UDC:
DOI: 10.5937/AnEkSub2500010D
Original scientific article

Анали Економског факултета у Суботици – The Annals of the Faculty of Economics in Subotica
Vol. XX, No. XX, pp. XX-XXX
Received: 08/04/2025
Revision: 28/05/2025
Accepted: 29/05/2025
Published online: 18/06/2025

Panel Analysis of Wholesale Profitability in the Republic of Serbia

Панел анализа профитабилности трговине на велико у Републици Србији

Stojanka Dakić
University of Novi Sad, Faculty of Economics in Subotica, Subotica, Republic of Serbia
stojanka.dakic@ef.uns.ac.rs, https://orcid.org/0000-0002-2416-7847
Daniela Nuševa*
University of Novi Sad, Faculty of Economics in Subotica, Subotica, Republic of Serbia
daniela.nuseva@ef.uns.ac.rs, https://orcid.org/0000-0002-0990-428X
Sonja Vučenović
University of Novi Sad, Faculty of Economics in Subotica, Subotica, Republic of Serbia
sonja.vucenovic@ef.uns.ac.rs, https://orcid.org/0000-0003-2375-5759
Mirjana Hladika
University of Zagreb, Faculty of Economics & Business, Zagreb, Croatia,
mhladika@efzg.hr, https://orcid.org/0000-0003-3170-9138
Lenče Petreska
International Slavic University, Faculty of Economics and Organization of Entrepreneurship, Sveti Nikole-Bitola, North Macedonia
lence.petreska@msu.edu.mk, https://orcid.org/0000-0001-8828-5167
Dejan Jovanović
University of Kragujevac, Faculty of Economics, Kragujevac, Republic of Serbia
djovanovic@kg.ac.rs, https://orcid.org/0000-0002-0424-0656

Abstract

Purpose: The aim of this paper is to analyze the profitability of wholesale companies in the Republic of Serbia and to investigate the factors that influence it.
Methodology: Profitability is measured by return on assets (ROA), while the impact of independent factors such as quick ratio, leverage, inventory turnover period, assets turnover ratio, growth, and company size is analyzed through panel regression. The sample includes 18 wholesale companies from the Republic of Serbia, whose financial statements were observed during the period from 2007 to 2023.
Findings: During this period, companies included in the sample showed a trend of profitability growth. The average return on assets was 6.69%, which means that wholesale companies, on average, generated 6.69 EUR of net profit for every 100 EUR invested in assets. The results of the panel regression analysis show that leverage and inventory turnover period have a significant negative impact on profitability. On the other hand, asset turnover ratio, growth, and company size have a positive and significant impact on profitability.
Originality/value: This paper contributes to the theoretical and practical research of the factors of profitability, especially from the perspective of wholesale companies in the Republic of Serbia.

* Corresponding author

Practical implications – The results of this research are both theoretically and practically significant for the process of making reliable decisions in managing profitability and can be useful for various stakeholders such as owners and/or managers of wholesale companies, regulatory bodies, and others.
Limitations: The limitation of this research is that it is focused only on the wholesale sector in the Republic of Serbia, and future research could include other countries to investigate economic specificities and their impact on profitability.

Keywords: Panel Regression Analysis, Wholesale, Profitability, Return on Assets
JEL classification: L81, C23, M42

Сажетак

Циљ: Циљ овог рада је анализа профитабилности велепродајних предузећа у Републици Србији и истраживање фактора који утичу на њу.
Методологија Профитабилност је мерена повратом на имовину (ROA), док је утицај независних фактора као што су quick ratio (коефицијент ликвидности), задуженост, период обрта залиха, обрт на имовини, раст и величина предузећа анализиран применом панел регресије. Узорком је обухваћено 18 велепродајних предузећа из Републике Србије, чији су финансијски извештаји посматрани у периоду од 2007. до 2023. године.
Резултати: У том периоду, предузећа која су била обухваћена узорком имала су тренд раста профитабилности. Просечна вредност повратa на имовину износила је 6,69%, што значи да су велепродајна предузећа, у просеку, остварила 6,69 ЕУР нето профита на сваких 100 ЕУР уложених средстава. Резултати спроведене панел регресионе анализе показали су да задуженост и период обрта залиха имају значајан негативан утицај на профитабилност. С друге стране, обрт имовине, раст и величина предузећа имају позитиван и значајан утицај на профитабилност.
Оригиналност/вредност - Овај рад доприноси теоријском и практичном истраживању фактора профитабилности, посебно из угла велепродајних предузећа у Републици Србији.
Практична примена - Резултати овог истраживања су теоријски и практично значајни за процес доношења поузданих одлука у управљању профитабилношћу и могу бити од користи различитим заинтересованим странама, као што су власници и/или менаџмент велепродајних предузећа, регулаторна тела и други.
Ограничења истраживања: Ограничење овог истраживања је то што се односи само на сектор трговине на велико у Републици Србији, те би будућа истраживања могла обухватити и друге земље како би се испитале економске специфичности и њихов утицај на профитабилност.

