FACTORS INFLUENCING THE PROFITABILITY OF SMES FROM THE REPUBLIC OF SERBIA: FOOD INDUSTRY

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ARTICLE INFO

Original Article

Received: *09 August 2024*

Accepted: *20 September 2024*

doi:10.59267/ekoPolj2502409N

UDC 338.439:658.11(497.11)

Keywords:

Profitability, SMEs, food industry, panel regression analysis

JEL*: C33, L25, L66*

ABSTRACT

Drawing from an extensive literature review on the impact of microeconomic and macroeconomic variables on the profitability of food enterprises globally and within national markets, this research analyzes the performance of small and medium-sized food companies in the Republic of Serbia from 2014 to 2022. The objective of this paper is to analyze the influence of microeconomic and macroeconomic factors on their profitability. By applying panel regression analysis, the impact of various factors on profitability, measured by return on assets, was examined. The research findings indicate that both the current asset turnover ratio and the growth rate of gross domestic product exert a significant positive influence on the profitability of the examined enterprises, whereas factors such as indebtedness, average collection period, asset tangibility, and inflation demonstrate a significant negative impact.

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Introduction

Profitability serves as a fundamental indicator of business success and sustainability within today's economic landscape. The financial performance of a company is used as a means to measure its current development and growth potential (Kim et al., 2021). Profitability not only reflects a company's ability to generate profit (Alarussi & Gao 2021), but also provides insight into the efficiency of its operations, management strategies, and competitive position in the market. In the context of the Serbian economy, which faces numerous challenges and opportunities in the process of transition and integration into global economy, profitability becomes even more significant as a measure of economic growth and development. Profitability plays several key roles in a country's financial system. It provides the means for further development and investment in companies, contributing to business expansion, modernization of production processes and improvement of competitiveness. For the Serbian economy, which needs technological advancements and increased productivity, profitable companies form the basis for sustainable economic growth. Profitability contributes to job stability and increased employment. Companies that generate profits have a greater capacity to hire new workers and provide better working conditions for existing employees. In Serbia, where the unemployment rate remains high, profitable companies are vital in helping reduce unemployment and enhancing citizens' quality of life. Furthermore, profitability is a significant factor in attracting both domestic and international investments. Investors tend to favor companies with stable and robust profits, as this reduces investment risk and heightens the chances of returns. For Serbia, which is undergoing economic reforms and moving toward European Union integration, drawing in investments is essential to achieving sustainable economic growth. Profitability serves not only as a reliable measure of current business performance but also as a predictive tool for future success. It reflects shareholder value and is thus attractive to investors. This makes understanding the factors that influence profitability, whether directly or indirectly, a key area of research in fields such as economics, strategic management, accounting, and finance (Nguyen & Nguyen, 2020).

Identifying the determinants of profitability is fundamental for effective business decision-making and the formulation of appropriate economic policies. Analyzing these factors enables the identification of a company's strengths and weaknesses, as well as recognizing opportunities and threats in the business environment. Numerous factors influence a company's profitability, which, according to economic literature, can be divided into two groups: microeconomic (internal) factors and macroeconomic (external) factors that are beyond the company's control (Tekić et al., 2022).

The food and beverage industry represents one of the key traditional sectors that is vital for every economy. Economists often view it as a stable sector that better withstands economic cycles and fluctuations compared to other industries (Šimáková et al., 2019). Serbia has a long tradition in the food processing industry (Dakić & Mijić, 2018). As one of the largest sectors of the economy, it not only contributes to the country's GDP but also employs over 100,000 people (Statistical Office of the Republic of Serbia,

2024). This industry also plays a key role in Serbia's export strategy, contributing to the stability of the trade balance. Given Serbia's rich agricultural resources, the food industry has enormous potential for further development. The profitability of the food industry directly impacts Serbia's economic growth and development. Stable and profitable food enterprises facilitate long-term investments in innovation, enhance production capacities and contribute to the generation of new employment opportunities. This process strengthens the economy while simultaneously enhancing the quality of life for the population through the provision of a secure and stable food supply.

Given the importance of this sector, this study focuses on small and medium-sized (SME) food companies operating within the Republic of Serbia from 2014 to 2022. The main objective is to evaluate these enterprises' profitability and to analyze the effects of various microeconomic and macroeconomic factors on their financial standing. Accordingly, the research is guided by the following hypotheses:

H_1: Liquidity has a significant impact on the profitability of small and medium-sized food companies.

H_2: Leverage significantly influences the profitability of small and medium-sized food companies.

