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The Pyramidal Indicator Decomposition Model of Return on Equity as a Tool for Economics and Managerial Decision-Making

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Abstract

Research background: Pyramidal indicator decomposition models represent an important analytical tool in corporate financial analysis, enabling the identification and quantification of causal relationships between synthetic and partial financial indicators. Among their most significant applications is the decomposition of return on equity (ROE), which provides a detailed understanding of the factors influencing corporate profitability and shareholder returns.
Purpose of the article: The aim of this paper is to examine the significance of the pyramidal indicator decomposition model in financial and economic analysis and to demonstrate its usefulness as a support tool for economic and managerial decision-making through the decomposition and interpretation of ROE.
Methods: The study applies a pyramidal indicator decomposition model to ROE using the logic of the DuPont framework. The relationships between the synthetic indicator and its underlying partial indicators are analysed through multiplicative and combined decomposition structures. The proposed approach is demonstrated through a case study based on corporate financial data, supported by graphical and verbal interpretations of the decomposition results.
Findings & Value added: The analysis identified the relative importance of profitability, asset efficiency, and financial leverage in shaping shareholder returns and demonstrated how changes in individual factors contribute to the overall development of the synthetic indicator. The study highlights the practical relevance of the pyramidal indicator decomposition model as a comprehensive instrument of financial analysis and a valuable support tool for economic and managerial decision-making. By enabling the identification of key performance drivers and quantifying their influence on ROE, the model provides managers with information that can support strategic planning, performance management, resource allocation, and corporate financial decision-making.

Keywords: pyramidal indicator decomposition model; return on equity; financial analysis; economic and managerial decision-making

JEL Classification: G3; G30; G32

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1. Introduction

In the current dynamic and highly competitive business environment, the ability to accurately assess and interpret a company's financial performance represents a fundamental prerequisite for effective managerial decision-making. Financial and economic analysis provides managers, investors, creditors, and other stakeholders with valuable information regarding the financial condition, efficiency, profitability, and long-term sustainability of a business entity (Copeland et al., 2000; Altendorfer, 2011; Dai and Piccotti, 2020). The growing complexity of business processes and increasing uncertainty in economic conditions have intensified the demand for analytical tools capable not only of evaluating corporate performance but also of identifying the underlying factors that drive its development (Brigham and Ehrhardt, 2019; Kovalova et al., 2026).

Among the methods used in financial analysis, pyramidal indicator decomposition models occupy a prominent position due to their ability to reveal causal relationships among financial indicators. These models are based on the systematic decomposition of a synthetic indicator into a set of partial indicators, thereby enabling a detailed examination of the factors influencing the overall value of the analysed performance measure. Through the identification and quantification of these relationships, pyramidal indicator decomposition models provide a comprehensive understanding of the mechanisms that shape corporate performance and financial health (Synek et al., 2011; Tudose et al. 2021).

The practical significance of pyramidal indicator decomposition models lies in their ability to support managerial decision-making processes. By identifying the key determinants of changes in profitability, value creation, liquidity, or other performance measures, managers can better understand the consequences of their decisions and implement targeted corrective actions. Furthermore, these models facilitate the evaluation of alternative strategic options and contribute to more efficient resource allocation within the enterprise. Their explanatory and predictive capabilities make them particularly valuable in performance management, financial planning, and strategic control (Lev, 1983; Coenders and Arimany, 2023; Podhorska et al., 2020).

An additional advantage of pyramidal indicator decomposition models is their flexibility and applicability to various synthetic financial indicators. While the decomposition of ROE has traditionally received considerable attention in financial analysis, the same methodological principles can be applied to other indicators, such as earnings after taxes (EAT) and economic value added (EVA). This broader application enhances the analytical value of pyramidal models and extends their usefulness in assessing different dimensions of corporate performance (Parzonko et al., 2023; Hawaldar et al., 2022).