Кључне речи: Панел регресиона анализа, трговина на велико, профитабилност, повратна имовину
ЈЕЛ класификација: L81, C23, M42

Introduction

Although the traditional forms of wholesale in many countries today compete with other organizational forms that take over some of its functions, wholesaling remains one of the key actors in marketing channels (Quinn & Sparks, 2007; Dawson, 2007; Musso, 2010). Wholesale companies resell partial or complete products made by manufacturers to third parties or another business, such as retailers, institutional, commercial or industrial customers (Tamilia & Charlebois, 2009). Thus, they interact with other intermediaries in the channels (Dawson, 2007). In comparison to retailers, wholesalers pay less attention to promotion, atmosphere and location as they rather deal with organizations as customers than with final consumers; their transactions and trade area coverage are usually larger than retailers'; and governments treat wholesalers and retailers differently in terms of legal regulations and taxes (Rudež, Gajić & Vujičić, 2019).

Wholesalers buy and sell goods acting as middlemen or merchants. As middlemen

(agents or brokers), they act on a fee or contract basis, while as merchants they act in their own name and on their own account and are usually specialized for particular products (European Commission, 2003). As they purchase goods in bulk quantities, they play a crucial role in the processes of products collection, sorting, modification, processing, packaging/repackaging, etc. In order to carry out these activities and maintain their market competitiveness, wholesale companies have to continuously improve their efficiency by investing in warehousing, inventory management, transportation facilities, new technologies, personnel trainings, etc. (Shyshkin, Onyshchenko, & Cherniak 2020; Krittanathip, Cha-um, Suwandee, Rakkarn, & Ratanamaneichat, 2013; Bohusova, Svoboda, & Veverkova, 2022; Rudež et al., 2019).

Wholesalers play a vital role in food, beverages and tobacco supply chains. In the structure of the total EU food supply chain turnover, which was valued at 3.8 trillion EUR in 2021, the food and drink wholesale turnover amounted to 1,039 billion EUR, while the turnover of agriculture was 498 billion EUR, food and drink industry 1,196 billion EUR and food and drink retail companies and stores 1,132 billion EUR (FoodDrinkEurope, 2024). As intermediaries, food, beverages and tobacco wholesalers are not only responsible for the availability of these products, but also for the promotion of sustainability and for addressing the global food security issues (Jones, Comfort, & Hillier, 2017; Rosa, Abdala, & Cezarino, 2019; Mc Carthy et al., 2018). Their competitive advantages stem from their higher accessibility to markets and networks, delivery infrastructure, information technologies, etc. (Dubovitski, Klimentova, & Rogov, 2022; Roy, Hall, & Ballantine, 2019). Due to the world`s rising geopolitical turbulences, global food, beverages and tobacco supply chains face disruptions and shifting trade patterns (Euromonitor International, 2023). With the growing retailers` financial power in this segment, many of them independently carry out wholesale activities and vice versa, many wholesalers are actively involved in organizing their own retail activities (Hallier, 2014).

The subject of this paper is the analysis of 18 companies in the wholesale sector in the Republic of Serbia for the period of 2007-2023. More precisely, the subject of analysis is the Group 46.3 "Wholesale of food, beverages and tobacco", according to classification of activities in the Republic of Serbia. It includes “Wholesale of fruit and vegetables; Wholesale of meat and meat products; Wholesale of dairy products, eggs and edible oils and fats; Wholesale of beverages; Wholesale of tobacco products; Wholesale of sugar and chocolate and sugar confectionery; Wholesale of coffee, tea, cocoa and spices; Wholesale of other food, including fish, crustaceans and molluscs; non-specialized wholesale of food, beverages and tobacco” (Paragraf, 2025). *The aim of this paper* is to determine the impact of the independent variables: quick ratio (acid test), leverage, inventory turnover period, asset turnover ratio, growth and companies’ size on profitability measured through return on assets (ROA) in the wholesale sector in the Republic of Serbia.

The paper proceeds as follows. Section 1 represents a review of the relevant literature. Section 2 lays out the data and methodology of the research. Section 3 explains the obtained results and discussion. At the end of the paper, conclusions and recommendations for further research are provided.

1. Literature Review

Companies' profitability is one of the most important indicators of their financial success, and of crucial importance for their reputation and survival on the market (Zeeshan et al., 2016). The goal of any business is the ability to cover costs and to additionally realize a financial surplus, i.e. profit (Chiladze, 2018). Many studies explore the impact of different determinants on the profitability of companies in various sectors, especially through its widely used indicator - the return on assets (ROA) (Čupić, & Vržina, 2024; Kuster, Álvarez, Lezcano, & Álvarez-Vaz, 2023; Tica, Vuković, Peštović, & Medved, 2023; Đaković, Milenković, & Andrašić, 2023; Peštović, Medved, Rađo, Jakšić, & Saković, 2022; Vojinović, Milutinović, Sertić, & Leković, 2022; Vojinović, Milutinović, & Leković, 2020).

Panel data analysis of 1,801 small and medium-sized enterprises and 321 large companies in the wholesale and retail sector in the Republic of Serbia in the period 2010-2014 was conducted (Mijić, Nuševa, & Jakšić, 2018). The results pointed out that profitability of small and medium-sized enterprises in this country is positively influenced by leverage, quick ratio, sales growth and previous profitability, but negatively by company`s size and fixed assets ratio.