H_3: Indebtedness significantly affects the profitability of small and medium-sized food companies.

H_4: The average receivables collection period has a significant effect on the profitability of small and medium-sized food companies.

H_5: The current asset turnover ratio significantly impacts the profitability of small and medium-sized food companies.

H_6: Tangibility significantly influences the profitability of small and medium-sized food companies.

H_7: GDP significantly affects the profitability of small and medium-sized food companies.

H_8: Inflation has a significant impact on the profitability of small and medium-sized food companies.

Literature review

Various scholars worldwide have studied the factors influencing firms' profitability in the food sector. Some studies concentrate exclusively on microeconomic (internal) factors, while others incorporate macroeconomic (external) influences on profitability.

Pervan and Mlikota (2013) analyzed profitability determinants in Croatia's food and beverage industry from 1999 to 2009. Utilizing dynamic panel analysis and the Generalized Method of Moments (GMM), their findings revealed a statistically significant negative effect of indebtedness on profitability. Conversely, company size,

industry concentration, and past performance had significant positive effects on current profitability. In Pakistan, Bhutta and Hasan (2013) examined profitability factors for food enterprises operating between 2002 and 2006. They found that asset tangibility, company growth, and inflation positively influenced profitability, while company size had a negative effect. This study considered only one macroeconomic factor, inflation, which proved to have a significant impact. The determinants of profitability for food industry companies in the EU were researched by Hirsch et al. (2014). The authors obtained data from companies in five countries (Belgium, France, Italy, Spain, and the UK) during the period from 2004 to 2008. Based on the results of the hierarchical linear model, they found that company size and concentration have a statistically significant and positive impact on profitability, while company risk, age and industry growth have a statistically significant and negative impact on profitability. Golas & Bieniasz (2016) researched how inventory management affects the financial performance of the food industry in Poland from 2005 to 2010. Panel regression models were applied in their analysis to examine the link between the length of the inventory cycle and company profitability, which was quantified by return on sales, assets, and capital. The results showed that shortening the overall inventory cycle, as well as individual inventory cycles, is positively associated with company profitability. The study emphasizes that efficient inventory management can significantly contribute to improving financial performance, especially in the food industry, where maintaining continuity of sales and production is essential due to the seasonal nature of raw material production. Mijić et al. (2016) conducted a study aimed at analyzing the profitability of the meat processing industry in Serbia for the period from 2011 to 2015. The study included 12 companies from this sector where profitability was measured by the return on assets (ROA). The panel regression analysis revealed that companies with a higher liquidity ratio and sales growth tend to achieve greater profitability, whereas a high level of indebtedness is associated with lower profitability. The analysis also revealed that company size, the ratio of fixed assets, and investment levels are not statistically significant determinants of profitability within the Serbian meat industry. The authors emphasize the need to reduce indebtedness and better utilize additional borrowings for adequate investments to improve profitability in this sector. Nuševa et al. (2017) investigated the performance of coffee processors and the coffee market in Serbia, utilizing market concentration analysis, profitability analysis and identification of profitability determinants. The research sample consisted of 40 coffee processors, which were classified into two groups: large processors and small processors. The results indicate that profitability is positively correlated with inventory turnover and negatively correlated with market share. An analysis of the factors influencing the profitability of companies engaged in fruit and vegetable processing in Serbia was conducted by Dakić & Mijić (2018). This study included 22 companies that operated from 2007 to 2015. Through the application of a panel regression model, the authors identified a statistically significant positive relationship between sales growth and profitability, while company size and capital turnover were found to significantly negatively affect profitability. An analysis conducted by Pervan et al. (2019) focused on 9,359 companies in Croatia's manufacturing

