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Analysis of key determinants affecting the performance of a food company through indicators return on assets and return on equity

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ABSTRACT

This research aimed to identify the key determinants that influence the performance of a food enterprise. The performance of the enterprise is assessed through profitability indicators, specifically ROA and ROE indicators. The statistical program RStudio was used to conduct the analysis and present the achieved results. The article analyzes individual indicators through panel regression, the outputs of which indicate the specific significance of the individual variables used, influencing the profitability of the enterprise's total assets. An important indicator is also the overall indebtedness of the enterprise, which expresses the proportion of the company's assets financed by debt rather than equity. This indicator guides many investors who monitor whether a company has sufficient financial resources to pay off its current liabilities. A company's performance is closely linked to profit generation, which in turn affects the ability to finance the company's needs from its own resources. In business management, profit is used not only as a source of financing but also as one of the most important synthetic indicators of business success and efficiency, particularly concerning invested capital. It also serves as a tool for the material motivation of owners, managers, and employees. This paper also describes external forms of financing, regardless of whether it involves owners, other companies, banks, insurance companies, or even the state. The study also examines alternative forms of financing that are not commonly used in business, such as financial leasing and forfaiting.

Keywords: ROA and ROE indicator, panel regression, enterprise performance, RStudio

INTRODUCTION

The food processing industry (FPI) is integral to the Slovak economy. The food processing industry (FPI) is closely connected with agriculture, the basis of food self-sufficiency. In Slovakia, the FPI has a long tradition and is integral to the industry and industrial production. The FPI must be understood as a strategic industry that ensures Slovakia's food sovereignty and has the potential for development to ensure the country's food self-sufficiency at a sufficient level **[1]**. Performance management and financial performance management are intensely debated but still current topics. The proof is the multitude of studies published over the years. Due to the multidimensional nature of performance, the diversity of its determinants, as well as the diversity of methods, techniques, and tools used for evaluation, performance research has been. It remains a topic of interest **[2]**. One of the central questions in entrepreneurship is why some firms succeed and others fail. Determining what factors influence performance has implications for prospective entrepreneurs, advisors, investors, managers, and so forth **[3]**. To obtain complete information about the financial condition of food companies and effectively implement strategic goals and management policies, it is essential to understand the determinants that influence economic performance indicators. Identifying these factors and analyzing the direction and extent of their impact on economic

performance enables food companies to control risks, minimize their effects, and manage income and expenses efficiently. This, in turn, contributes to achieving the planned level of profitability more effectively. **[4]**. Every enterprise, project, or business activity is financed from specific sources. Financing is crucial for a business's establishment, operation, and prosperity. Therefore, it is essential to address the issue of financing even before the project or business begins. It is necessary to familiarize oneself with the various forms of financing, of which there are currently many available. It is up to the business entity to choose the form that suits them based on the financing conditions. Financing is an essential tool for the growth of any company and is required throughout the company's life cycle.

In most cases, when discussing business, whether it is a prosperous, newly established, or just starting enterprise, we encounter the issue of financing. Every business, project, or activity needs to be financed somehow. For this reason, it is essential to address the issue of funding, as well as what options are available today and from which sources companies are financed. Every new economic entity must be financed from some sources, and that is what the company's asset and capital structure is for. Therefore, the importance of the company's asset and capital structure cannot be overlooked. Both structures must be managed at the company's establishment and throughout its business period **[5]**. The main goal of a company is the generation of profit and the maximization of shareholders' equity. Glancing at corporate finance textbooks and literature, sample information is found on shareholder wealth maximization being the primary goal of corporations, and many others argue that maximizing the market value of a firm offers the most essential objective function necessary for the efficient management of a firm. Thus, the importance of return on equity as a profitability indicator becomes evident because it measures how effectively the management generates wealth for shareholders. However, deep profitability analysis (return on equity) is a demanding and complicated **[6]**. The largest buyers of products from the food industry in Slovakia are retail chains, which demand lower prices from suppliers compared to foreign suppliers. The authors also note that while the food industry in Slovakia is generally profitable with revenues consistently exceeding costs, its performance and competitiveness remain low. The sector lacks financial resources for research and development, and the utilization of processing capacities is generally low, leading to increased demands on fixed costs and technological equipment obsolescence. On the positive side, recent years have seen a greater investment in technology than buildings and infrastructure within the food industry.

Scientific Hypothesis

The scientific goal of the article is, based on the study of literary sources, own research, and information from the field of financing, to highlight the key determinants affecting the performance of the enterprise. The article uses panel regression to identify and analyze the key determinants influencing the enterprise's performance. The performance of the enterprise is assessed through profitability indicators, specifically ROA and ROE indicators. The statistical program RStudio is used to conduct the analysis and present the results. The results of the assumptions are accepted or rejected based on the p-value, which is compared with the statistical significance level. The hypotheses are set as follows:

For serial correlation, it applies:

H0: There is no serial correlation in the model. H1: There is serial correlation in the model.

For cross-sectional dependence, it applies:

H0: There is no cross-sectional dependence in the model. H1: There is cross-sectional dependence in the model.