The study of Tousek, Hinke, Malinska & Prokop (2021) based on their research of trading companies in the Czech Republic pointed out that "wholesale is on average a less profitable and more leveraged sector than retail" (p. 165). They also concluded that leverage has a negative impact on profitability in both sectors. Analysis results of linear regression showed that profitability of joint stock companies in Montenegro through return on assets (ROA) is negatively affected by leverage (Filipovic & Demirovic, 2016).

Panel regression model of 189 companies in the food sector in the Republic of Serbia from 2011-2021 identified a positive correlation between profitability and liquidity and sales growth rate (Tomašević, Momčilović, Milenković, & Milić, 2024). Leverage, size, and materiality of assets are in negative correlation with profitability. The authors concluded that there is no significant correlation between liquidity and profitability.

As liquidity ratios represent a measure of company's ability to meet its obligations to creditors at any moment, they have a significant impact on the profitability of companies measured by the rate of return on assets (ROA) (Saleem & Rehman, 2011). The quick ratio, as one of the indicators of the company's liquidity, shows its ability to meet short-term liabilities (Svitlík & Poutník, 2016). The results of the regression analysis of 158 manufacturing companies in Indonesia in the period 2012-2016 confirm the positive influence of the quick ratio on their profitability and ROA, that is, the availability of liquidity will encourage companies to reduce debt and equity costs and risks by using internal instead of external financing in their daily operations (Pandeirot, Sumanti, & Aseng, 2022). A regression analysis of the trade sector in Jordan in the period 2008-2015 revealed a significant influence of the quick ratio as a liquidity indicator on the profitability of trading companies in this country (Al-Qadi & Khanji, 2018).

Based on the empirical research through linear regression of pharmaceutical companies, which were listed on the Indonesia Stock Exchange from 2015-2019,

Rajagukguk & Siagian (2021) stated that liquidity and total assets turnover have a negative effect on companies' profitability. Companies use total asset turnover ratio as a measure of the efficiency of their business operations (Patin, Rahman, & Mustafa, 2020).

One of the most important company`s financial goals is to determine and maintain the optimal level of inventory (stocks of raw materials, production in process and finished products) in order to minimize asset values losses and boost profitability (Kumaraswamy, 2016). In his analysis of data from 2015-2017 gathered from the U.S. Security and Exchange Commission website, Hamad (2024) found that a shorter inventory turnover period increases return on assets (ROA) as it lowers a company`s inventory costs. So, inventory turnover period negatively impacts profitability.

Results of the research of 50 large and medium-sized manufacturers in the Republic of Serbia from 2018-2021 indicate that independent variables such as inventory ratio and sales growth positively influence profitability (Nuševa, Dakić, Peštović, & Hladika, 2024). Another study of Serbian manufacturing companies listed on the Belgrade stock exchange from 2017-2020 showed that there is significantly positive correlation between ROA and the following variables: size, current ratio, and growth (Rađo & Peštović, 2022). On the other hand, there is a significantly negative correlation between ROA and leverage.

2. Data and Methodology

The purpose of this paper is to demystify the impact of selected financial indicators on corporate profitability, measured through the return on assets (ROA). Each of the selected financial indicators in this study provides insight into different aspects of company's financial health and operational efficiency. Together, these indicators can help assess a company's ability to generate revenue based on its assets.

The research covers companies from the wholesale sector, observed over the period from 2007 to 2023. The analysis was conducted using the Gretl software, and the data were sourced from the Scoring database (Scoring, 2025).

The initial model was defined as a panel regression with ROA as the dependent variable, while the independent variables included the Quick Ratio (Acid Test), Debt Ratio, Inventory Turnover Period, Asset Turnover Ratio, Growth, and Size.

Table 1 presents an overview of all variables included in the model, along with an explanation of their meaning, calculation methods, and the expected impact of the independent variables on the dependent variable (ROA).

Table 1. Variables included in the model

Variable	Explanation	Calculation	Expected impact on the dependent variable
Dependent Variable			

Return on Assets (ROA)	ROA measures how efficiently a company utilizes its total assets to generate net income.	Net income / Total assets	/
Independent Variables			
Quick Ratio (Acid test)	A company's ability to meet its short-term obligations using its most liquid assets.	(Current assets – Inventory) / Current liabilities	Positive
Debt Ratio	The proportion of debt in total assets, indicating the extent to which a company is financed through borrowing.	Total debt / Total assets	Negative
Inventory Turnover Period	The average number of days required for inventory turnover.	(Average Inventory / Annual cost of goods sold) *365	Negative
Asset Turnover Ratio	Indicates how many times total assets are turned over during a year.	Sales revenue / Total assets	Positive
Growth	Revenue growth between two consecutive accounting periods.	(Sales revenue $_t$ – Sales revenue $_{t-1}$) / Sales revenue $_{t-1}$	Positive
Size	The size of a company expressed as the natural logarithm of total assets.	Total assets	Positive

Source: the authors'

Considering the subject and objective of the research, and relying on the expected impact of the independent variables on the dependent variable, ROA, we formulated the following research hypotheses:

- H_1: Quick Ratio (Acid test) positively affects the profitability of wholesale companies, measured by ROA.
- H_2: Debt Ratio negatively affects the profitability of wholesale companies, measured by ROA.
- H_3: Inventory Turnover Period negatively affects the profitability of wholesale companies, measured by ROA.
- H_4: Asset Turnover Ratio positively affects the profitability of wholesale companies, measured by ROA.
- H_5: Business growth positively affects the profitability of wholesale companies, measured by ROA.
- H_6: Company size positively affects the profitability of wholesale companies, measured by ROA.