industry during the period from 2006 to 2015. The study categorized the determinants of profitability into firm-specific factors, industry-specific factors and macroeconomic factors, applying the dynamic panel estimator General Method of Moments (GMM) to capture the dynamic aspect of profitability. The results showed that company age, labor costs, industry concentration, GDP growth and inflation significantly influence profitability. Specifically, older companies and favorable economic conditions positively impact profitability, while higher labor costs and industry concentration negatively impact it. Dakić, et al. (2019) analyzed the determinants of business success for companies in Serbia's food industry using multiple regression analysis on a sample of 73 companies from 2007 to 2015. The research results showed that sales growth has a significantly positive impact on profitability across all analyzed sectors of the food industry. In the meat processing sector, profitability is positively associated with the liquidity ratio, while company size, indebtedness and capital turnover ratio are negatively associated with profitability. In the fruit and vegetable processing sector, profitability is negatively associated with company size and capital turnover ratio. In the dairy processing sector, profitability is positively associated with the quick liquidity ratio and negatively associated with indebtedness. A study conducted by Blažková & Dvouletý (2019) examined the factors influencing the performance of food enterprises in the Czech Republic. Through the analysis of 1,804 enterprises spanning the period from 2003 to 2014, the authors utilized a panel regression model and identified labor productivity, company age, and size as having a statistically significant positive impact on profitability, whereas indebtedness was found to have a statistically significant negative effect. Grau-Reig et al. (2020) analyzed the profitability of small and medium-sized enterprises (SMEs) in the agri-food industry in Europe. The authors applied a hierarchical linear model (HLM) to decompose the variance in return on assets (ROA) into multiple levels: year, country, industry, and company. This analysis aimed to identify the factors that contribute most to profitability. The results indicate that company-level factors have a significantly greater impact on profitability than industry characteristics. Specifically, company size and industry concentration are key drivers, while company risk, age, and industry growth are negatively correlated with profitability. A study on the factors influencing the profitability of meat processing companies in Serbia was conducted by Dakić & Mijić (2020). Using data from 24 companies over the period 2007–2016, the authors employed panel regression analysis to determine the influence of various factors on profitability. The results revealed that company age, debt levels, and capital turnover negatively affect profitability, while both sales growth and liquidity are positively correlated with profitability. In their study, Andrés González-Moralejo et al. (2021) examined the factors affecting the profitability of food industry enterprises in the Valencia region from 2006 to 2015. Based on the results of panel regression analysis, the authors concluded that company size and exports were essential for profitability, with macroeconomic conditions and location also significantly impacting financial outcomes. Tekić et al. (2022) analyzed the determinants of profitability for small agricultural and food companies in the Republic of Serbia. The panel regression analysis conducted on a sample of 123 food enterprises from 2010 to

2019 showed that the total asset turnover ratio and inflation significantly and positively impacted profitability, while liquidity, indebtedness, tangibility, and the GDP growth rate had a significant negative effect on profitability. Additionally, Nuševa et al. (2024) examined how sales growth affects the profitability of manufacturing companies in the Republic of Serbia. The panel regression results for a sample of 200 enterprises operating from 2018 to 2021 indicated that inventory exerted a statistically significant negative impact on profitability, whereas sales growth was found to have a statistically significant positive effect on profitability in the Serbian manufacturing sector.

Materials and methods

This research utilizes data derived from companies' financial reports. According to the Serbian Business Registers Agency, there were 3,911 active food enterprises in Serbia as of the end of 2022. Out of this total, 591 were categorized as small, and 149 as medium-sized enterprises. Initially, companies that were inactive during the study period were excluded from the sample. Furthermore, companies that did not adhere to the regular submission of financial reports, in addition to those in bankruptcy or liquidation, were excluded from the study. Following this, the Tukey-Fence rule (Zijlstra et al., 2007) was applied to eliminate enterprises with extreme values in profitability indicators. This process yielded a final sample of 311 enterprises, which were then analyzed using panel regression techniques.

The review of existing literature indicates that the return on assets (ROA) is the most frequently used profitability metric. Calculating this indicator involves comparing the net result with the average total assets, thereby revealing the net profit generated from the company's assets. Additionally, this metric serves to assess the effectiveness with which the company employs its investments to generate profit (Alshatti, 2015). Therefore, return on assets (ROA) will be incorporated as the variable being explained in the panel regression model. Various financial performance indicators (liquidity, leverage, indebtedness, receivables collection period, current asset turnover ratio and tangibility) were used as microeconomic determinants of profitability (independent variables). Ehiedu (2014) states that an enterprise lacking adequate liquidity may be considered nonviable, highlighting the critical importance of sustaining an appropriate liquidity level. Additionally, it is fundamental to recognize overabundant liquidity, as it may lead to the accumulation of unproductive inventory that fails to generate profit. Excessive borrowing can also place an enterprise in a precarious position and there must be a balance between the level of borrowed funds, the sources designated for debt repayment and the total available assets. Consequently, leverage and indebtedness have been incorporated into the analyzed indicators. The receivables collection period is a key aspect of a business's cash flow management, particularly for SMEs within the food sector. A reduced receivables collection period facilitates the timely collection of payments from customers, thereby enhancing cash flow. The current asset turnover ratio reflects the ability to convert current assets, such as inventory and receivables, into sales. A higher ratio indicates that the company is effectively managing its assets,

which can lead to increased sales relative to the investments. Tangible assets, such as machinery, equipment, and real estate, are vital for food production and distribution. High levels of tangible assets can enhance operational efficiency, allowing companies to increase output and consequently, profitability. The independent variables (regarding macroeconomic determinants of profitability) were the gross domestic product (GDP) growth rate and inflation (CPI). While rising GDP can enhance profitability through increased consumer spending and market expansion, inflation presents a more nuanced challenge by affecting input costs and consumer behavior. SMEs must remain vigilant and adaptable to these economic conditions to sustain and enhance their profitability in a dynamic economy. The variables incorporated into the panel regression models are outlined in Table 1.