For heteroskedasticity, it applies:

H0: There is no heteroskedasticity in the model. H1: There is heteroskedasticity in the model.

Objectives

This paper aims to identify the key determinants that influence a food company's performance, describe external forms of financing, and explore potential alternative forms of funding that are not commonly used in business, such as financial leasing and forfeiting.

MATERIAL AND METHODS

Measuring the company's performance is a significant process in assessing the company's success, increasing competitiveness, and market value. The synthetic picture of the company's measuring provides the company's financial analysis. The formation of the new modern approaches encouraged the main problems connected to the reality that the traditional indicators are based on accounting profit, which correlates insufficiently with creating shareholder value. The other shortcomings are the possibility of influencing the amount of reported profit using legal accounting practices and disregarding the time value of money, inflation, and risk. Performance measurement aims to measure relevant (key) processes and use the data obtained in process and business management. Performance management consists of identifying processes to coordinate and improve work

activities and results within an organizational unit **[7]**. Measuring company performance using generally accepted indicators is a source of key information on company efficiency and its prospects. This information provides various kinds of financial and non-financial indicators, the monitoring of which on the part of the company management is a clear sign of necessary changes or the opposite, that of maintaining the measures already established within the specific areas of the company, all that applies to any branch of the national economy. Some managers are apt to believe that performance is to be measured exclusively in terms of economic indicators. However, the increasing competitive pressures make managers believe that measuring financial performance alone will not suffice. Company performance is to be planned in a long-term perspective. The contribution aims to assess the efficiency of selected performance attributes on a chosen health resort and suggest their optimization **[8]**. The considerable number of studies that approach the performance issue at the microeconomic level proves the special importance of financial management aspects, the improvement of which depends on the obtained results and the company's competitiveness. In the case of economic agents, various methods may be used to study performance. One way to research company performance is regression analysis, which allows the modelling the functional form of dependence between different economic and financial indicators. Modeling economic performance aims to increase efficiency by improving interventions in an adaptive learning cycle **[9]**. The main objective of this article is to analyze the forms of financing and performance of food companies. The selection of companies was random and motivated by personal curiosity based on the industry's development within the Slovak Republic territory. The analysis is performed on a sample of ten companies within Slovakia. Only companies operating as limited liability companies are included in the sample to ensure the comparability of results among the examined companies. In addition to analyzing the forms of financing, panel regression is also used in this section to identify and analyze key determinants affecting the company's performance. The performance of the enterprise is assessed through profitability indicators, specifically ROA and ROE indicators. Companies look at their financial health using gross margin, net margin, ROA, and ROE. The information helps one judge the firm's overall condition since it shows how a company performs compared to other businesses **[10]**. Profitability is used to measure management effectiveness based on results generated from the loan repayment and investment **[11]**. Among the many return indicators, firms' managers mostly use Return on Assets (ROA) to measure a company's performance. Return on equity (ROE) and return on assets (ROA) are essential indicators that reveal the sustainability of a company's profitability performance for managers and investors. The correct prediction of these indicators will provide a basis for the strategic decisions made by the company managers. Estimating these signs significantly supports potential investors' decisions and up-to-date knowledge **[12]**.

There are different types of financial factors[current asset (CR), quick ratio (QR), cash ratio (CSR), operating profit margin (OPM), net profit margin (NPM), total asset turnover (TAT), current asset turnover (CAT), fixed asset turnover (FAT), account receivable turnover (ART), inventory turnover (IT), inventory holding period (IHP), debt to equity (DTE), debt to total asset (DTTA), debt ratio (DT), return on equity(ROE), earning per share (EPS)] used to measure return on assets (ROA). A multiple linear regression model is used to measure the influence of these factors on ROA, where ROA is used as a dependent variable and the rest are used as independent variables **[13]**. The statistical program RStudio is used to conduct the analysis and present the results. The observed period, during which the necessary analyses were carried out, consists of nine years, specifically from 2015 to 2023. The observed period is suitable and enjoyable because it includes the global pandemic that broke out in 2019. All necessary data for calculating the ratio indicators are drawn from the financial statements of the individual companies. The preparation of this article utilized available data, as well as other unprocessed information. The panel regression method is used to analyze the key determinants affecting the performance of the enterprise. The inspiration for examining company performance using ROA and ROE indicators is that both indicators express the company's profitability. The selection of these ratio indicators and the specific variables entering the model are based on various empirical studies from abroad. The examined models are:

MODEL 1

$$ROAi,t = \beta 0 + \beta\ DE\ ,t + \beta 2TD\ ,t + \beta 3FP,t + \beta\ SIZEi,t + \beta 5AGE\ ,t + \beta 6TURN\ ,t + \beta 7TANGi,t + \beta 8LDCEi,t + \varepsilon i,t$$

MODEL 2

$$ROE,t = \beta 0 + \beta\ DEi,t + \beta 2TD\ ,t + \beta 3FP,t + \beta\ SIZEi,t + \beta 5AGE\ ,t + \beta 6TURN\ ,t + \beta 7TANGi,t + \beta 8LDCE\ ,t + \varepsilon i,t$$

Model 1 and Model 2 contain the β coefficient, which expresses the individual relationships of the variables. These two models will be used to perform panel regression. The advantages of panel data are that they mainly represent a richer structure, which brings greater viability of data and more observations, and the possibility of accounting for the heterogeneity specific to individual accounting units. In panel regression, we know two types of panel data: time series and cross-sectional data. The time series represents the years 2015 – 2023, inclusive.