The aim of this paper is to examine the significance of the pyramidal indicator decomposition model in financial and economic analysis and to demonstrate its usefulness as a support tool for economic and managerial decision-making through the decomposition and interpretation of ROE.

2. Literature review

Corporate financial performance evaluation remains one of the most important areas of financial management research. Contemporary financial analysis is no longer limited to the assessment of profitability, liquidity, or solvency through individual financial ratios; rather, it increasingly focuses on identifying the underlying drivers of corporate performance and value creation. Recent studies emphasize that understanding the causal relationships among financial indicators is essential for effective managerial decision-making, strategic planning, and performance management (Palepu et al., 2022; Ross et al., 2022; Coenders and Arimany, 2023; Brealey et al., 2020).

The theoretical foundations of indicator decomposition can be traced to the DuPont system, which introduced a structured framework for analysing ROE through profitability, asset efficiency, and financial leverage. Although originally developed in the early twentieth century, the DuPont logic remains relevant in contemporary financial analysis due to its ability to explain the determinants of shareholder returns. Research by Soliman (2008) demonstrated that decomposed profitability measures provide more informative insights than aggregate indicators alone, while Nissim and Penman (2001) showed that ratio decomposition improves the interpretation of financial performance and equity valuation.

Recent empirical evidence further supports the relevance of decomposition-based approaches. Fairfield and Yohn (2001) found that the decomposition of profitability into profit margin and asset turnover improves the prediction of future profitability. Building on this work, Bauman (2014) confirmed that DuPont-based decomposition enhances the forecasting of operating performance and earnings persistence. More recently, Anderson et al. (2024) demonstrated that the individual components of the DuPont model provide incremental explanatory power in predicting future profitability beyond conventional financial indicators. These findings suggest that decomposition models remain highly relevant in modern financial analysis and continue to offer valuable information for both analysts and managers (Parzonko et al., 2023).

The growing complexity of business environments has encouraged researchers to extend traditional decomposition frameworks beyond the analysis of profitability indicators. Contemporary studies increasingly integrate value-based measures, risk factors, and strategic performance indicators into decomposition models. Coenders and Arimany (2023) argue that modern financial statement analysis should focus on understanding the interrelationships among financial variables rather than on isolated indicator evaluation. Similarly, recent research has highlighted the potential of decomposition techniques to support predictive analytics and performance forecasting through the integration of advanced analytical approaches and data-driven methodologies (Hoag et al., 2025; Anderson et al., 2024).

Within the Central European context, the development of pyramidal indicator decomposition models has been strongly influenced by the work of Neumaierova and Neumaier (2002), who extended the traditional DuPont framework by constructing comprehensive pyramidal systems of financial indicators. Their approach enabled the decomposition of synthetic indicators into interconnected partial indicators linked through additive, multiplicative, and combined relationships. Subsequent contributions by Dluhosova (2010), Kislingerova (2018), and Ruckova (2021) further emphasized the practical usefulness of decomposition models for identifying performance drivers and supporting managerial decision-making.

The application of decomposition techniques has also expanded across different sectors and organizational settings. Chang et al. (2014) demonstrated the usefulness of DuPont decomposition in explaining financial performance within the healthcare sector, while recent studies continue to confirm the adaptability of decomposition models across industries characterized by different operational and financial structures. Moreover, Altendorfer (2011) highlighted the importance of linking value-based indicators with operational performance measures, demonstrating how analytical models can support value creation and managerial decision-making.

From a managerial perspective, decomposition models are increasingly viewed as decision-support tools rather than merely analytical instruments. Contemporary management research emphasizes that effective decision-making requires a clear understanding of the causal relationships linking operational activities, financial outcomes, and strategic objectives (Kaplan and Norton, 2008; Tudose et al., 2021). By quantifying the contribution of individual determinants to changes in financial performance indicators, pyramidal decomposition models provide managers with actionable information for resource allocation, performance management, financial planning, and strategic control.