Table 1. List of indicators

Indicator	Notation	Explanation
Return on asset	ROA	Net income/Average total assets
Liquidity	LIQ	Current assets/Short-term liabilities
Leverage	LEV	Total liabilities/Total capital
Indebtedness	DEBT	Total liabilities/Total assets
Receivables collection period	RCP	365/Accounts receivable turnover ratio
Current asset turnover ratio	CATR	Sales revenue/Average current assets
Tangibility	TANG	Fixed assets/Total assets
GDP	GDP	Growth rate of GDP
Inflation	CPI	Growth rate of CPI

Source: Author's review (based on: Fernández-Lopez et al., 2020; Tekić et al., 2022)

The panel regression model was utilized to evaluate the factors affecting the profitability of small and medium-sized food enterprises operating in the Republic of Serbia from 2014 to 2022. This model combines cross-sectional and time series data, encompassing both spatial and temporal dimensions. In this study, a classical linear panel regression model was used on balanced data, with a previously selected set of variables. The regression model was calculated according to:

$$ROA_{it} = \beta_{it} + \beta_{1\,LIQ} + \beta_{2\,LEV} + \beta_{3\,DEBT} + \beta_{4\,RCP} + \beta_{5\,CATR} + \beta_{6\,TANG} + \beta_{7\,GDP} + \beta_{8\,CPI} + u_{it}$$

In this specification, *i* denotes the individual company (*i*= 1,2,3…, n), *t* refers to each year (t= 1,2,3…,9), and u_{it} is the error term, assumed to have a mean of zero and constant variance for all *i* and *t*.

Following the formulation of the initial model, the key assumptions necessary for the application of panel regression models were assessed, namely multicollinearity, heteroskedasticity, autocorrelation, and cross-sectional dependence.

Prior to selecting the final model specification, it is essential to assess the presence of individual and/or time effects within a fixed or random effects framework. Hypothesis testing examines the presence of unobserved heterogeneity in the panel regression model,

and if heterogeneity is confirmed, it is determined whether it is fixed or random. Then, the F-test is used to determine whether a fixed-effects model or an OLS model is more appropriate. For comparing the OLS model and the random-effects model, Lagrange Multiplier (LM) tests are used. If no test rejects the null hypothesis, the OLS model is applied. The Hausman specification test is most commonly used to compare fixed and random effects models, assuming that individual effects are not correlated with the regressors. If the null hypothesis is rejected in favor of the alternative hypothesis, it is necessary to apply the fixed-effects model (Das, 2019).

Results and discussion

The results of the descriptive statistical analysis for the business performance indicators of the observed food enterprises are shown in Table 2.

Table 2. Descriptive data analysis

Indicator	Med	Min.	Max.	Std.dev
ROA	5.85	-41.37	61.08	6.92
LIQ	2.93	0.06	93.74	5.11
LEV	2.31	0.00	297.49	7.34
DEBT	0.49	0.00	1.29	0.25
RCP	47.73	0.93	461.91	13.88
CATR	3.13	0.09	39.45	2.63
TANG	0.43	0.00	0.97	0.21
GDP	2.63	-1.60	7.70	2.66
CPI	3.24	1.10	12.00	3.22

Source: Authors' calculation

During the observed period, the median value of the ROA indicator was 5.85%, which suggests an average level of profitability, slightly above the 5% benchmark typically seen as indicating good profitability. The median liquidity ratio of 2.93 indicates that these companies have sufficient current assets to meet their short-term liabilities. The median financial leverage of 2.31 suggests a substantial reliance on liabilities in the capital structures. The median indebtedness ratio was 0.49, meaning that 49% of the enterprises' assets were financed by debt, while the remaining 51% were financed by equity. The median day of the receivables collection period was 47.73, indicating that, on average, it took enterprises about 48 days to collect their receivables. This indicator showed a high degree of variability, with some enterprises collecting receivables immediately, while others took up to 462 days. The median current asset turnover ratio was 3.13, meaning that the average current assets turned over or converted back to cash was 3.13 times. The median tangibility was 0.43, indicating that 43% of total assets were fixed assets. This indicator also showed a low standard deviation, implying a low level of variability among the enterprises in the sample. Throughout the observed period, the median GDP growth rate was 2.63%, while the average CPI rate stood at 3.24%. The GDP growth rate reached its lowest point in 2014 at -1.6%, and its highest in 2021 at 7.7%. The CPI rate was at its lowest in 2016, at 1.1%, and at its highest in 2022, at 12%.