Cross-sectional data represent a specific year in which various types of variables appear. It is also essential to know whether the model is balanced or unbalanced. In our case, it is a balanced model, as there are no missing data, and it is in the "long" format. The type of model is an essential point in panel regression. Generally, there is a pooled, fixed, and random effects model. When examining, it is possible to use the F-test, which decides between the fixed effects model and the pooled model. Another significant test is the Lagrange multiplier test, also known as the Breusch-Pagan test, which decides between the random effects model and the pooled model.

The last is the Hausman test, which decides between the random and fixed effects models. After selecting the appropriate model with the help of the mentioned tests, the model assumptions are tested, including serial correlation, cross-sectional dependence, and heteroskedasticity. The Breusch-Godfrey/Wooldridge test is used to identify serial correlation, where, based on the p-value, the null hypothesis is accepted, or the alternative hypothesis indicating the presence of serial correlation in the model is accepted. Cross-sectional dependence is determined using the Pesaran CD test, where the decision is made based on the p-value using null hypotheses. The Breusch-Pagan test is used to detect heteroskedasticity in the model. The mentioned assumptions in the model could lead to inaccurate estimates of the standard deviations of the estimated coefficients, resulting in undesirable or incorrect regression coefficient outputs. Variables such as return on assets (ROA), return on equity (ROE), return on sales (ROS), return on costs (ROC), debt ratio (DE), total debt (TD), financial leverage (FP), number of employees (SIZE), years of market presence (AGE), asset turnover (TURN), asset structure (TANG), and the ratio of long-term liabilities to used assets (LDCE) enter our model.

Data Access

All necessary data for calculating financial ratios are derived from the financial statements of individual companies.

Statistical Analysis

The analysis assesses the company's performance based on profitability indicators, specifically ROA (Return on Assets) and ROE (Return on Equity) metrics. The statistical program RStudio is utilized to conduct the analysis and present the results.

RESULTS AND DISCUSSION

The status of the investigated topic

Companies with the status of going public aim to increase prosperity for owners or shareholders through increased firm value. A wealth of the shareholder and company is presented by the share market price, which is a reflection of the investment decision, financing, and asset management conducted by the shareholder with the management party to maximize the company's ability to generate profit and the growth rate of the company, to maintain the position of the company. One factor affecting the company's value is the ownership structure; when we maximize the firm value, the unification of shareholders and management's interests in achieving the objectives is needed. Empirical evidence shows that ownership structure will affect the value of the company. The evidence is inconsistent with findings proving that the ownership structure does not affect firm value. Using debt at a certain level will reduce the cost of capital because the cost of debt is the reduction of company tax, and can increase the share price. Therefore, it can be concluded that the addition of debt in the right proportions can help the company achieve an optimal level of capital structure and increase the value of the company. Capital structure is affected by the firm value; institutional ownership also significantly affects the firm value. These findings differ from others, proving that the capital structure will negatively influence the firm’s value. The company's profitability is one of the alternatives used to accurately assess the extent to which the rate of return will be obtained from investment activities. Profitability can reflect the profit of a financial investment, meaning that the profitability will affect the company's value if the company's ability to generate profit increases since the stock price will also increase. Profitability affects the value of the company. These findings refute the findings indicating that profitability has no significant effect on firm value **[14]**. Financial performance is a subjective measure of how well a firm can use assets from its primary business mode and generate revenues. The term also measures a firm’s overall financial health over a period **[15]**. Corporate value can also be influenced by the size of the profit generated by the company. Company management should pay attention to the capital structure, company size, and profitability so that the share price will increase and impact the company's value to investors. Return on equity (ROE) is a ratio that indicates a company's ability to generate net income for shareholder equity returns. The greater the ROE results, the better the company's performance. ROE growth shows the prospect of a better company because it means a potential profit increase. Investors capture this as a positive signal from the company that will increase investor confidence and facilitate the company's management to attract capital in the

