research.

Table 2. Correlation matrix

	Sigma	PSE	ERP	BM	IFA	HCE	SCE	CEE	Size	AGE	LEV
$\hat{\delta}_{i,t-1}$	1.000										
PSE	0.086	1.000									
ERP	0.551	0.148	1.000								
BM	0.204	0.123	0.335	1.000							
IFA	0.228	0.473	0.433	0.292	1.000						
HCE	0.236	0.502	0.490	0.360	0.311	1.000					
SCE	0.142	0.122	0.111	0.365	0.133	0.184	1.000				
CEE	0.381	0.229	0.354	0.394	0.116	0.348	0.460	1.000			
Size	0.309	0.206	0.452	0.062	0.234	0.295	0.382	0.160	1.000		
AGE	0.347	0.028	0.362	0.274	0.103	0.505	0.185	0.609	0.416	1.000	
LEV	0.444	0.016	0.577	0.376	0.364	0.582	0.468	0.556	0.314	0.963	1.000

Source: Authors calculation

The results from the four different estimators for dynamic panel data analysis are presented in Table 3. The outcomes demonstrate consistency across all evaluated models. Each model exhibits favorable characteristics. The Hausman test results, along with those from the Weak instrument test, indicate that the chosen instruments are appropriate. Furthermore, the Wald test signifies that all regressors are statistically significant, while the differing group intercepts test confirms that each unit has its own unique intercept. The R-squared values range from 86.1% for the Fixed-effects TSLS estimator to 91% for the TLSL estimator

Table 3. Model (3) parameter estimates

Fixed-effects TSLS				**TSLS**		
Dependent variable: sigma				Dependent variable: **sigma**		
Endogenous: HCE, SCE, Size				Instrumented: HCE, SCE, Size		
Instruments: const PSE ERP BM IFA CEE AGE LEV MS IHR IGR				Instruments: const PSE ERP BM IFA CEE AGE LEV MS IHR IGR		
Variable	coefficient	std. error	p-value	coefficient	std. error	p-value
const	0.374	0.072	0.000	0.329	0.075	0.000
$\hat{\delta}_{i,t-1}$	0.474	0.172	0.006	0.504	0.077	0.000
PSE	0.213	0.012	0.000	0.197	0.009	0.000
ERP	0.176	0.322	0.585	-0.048	0.177	0.786
BM	0.679	0.564	0.229	0.19	0.261	0.467
IFA	0.332	0.072	0.000	0.385	0.049	0.000
HCE	0.182	0.039	0.000	0.204	0.008	0.000
SCE	0.048	0.018	0.008	0.116	0.053	0.030
CEE	-1.276	0.797	0.109	0.181	0.231	0.434
Size	0.281	0.109	0.010	0.278	0.084	0.001
AGE	-0.312	0.228	0.171	-0.364	0.199	0.069
LEV	0.087	0.025	0.001	0.083	0.039	0.034

R-squared: 0.861				R-squared: 0.910		
Wald chi-square(11) = 2.5e+22 (p-value 0.000)				Hausman test Chi-square(3) = 22.334 (p-value 0.000)		
Test for differing group intercepts F(29,228) = 1.58 (p-value 0.035)						
LIML				**IV- one step GMM**		
Dependent variable: sigma				Dependent variable: sigma		
Instrumented: HCE, SCE, Size				Instrumented: HCE, SCE, Size		
Instruments: const PSE ERP BM IFA CEE AGE LEV MS IHR IGR				Instruments: const PSE ERP BM IFA CEE AGE LEV MS IHR IGR		
Variable	coefficient	std. error	Z test p-value	coefficient	std. error	Z test p-value
const	0.231	0.102	0.024	0.331	0.051	0.000
$\hat{\delta}_{i,t-1}$	0.389	0.039	0.000	0.481	0.016	0.000
PSE	0.208	0.054	0.000	0.199	0.073	0.006
ERP	0.155	0.392	0.693	-0.065	0.391	0.868
BM	0.191	0.402	0.635	0.201	0.227	0.376
IFA	0.305	0.022	0.000	0.411	0.094	0.000
HCE	0.163	0.087	0.061	0.221	0.055	0.000
SCE	0.037	0.006	0.000	0.124	0.098	0.206
CEE	-1.301	0.958	0.174	0.188	0.444	0.672
Size	0.199	0.049	0.000	0.293	0.067	0.000
AGE	-0.279	0.429	0.515	-0.370	0.425	0.384
LEV	0.067	0.029	0.021	0.092	0.043	0.032
Equation is just identified				GMM criterion: 0.000		

Source: Authors calculation

Interestingly, all four estimators produced comparable coefficient values. The obtained research results indicate the following: 1) the business performance from the previous period has the greatest impact on performance in the current period. This is somewhat expected as it represents the foundation for future growth and development. The cumulative effects of previous achievements enable companies to improve their assets, organization, invest more in promotion, and enhance relationships with external stakeholders, while also optimizing work processes and products; 2) The important factor is PSE. There are several reasons for this. First, such support helps to create a stable and predictable working environment, which is essential for planning and investing in agricultural production. Second, policies that encourage innovation and technology transfer enable agricultural businesses to improve their practices and increase efficiency. Third, institutional support, such as providing access to financial resources, training, and management advice, can significantly enhance the competitiveness of agricultural enterprises. Additionally, policies that focus on sustainability and environmental protection assist farmers in adapting to climate change and ensuring the long-term viability of their operations. Finally, facilitating access to markets through various support programs can improve the market position of agricultural enterprises and strengthen their role in the economy; 3) It is known that strict employment protection laws can limit a company's ability to respond quickly to changes in the market, which can have a negative impact. However, the fact that HRP (Human Resource Policies) does not have a statistically significant impact can be explained by the complicated regulations regarding the hiring of seasonal workers from the