The application of panel data assumes that the independent variables are not excessively correlated, which in turn implies the lack of multicollinearity. For the formulated model, the variance inflation factors (VIF) and tolerance values were calculated first to determine the presence of multicollinearity (Table 3).

Table 3. Multicollinearity among the independent variables

Variable	VIF	TOL
DEBT	1.51	0.66
LIQ	1.30	0.77
CATR	1.18	0.85
LEV	1.18	0.85
TANG	1.13	0.88
RCP	1.06	0.94
GDP	1.02	0.98
CPI	1.02	0.98

Source: Authors' calculation

According to the VIF and TOL (1/VIF) results, none of the variables have a VIF value exceeding 5, and all TOL values are above the threshold of 0.2. This leads to the conclusion that multicollinearity does not adversely affect the developed model. Daoud (2017) states that VIF values should be between 1 and 5 to consider the variables moderately correlated, which is desirable in regression analysis.

The next phase of the analysis focused on testing additional assumptions for panel regression, including heteroskedasticity, autocorrelation, and cross-sectional dependence (Table 4).

Table 4. Analyses of heteroskedasticity, autocorrelation and cross-sectional dependence

Test	Test statistics	p-value
Breusch-Pagan / Cook-Weisberg test	448.91	0.00
Wooldrige test	278.52	0.00
CD Pesaran test	21.43	0.00

Source: Authors' calculation

Heteroskedasticity was tested using the Breusch-Pagan / Cook-Weisberg test. At the 1% significance level, the results indicate a rejection of the null hypothesis of homoskedasticity, providing evidence in support of the alternative hypothesis of heteroskedasticity ($p < 0.01$). Autocorrelation was examined using the Wooldridge test, which confirmed its presence at the 1% significance level ($p<0.01$). Furthermore, Pesaran's CD test results indicate significant cross-sectional dependence ($p < 0.01$), which suggests that the dependent variable is affected by underlying common factors.

In the subsequent phase of the research, tests were performed to assess the presence of individual and/or temporal effects. The F-test for fixed effects and the Breusch-Pagan LM test for random effects were employed to test for the presence of individual and/or time effects (Table 5).

Table 5. Tests for individual and/or time effects

Test	Test statistics	p-value
F-test (individual effects)	6.54	0.00
F-test (time effects)	5.34	0.00
Breusch-Pagan LM test (individual effects)	1470.90	0.00
Breusch-Pagan LM test (time effects)	28.13	0.00

Source: Authors' calculation

The F-test results for individual effects confirm the presence of these effects at a 1% significance level ($p<0.01$). Similarly, the F-test for time effects supports the alternative hypothesis, indicating significant time effects in the model ($p<0.01$). The Breusch-Pagan LM test also confirms the presence of individual effects in the model ($p<0.01$), and further shows that time effects are statistically significant as well ($p<0.01$).

The subsequent step necessitates an analysis of the characteristics of individual and temporal effects, focusing on the determination of their status as either fixed or random. To choose the appropriate model specification, a modified Hausman test is applied. With a Hausman test statistic of 35.71 ($p = 0.00$), the null hypothesis is rejected at the 1% significance level, suggesting that a fixed-effects model is appropriate for capturing both individual and time effects.

In order to address the violations of the initial assumptions for panel regression, an alternative fixed-effects model with panel-corrected standard errors (PCSE) was employed. The outcomes of this specification are displayed in Table 6.

Table 6. Model estimation with fixed individual and time effects for analyzing the profitability of food SMEs

	Coeff.	Std. Error	t-ratio	p-value
Const	16.895	1.519	11.121	0.000**
LIQ	-0.062	0.039	-1.611	0.109
LEV	0.017	0.027	0.644	0.524
DEBT	-15.549	2.125	-7.322	0.000**
RCP	-0.004	0.001	-2.808	0.005**
CATR	0.817	0.144	5.655	0.000**
TANG	-11.329	1.679	-6.754	0.000**
GDP	0.180	0.035	5.090	0.000**
CPI	-0.067	0.032	-2.091	0.037*
n	311			
t	9			
N	2799			
R^2	0.53			
F- test	16.77**			
*Note: ** - level of significance 1%; * - level of significance 5%*				

Source: Authors' calculation

Based on data from 311 food companies over a nine-year period, the panel regression model was developed, generating a total of 2,799 observations. The F-test results indicate that the model is highly significant ($p < 0.01$), and the coefficient of determination reveals that 53% of the variability in profitability can be explained by the factors included in the model.