form of shares. If there is an increase in a company's stock demand, it will raise the price of the stock in the capital market. Profitability can be calculated with ROE (return on equity). ROE reflects the return on investment for shareholders. High profitability reflects the company's ability to generate high returns for shareholders. A high profitability ratio owned by a company will attract investors to invest. Investors' high interest in investing in companies with high ROE will increase stock prices **[16]**. Any business activity requires financing from some source. A business entity needs assets to carry out activities associated with its business. The amount and structure of these assets depend primarily on the nature and scope of the business activity. From an accounting perspective, we view assets as resources. Conversely, sources of coverage are referred to as capital. We will label the sources of coverage of assets as liabilities **[17]**. One of the most important questions in financing a business is the decision on the form of financing. We are talking about the ratio between long-term and short-term assets that the business has at its disposal. Therefore, a suitable and well-chosen asset and capital structure is crucial for a business to achieve its primary goals. When choosing an appropriate structure, it is important to consider that it is crucial not only at the time of the business's establishment but throughout its entire existence **[18]**. As previously mentioned, financing is a key tool for the growth of any company and is required throughout the company's life cycle **[5]**. The basic internal forms of financing include self-financing from profits and depreciation. Profit or self-financing, from a quantitative point of view, has the highest impact of all sources. It is influenced by various factors, such as the unit's price of realized production. Its amount and distribution are strongly influenced by the company's tax and dividend policy **[19]**. In business management, profit is used not only as a source of financing but also as one of the most important synthetic indicators of business success and efficiency, especially concerning invested capital, and as a tool for material interest (for owners, managers, as well as employees) **[20]**. Conversely, depreciation does not represent newly created financing sources for the business but is a monetary expression of asset wear and tear **[21]**. The American Institute of Certified Public Accountants defined depreciation as accounting for allocating the acquisition cost or other basic value of an asset, reduced by residual value, over its estimated useful life systematically and rationally **[22]** and **[23]**.

The characteristics of external sources vary. However, if we were to define external financing, we could say that it includes all sources that come into the business from external entities, regardless of whether it is from an owner, other businesses, banks, insurance companies, or even the state. When utilizing external sources of financing, we are most likely to encounter bank loans frequently. In this process, an institution specializing in "money trade," primarily a bank, takes part. Under predetermined conditions, the bank lends its money to the business entity, expecting an inevitable return in the form of interest. A bank loan is provided primarily by banks to individual economic entities through monetary funds to cover operational and other needs. Today, this form of financing is most commonly used, becoming a sure "starter" for developing a new business. Alternative forms of funding of include those that are not widely used in business. One such form is financial leasing. In Slovakia, it is a popular form of asset financing **[24]**. Another form is forfaiting, which is used for long-term international trade transactions. "Forfaiting houses," which participate in this form of financing, subconsciously react to situations where a business entity may not repay a debt, creating a receivable for the other party. The process of financing short-term receivables is often known as factoring **[25]** and **[26]**. Another form of financing is franchising. It is a business model in which the franchisor extends its know-how, intellectual property, and the right to operate under the brand name in exchange for a fee (usually in the form of charges and royalties) to the franchisee.

Franchising is also a model for businesses to achieve growth with limited resources. International franchising is an entry method that allows companies to develop new markets with relatively low risk but also limited control **[27]**, **[28]**, and **[29]**. Venture capital in businesses represents sources aimed at acquiring a stake in the business despite the project's riskiness. This form is not shared and originates from the USA. This method began to take shape and expand in Europe in the 1980s. Various specialized companies and venture capital funds were created to facilitate its use. Their business activity and sole purpose are to acquire financial resources from multiple individual and institutional investors to invest these resources into businesses in venture capital investing. The decision to invest resources in a company is based on various factors, such as assessing the enterprise's business plans, management quality, investment management methods, and primarily the planned return and anticipated growth in the company's market value **[30]** and **[31]**.

ROA and ROE are among the indicators used to measure, evaluate, and analyze enterprises' performance. When the literature is examined, these ratios provide essential information about the enterprise's profitability, performance, and financial structure. ROA measures how efficiently a company uses its assets, while ROE includes information about the efficiency of using its equity. Accurate and reliable analysis of these ratios is critical for internal and external information users **[32]**.

When studies on the importance of ROA in the literature are examined, they are especially focused on determining how effectively enterprise assets are used. Companies look at their financial health via gross margin,

net margin, ROA, and ROE. The information helps one judge the firm's overall condition since it shows how a company performs compared to other businesses **[33]**. Theoretical arguments and empirical studies on financial decision-making in capital structure play a crucial role. These include a wide range of determinants affecting debt financing decisions and their connection to the performance of the food sector **[34]**.

Analysis of financing forms and key determinants

Ratio indicators ROA, ROE, ROS, and ROC are used to calculate the financing form of individual companies. Calculations are presented for 9 years for all 10 companies. Based on the calculation of the indicators above, it is necessary to know the sources from which the companies are financed. Based on surveys of several empirical studies that dealt with the impact of various determinants on company performance, our variables, whose impact we want to monitor, are selected. Both empirical studies and personal interest inspire our selection of final determinants for the model. All variables used are listed in Table 1. The necessary calculated indicators are combined into a single table, serving as a basis for panel regression. The key determinants we have chosen are analyzed for the company's performance, specifically for ROA and ROE indicators. Based on positive or negative dependency, it can be determined whether a given variable impacts the company's performance.

Table 1 Ratio indicators.

Ratio indicators	**Abbreviation**	**Calculation of indicator**
Return on total Assets	ROA	$ROA = \frac{Net\ Profit\ after\ Tax}{Total\ Assets}$
Return on Equity	ROE	$ROE = \frac{Net\ Profit\ after\ Tax}{Equity}$
Return on Sales	ROS	$ROS = \frac{Net\ Profit\ after\ Tax}{Sales}$
Return on Costs	ROC	$ROC = 1 - ROS$
Debt Ratio	DE	$DE = \frac{Debt}{Equity}$
Total Debt	TD	$TD = \frac{Debt}{Total\ Assets}$
Financial Leverage	FP	$FP = \frac{Total\ Assets}{Equity}$
Number of Employees	SIZE	-
Years of Operation	AGE	-
Asset Turnover	TURN	$TURN = \frac{Sales}{Total\ Assets}$
Asset Ratio or Asset Structure	TANG	$TANG = \frac{Equity\ -\ Intangible\ Assets}{Total\ Assets\ -\ Intangible\ Assets}$
Long-term Debt to Asset Ratio	LDCE	$LDCE = \frac{Long - term\ Liabilities}{Total\ Assets}$

Note: Source: Author´s own elaboration.

