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Profitability Determinants of Transport Service and Warehouse Enterprises

A Case Study from Poland

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Abstract

The main purpose of the research is to identify differences in the factors determining changes in the return on capital (ROE) of transport and warehouse enterprises in individual voivodeships in Poland. The research used the ROE decomposition method which was justified by mathematical aspects. It paid attention on the decomposition of relative differences shaping the changes in this specific indicator. The substantive basis is the modified 5-factor Du Pont model. This method allowed for analysing relative changes in three decision areas. These areas encompass operational, financial, and tax management. The findings confirmed that the differences in individual voivodeships compared to the entire section H in Poland result mainly from financial management. However, the examined differentiation was not dependent on tax management. The presented research results can represent the basis for the strategy of corporate management in section H in positioning against competitive enterprises in Poland. The research also allows for a macroeconomic analysis of the phenomena occurring in the transport as well as warehousing sector, especially in terms of changes in their profitability.

Keywords

transport services, warehousing, financial management, profitability, ROE, 5-factor Du Pont model

1 Introduction

Nowadays, the market services sector is becoming the principal driving force of national economies. This tendency is visible in many socio-economic aspects. One of the most important service sections in the Polish economy is transport and storage services. In this context, scientific research describing various aspects of the development of transport and storage services is valuable and purposeful. The research presented in this article covers the period 2009-2020. The principal goal is to identify the factors and the manner of their impact on the relative differences in individual voivodeships in relation to the entire section of transport and storage services in Poland.

It adopted the method of relative differences decomposition in the conducted research. The section H applies to the sector which covers subjects and entities conducting business activities classified according to Polish Classification of Activities (PKD 2007) as transport and warehouse services (Statistics Poland, 2020). Section H was decomposed using the division into voivodeships. The method was described and mathematically justified. The difference decomposition method was combined with the integrated Du Pont model. As a result, it selected elementary ratios that have a real impact on changes in the return on equity (ROE). This made it possible to relate them to three management areas. These are operational management, financial management, and the impact of taxation on the corporate profitability, which relates to tax optimization (Caban et al., 2021; Obudho et al., 2020).

In this study a hypothesis was adopted. It is widely recognized that managerial decisions effect changes in the return's value on sales (ROS), the working capital turnover ratio (WCTR), the financial leverage ratio (DFL), the

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financial cost ratio (FCR) and the tax effect ratio (TER). These are indicators that have the status of elementary indicators in the research. Therefore, it can be assumed that individual elementary indicators will influence the changes in the level of profitability of enterprises in section H differently. In this context, a certain thesis was also put forward. The primary factors determining the differences in ROE in individual provinces result from managerial decisions in operational and financial management (Kampf et al., 2019). They are not significantly dependent on managerial decisions regarding tax optimization.

The research described below allowed to draw quite interesting conclusions. It was found that the differentiation of profitability of enterprises in section H in individual voivodeships depends mainly on financial management. Operational management affects this differentiation only in terms of sales profitability decisions (Hitka et al., 2018). The tax ordinance had no major impact on the changes in the ROE differences.

2 Literature review

As stated in (Mindur and Mindur, 2021), according to Eurostat data, the service sectors of the European Union (27 countries) generated 69% of the total gross value added in 2000. In 2020, this share has already increased to 73%. This increase in the importance of services in the EU economy takes place with a simultaneous decline in the importance of industry. This is one of the many symptoms of global growth in services in national economies. It's they that characterize, among others, the high level of development of the service sector (Szczukocka, 2013). A very similar trend is observed in Poland. Although the share of services in shaping is not as high as in the entire EU economy, there is an upward trend. According to the data of the Statistics Poland (2020), in 2020, the share of the service sector in generating gross value added reached the level of over 65%.

According to Grzywacz and Burnewicz (1989), the transport services market is classified as a spatial and dynamic economic category. It belongs to the basic concepts and structures functioning in the theory and practice of transport. It is a place where the demand for transport services meets their supply. The transport services market can be defined as an area of trading in transport services, in which principals and contractors influence each other, while shaping the demand and supply. Entities operating on the transport services market include transport, forwarding and logistics companies, transport users and units ensuring the flow of information on the market, e.g., transport exchanges (Caban et al., 2019; Grzywacz and Burnewicz, 1989).

The importance of transport services results from many connections and dependencies on all aspects of the country's economic development. Basically, the transport activity contributes to the general socio-economic development of the state, enables the efficient functioning of the branches of the national economy on which it's based (Kruk, 2017). The most important function of transport is the service function, which comprises moving people and things in space. It has a two-fold character: first, an intangible consumer good for the transport of passengers, and second, an intangible consumer good, enabling the achievement of another good for the transport of goods that make production activities real, then distribution and consumption, as stated in (Purnamasari, 2015). The latter character of transport service activity manifests itself in the economy, commonly serving as a tool for domestic and international goods exchange. Each business activity is preceded by transport activity resulting from a previously concluded commercial contract, e.g., delivery of raw materials, semi-finished products, and then further involvement of transport based on another commercial contract for the sale and export of manufactured products, possibly semi-finished products and waste (Mendyk, 2002).