Recent developments have further expanded the scope of decomposition methodologies by incorporating risk and uncertainty into traditional performance measurement systems. Zmeskal et al. (2025) proposed an extended ROE decomposition framework integrating profitability and risk considerations, demonstrating its applicability under conditions of economic instability and external shocks. These developments reflect a broader trend toward the integration of traditional financial analysis with modern decision-support systems and value-based management approaches (Turner et al., 2015; Ladvenicova et al., 2025).

Despite the growing body of literature on financial ratio decomposition and DuPont analysis, research continues to focus predominantly on the identification of financial performance drivers rather than on the managerial implications of decomposition results. While previous studies have confirmed the explanatory and predictive capabilities of decomposition models, relatively limited attention has been devoted to their role as a practical support tool for economic and managerial decision-making. This research gap provides the motivation for the present study, which examines the application of a pyramidal indicator decomposition model to ROE and evaluates its contribution to financial analysis and managerial decision-making.

3. Methodology

Following the identification of the relationships between a synthetic indicator and its underlying partial indicators, an appropriate decomposition method is selected to quantify the contribution of individual factors to changes in the synthetic indicator. The choice of the method depends on the mathematical nature of the relationships among the indicators.

When the synthetic indicator is expressed as an additive function of partial indicators, the contribution of individual factors can be determined directly without the application of a specific decomposition method. In such cases, the synthetic indicator can be expressed as:

$$\left.\begin{aligned} x &= a + b + c \\ x_0 &= a_0 + b_0 + c_0 \\ x_1 &= a_1 + b_1 + c_1 \end{aligned}\right\} \; \frac{\Delta a}{\Delta x} \cdot 100 \qquad (1)$$

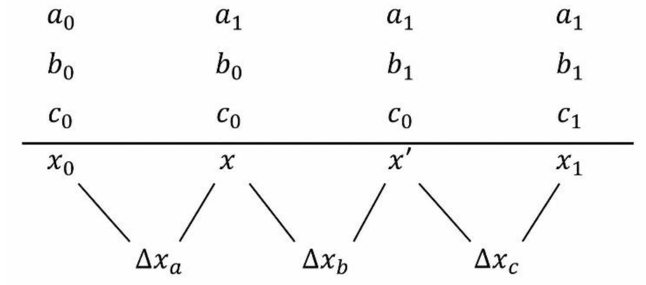
where x is synthetic (top-level) indicator,
a, b, c are partial indicators,
0 is base period,
1 is current period.

In contrast, when the synthetic indicator is characterized by multiplicative or combined relationships, the contribution of individual factors cannot be directly observed and must be quantified using specialized decomposition methods. The literature most frequently identifies three approaches: the chain substitution method, the logarithmic method, and the functional method.

3.1. Chain substitution method

The chain substitution method is one of the most widely applied approaches for quantifying factor contributions in multiplicative systems. The method is based on the ceteris paribus principle, if only one factor changes at a time while all other factors remain constant. The contribution of each factor is calculated through the sequential substitution of observed values into the decomposition model.

Figure 1: Chain substitution method



Source: own processing

For a multiplicative relationship:

$$\begin{aligned} \Delta x_a &= (a_1 - a_0) \cdot b_0 \cdot c_0 & \Delta x_a &= \Delta a b_0 c_0 \\ \Delta x_b &= a_1 \cdot (b_1 - b_0) \cdot c_0 & \Delta x_b &= a_1 \Delta b c_0 \\ \Delta x_c &= a_1 \cdot b_1 \cdot (c_1 - c_0) & \Delta x_c &= a_1 b_1 \Delta c_0 \end{aligned} \tag{2}$$

3.2. Logarithmic method

The logarithmic method is also applicable to multiplicative relationships. Unlike the chain substitution method, it is based on relative changes expressed through index numbers rather than absolute differences. The contribution of each factor is determined proportionally according to its logarithmic share in the overall change of the synthetic indicator.