In this study, a panel regression model was initially applied, as it allows for a deeper analysis compared to cross-sectional or time series analyses. Panel data combines variations between companies (cross-sectional variation) and changes over time (time variation), enabling more precise estimates of the effects of independent variables on ROA. Standard

cross-sectional analyses do not provide insight into how changes in independent variables impact the dependent variable over time.

During standard tests for verifying the assumptions of panel regression methods, heteroskedasticity and autocorrelation issues were identified in the dataset. As a result, the initial panel regression model (along with other corrections detailed in the *Results and Discussion* section) was replaced by an OLS model with robust standard errors (White-Huber HC1 correction).

The application of the White-Huber correction for standard errors ensures reliable estimates in cases where heteroskedasticity issues are present. Standard OLS estimates assume constant variance of residuals, which is often not the case in practice. By using the White-Huber correction, standard errors become resistant to changes in error variance, ensuring a more accurate assessment of the statistical significance of the model.

3. Results and discussion

The first step in the analysis presented in this study was the calculation of basic descriptive statistics shown in Table 2. The importance of this step is justified by the fact that descriptive statistics provide the foundation for further analysis, offering insight into the characteristics of the variables included in the study, as well as potential modelling possibilities.

Table 2. Descriptive Statistical Analysis

Variable	Mean	Median	S.D.	Min	Max
ROA	0.06697	0.05125	0.073115	-0.1584	0.4392
Quick Ratio	3.0071	1.55	4.5911	0.43	50.35
Debt Ratio	0.50122	0.5257	0.26879	0	1
Inventory Turnover Period	48.306	32.885	54.448	0	458.03
Asset Turnover Ratio	2.9903	2.285	2.4334	0.39	19.47
Growth	6.175	1.0714	110.72	0	2416.7
Size	11.755	11.594	1.662	8.0074	17.058

Source: the authors'

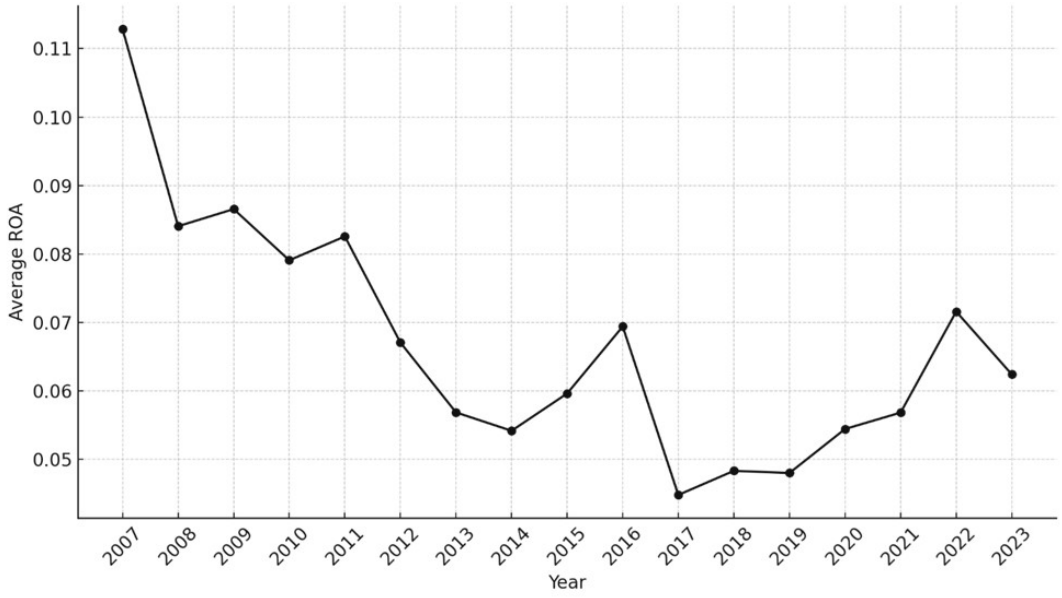
Based on the results presented in Table 2, the following observations can be made:

- A high standard deviation relative to the mean value of ROA indicates significant differences in company profitability, while a negative minimum value suggests the presence of companies that experienced losses.
- A high standard deviation and a large gap between the maximum and minimum values of the Quick Ratio indicate substantial differences in liquidity among the observed companies. However, the average Quick Ratio value suggests that, on average, companies do not face liquidity issues.