Figure 1 is presented to provide a better understanding and visualization of the development of asset profitability. It shows the development of the ROA indicator for the 10 selected analyzed companies over 9 years.

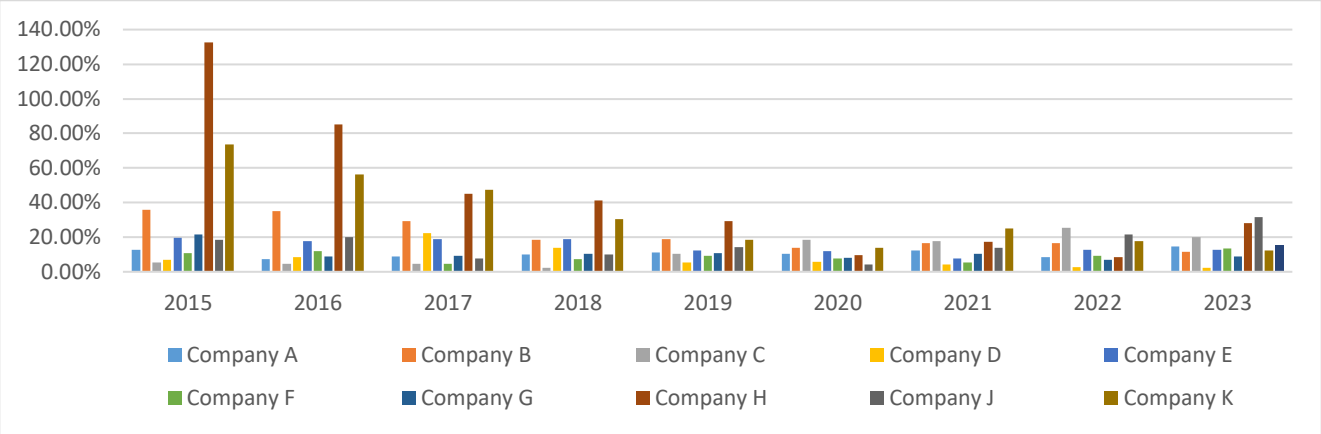

Figure 1 ROA indicator of selected companies.

Figure 2 illustrates the return on equity (ROE). Company "K" has the highest values compared to the industry.

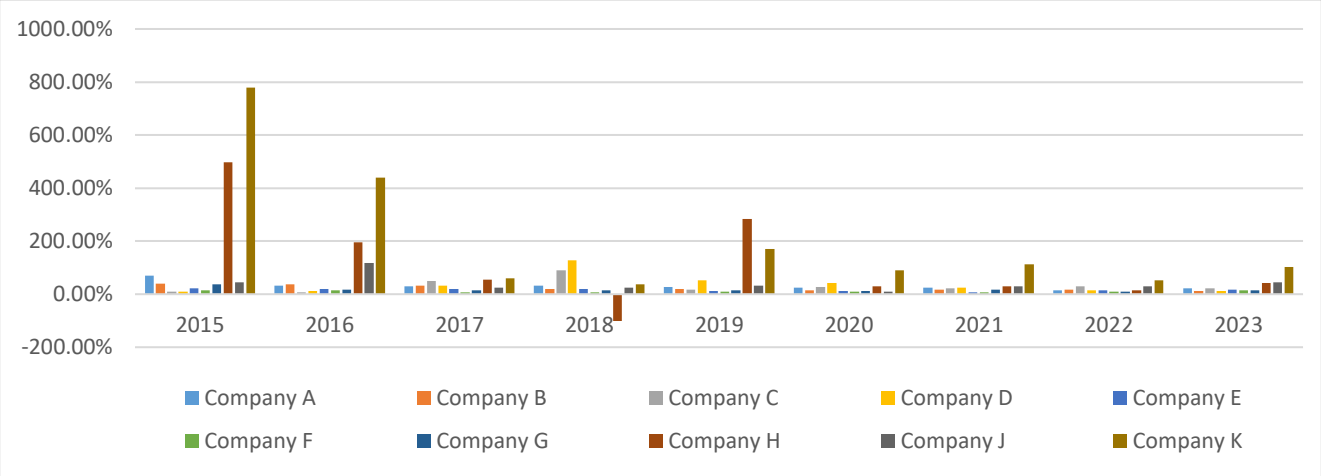

Figure 2 ROE indicator of selected companies.

Analysis of key determinants affecting ROA indicator

This section of the article deals with the variables that relate to the explained ROA indicator and are presumed to significantly impact this relationship.