In the literature on the subject, there are many criteria for classifying the transport services market. Basic divisions are created because of the principle of operation, economic strength of entities or the subject of transport, area of operation or type of transport in terms of branches (Cieśla, 2019).

Polish transport companies noticed that in order to be active in the EU market, it is necessary to better adapt to the requirements of recipients, provide better-quality and cost-effective services, as well as invest in modern information and communication technologies (Lakhmetkina et al., 2019; Šarkan et al., 2013). The dynamically changing situation on the road freight market in the European Union requires constant adaptation to the expectations of service recipients and taking actions allowing for effective competition with enterprises from other EU countries (Kalina et al., 2017). In such conditions, competition becomes more and more sophisticated, and the competitive advantage of companies is dynamic and is constantly reconfigured by strategic action. In order to win this market competition, companies must be competitive (Krupski, 1998).

Transport services can be assessed in terms of many criteria. One of them is the level of competitiveness. The basic factors enabling enterprises to gain an advantage over competitors include: the level of enterprise costs, technological level (modern rolling stock, availability and quality of the infrastructure used, IT systems), employee

qualifications, organizational efficiency and marketing strategies (Koźlak, 2017). Lendel and Varmus (2010) formulated that innovation is currently the key factor affecting the competitiveness of enterprises on the market. Logistics service providers are also required to generate, absorb and develop new solutions (Friedrich and Elbert, 2022).

The publication (Cywiński, 2018) emphasized that it is well known that transport accompanies man from the oldest times and determines the development of society. From the economic point of view, we understand transport as the paid provision of services, the result of which is most often the movement of people and cargo based on logistic infrastructure, which can be classified as: warehouses (buildings and structures), manipulators (auxiliary devices), means of transport (aviation, road, water, rail and transmission), packaging and ICT (communication, software, IT technologies).

In addition, in the European transport approach, mixed transport is distinguished, which takes place using more than one means of transport, including: combined, bimodal, intermodal and multimodal transport (Shlikhter, 2003). Transport, along with the broadly understood concepts of logistics and forwarding, is part of the industry commonly known as TSL (transport-forwarding-logistics). Logistics can roughly be defined as planning, implementing and controlling the efficient and cost-effective flow of raw materials, materials, finished products and dedicated information from point of origin to point of consumption to meet customer requirements. Forwarding comprises organizing the transport of goods (Coyle et al., 2002; Skowronek and Sarjusz-Wolski, 2008).

Despite the observed boom in the Polish transport industry and the success of our companies in the domestic and EU markets, there are still reasons for concern. Globalization of each market, including TSL services, results both in new development opportunities and threats. One of such spectacular examples of the globalization of the TSL services market is the impact of economic perturbations, both in the economy and in finances in the international arena. Transport can be defined as the movement of goods and people in geographical space using appropriate means of transport (Cywiński, 2018). The needs related to the transport and movement of goods belong to the group of secondary human needs and are related to the fact of different spatial distribution of resources, human clusters, but also entire jobs (Klauenberg et al., 2020).

Nowadays, there is agreement in the economic environment that we are dealing with an undoubted increase in the importance and development of the service sector in domestic economies (Callon et al., 2002; Cuadrado-Roura et al., 2002; Lee et al., 2007). However, this research focuses on non-financial transport and warehouse management companies.

In this context, the method of decomposition of the profitability ratio differences was used, which allows for the analysis of individual elementary ratios (Burja and Mărginean, 2014; Herciu et al., 2012). The research selected indicators that enable the examination of relative changes in operational management, financial management and decisions involving tax optimization (Bieniasz et al., 2010). Thus, the relative differences will show what the structure that determines the value of ROE looks like in individual provinces of transport and storage services in relation to the entire H section in Poland. The research and analyses carried out in this way will finally allow for answering the key research questions.

3 Methodology

The methodological foundation of the research consists in the modified 5-factor Du Pont model. Its modification was aimed at decomposing the relative ROE differences for individual provinces. The method used in the research is described below (Gospodarek and Pizoń, 2020; Kantar, 2022).