The contribution of individual factors is calculated as follows:

$$\begin{aligned} \Delta x_{\Delta a} &= \Delta x \cdot \frac{log\frac{a_1}{a_0}}{log\frac{x_1}{x_0}} \\ \Delta x_{\Delta b} &= \Delta x \cdot \frac{log\frac{b_1}{b_0}}{log\frac{x_1}{x_0}} \\ \Delta x_{\Delta c} &= \Delta x \cdot \frac{log\frac{c_1}{c_0}}{log\frac{x_1}{x_0}} \end{aligned} \tag{3}$$

3.3. Functional method

The functional method represents the most theoretically accurate approach to factor decomposition in multiplicative systems. It is based on coefficients of relative change and allocates interaction effects proportionally among the factors. However, despite its higher precision, the method becomes increasingly complex as the number of partial indicators increases.

For a decomposition involving two factors, the coefficients of change are defined as:

$$\begin{aligned} A &= \frac{\Delta a}{a_0} = \frac{a_1 - a_0}{a_0} = \frac{a_1}{a_0} - 1 \\ B &= \frac{\Delta b}{b_0} = \frac{b_1 - b_0}{b_0} = \frac{b_1}{b_0} - 1 \\ \Delta x_{\Delta a} &= x_0 \cdot A \cdot \left(\frac{1}{1} + \frac{B}{2}\right) \\ \Delta x_{\Delta b} &= x_0 \cdot B \cdot (\frac{1}{1} + \frac{A}{2}) \end{aligned} \tag{4}$$

where A is the coefficient of change of indicator a,
B is the coefficient of change of indicator b.

For a three-factor decomposition, an additional coefficient:

$$\begin{aligned} C &= \frac{\Delta c}{c_0} = \frac{c_1 - c_0}{c_0} = \frac{c_1}{c_0} - 1 \\ \Delta x_{\Delta a} &= x_0 \cdot A \cdot \left(\frac{1}{1} + \frac{B + C}{2} + \frac{B \cdot C}{3}\right) \\ \Delta x_{\Delta b} &= x_0 \cdot B \cdot \left(\frac{1}{1} + \frac{A + C}{2} + \frac{A \cdot C}{3}\right) \\ \Delta x_{\Delta c} &= x_0 \cdot C \cdot \left(\frac{1}{1} + \frac{A + B}{2} + \frac{A \cdot B}{3}\right) \end{aligned} \tag{5}$$

where C is the coefficient of change of indicator c.

In financial analysis, most performance measures can be considered synthetic indicators. Consequently, organizations may construct pyramidal indicator decomposition models for virtually any financial indicator of interest. However, the explanatory power of such models depends on the appropriate selection of partial indicators, the preservation of mathematically valid relationships among them, and the use of a suitable decomposition method for quantifying factor contributions. The validity of the resulting interpretation therefore relies on both the logical structure of the decomposition model and the methodological correctness of the applied quantification technique.

Limited research has examined the practical implications of these decomposition models for managerial decision-making. This research gap provides the motivation for the present study, which extends the application of pyramidal indicator decomposition models to multiple synthetic indicators and investigates their contribution to financial analysis and managerial decision-making within a corporate environment. The aim of this paper is to examine the significance of the pyramidal indicator decomposition model in financial and economic analysis and to demonstrate its usefulness as a support tool for economic and managerial decision-making through the decomposition and interpretation of ROE.

4. Results

This section presents the results of the application of pyramidal indicator decomposition models to selected synthetic financial indicators. Following the methodological framework outlined in the previous section, the analysis focuses on identifying and quantifying the contribution of individual partial indicators to changes in the selected synthetic indicators.

The empirical analysis is based on financial data obtained from the examined company. For ROE indicator, an appropriate pyramidal decomposition model was constructed in accordance with the mathematical relationships among the underlying partial indicators. Subsequently, suitable decomposition methods were applied to quantify the contribution of individual factors to the observed changes in the synthetic indicators. The resulting pyramidal structures provide a detailed view of the causal relationships among financial indicators and enable the identification of the key determinants of corporate performance.