- The arithmetic mean (0.50122) and median (0.5257) of the Debt Ratio indicate that the companies in the sample maintain an optimal level of indebtedness, as their assets are financed nearly 50:50 from equity and external sources.
- The extremely high maximum value (458.03) and the large standard deviation (54.448) of the Inventory Turnover Period indicate that some companies hold inventory significantly longer than others.
- Although the average value of the Asset Turnover Ratio is relatively high, its wide variability (large S.D.) suggests notable differences among companies in the efficiency of asset utilization.
- A high standard deviation relative to the mean value of Growth indicates a very wide distribution, with potential outliers significantly increasing the maximum value.
- The distribution of company size appears relatively consistent, with values concentrated around the mean.

By analyzing ROA trends over time, key periods of change can be identified, helping to understand the causes of these changes, which is valuable for planning future strategies. Figure 1 presents the trend of the average value of the dependent variable (ROA) over the observed period from 2007 to 2023.

Figure 1. Trend of the average ROA value in the period from 2007 to 2023.



Source: the authors'

As we can see in the chart, during the observed period, there are periods of ROA

growth, indicating favorable economic conditions or periods of successful internal management strategies and improved operational efficiency. On the other hand, there are periods of ROA decline, which may result from an economically challenging environment and/or poor asset management. In any case, visible variability in asset utilization efficiency indicates that company profitability is sensitive to both external economic factors and changes in internal company policies. A deeper and more detailed analysis would require considering additional variables, as well as correlating the trends displayed with specific events within each individual company.

The next step in the research was to check for the presence of multicollinearity among the data. Therefore, a correlation matrix (Table 3) was calculated, and a Variance Inflation Factor (VIF) analysis was performed (Table 4).

Table 3. Correlation Matrix

	ROA	Quick Ratio	Debt Ratio	Inventory Turnover Period	Asset Turnover Ratio	Growth	Size
ROA	1						
Quick Ratio	0.1485	1					
Debt Ratio	-0.3668	-0.5544	1				
Inventory Turnover Period	-0.1111	-0.015	-0.0414	1			
Asset Turnover Ratio	0.0775	0.0136	0.0035	-0.3546	1		
Growth	0.0343	-0.0194	0.0693	-0.0288	0.0166	1	
Size	0.1222	-0.05	-0.1132	0.268	-0.4874	-0.0044	1

Source: the authors'

As seen in Table 3, the highest correlation in the dataset is between the Quick Ratio and Debt Ratio (-0.5544). This correlation is logical, as a higher Quick Ratio may indicate lower debt relative to liquid assets. Other correlations do not exceed the threshold of 0.5 and are well below the 0.8 threshold, which is typically considered the point of serious concern regarding the presence of multicollinearity among the data.

Table 4. Variance Inflation Factor (VIF) Analysis

Variable	VIF
Quick Ratio	1.477
Debt Ratio	1.506
Inventory Turnover Ratio	1.162
Asset Turnover Ratio	4.423
Growth	1.006
Size	1.379

Source: the authors'

The VIF analysis presented in Table 4 confirms that, although there is a moderately high correlation between the Quick Ratio and Debt Ratio (Table 3), it does not cause a statistically significant multicollinearity problem in the model. Therefore, we conclude that there is no presence of multicollinearity. All VIF values are significantly lower than the usual thresholds that indicate multicollinearity in the dataset. The common threshold is a VIF value of 10, and in stricter approaches, it is 5. In both cases, the VIF values shown in Table 4 are much lower, which means the predictors are independent of each other.

In the next step, we tested for the presence of heteroskedasticity in the data (Table 5).

Table 5. Heteroskedasticity Tests

Test	Test Statistics	*p – value*
White test	93.62	0.0000000028
Breusch-Pagan test	34.04	0.0000066

Source: the authors'

Both tests presented in Table 5 indicated significant variance inequality of the residuals between different companies, thus confirming the presence of heteroskedasticity in the data.

The Durbin-Watson test for autocorrelation, with a statistic of DW = 0.847, below 2, indicated the presence of positive autocorrelation. This means there is dependence between residuals at different time periods. This was also confirmed by the Wooldridge test.

The presence of heteroskedasticity and autocorrelation in the data can lead to incorrect conclusions about the significance of variables and cause unreliable coefficient estimates. Keeping this in mind, the authors implemented appropriate corrective measures to address the issues:

- 10 companies with extreme values (outliers) were eliminated from the initial sample of 28 wholesale companies, reducing the sample size to 18 companies and decreasing heteroskedasticity in the data.
- A logarithmic transformation of the "Debt Ratio" and "Size" variables was performed to correct standard errors for heteroskedasticity and autocorrelation.
- An OLS model with robust standard errors (White-Huber HC1 correction) was applied to fully address the heteroskedasticity problem.

After these corrections, the final model is presented in Table 6.