It is assumed that the X index is equal to the ROE index. It is written as the product of n components (see Eq. (1)):

$$X = X_1 \times X_2 \times \ldots \times X_n. \tag{1}$$

The individual components of X_i will have their appropriate economic interpretation in shaping the ROE value. For the study, Eq. (1), which is in its multiplicative form, will be transformed into its additive form. This will allow for easier interpretation of the results. To this end, Eq. (1) was logarithmized to the form (see Eq. (2)):

$$\log X = \log X_1 \times \log X_2 \times \ldots \times \log X_n. \tag{2}$$

Subsequently, Eq. (2) was differentiated assuming that $\log X \cong \Delta X / X$ (see Eq. (3)):

$$\frac{\Delta X}{X} \cong \frac{\Delta X_1}{X_1} + \frac{\Delta X_2}{X_2} + \ldots + \frac{\Delta X_n}{X_n}. \tag{3}$$

The above additive form emphasizes the relative changes of the independent variables. For the following studies, this relativity is of great importance. It will mean a relative difference between individual voivodeships in relation to Poland. Assuming that X = ROE, the ΔROE/ROE relation will mean the relative differences in values in individual voivodeships regarding transport and storage services throughout Poland (total section H).

When Eq. (1) is transformed into additive form, an error appears here. It results from the linear approximation of the logarithmic function. Equation (3) will, therefore, be true only when ΔX_i is relatively small. The decomposition formula in which this problem disappears can, however, be got from Eq. (1) by appropriately multiplying the component variables. For this, the relative change is written as $X + \Delta X$. Thus, the following Eq. (4) is expressed:

$$\begin{aligned}(X+\Delta X) &= (X_1+\Delta X_1)\times(X_2+\Delta X_2)\times\ldots\times(X_n+\Delta X_n)\\ &= X_1X_2\ldots X_n+\Delta X_1X_2\ldots X_n\ldots..X_1\Delta X_2\ldots X_n+\cdots\\ &+X_1X_2\ldots\Delta X_n+=X_1\ldots_{\ldots}\ldots X_n+\Delta X_1\ldots_{\ldots}\ldots..._n\\ &+X_1\Delta\ldots_2\ldots X_n+\cdots+X_1X_2\ldots\Delta X_n++\Delta X_1\Delta X_2\ldots X_n\\ &+\Delta X_1X_2\Delta X_3\ldots X_n+\cdots+X_1X_2\ldots\Delta X_{n-1}\Delta X_n+\cdots\\ &+\Delta X_1\Delta X_{\ldots}\ldots\Delta X_n.\end{aligned} \tag{4}$$

Thanks to a simple algebraic transformation of Eq. (4), the exact form of the distributions of relative increments for the variable X is got (see Eq. (5)):

$$\begin{aligned}&\text{Part included in decomposition}\\ &\frac{\Delta X}{X}=\frac{\Delta X_1}{X_1}+\frac{\Delta X_2}{X_2}+\ldots+\frac{\Delta X_n}{X_n}\\ &\text{Part non-included in decomposition}\\ &+\frac{\Delta X_1}{X_1}\frac{\Delta X_2}{X_2}+\frac{\Delta X_1}{X_1}\frac{\Delta X_3}{X_3}+\ldots+\frac{\Delta X_{n-1}}{X_{n-1}}\frac{\Delta X_n}{X_n}\\ &+\ldots+\frac{\Delta X_1}{X_1}\frac{\Delta X_2}{X_2}\ldots\frac{\Delta X_n}{X_n}.\end{aligned} \tag{5}$$

The first expression (the top line of Eq. (5)) remains included in the decomposition shown in Eq. (3). These are the key elements of the expansion of relative increments of the variable X. The other elements on the right side of Eq. (5) also belong to this group. However, in this research, it was assumed that they make up an acceptable approximation error and will not be included in the decomposition (bottom line of Eq. (5)).

Economists often believe that the ROE, which is a simple synthetic measure, is not the best instrument for analysing and interpreting dynamic phenomena occurring within the company's boundaries (Jędrzejczak-Gas, 2013). Instead, the ROE decomposition method is used based on the Du Pont financial control system (Liesz and Maranville, 2008). Thanks to it, it's possible to identify the relationships of individual elementary indicators that determine its changes (Bednarski, 1994). In addition, it becomes possible to make calculations using financial data from profit-and-loss accounts and balance sheets of enterprises (Siegel et al., 1992).

Du Pont model was presented in has developed and continues to develop dynamically. Starting from the original form of two-way (Blumenthal, 1998), by the more complex models to form a 9-factor (Boyd, 1989; Gitman, 2002; Gołaś, 2015; Hawawini and Viallet, 2010; Sibilski, 2013). The so-called modified 5-factor Du Pont model (Hawawini and Viallet, 2010). This model offers quite an interesting advantage. The five factors used in it, which decompose ROE, reflect individual decision-making areas within the enterprise boundaries (Liesz and Maranville, 2008). They are described in Section 4.