The results are presented through graphical representations of the pyramidal decomposition model and are complemented by a detailed interpretation of the identified factor effects. Attention is devoted to the analysis of the magnitude and direction of individual factor contributions and their implications for corporate financial performance and managerial decision-making.

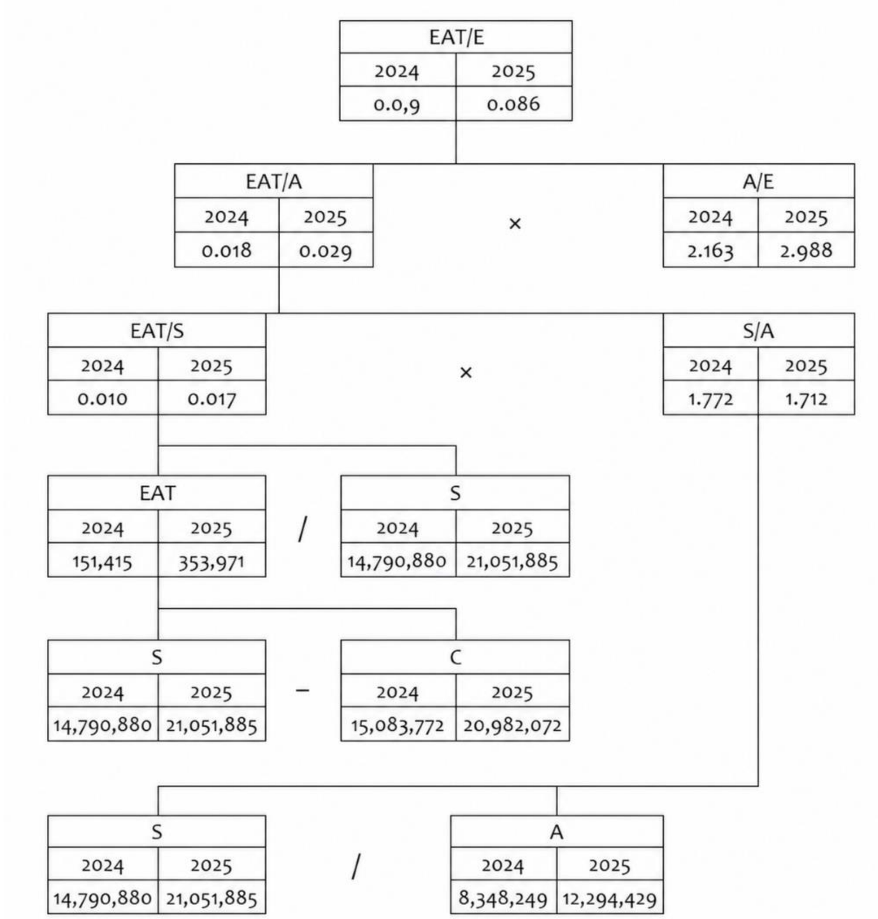
4.1. ROE Decomposition

The ROE indicator is determined by both multiplicative relationships among partial indicators (the first and second branches of the decomposition structure) and additive or combined relationships within the subsequent branches of the decomposition model. ROE expresses a company's ability to generate returns on the equity invested by its shareholders. To quantify the relationships within the ROE pyramidal indicator decomposition model, the logarithmic method was applied.

The pyramidal indicator decomposition model of ROE is presented in Figure 1. Detailed calculations of the logarithmic decomposition and the resulting factor contributions are provided in Appendix A.

The ROE indicator is determined by both multiplicative relationships among partial indicators (the first and second branches of the decomposition structure) and additive or combined relationships within the subsequent branches of the decomposition model. ROE expresses a company's ability to generate returns on the equity invested by its shareholders. To quantify the relationships within the ROE pyramidal indicator decomposition model, the logarithmic method was applied.