Table 6. OLS Model with Robust Standard Errors (White-Huber HC1 Correction)

Variable	Coefficient	Std. Error	t-Statistic	p-Value
Const	-0.326079	0.064896	-5.024676	0.000001
Quick Ratio	0.001639	0.001423	1.151272	0.250540
Debt Ratio (log)	-0.079665	0.024522	-3.248710	0.001291

Inventory Turnover Period	-0.000118	0.000059	-2.003919	0.045981
Asset Turnover Ratio	0.005341	0.001105	4.831876	0.000002
Growth	0.000029	0.000002	12.479781	0.000000
Size (log)	0.166140	0.024357	6.821076	0.000000

Source: the authors

Based on Table 6, we can conclude that all independent variables, except for Quick Ratio, are statistically significant at the 5% level. The logarithmically transformed variable Debt Ratio (-0.079665; $p = 0.001$) shows a negative impact on ROA, meaning that a higher level of debt negatively affects profitability. The same conclusion applies to the Inventory Turnover Period (-0.000118; $p = 0.046$), indicating that a longer average time needed to sell inventory reduces profitability. The Asset Turnover Ratio (0.005341; $p < 0.001$) has a positive impact on the dependent variable ROA, meaning that a higher asset turnover (fewer days tied up in assets) positively contributes to profitability. Company growth (0.000029; $p < 0.001$) also has a positive effect on ROA, as larger companies (0.166140; $p < 0.001$) tend to achieve higher ROA.

Based on these results, we can conclude that hypotheses H_2, H_3, H_4, H_5, and H_6 are confirmed, while hypothesis H_1 is rejected.

The model is statistically significant (F-statistic: 193.9696 with p-value < 0.0001) and explains about 31.8% of the variation in ROA ($R^2 = 0.318$). Autocorrelation is still present (DW = 0.755241559), but it does not undermine the validity of the model since the standard errors have been adjusted.

The presented OLS model with robust standard errors has proven to be the most suitable choice in this case. The methodological correctness is evident, as it addresses the problems of heteroskedasticity and autocorrelation (ensuring consistency of estimates despite the presence of positive autocorrelation), is easy to interpret, and has no limitations regarding the correlation between individual effects and independent variables. The Hausman test did not provide valid results, so we could not provide valid evidence that either the Fixed-effect (FE) or Random-effect (RE) model would be a better fit.

Conclusion

The wholesaling industry of food, beverages and tobacco in Serbia increased by 0.8 % CAGR in the period 2019-2024, recording an estimated revenue of 4.3 billion EUR, 29,938 employees and 4,202 businesses in 2024 (IBIS World, 2024). It is of a great importance for the country`s economy as a significant part of Serbia`s total wholesale trade turnover is realized by these products. The wholesale trade turnover by commodity groups in Serbia in 2023 total was 3,820,155 mil. RSD (approximately 3,820 mil EUR), while the wholesale trade turnover by food products (including non-alcoholic and alcoholic beverages) was 638,385 mil. RSD (approximately 5,410 mil EUR) and the wholesale trade turnover by

tobacco products was 253,361 mil. RSD (approximately 2,147 mil EUR) (Statistical Office of the Republic of Serbia, 2024).

This analysis has highlighted the significance of certain financial indicators in predicting the profitability of companies in the wholesale sector. Through a series of diagnostic tests and corrective measures, the validity of the model was ensured despite initial issues with heteroscedasticity and autocorrelation.

We conclude that companies with higher levels of debt and longer inventory turnover periods achieve lower profitability. To improve profitability, companies should reduce their debt levels and shorten the inventory turnover period. On the other hand, companies with fewer days of asset turnover, companies that experience sales growth, and larger companies achieve better profitability. These findings can be useful for managers and investors in making strategic decisions regarding financing and operational efficiency.

Future research could consider applying dynamic panel models (Arellano-Bond GMM) to further eliminate autocorrelation, as well as incorporating other factors that may affect ROA, such as macroeconomic indicators and sector-specific factors, along with comparative analysis with companies from other countries.

References

Al-Qadi, N. S., & Khanji, I. M. (2018). Relationship Between Liquidity and Profitability: An Empirical Study of Trade Service Sector in Jordan. *Research Journal of Finance and Accounting, 9*(7), 153-157.

Bohusova, H., Svoboda, P., & Veverkova, A. (2022). Impact of New Lease Reporting on Retailing and Wholesale Companies. *Montenegrin Journal of Economics, 18*(3), 89-98. Doi: https://doi.org/10.14254/1800-5845/2022.18-3.7

Chiladze, I. (2018). Theoretical and practical aspects of profitability factorial analysis. *Science and studies of accounting and finance: problems and perspectives, 1*(1), 12-19. Doi: https://doi.org/10.15544/ssaf.2018.02

Čupić, M., & Vržina, S. (2024). Firm exports and performance: Evidence from Serbia. *Economic Horizons*, *26*(2), 127-142. Doi: https://dx.doi.org/10.2139/ssrn.4944355

Dawson, J. (2007). Wholesale distribution: The chimera in the channel. *The International Review of Retail, Distribution and Consumer Research*, *17*(4), 313–326. Doi: https://doi.org/10.1080/09593960701507468

Dubovitski, A., Klimentova, E., & Rogov, M. (2022). Applicability of machine learning models using a neural network for predicting the parameters of the development of food markets. *Journal of Process Management and New Technologies*, *10*(3-4), 93-105. Doi: https://doi.org/10.5937/jouproman2203093D