The analysis is performed through panel regression using time series and cross-sectional data. Before starting the panel regression, it is assumed that there is a correlation between the variables. This correlation is verified in several ways, including a tabular correlation matrix, the KMO (Kaiser-Meyer-Olkin) criterion, or by plotting a correlation matrix graph. The correlation matrix can be seen in Figure 3. A threshold value for correlation can be considered around 0.80. However, it is generally accepted that a positive correlation is indicated by values above 0.80. In our case, Figure 3 shows a clear value equal to 1.

The value of 1 is between the variable DE (debt ratio) and the variable FP (financial leverage), where this value represents an ideally strong positive correlation between the variables. The goal for these indicators is to maintain lower values – for the DE indicator, we aim to have a value lower than 1, and for financial leverage, we seek an even ratio between equity and debt, as higher debt is associated with higher risk.

The second highest value, showing the correlation between ROA and ROE, is 0.75. Both of these indicators can be considered fundamental indicators of companies. It is based on these indicators that two equations are formulated and analyzed. The task is to determine which variable, ROA or ROE, the key determinants have a more significant impact on, based on Model 1.

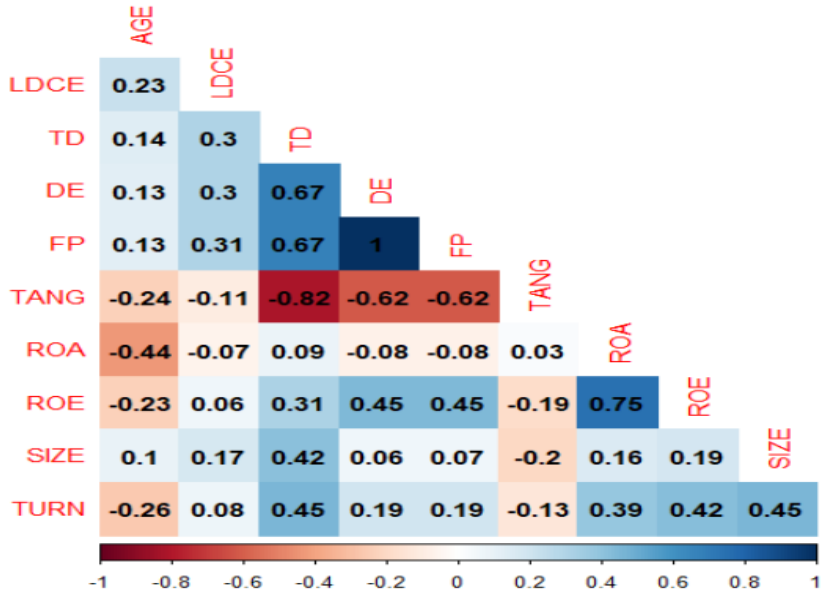

Figure 3 Correlation Matrix Graph.

Based on the model testing performed in the RStudio environment and the results shown in the Table 2, it is evident that after conducting the test between the fixed model of ROA indicator and the pooled model (Pooled_ROA), the p-value is significant at the 0.001 significance level. Therefore, based on this test, the more suitable model is the fixed effects model. The second test is the Lagrange Multiplier test, which compares the random and pooled models. Based on the first and second tests, it was confirmed that the pooled model is not suitable. The final test is the Hausman test, which tests both models that passed the previous tests. The Hausman test recommends the random effects model, based on the p-value of 0.5765, which is higher than the significance level of 0.05. The final model to be used from all the tests is the random fixed effects model.

Table 2 Evaluation of individual model tests for ROA model.

Model	Test Name	p-value	Suitable Model
FE_ROA vs. Pooled ROA	F test	< 0.001	FE_ROA
RE_ROA vs. Pooled ROA	Langange Multiplier Test	< 0.001	RE_ROA
RE_ROA vs. FE_ROA	Hausman test	> 0.05	RE-ROA

Note: Source: Author´s elaboration.

After arriving at the final model, we test the assumptions to check for issues such as serial correlation, cross-sectional dependence, or heteroskedasticity in the model. The presence of these issues could affect the accuracy of our results. To identify these potential problems, we use three types of tests. The results are recorded in the following Table 3.

Table 3 Testing assumptions in ROA model.

Assumption	Test Name	p-value	Conclusion
Serial Correlation	Breusch-Godgrey/Wooldridge test	< 0.001	There is a problem with serial correlation in the model
Cross-Sectional Dependence	Pesaran CD test	> 0.05	There is no cross-sectional dependence in the model
Heteroskedasticity	Hausman test	> 0.05	There is no heteroskedasticity in the model

Note: Source: Author´s own elaboration.

The results of the assumptions are accepted or rejected based on the p-value, which we compare with the statistical significance level. The hypotheses are set as follows:

For serial correlation:
H0: There is no serial correlation in the model. H1: There is serial correlation in the model.
For cross-sectional dependence:
H0: There is no cross-sectional dependence in the model. H1: There is cross-sectional dependence in the model.

For heteroskedasticity:
H0: There is no heteroskedasticity in the model. H1: There is heteroskedasticity in the model.