Figure 1: The pyramidal indicator decomposition model of ROE



Note: EAT denotes earnings after taxes, E represents equity, A represents total assets, S denotes sales, and C represents costs. Source: own processing

In the year-on-year comparison of 2025 and 2024, ROE increased by 119.34%, corresponding to an absolute increase of EUR 0.047. The two principal determinants of ROE are EAT and equity. It is generally assumed that an increase in EAT positively affects ROE, whereas an increase in equity, ceteris paribus, has a negative effect on the resulting ROE value.

EAT increased by EUR 202,556 year-on-year, representing a relative increase of 133.78%. This increase had a positive impact on ROE, contributing 108.11% to its overall change. Equity also increased during the analysed period, rising by EUR 253,971, which corresponds to a year-on-year increase of 6.58%. As expected, the growth in equity negatively affected ROE, contributing –8.11% to its overall change.

The analysis subsequently focused on the first branch of the DuPont decomposition model, represented by the product of return on assets (ROA) and financial leverage. The results indicate that the year-on-year increase in ROE of 119.34% (EUR 0.047) was positively influenced by both determinants, as each of them recorded growth during the analysed period. Specifically, ROA increased by 58.74%, corresponding to an absolute increase of EUR 0.011, and contributed positively to ROE by 58.13%. Financial leverage increased by 38.18%, corresponding to an absolute increase of 0.825, and contributed 41.17% to the overall increase in ROE.

The decomposition analysis was further extended by one additional level to examine the influence of ROS and Total Asset Turnover on ROA, which was considered the synthetic indicator at this stage of the decomposition process. Both indicators are generally expected to be maximized; therefore, an increase in either indicator should positively affect ROA, while a decrease should have a negative impact.

Although ROA contributed positively to ROE by 58.13%, its development was influenced differently by its underlying determinants. The increase in ROA was driven primarily by the growth in return on sales (ROS), while the decline in total asset turnover had a negative effect. Specifically, ROS increased by 64.25% year-on-year (EUR 0.007), resulting in a positive contribution of 107.38% to the overall change in ROA. In contrast, Total Asset Turnover decreased by 3.53%, which reduced ROA by 7.38%.

5. Discussion

The results of the empirical analysis confirm the practical relevance of the pyramidal indicator decomposition model in explaining changes in corporate financial performance. The findings are consistent with contemporary research emphasizing that the decomposition of financial indicators enhances both the explanatory and predictive power of financial analysis (Coenders and Arimany, 2023; Anderson et al., 2024). By identifying the individual determinants of ROA and quantifying their contributions, the applied model provides a more comprehensive understanding of corporate performance than traditional ratio analysis. The decomposition approach enabled the identification of causal relationships among financial indicators and revealed the relative importance of individual performance drivers, thereby supporting more informed economic and managerial decision-making.

The analysis of ROE confirms the continuing relevance of the DuPont framework as a tool for understanding the determinants of shareholder returns. The results indicate that changes in profitability, asset efficiency, and financial leverage jointly influenced the development of ROE. These findings are consistent with the conclusions of Anderson et al. (2024), who demonstrated that the individual components of the DuPont model possess significant explanatory and predictive power with respect to future corporate profitability. Similarly, Bauman (2014) argued that decomposed profitability measures improve the identification of performance drivers and enhance the analytical value of financial analysis. The present study supports these conclusions by demonstrating that the decomposition of ROE reveals information that would remain hidden if only the aggregate indicator were analysed.

The decomposition of ROA into ROS and Total Asset Turnover provides further evidence of the usefulness of pyramidal decomposition models. Although ROA contributed positively to the overall increase in ROE, the detailed analysis revealed differing effects of its underlying determinants. While the increase in ROS positively affected ROA, the decline in asset turnover partially offset this favourable development. Such findings confirm the conclusions of Fairfield and Yohn (2001), who demonstrated that the separate analysis of profitability and efficiency components improves the understanding of future performance. They also correspond with the observations of Coenders and Arimany (2023), who emphasize that financial statement analysis should focus on the interrelationships among financial indicators rather than on individual ratios in isolation.