Thus, the research assumes the following form of ROE decomposition (see Eq. (6)):

$$\mathrm{ROE}=\underset{\underset{\text{ROS}}{\Downarrow}}{\frac{\mathrm{EAT}}{\mathrm{EC}}}=\underset{\underset{\text{WCTR}}{\Downarrow}}{\frac{\mathrm{EBIT}}{\mathrm{S}}}\times\frac{\mathrm{OC}}{\mathrm{S}}\times\underset{\underset{\text{DFL}}{\Downarrow}}{\frac{\mathrm{EBIT}}{\mathrm{EBIT}-\mathrm{FC}}}\times\underset{\underset{\text{FCR}}{\Downarrow}}{\frac{\mathrm{EBT}}{\mathrm{EBIT}}}\times\underset{\underset{\text{TER}}{\Downarrow}}{\frac{\mathrm{EAT}}{\mathrm{EBT}}}, \tag{6}$$

where ROE is return on capital, EAT denotes net profit, EC is equity, S is sales, OC denotes operating costs, FC is financial costs, EBT is gross profit, EBIT denotes operating profit.

ROE decomposition here comes down to the product of five elements. The first is profitability of sales ROS = EBIT/S. Two further elements were changed because of the available statistical data. The second expression on the right side of Eq. (6) is the working capital turnover ratio WCTR = OC/S. In the original version (Liesz and Maranville, 2008), there is an invested capital turnover ratio, which relates to investment management in the enterprise. However, in the model, there is a problem with obtaining data on invested capital. The introduction of the WCTR model further strengthens the operational management aspect (Simanová and Stasiak-Betlejewska, 2018). The third expression is the leverage ratio DFL = EBIT/(EBIT − FC). In the theoretical leverage ratio, the denominator shows the value of interest on foreign capital and again the value of invested capital. Therefore, the research used the value of financial costs, which mainly include interest in foreign capital. In this context, the DFL index is understood as the structure of the cost function (Berent, 2010; Dudycz, 2001). The fourth expression is the financial cost ratio FCR = EBT/EBIT. The last expression on the right side of Eq. (6) is the tax effect ratio TER = EAT/EBT. The model changed in this way continues to emphasize the importance of the impact

of operational and financial decisions on ROE. It uses indicators that allow for the identification of ROE drivers. In addition, it gives the opportunity to develop recommendations in order to improve the relevant dependencies (Liesz and Maranville, 2008). Thus defined, the modified Du Pont model is the starting point for the decomposition of ROE differences.

The decomposition of ROE differences is aimed at identifying those factors that determine the relative differences in ROE in smaller units in relation to the higher-order unit. This allows the dislocation of individual elements that determine relative changes in the various decision areas within the company boundaries. Therefore, three areas of company management have been adopted, which are defined by appropriate elementary indicators (Assagaf, 2017; Orynycz and Tucki, 2020):

- Operational Management vs. operating profitability of the enterprise:
  - return on sales (ROS),
  - working capital turnover ratio (WCTR).
- Financial management vs. profitability in the sense of the leverage multiplier:
  - financial leverage ratio (DFL),
  - financial cost ratio (FCR).
- Tax management in profitability —tax effect indicator (TER).

The research focused on the decomposition of relative differences for individual provinces (subscript *w*) in relation to the total transport and storage services in Poland (section H). Thus, changes in $\Delta X = X_w - X$ will mean relative differences for the voivodeship *w* to the total value. Here, the variables without subscription will apply to the entire Polish section H. The adopted Du Pont model (Eq. (6)), assuming mathematical justification (Eq. (5)), can be written as (see Eq. (7)):

$$\frac{\Delta ROE}{ROE} = \frac{\Delta\frac{EBIT}{S}}{\frac{EBIT}{S}} + \frac{\Delta\frac{OC}{S}}{\frac{OC}{S}} + \frac{\Delta\frac{EBIT}{EBIT-FC}}{\frac{EBIT}{EBIT-FC}} + \frac{\Delta\frac{EBT}{EBIT}}{\frac{EBT}{EBIT}} + \frac{\Delta\frac{EAT}{EBT}}{\frac{EAT}{EBT}} + \text{approximation error.} \quad (7)$$

Using the previous mathematical justification, the approximation error will not be included in this decomposition. It was acceptable here. This means that the decomposition of ROE differences between individual provinces in section H will take the form of (see Eq. (8)):

$$\frac{\Delta ROE}{ROE} = \frac{\Delta\frac{EBIT}{S}}{\frac{EBIT}{S}} + \frac{\Delta\frac{OC}{S}}{\frac{OC}{S}} + \frac{\Delta\frac{EBIT}{EBIT-FC}}{\frac{EBIT}{EBIT-FC}} + \frac{\Delta\frac{EBT}{EBIT}}{\frac{EBT}{EBIT}} + \frac{\Delta\frac{EAT}{EBT}}{\frac{EAT}{EBT}}. \quad (8)$$

For the relevant calculations in the research, financial data from the profit-and-loss accounts and from the balance sheets of enterprises were used. For the sake of methodological consistency, the data of the Statistics Poland from the category of "corporate finance" were used. They were based on the annual data and on the values given at current prices. The data on the financial results of non-financial enterprises refer only to economic entities keeping books of accounts. The study assumed period from 2009 until 2020.