The RStudio outputs, recorded in Table 3, are interpreted as follows. Using the test, the p-value obtained is < 0.001 for serial correlation. This means that the null hypothesis H0 is rejected, the alternative hypothesis H1 is accepted, and thus it is concluded that there is serial correlation in the model. The second tested assumption is cross-sectional dependence, where the p-value is 0.5262 > 0.05, meaning that the null hypothesis H0 is not rejected. Thus there is no cross-sectional dependence in the model. The final assumption is the presence of heteroskedasticity, where the p-value is 0.1616 > 0.05, the null hypothesis H0 is accepted, and there is no problem with heteroskedasticity in the model. Subsequently, it is necessary to remove the serial correlation from our model. This is important because if serial correlation is left in the model and ignored, its presence could lead to a loss of efficiency and asymptotic efficiency of the estimated regression coefficients. Therefore, we remove the correlation using a robust covariance matrix. The values of the final model for ROA indicator after removing serial correlation are recorded in Table 4.

Table 4 Final model for ROA.

Random individual effects model for ROA			
Variable	**Beta Coefficient**	**p-value**	**Statistical significance**
ROA	-	-	-
DE	0.12422	0.51284	
TD	-0.18638	0.06634	0.05
FP	-0.13197	0.48071	
SIZE	< 0.001	0.80354	
AGE	-0.01291	0.05387	0.05
TURN	0.14017	0.07563	0.05
TANG	-0.022497	0.32486	
LDCE	0.157	0.45291	
R-Squared		0.29803	
p-value		< 0.01	

Note: Source: Author´s own elaboration.

Table 4 shows that three variables (DE, AGE, TURN) are statistically significant, even though they exhibit only weak statistical significance at the 0.05 level. If the debt ratio (DE) increases by 1%, it will cause an increase in ROA indicator by 0.12%. This shows that asset profitability depends on the debt ratio. Conversely, if the total debt (TD) increases by 1%, it will cause a decrease in asset profitability by 0.19%. It is also noticeable that the total debt has statistical significance at the 0.05 level. An interesting fact is that the variable "SIZE," which represents the number of employees in the company, has almost no impact on asset profitability, whereas the variable "AGE," which means the duration of the company's existence in the market, does have an impact on asset profitability. Additionally, the asset turnover indicator (TURN) is statistically significant at the 0.05 level in ROA model. This means that if asset turnover increases by 1%, asset profitability will increase by 0.14%.

The statistical significance of the model as a whole is assessed based on the p-value and the acceptance or rejection of hypotheses, which are as follows:
H0: The model as a whole is not statistically significant. H1: The model as a whole is statistically significant.

The p-value of the model is 0.0031974, which is less than the significance level of 0.01, meaning that the null hypothesis is rejected and the alternative hypothesis is accepted, indicating that the model as a whole is statistically significant. The coefficient of determination of the model is 0.29803. This number indicates the percentage of total variability of the explained variable in the model that can be described using the given explanatory variables. The higher this number, the more significant it is. In this case, this value is relatively low because we are working with actual data.

From the overall analysis of ROA indicator through panel regression, the output highlights the specific significance of individual variables in the model. The most significant variables influencing the profitability of total assets are total debt, the duration of the company's existence in the market, and total asset turnover. Understandably, these variables influence asset profitability. Total debt is the proportion of the company's assets financed by debt rather than equity. This indicator is followed by many investors who monitor whether the company has sufficient financial resources to pay off its current liabilities. Also, creditors are concerned with the company's total debt relative to its total assets to determine how much debt the company already has and whether it can repay it. Based on this fact, whether a loan will be granted to the company if requested is also decided. The age or duration of the company's existence in the market also matters. It can be expected that a company with many years of market experience, having gone through various fluctuations such as economic crises or the COVID-19 pandemic, is more resilient and prepared for future unexpected or adverse events than a company that has only been in the market for 2-3 years. The last most significant indicator is asset turnover, which indicates how many times per year the assets turn into sales. This means how efficiently the company manages its assets.

Analysis of key determinants affecting ROE indicator

This chapter analyzes the explanatory variables entering the model for the explained variable ROE. It mainly compares the same input variables used in the equation for ROA indicator. The goal is to determine whether the key determinants better capture the essence of asset profitability or equity profitability. The procedure is the same as for analyzing the determinants of ROA indicator, based on Model 2.

We will find out if there is a correlation between the variables. Again, we take the imaginary threshold of 0.80, where the numbers above express a positive correlation. Since we are working with the same data, the graph is identical to Figure 3. We see that a strong correlation equal to one is between the debt ratio and financial leverage. A lower but still notable correlation is between ROA and ROE with a value of 0.75. The next step is selecting the appropriate model from the three types, which are the pooled model, fixed effects model, and random effects model. The results of their comparisons and the tests used are recorded in Table 5.

Table 5 Evaluation of individual tests for ROE model.

Model	Test	p-value	Suitable Model
FE_ROE vs. Pooled ROE	F test	< 0.001	FE_ROE
RE_ROE vs. Pooled ROE	Langange Multiplier Test	< 0.001	RE_ROE
RE_ROE vs. FE_ROE	Hausman test	> 0.05	RE-ROE

Note: Source: Author´s own elaboration.