The panel regression analysis results show that liquidity and leverage do not have a statistically significant impact on the profitability of small and medium-sized food companies, leading to the rejection of hypotheses H_1 and H_2. The analysis reveals a statistically significant negative effect of indebtedness on profitability, supporting hypothesis H_3. Similar conclusions were reported by Pervan and Mlikota (2013) for Croatian food enterprises, Mijić et al. (2016) for Serbian meat processing companies, and Tekić et al. (2022) for small food enterprises in Serbia. Additionally, the results indicate that the receivables collection period has a statistically significant negative impact on profitability, implying that longer collection periods are associated with reduced profitability. Consequently, hypothesis H_4 is accepted. These findings are consistent with previous research by Mathavu (2010), Ray (2012), and Pais and Gama (2015). The analysis reveals that the current asset turnover ratio significantly positively influences the profitability of the observed food enterprises, thereby supporting hypothesis H_5. An increase of 1 in this ratio corresponds to a 0.82% rise in profitability. These findings are consistent with the results reported by Akoto et al. (2013). Asset tangibility significantly negatively affects the profitability of the observed enterprises, thereby supporting hypothesis H_6. Specifically, an increase in tangibility by 1 resulted in an 11.34% decrease in profitability. This finding suggests deficiencies in the condition and management of fixed assets, highlighting the necessity for investments in new facilities and equipment. The negative correlation between tangibility and profitability was further confirmed by Tekić et al. (2022) in their research on food enterprises in Serbia. The results show that macroeconomic factors have a statistically significant impact on the profitability of the observed companies, where GDP growth positively influences profitability, while the CPI has a negative effect. Consequently, hypotheses H_7 and H_8 are accepted. The positive effect of GDP growth on profitability has also been identified by Pervan et al. (2019), Juszczyk et al. (2020) and Grau and Reig (2021). Additionally, the adverse impact of CPI on the profitability of food enterprises has been corroborated by Juszczyk et al. (2020) and Tekić et al. (2022).

Conclusions

This study analyzed the profitability of small and medium-sized food companies in the Republic of Serbia from 2014 to 2022, with an emphasis on identifying the microeconomic and macroeconomic factors that impact profitability. The findings indicate that the average profitability of the enterprises examined during this period was 5.85%.

Utilizing a panel regression model with fixed effects allowed for the identification of key factors that significantly influence the profitability of the enterprises studied. The

analysis indicates that indebtedness, the period for collecting receivables, current asset turnover ratio, tangibility, GDP growth rate, and the CPI are statistically significant variables influencing the profitability of food enterprises. Specifically, indebtedness, receivables collection period, tangibility, and CPI were found to have a negative effect on profitability, while the current asset turnover ratio and GDP growth rate positively influenced it. The negative impacts of indebtedness and tangibility suggest a need for improved debt management and more efficient use of fixed assets. Similarly, the negative effect of the receivables collection period indicates a need for stronger credit policies, as longer collection periods mean a higher amount of financial resources are tied up, representing an opportunity cost for these companies. On the other hand, the positive influence of the current asset turnover ratio highlights the importance of effective working capital and liquidity management for achieving higher profitability. Regarding macroeconomic factors, the positive effect of GDP growth underscores the value of favorable economic conditions for the success of food enterprises, while the negative impact of the CPI rate emphasizes the necessity of price stability and a predictable economic environment for effective business planning.

This study offers a better understanding of the key factors impacting the profitability of food enterprises in Serbia and can serve as a basis for formulating adequate economic policies and management strategies that would improve the operations and competitiveness of this sector. It is particularly important to focus on reducing indebtedness, more efficient management of fixed assets and adapting business operations to macroeconomic conditions to achieve sustainable profitability and growth of food enterprises in Serbia. This research has certain limitations. First, since the sample comprises only small and medium-sized food enterprises from the Republic of Serbia, the results may not fully represent the broader food sector. Therefore, future research should include micro and large enterprises. Second, the period covered by the research is another limitation; in the future, the database should be expanded and the research should be repeated. Additionally, it is necessary to conduct studies in other industries for the comparison of results and identification of specific factors influencing the profitability of enterprises across different economic sectors.