The results further highlight the growing importance of decomposition-based approaches in contemporary financial analysis. Recent studies suggest that traditional ratio analysis should increasingly be complemented by analytical techniques capable of identifying the mechanisms responsible for value creation and financial performance (Palepu et al., 2022; Ross et al., 2022). The present findings support this perspective, as the decomposition model provided a detailed explanation of the factors responsible for changes in ROE and enabled a more accurate interpretation of corporate performance.

From a managerial perspective, the results confirm the practical importance of pyramidal indicator decomposition models as decision-support instruments. By quantifying the contribution of individual determinants, the model enables managers to distinguish between key performance drivers and factors with only marginal influence on overall performance. This finding is consistent with the conclusions of Tudose et al. (2021), who emphasize that performance measurement systems should provide managers with actionable information for strategic decision-making. Likewise, Kaplan and Norton (2008) argue that effective managerial decisions require a clear understanding of the causal relationships connecting operational activities, financial outcomes, and strategic objectives. In the analysed company, the decomposition model provided precisely such information by identifying the factors responsible for changes in shareholder returns and facilitating a more informed evaluation of managerial actions.

The findings also contribute to the ongoing discussion regarding the integration of traditional financial analysis with modern performance management approaches. Recent research increasingly emphasizes the need to combine conventional financial indicators with predictive and data-driven analytical tools (Anderson et al., 2024; Coenders and Arimany, 2023). The present study demonstrates that pyramidal indicator decomposition models remain relevant in this context because they provide a transparent framework for understanding the determinants of corporate performance and can serve as a foundation for more advanced analytical applications. The ability to quantify the contribution of individual determinants further strengthens the practical usefulness of these models in managerial practice.

Despite these contributions, several limitations should be acknowledged. First, the analysis was conducted using data from a single company, which limits the generalizability of the findings. Second, the results are influenced by the structure of the selected decomposition model and the quantification method applied. Future research could therefore focus on applying pyramidal indicator decomposition models across larger samples of companies and industries and examining their integration with predictive analytics, machine-learning techniques, and contemporary business intelligence systems.

Overall, the results confirm that the pyramidal indicator decomposition model represents a valuable analytical framework for both financial analysis and economic-managerial decision-making. Its ability to reveal causal relationships, quantify factor contributions, and explain changes in ROE supports the conclusions of recent studies while highlighting the continuing relevance of decomposition-based approaches in contemporary corporate performance management.

6. Conclusions

The aim of this paper is to examine the significance of the pyramidal indicator decomposition model in financial and economic analysis and to demonstrate its usefulness as a support tool for economic and managerial decision-making through the decomposition and interpretation of ROE. The study focused on identifying and quantifying the contribution of individual determinants influencing the development of ROE and on explaining the causal relationships among the underlying financial indicators. The results confirmed that the pyramidal indicator decomposition model provides a comprehensive explanation of changes in ROE by decomposing the synthetic indicator into its key determinants. The analysis revealed that profitability, asset efficiency, and financial leverage jointly influence shareholder returns, while the decomposition of ROA provided a more detailed understanding of the interactions between ROS and Total Asset Turnover. The findings demonstrate that the analysis of individual determinants offers substantially greater explanatory power than the interpretation of aggregate indicators alone.

From a practical perspective, the study highlights the importance of pyramidal indicator decomposition models as an effective instrument of financial analysis and managerial support. By identifying the factors responsible for changes in financial performance and quantifying their contributions, the model enables managers to better understand the drivers of corporate performance and make more informed decisions regarding strategic planning, resource allocation, and performance management. The study also confirms that pyramidal decomposition models remain a relevant analytical framework in contemporary corporate finance. Their ability to reveal causal relationships among financial indicators and provide a detailed explanation of performance development makes them a valuable component of modern financial and economic analysis.