4 Results and discussion

Section 4 presents the most important research results. For better readability of the charts, their legends use symbols of individual elementary indicators. The values, however, are always relative values in%, which results from the test method described earlier. Thus, the relative differences presented in individual graphs determine the difference in value between the studied phenomenon and the value for a higher-order unit.

The results of the decomposition of ROE differences for the transport and storage services section in Poland, broken down into 16 voivodeships, are presented here. They allow for the identification of differences between individual non-financial enterprises belonging to section H in relation to the entire section in Poland. These differences relate to two aspects. The first is the difference in changes in the ROE value itself over time (a solid line placed on the right ordinate axis). The second aspect is the structure of elementary indices that differentiate and determine these changes (stacked column chart placed on the left ordinate axis). All charts in this section are split into two panels. Each of them presents the results for individual voivodeships in Poland.

First, however, the decomposition of ROE differences between transport services and warehouse management and the entire sector of market services is presented (see Fig. 1). Because of the lack of availability of complete statistical

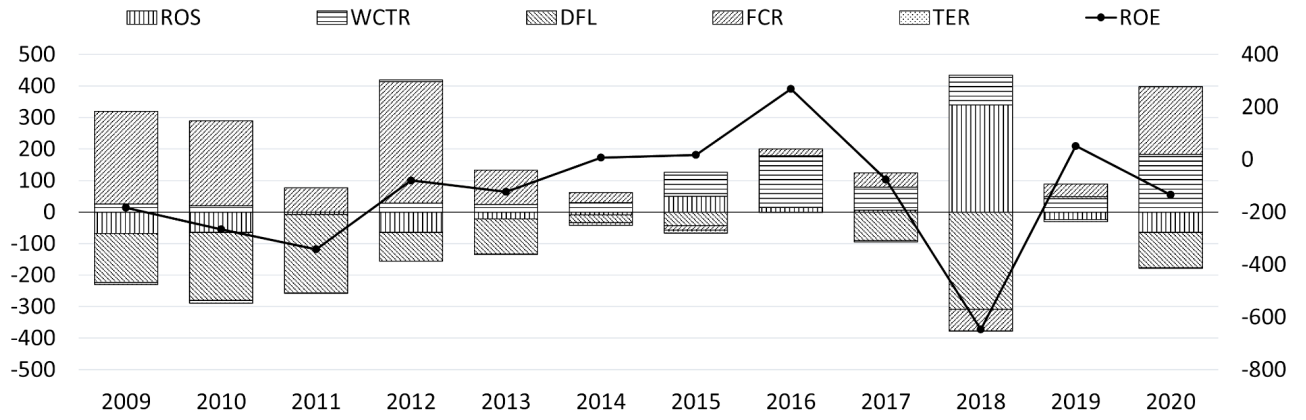
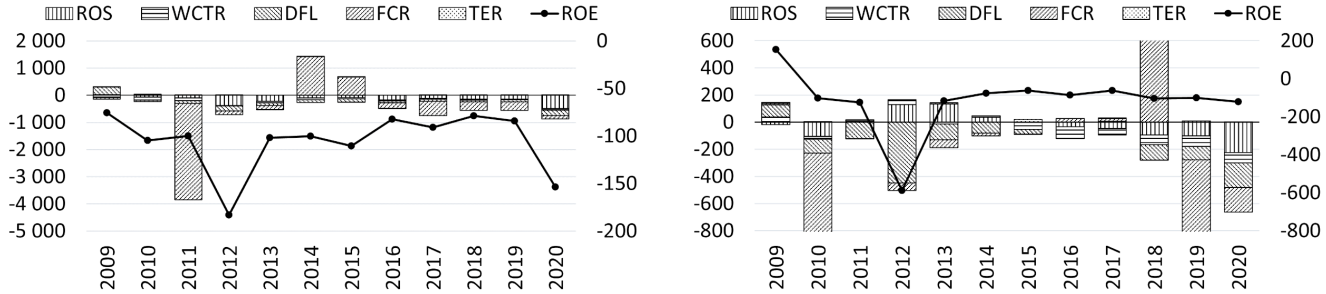


Fig. 1 Decomposition of ROE differences in section H. Relative differences in % to total services. Source: authors