Acknowledgments

This research was supported by the Provincial Secretariat for Higher Education and Scientific Research of the Autonomous Province of Vojvodina, the Republic of Serbia during the project Assessment of Economic Performance of the Agricultural and Food Sector of AP Vojvodina, grant number 142-451-2567/2021-01/3.

Conflict of interests

The authors declare no conflict of interest.

References

1. Akoto, R.K., Vitor, D.A. & Angmor, P.L. (2013). Working Capital Management and Profitability: Evidence from Ghanaian listed Manufacturing Firms. *Journal of Economics and International Finance*, 5(9), 373-379. Retrieved from https://doi.org/10.5897/JEIF2013.0539 (July 10, 2024).
2. Alarussi, A.S. & Gao, X. (2023). Determinants of profitability in Chinese companies. *International Journal of Emerging Markets*, 18 (10), 4232-4251. Retrieved from https://doi.org/10.1108/IJOEM-04-2021-0539 (July 10, 2024).
3. Alshatti, S. (2015). The Effect of the Liquidity Management on Profitability in the Jordanian Commercial Banks. *International Journal of Business and Management*, 10 (1), 62-71.
4. Bhutta, N. & Hassan, A. (2013). Impact of Firm Specific Factors on Profitability of Firms in Food Sector. *OpenJournal of Accounting*, 2(2), 19-25.
5. Blažková, I. & Dvouletý, O. (2019). Investigating the differences in entrepreneurial success through the firm-specific factors: Microeconomic evidence from the Czech food industry. *Journal of Entrepreneurship in Emerging Economies*, 11(2), 154-176. Retrieved from https://doi.org/10.1108/JEEE-11-2017-0093 (July 11, 2024).
6. Dakić S. & Mijić K. (2018). A panel analysis of profitability in the fruit and vegetable processing industry in Serbia. *Economics of Agriculture*, 65 (1), 307-321. Retrieved from https://doi.org/10.5937/ekoPolj1801307D (July 15, 2024).
7. Dakić, S., Mijić, K. & Jakšić, D. (2019). Multiple Regression Approach to Modelling Determinants of Business Success Based on Financial Statements: Evidence from Food Processing Companies in the Republic of Serbia. Custos e agronegocio on line, 15 (4), 485- 501.
8. 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. Retrieved from http://doi.org/10.5937/StraMan2001029D (July 16, 2024).
9. Daoud, J. (2017). Multicollinearity and Regression Analysis. *Journal of Physics: Conference Series, Volume 949, 4th International Conference on Mathematical Applications in Engineering 2017 (ICMAE'17) 8–9 August 2017, International Islamic University Malaysia, Kuala Lumpur, Malaysia, 1-6.* Retrieved from https://doi.org/10.1088/1742-6596/949/1/012009 (July 11, 2024).
10. Ehiedu, V.C. (2014). The Impact of Liquidity on Profitability of Some Selected Companies: The Financial Statement Analysis (FSA) Approach. *Research Journal of Finance and Accounting*, 5 (5), 81- 90.
11. Fernández-López, S., Rodeiro-Pazos, D., & Rey-Ares, L. (2020). Effects of working capital management on firms' profitability: evidence from cheese-producing companies. *Agribusiness*., 1-22. Retrieved from https://doi.org/10.1002/agr.21666 (July 20, 2024).
12. Golas, Z. & Bieniasz, A. (2016). Empirical Analysis of the Influence of Inventory Management on Financial Performance in the Food Industry in Poland. Engineering Economics, 27(3), 264-275. Retrieved from https://doi.org/10.5755/j01.ee.27.3.5933 (July 21, 2024).