Đaković, M., Milenković, N., & Andrašić, J. (2023). Determinants of banks net interest income: The example of Serbia. *Ekonomika*, *69*(1), 25-37. Doi: https://doi.org/10.5937/ekonomika2301025D

Euromonitor International. (2023). *Food, Beverages and Tobacco Global Industry Overview.* Retrieved March 5, 2025, from https://www.euromonitor.com/food-beverages-and-tobacco-global-industry-overview/report

European Commission. (2003). *Wholesale trade.* Retrieved March 3, 2025, from https://ec.europa.eu/eurostat/documents/3217494/5611492/KS-BW-06-001-17-EN.PDF/db21cd63-d64f-4f35-a254-dd92bebff498?version=1.0

Filipovic, A. L., & Demirovic, S. (2016). The relationship between debt and profitability of stock companies in Montenegro. *Journal of Contemporary Economic and Business Issues, 3*(2), 19-34.

FoodDrinkEurope. (2024). *Data and Trends, EU Food and Drink Industry: 2024 Edition.* https://www.fooddrinkeurope.eu/wp-content/uploads/2025/01/FoodDrinkEurope-Data-Trends-2024.pdf

Hallier, B. (2014). The Role of Wholesale and Retail for the Food Supply of Tomorrow. *TATuP - Zeitschrift für Technikfolgenabschätzung in Theorie Und Praxis*, *23*(3), 51-60. Doi: https://doi.org/10.14512/tatup.23.3.51

Hamad, S. (2024). The Effect of Average Collection Period, The Inventory Turnover Period, and The Average Inventory Period on Return on Assets. *European Scientific Journal, 20*(31), 61-80. Doi: https://doi.org/10.19044/esj.2024.v20n31p61

IBIS World. (2024). Food & Drink Wholesaling in Serbia - Market Size, Industry Analysis, Trends and Forecasts (2024-2029). Retrieved March 6, 2025, from https://www.ibisworld.com/serbia/industry/food-drink-wholesaling/200227/#IndustryStatisticsAndTrends

Jones, P., Comfort, D., & Hillier, D. (2017). European Food and Drink Wholesalers and Sustainability. *European Journal of Sustainable Development Research*, 1(1), 1-12. Doi: http://dx.doi.org/10.20897/ejosdr.201703

Krittanathip, V., Cha-um, S., Suwandee, S., Rakkarn, S, & Ratanamaneichat, C. (2013). The Reduction of Inventory and Warehouse Costs for Thai Traditional Wholesale Businesses of Consumer Products. *Procedia - Social and Behavioral Sciences, 88,* 142–148. Doi: https://doi.org/10.1016/j.sbspro.2013.08.489

Kumaraswamy, S. (2016). Impact of working capital on financial performance of gulf cooperation council firms. *International Journal of Economics and Financial Issues*, *6*(3), 1136-1142.

Kuster, C., Álvarez, J., Lezcano, M., & Álvarez-Vaz, R. (2023). Comparison of different ways to measure profitability in the Uruguayan agricultural sector through longitudinal

clusters. *Agrociencia Uruguay,* 27(19):1023, 1-13. Doi: http://dx.doi.org/10.31285/AGRO.27.1023

Mc Carthy, U., Uysal, I., Badia-Melis, R., Mercier, S., O'Donnell, C., & Ktenioudaki, A. (2018). Global food security – Issues, challenges and technological solutions. *Trends in Food Science & Technology, 77,* 11-20. Doi: https://doi.org/10.1016/j.tifs.2018.05.002

Mijić, K., Nuševa, D., & Jakšić, D. (2018). The Determinants of SMES Profitability in the Wholesale and Retail Sector in Serbia. *TEME, XLII*(1), 97-111. Doi: https://doi.org/10.22190/10.22190%2FTEME1801097M

Musso, F. (2010). Innovation in Marketing Channels: Relationships, Technology, Channel Structure. *Symphonya: Emerging Issues in Management, 1,* 23-42.

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 (online first).* Doi: https://doi.org/10.5937/StraMan2400009N

Pandeirot, L. B., Sumanti, E. R., & Aseng, A. C. (2022). An Empirical Study of Quick Ratio and Profitability on Manufacturing Firms in Indonesia. *Society, 10*(2), 426-434. Doi: https://doi.org/10.33019/society.v10i2.470

Paragraf. (2025). *Classification of activities (Official Gazette of the RS, No. 54/2010).* Retrieved February 27, 2025, from https://www.paragraf.rs/propisi/uredba_o_klasifikaciji_delatnosti-5.html

Patin, J. C., Rahman, M., & Mustafa, M. (2020). Impact of Total Asset Turnover Ratios on Equity Returns: Dynamic Panel Data Analyses. *Journal of Accounting Business and Management, 27*(1), 19-29. Doi: http://dx.doi.org/10.31966/jabminternational.v27i1.559

Peštović, K., Medved, I., Rađo, D., Jakšić, D., & Saković, D. (2022). The impact of accounting regulation basis to the mandatory biological assets reporting: evidence from the Serbian agricultural production companies. *Custos e agronegocio, 18*(3), 94-109.