employment agency, which affects agricultural enterprises' ability to take advantage of these opportunities. Another reason may be that companies are not informed about such benefits; 4) the complicated procedure for obtaining loans, along with the lack of guarantees, creates obstacles that diminish the potential effect of broad money on the operations of agricultural enterprises; 5) IFA is a significant factor. Investing in fixed assets is crucial for the success of agricultural enterprises for several reasons. First, modern fixed assets such as tractors, combines, and other machinery enable farmers to perform their tasks more efficiently, significantly increasing yields and reducing the time required for various agricultural activities. Additionally, investments in quality irrigation systems, storage, and processing enhance product quality, which directly impacts market prices and competitiveness; higher-quality products often attract greater demand, facilitating better sales. Moreover, more efficient equipment and technologies can lead to a reduction in long-term operational costs, including labor and material expenses, ultimately improving profitability. Investment in fixed assets also allows farmers to access new markets by producing new or specialized products. Furthermore, such investments help in better risk management associated with climate change and unpredictable weather; for example, efficient irrigation systems can reduce dependence on rainfall, ensuring better yields; 6) HCE is a significant factor. This finding emphasizes the significance of fostering and enhancing human capital within agricultural enterprises. This understanding is particularly crucial when considering the findings of a study by [25], which reveals that the demand for human resources is increasing at a rate of 9-11%, while the supply is only growing at a rate of 6-7%. Therefore, agricultural enterprises must focus on promoting the more effective utilization of their human resources and encouraging creativity and collaborative learning among employees; 7) SCE is a significant factor. This result should be viewed in light of either 1) the changes from outdated and inefficient organizational methods and management styles that prevailed prior to the privatization of these companies, or 2) the positive outcomes resulting from the implementation of new organizational and management approaches. 8) CCE is not a significant factor. This outcome was surprising considering that this is a labor-intensive industry where physical capital, such as machinery and equipment, significantly contributes to enhancing productivity. Additionally, it is a sector known for its low turnover and liquidity ratios; 9) The size of an agricultural enterprise significantly influences its success for several reasons. One reason is the benefit from economies of scale, allowing them to reduce costs per unit of production and improve profitability. They typically have easier access to financial resources and credit, as banks and investors tend to favor established, stable businesses with proven success records. Furthermore, larger organizations often employ a more skilled workforce, contributing to improved management processes and operational efficiency; 10) Lev is a significant factor. Leverage has a positive impact on agricultural enterprises for several reasons. By utilizing borrowed capital, these businesses can invest in necessary assets, such as modern equipment and technology, which enhance productivity and efficiency. This additional funding allows farmers to expand their operations, increase production capacity, and improve their competitive edge in the market. Additionally, leveraging capital can enable agricultural enterprises to manage cash flow more effectively by financing operations during periods of low income, ensuring business continuity.

Conclusions

This research highlights the essential factors influencing the success of agricultural enterprises in the Republic of Serbia from 2015 to 2023, utilizing a balanced panel data analysis of 32 enterprises. The results indicate that past business performance is a critical predictor of current outcomes, establishing a basis for continued growth and development. Additionally, the significance of Product Support Estimate (PSE) has been underscored, as it fosters a stable working environment and encourages innovation, ultimately enhancing competitiveness. While strict Human Resource Policies (HRP) were found to have a negligible impact due to regulatory complexities, investments in fixed assets (IFA) and human capital employment (HCE) emerged as vital elements for improving operational efficiency and productivity. Furthermore, Structural

Capital Employed (SCE) demonstrated its relevance in light of new management practices, whereas Customer Capital Employed (CCE) did not show significant influence. The size of agricultural enterprises and the effective use of leverage (LEV) also play pivotal roles in shaping their success, enabling them to capitalize on economies of scale and access necessary resources. Collectively, these findings offer valuable insights for agricultural stakeholders in Serbia, emphasizing the importance of strategic investments, effective management practices, and supportive policies to foster sustainable growth in the agriculture sector.

Future researchers in the field of agriculture in Serbia should focus on longitudinal studies that track changes over time to better understand the essential factors of success. It is also important to explore the role of innovation and alternative approaches to human resources, as well as analyzing how technological solutions can enhance operational efficiency and competitiveness in the sector. Including a broader sample of enterprises and considering external factors, such as climate and regulations, will further enrich the research.

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Table 1A. Panel Unit Root Test and the Hausman Test

Variable	LLC test		Hausman test	
	z-score	p -value	χ^2 (1)	p -value
$\hat{\delta}_{i,t-1}$	-3.567	0.000	2.859	0.091
PES	15.540	1.000	/	/
EPR	10.600	0.855	/	/
IFA	-6.809	0.000	/	/
MB	0.568	0.715	/	/
HCE	-2.317	0.010	10.531	0.001
SCE	-34.123	0.000	3.145	0.076
CEE	-3.567	0.000	6.342	0.012
Size	-11.238	0.000	12.876	0.000
AGE	-7.983	0.000	0.842	0.359
LEV	-1.245	0.107	1.082	0.298

Note: All variables that have a p-value less than 0.05 are nonstationary.
Source: Authors calculation

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