13. González-Moralejo S.A., Cortés M.G. & Miquel J.F.L. (2021). Are small and medium-size food industry firms profitable? Explaining differences in their performance: The case of the Valencia Region. Economia Agro-Alimentare/Food Economy, 23, 1–24.
14. Grau, A. J., & Reig, A. (2015). Vertical integration and profitability of the agrifood industry in an economic crisis context. Spanish Journal of Agricultural Research, 13(4),e0107. Retrieved from https://doi.org/10.5424/sjar/2015134-7487 (July 25, 2024).
15. Hirsch, S., Schiefer, J., Gschwandtner, A. & Hartmann, M. (2014). The Determinants of Firm Profitability Differences in EU Food Processing. Journal of Agricultural Economics, 65(3), 703-721. Retrieved from https://doi.org/10.1111/1477-9552.12061 (July 29, 2024).
16. Juszczyk, S., Balina, R., Bąk, M. & Juszczyk, J. (2020). Macroeconomic conditions of the financial efficiency of food industry enterprises. *Economic and Regional Studies*, 13(4), 407-428. Retrieved from https://doi.org/10.2478/ers-2020-0030 (July 27, 2024).
17. Kim, L.T.N., Duvernay, D. & Thanh, L.H. (2021). Determinants of financial performance of listed firms manufacturing food products in Vietnam: regression analysis and Blinder–Oaxaca decomposition analysis. Journal of Economics and Development, 23(3), 267-283. Retrieved from https://doi.org/10.1108/JED-09-2020-0130 (July 28, 2024).
18. Mathuva, D. M. (2010). The Influence of Working Capital Management Components on Corporate Profitability: A Survey on Kenyan Listed Firms. *Research Journal of Business Management*, 4, 1-11. Retrieved from https://doi.org/10.3923/rjbm.2010.1.11 (July 14, 2024).
19. Mijić, K., Zekić, S. & Jakšić, D. (2016). Profitability analysis of meat industy in Serbia. Facta universitatis-series:Economics and Organization, 13(4), 379-386. Retrieved from https://doi.org/10.22190/fueo1604379M (July 19, 2024).
20. Nguyen, N.L., Nguyen, V.C. (2020). The Determinants of Profitability in Listed Enterprises: A Study from Vietnamese Stock Exchange; School of Economics. Journal of Asian Finance, Economics and Business, 7 (1), 47-58. Retrieved from https://doi.org/10.13106/jafeb.2020.vol7.no1.47 (July 17, 2024).
21. Nuševa, D., Mijić, K., & Jakšić, D. (2017). The performances of coffee processors and coffee market in the Republic of Serbia. Economics of Agriculture, 64(1), 307-322. Retrieved from https://doi.org/10.5937/ekoPolj1701307N (July 14, 2024).
22. Nuševa, D., Dakić, S., Peštović, K., & Hladika, M. (2024). The impact of sales growth on manufacturing companies' profitability in the Republic of Serbia: Panel data analysis. *Strategic Management*. Retrieved from https://doi.org/10.5937/StraMan2400009N (July 16, 2024).
23. Pais, M.A. & Gama, P.M. (2015). Working capital management and SMEs profitability: Portuguese evidence. International Journal of Managerial Finance, 11(3), 341-358. Retrieved from https://doi.org/10.1108/IJMF-11-2014-0170 (July 04, 2024).

24. Pervan, M. & Mlikota, M. (2013). What Determines The Profitability of Companies: Case of Croatian Food and Beverage Industry. *Economic Research*, 26(1), 277-286. Retrieved from https://doi.org/10.1080/1331677X.2013.11517602 (July 30, 2024).
25. Pervan, M., Pervan, I. & Ćurak, M. (2019). Determinants of firm profitability in the Croatian manufacturing industry: evidence from dynamic panel analysis. Economic Research, 32(1), 968-981. Retrieved from https://doi.org/10.1080/1331677X.2019.1583587 (July 28, 2024).
26. Ray, S. (2012). Evaluating the Impact of Working Capital Management Components on Corporate Profitability: Evidence from Indian Manufacturing Firms. International Journal of Economic Practices and Theories, 2(3), 127-136.
27. Serbian Business Registers Agency: financial reports for observed enterprises, available at: https://fin.apr.gov.rs/JavnaPretraga (type name of enterprise in the proper search bar, assessed 07.07.2024).
28. Statistical Office of the Republic of Serbia, 2024, Retrieved from https://publikacije.stat.gov.rs/G2024/HtmlL/G20241110.html (July 28, 2024).
29. Tekić, D., Mutavdžić, B., Milić, D., Matkovski, B., Đokić, D., & Novaković, T. (2022). Profitability determinants of small agricultural and food companies in the Republic of Serbia. *Custos e agronegocio*, 18(3), 124-145.
30. Šimáková, J., Stavárek, D., Pražák, T. & Ligocká, M. (2019). Macroeconomic factors and stock prices in the food and drink industry. *British Food Journal*, 121(7), 1627-1641. Retrieved from https://doi.org/10.1108/BFJ-12-2018-0839 (July 22, 2024).
31. Zijlstra, W. P., Van der Ark, L. A., & Sijtsma, K. (2007). Outlier Detection in Test and Questionnaire Data. *Multivariate Behavioral Research*, 42(3), 531–555. Retrieved from https://doi.org/10.1080/00273170701384340 (July 21, 2024).