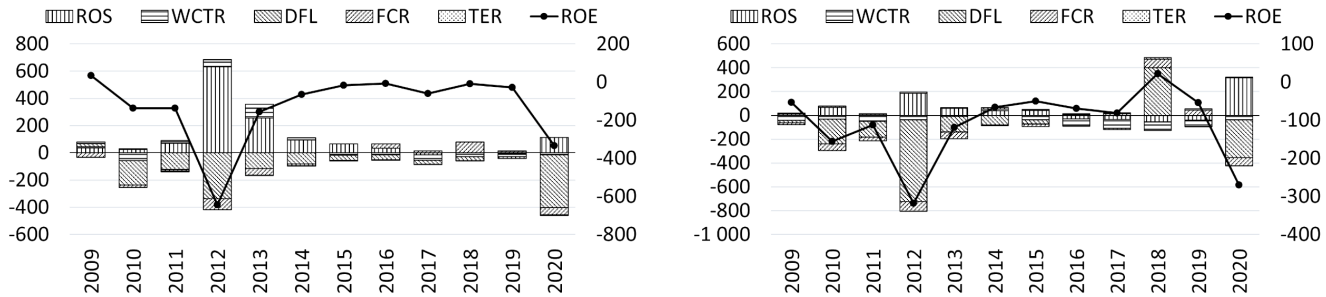
data in the Statistics Poland (2020), sections R and S were not included in the market services sector. Section R includes activities related to culture, entertainment and recreation, while section S encompasses the remaining service activities. There is an obvious change in ROE differences in section H compared with the entire service sector. Since 2014, the value of this difference is greater than zero, so the dynamics of changes in ROE are greater in the analysed section of services. In 2020, however, we can see a breakdown in this situation, which was most likely caused by the economic slowdown caused by the COVID-19 pandemic (Wild et al., 2021). The analysis of this graph also allows the identification of the key determinants of this differentiation. One can see that the differences in the FCR index had the greatest impact here, and until 2014, the differences in the DFL index were also significant.

The following figures (Figs. 2–9) already show the results of the decomposition of ROE differences in transport and warehouse enterprises in individual voivodeships. Fig. 2 (a) depicts the results for the voivodeship Lower Silesia. In this region of Poland, it can be seen that the value of ROE differences in the entire analysed period is less than zero.



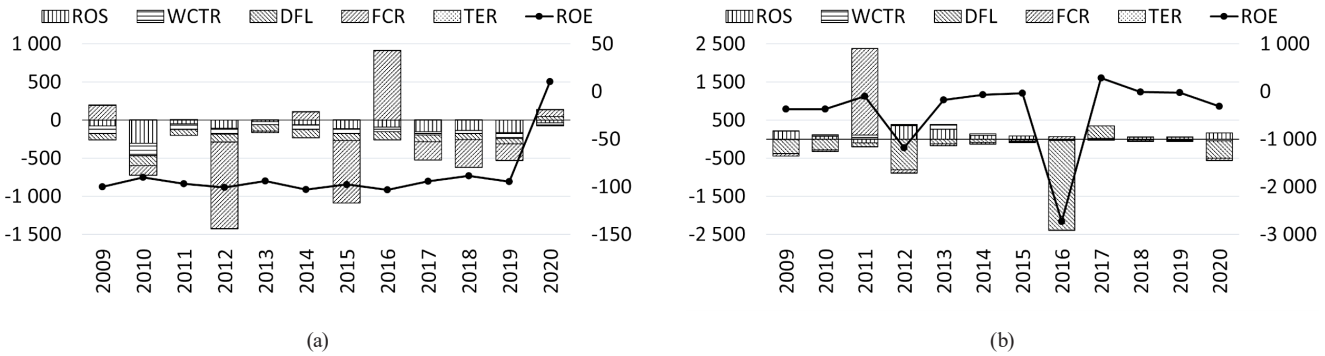
(a) (b)

Fig. 2 Decomposition of ROE differences according to NUTS 2. Relative differences in % to total section H: (a) Lower Silesia and (b) Kuyavian-Pomeranian. Source: authors