Based on the data from Table 5, we can see that comparing the tests led to selecting the appropriate model, which is the random effects model. The next important step is verifying the assumptions of serial correlation, cross-sectional dependence, and heteroskedasticity in the model. Their presence could distort the final results, and this situation is undesirable. Therefore, the results from the tests are shown in Table 6.

Table 6 Testing assumptions for ROE model.

Assumption	Test Name	p-value	Conclusion
Serial Correlation	Breusch-Godgrey/Wooldridge test	> 0.05	There is no problem with serial correlation in the model
Cross-Sectional Dependence	Pesaran CD test	> 0.05	There is no cross-sectional dependence in the model
Heteroskedasticity	Studentized Breusch-Pagan test	> 0.05	There is no heteroskedasticity in the model

Based on the tests whose results are listed in Table 6, we can see that ROE model does not exhibit the presence of any of the specified assumptions. For serial correlation, the p-value is 0.05777, which is higher than the significance level of 0.05, indicating no problem with serial correlation in the model. For the Pesaran CD test, the p-value is 0.9134, which is also higher than the significance level of 0.05, indicating no problem with cross-sectional dependence in the model. The final tested assumption was heteroskedasticity, with a p-value of 0.364. This value is higher than the significance level of 0.05, leading to the rejection of the presence of heteroskedasticity in ROE model.

Subsequently, we obtain a model evaluated in Table 7 containing explanatory variables, their p-values, and statistical significance. Compared to ROA model, it can be seen that there are fewer significant variables. Still, on the other hand, they are statistically significant at a lower significance level, which is a good result. Both models have two standard explanatory variables, and these are TURN indicator - asset turnover and total debt (TD). If we look at total debt in ROE model in Table 7, it can be seen that it is statistically significant at a lower level of significance than in ROA model. This means that if total debt increases by 1%, there would be a decrease in return on capital by 1.14%, which represents a more significant impact of TD variable than in ROA model. The variable that has the most significant impact on the return on working capital in ROE model is asset turnover. If this indicator increases by 1%, the return on working capital will increase by 0.49%. Also based on the coefficient of determination, which has a value of 0.44557, it can be argued that the standard variables in both models better explain the return on equity than the return on corporate assets. Specifically, it is possible to explain 44.57% of the variability of the explanatory variable ROE using the given variables. The model is also statistically significant at the significance level of 0. After analyzing the input variables affecting the return on assets and the return on working capital, it can be seen that the input variables affect the return on capital more. Since companies have debts, for example, in loans, credits, and other forms, the company increases its assets thanks to the cash it receives. Therefore, The assets are higher than the company's equity, and ROA will be higher. In this case, ROE will decrease due to the lower value of the denominator, which is equity. Both ROA and ROE models are essential factor and indicator, especially for investors who use both of these variables.

Table 7 Final model for comparison of ROA and ROE models.

Variable	Final model for comparison of ROA and ROE models						
	Beta Coefficient	**p-value**	**Statistical Significance**	**Variable**	**Beta Coefficient**	**p- value**	**Statistical Significance**
ROA	-	-	-	ROE	-	-	-
DE	0.12422	0.51284		DE	1.42639	0.10013	
TD	-0.18638	0.06634	0.05 (.)	TD	-1.13795	0.02671	0,01 (*)
FP	-0.13197	0.48071		FP	-1.23459	0.46515	
SIZE	< 0.001	0.80354		SIZE	< 0.001	0.46802	
AGE	-0.01291	0.05387	0.05 (.)	AGE	-0.02584	0.10330	
TURN	0.14017	0.07563	0.05 (.)	TURN	0.49180	< 0	0 (***)
TANG	-0.02249	0.32486		TANG	0.03994	0.78602	
LDCE	0.15700	0.45291		LDCE	0.00714	0.99427	
R-Squared		0.29803		R-Squared		0.44557	
p-value		< 0.01		p-value		< 0	

Note: Source: Author´s own elaboration.

CONCLUSION

The common significant key determinants of performance for the analyzed companies for both ROA and ROE are total debt and asset turnover. The presence of competition and pressure on prices can significantly impact the return on equity of these companies. A decrease in prices or loss of market share due to competition can lead to reduced profitability and thereby decreased equity value. It is crucial to focus on reducing the company's total debt. Despite once-favorable interest rates, the economy and the world are constantly changing, and fixed interest rates may not always offer the best deal for a company. Higher debt levels mean less economic stability. Thus, despite cheap loans or credit, it is important to manage liabilities rationally. Currently, there are many alternative sources of financing other than traditional bank loans. The fewer external sources fund a company, the more stable it will be, making it attractive to potential future investors. Finding new customers reduces costs and creates room for increased sales, significantly impacting equity profitability. Although the food industry is not among the leading sectors, its specific characteristics and role in providing daily nutrition give it an indispensable place in the national economy's structure. It significantly contributes to economic growth, considering the specifications and challenges that food companies currently face. Ensuring performance, economic efficiency, and competitiveness is crucial for food companies. One of the aims of this article was to assist food company managers by demonstrating how the information presented could contribute to optimizing profitability, which is essential for maintaining competitiveness in the food industry.

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