Despite the contributions of the study, certain limitations should be acknowledged. The analysis was conducted using data from a single company, which may limit the generalizability of the findings. Future research could therefore apply pyramidal indicator decomposition models to larger samples of firms and different industries, as well as explore their integration with advanced analytical and predictive techniques. Overall, the findings suggest that the pyramidal indicator decomposition model represents a valuable tool for analysing corporate financial performance and supporting economic-managerial decision-making. Its application contributes to a deeper understanding of the determinants of ROE and enhances the informational value of financial analysis for both analysts and managers.

Author contributions

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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Data Availability Statement

The data presented in this study are available on request from the corresponding author.

Conflicts of Interest

The authors declare no conflict of interest.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this study, the authors used AI-assisted tools for language editing and structural support. After using these tools, the authors reviewed and edited the content as needed and took full responsibility for the published paper.

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Appendix A. Detailed calculations of the DuPont logarithmic decomposition of ROE.

$$\Delta\frac{EAT}{VK}_{\Delta EAT} = \Delta\frac{EAT}{VK}\cdot\frac{ln\frac{EAT_1}{EAT_0}}{ln\frac{\frac{EAT}{VK}_1}{\frac{EAT}{VK}_0}} = 0,047\cdot\frac{ln\frac{353,971}{151,415}}{ln\frac{0.086}{0.039}} = 0.050611;\ \frac{0.0506}{0.047}\cdot 100 = 108.1124\%$$

$$\Delta\frac{EAT}{VK}_{\Delta VK} = \Delta\frac{EAT}{VK}\cdot\frac{ln\frac{VK_1}{VK_0}}{ln\frac{\frac{EAT}{VK}_1}{\frac{EAT}{VK}_0}} = 0.047\cdot\frac{ln\frac{4,114,051}{3,860,080}}{ln\frac{0.086}{0.039}} = 0.003798; \frac{0.0038}{0.047}\cdot 100 = 8.1124\%$$

$$\Delta\frac{EAT}{VK}_{\Delta\frac{EAT}{A}} = \Delta\frac{EAT}{VK}\cdot\frac{ln\frac{\frac{EAT}{A}_1}{\frac{EAT}{A}_0}}{ln\frac{\frac{EAT}{VK}_1}{\frac{EAT}{VK}_0}} = 0.047\cdot\frac{ln\frac{0.018}{0.029}}{ln\frac{0.086}{0.039}} = 0.027541;\ \frac{0.0275}{0.047}\cdot 100 = 58.8305\%$$

$$\Delta\frac{EAT}{VK}_{\Delta\frac{A}{VK}} = \Delta\frac{EAT}{VK}\cdot\frac{ln\frac{\frac{A}{VK_1}}{\frac{A}{VK_0}}}{ln\frac{\frac{EAT}{VK}_1}{\frac{EAT}{VK}_0}} = 0.047\cdot\frac{ln\frac{2.988}{2.163}}{ln\frac{0.086}{0.039}} = 0.019273;\ \frac{0.01927}{0.047}\cdot 100 = 41.1695\%$$

$$\Delta\frac{EAT}{A}_{\Delta\frac{EAT}{TR}} = \Delta\frac{EAT}{A}\cdot\frac{ln\frac{\frac{EAT}{TR}_1}{\frac{EAT}{TR}_0}}{ln\frac{\frac{EAT}{A}_1}{\frac{EAT}{A}_0}} = 0.011\cdot\frac{ln\frac{0.017}{0.010}}{ln\frac{0.029}{0.018}} = 0.01144;\ \frac{0.01144}{0.011}\cdot 100 = 107.3827\%$$

$$\Delta\frac{EAT}{A}_{\Delta\frac{TR}{A}} = \Delta\frac{EAT}{A}\cdot\frac{ln\frac{\frac{EAT}{A}_1}{\frac{EAT}{A}_0}}{ln\frac{\frac{TR}{A}_1}{\frac{TR}{A}_0}} = 0,011\cdot\frac{ln\frac{1.712}{1.772}}{ln\frac{0.029}{0.018}} = -0.000787;\ \frac{-0.000787}{0.011}\cdot 100 = -7.3827\%$$