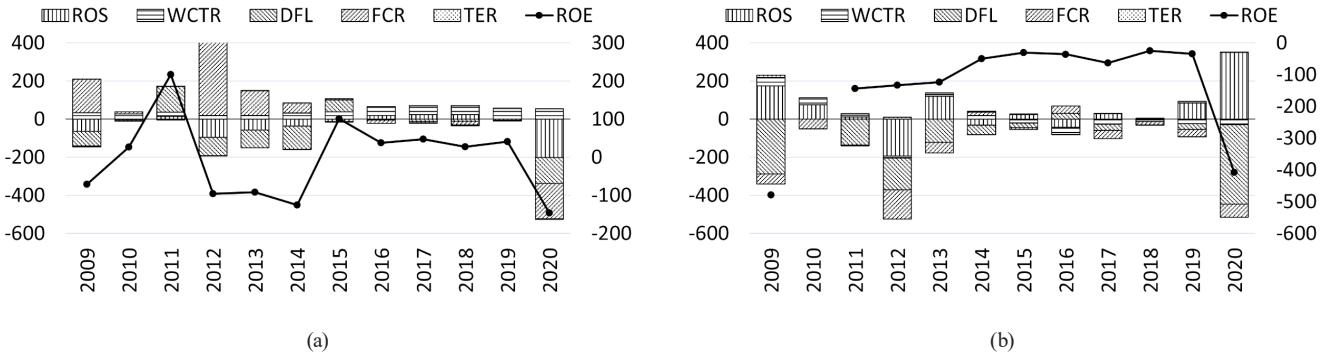
(a) (b)

Fig. 3 Decomposition of ROE differences according to NUTS 2. Relative differences in % to total section H: (a) Lublin and (b) Lubusz. Source: authors



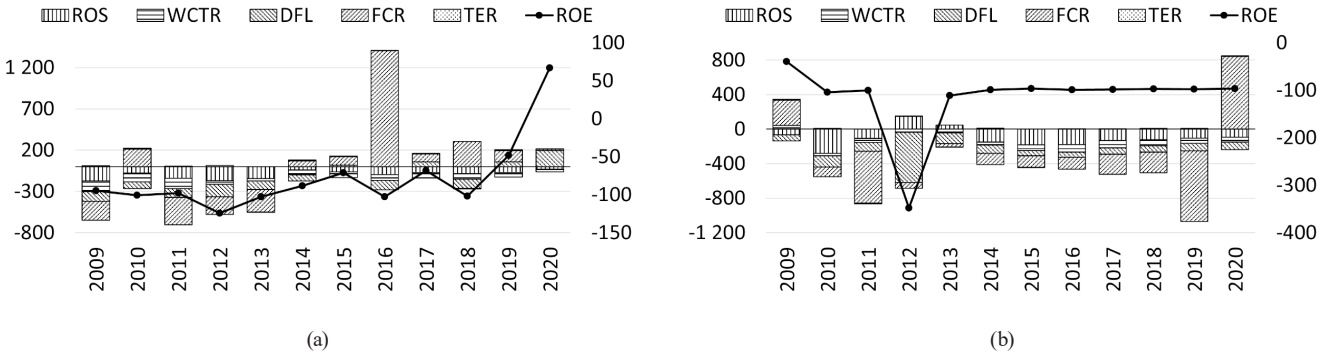
(a) (b)

Fig. 4 Decomposition of ROE differences according to NUTS 2. Relative differences in % to total section H: (a) Lodz and (b) Lesser Poland. Source: authors



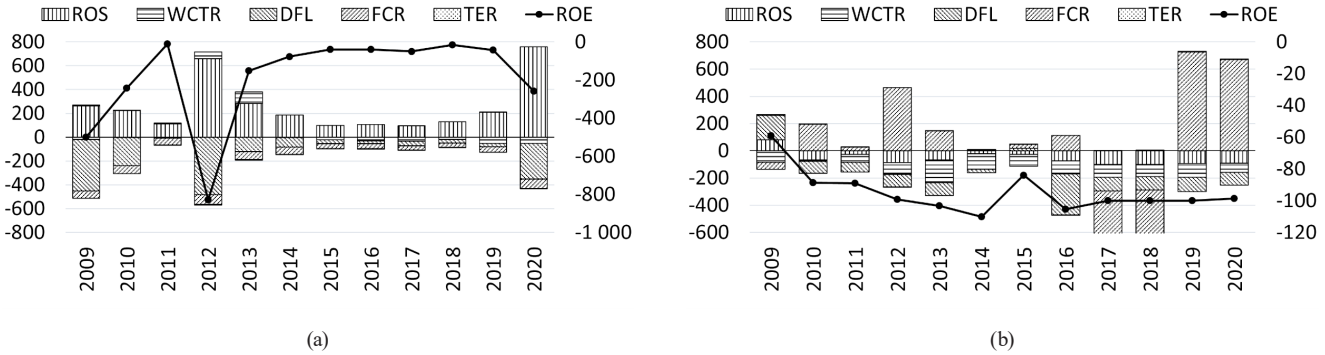
(a) (b)

Fig. 5 Decomposition of ROE differences according to NUTS 2. Relative differences in % to total section H: (a) Masovian and (b) Opole. Source: authors



(a) (b)

Fig. 6 Decomposition of ROE differences according to NUTS 2. Relative differences in % to total section H: (a) Subcarpathian and (b) Podlaskie. Source: authors



(a) (b)