Quinn, J., & Sparks, L. (2007). Editorial: Research Frontiers in Wholesale Distribution. *The International Review of Retail, Distribution and Consumer Research*, *17*(4), 303–311. Doi: https://doi.org/10.1080/09593960701505736

Rađo, D., & Peštović, K. (2022). Factors of Profitability: Evidence from the Serbian Manufacturing Sector. *ENTRENOVA - ENTerprise REsearch InNOVAtion, 8*(1), 299-309. Doi: https://doi.org/10.54820/entrenova-2022-0026

Rajagukguk, J., & Siagian, H. (2021). The Effect of Liquidity and Total Asset Turnover on Profitability: Research Study n Pharmaceutical Companies in Indonesia Stock Exchange. *Ekonomis: Journal of Economics and Business, 5*(2), 444-448. Doi: http://dx.doi.org/10.33087/ekonomis.v5i2.400

Rosa, A. A. S., Abdala, E. C., & Cezarino, L. O. (2019). Sustainable practices and the relationship with suppliers in SSCM: a case study in wholesale. *Brazilian Journal of Operations & Production Management*, *16*(3), 413–423. Doi: https://doi.org/10.14488/BJOPM.2019.v16.n3.a5

Roy, H., Hall, C. M., & Ballantine, P. W. (2019). Connecting local food to foodservice businesses: An exploratory qualitative study on wholesale distributors' perceived benefits and challenges. *Journal of Foodservice Business Research, 22*(3), 261–285. Doi: https://doi.org/10.1080/15378020.2019.1600891

Rudež, J., Gajić, A., & Vujičić, S. (2019). Analiza veleprodajnog tržišta telekomunikacija u Republici Srbiji. *Trendovi u poslovanju, 7*(2), 68-77. Doi: https://doi.org/10.5937/trendpos1902068R

Saleem, Q., & Rehman, R. U. (2011). Impacts of liquidity ratios on profitability (Case of oil and gas companies of Pakistan). *Interdisciplinary Journal of Research in Business, 1*(7), 95-98.
Doi: https://doi.org/10.5539/ijef.v8n3p69

Scoring. (2025). *Database.* Retrieved 10.02.2025 from https://www.scoring.rs/

Shyshkin, V., Onyshchenko, O., & Cherniak, K. (2020). Modern approaches to warehouse logistics management, *Management and entrepreneurship: trends of development, 2*(12), 105-117.
Doi: https://doi.org/10.26661/2522-1566/2020-2/12-08

Statistical Office of the Republic of Serbia. (2024). *Statistical Yearbook of the Republic of Serbia, 2024*. Retrieved March 3, 2025, from https://publikacije.stat.gov.rs/G2024/Pdf/G20242057.pdf

Svitlík, J., & Poutník, L. (2016). Relationship between liquidity and profitability: Empirical study from the Czech Republic. *European Financial and Accounting Journal, 11*(3), 7-24. Doi: https://doi.org/10.18267/j.efaj.159

Tamilia, R., & Charlebois, S. (2009). Wholesaling, the Role of the Middleman and Marketing Costs: Some Forgotten Concepts in Marketing Thought. *Journal of Advances in Management Research, 1*(2):5-5, 1-20.
Doi: https://doi.org/10.5296/jmr.v1i2.114

Tica, T., Vuković, B., Peštović, K., & Medved, I. (2023). Determinante profitabilnosti akcionarskih društava u Republici Srbiji. *Ekonomski horizonti, 25*(3), 245-260. Doi: https://doi.org/10.5937/ekonhor2303245T

Tomašević, S., Momčilović, M., Milenković, N., & Milić, D. (2024). Determinants of Profitability of Food Enterprises from the Territory of the Republic of Serbia. *Ekonomika Poljoprivrede*, *71*(2), 519–533.
Doi: https://doi.org/10.59267/ekoPolj2402519T

Tousek, Z., Hinke, J., Malinska, B., & Prokop, M. (2021). The Performance Determinants of Trading Companies: A Stakeholder Perspective. Journal of Competitiveness, 13(2), 152–170.
Doi: http://dx.doi.org/10.7441/joc.2021.02.09

Vojinović, Ž., Milutinović, S., Sertić, D., & Leković, B. (2022). Determinants of Sustainable Profitability of the Serbian Insurance Industry: Panel Data Investigation. *Sustainability*, *14*(9), 5190.
Doi: https://doi.org/10.3390/su14095190

Vojinović, Ž., Milutinović, S., & Leković, B. (2020). Micro-specific Profitability Factors of the Serbian Insurance Industry: A Panel Data Estimation. *E&M Economics and Management,* *23*(1), 135–155.
Doi: https://doi.org/10.15240/tul/001/2020-1-010

Zeeshan, F., Zahid, A., Farrukh, S., Imran, N. M., & Assad, U. (2016). Determinants of Profitability: Evidence from Power and Energy Sector. *Sciendo, 61*(3), 59-78.
Doi: http://dx.doi.org/10.1515/subboec-2016-0005