Fig. 7 Decomposition of ROE differences according to NUTS 2. Relative differences in % to total section H: (a) Pomerania and (b) Silesia. Source: authors

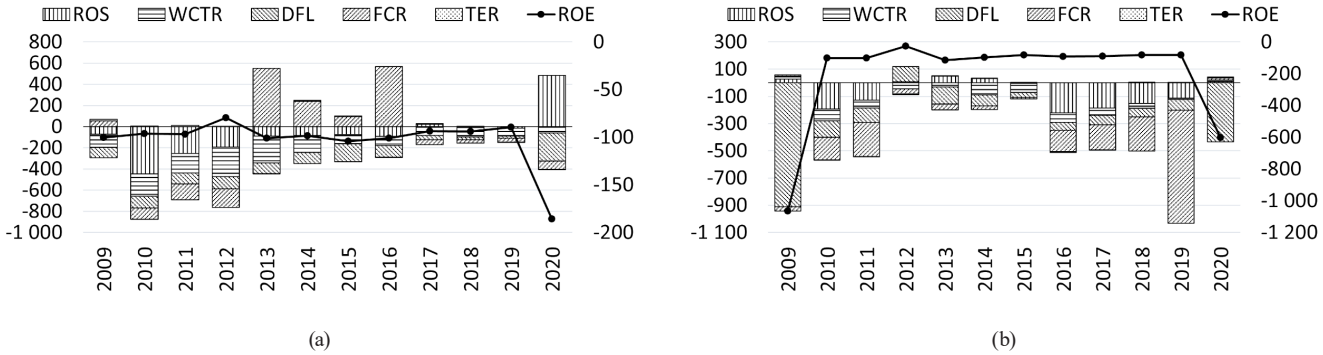


Fig. 8 Decomposition of ROE differences according to NUTS 2. Relative differences in % to total section H: (a) Holy Cross and (b) Warmian-Masurian. Source: authors

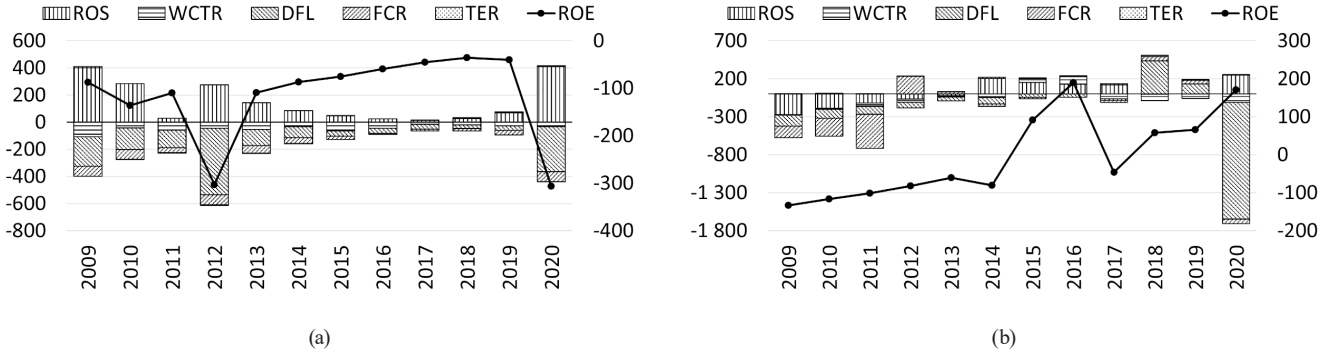


Fig. 9 Decomposition of ROE differences according to NUTS 2. Relative differences in % to total section H: (a) Greater Poland and (b) West Pomeranian. Source: authors

The key factor of this differentiation is the differences in the FCR index. A similar situation is observed in the Kuyavian-Pomeranian Voivodeship (see Fig. 2 (b)). Here, the value of differences in ROE changes is also below zero, except for 2009. However, an interesting situation is observed in elementary indicators that differentiate and determine these changes. In several periods, very strong changes in the differences in FCR can be seen. For better readability of the graph, the values on the left ordinate axis have been limited to the range from 600% to −800%. Thanks to this, it can be seen that it is the differences of this indicator that are the key determinant of ROE differentiation. Noteworthy are also the differences in the ROS and DFL indicators, which, except over the periods of 2014-2017, show quite significant activity in the process of ROE differentiation in the Kuyavian-Pomeranian Voivodeship.

Fig. 3 (a) shows the results of the decomposition of differences for the Lublin Voivodeship. In this region, the ROE difference line is again below zero, although these distances are not as large as in the previous regions. Here, the key factors determining this differentiation are the differences in ROS and DFL indexes. We are dealing with a very similar situation in the Lubusz Voivodeship (see Fig. 3 (b)). Here, the differences in ROE changes are less than zero as well, except for 2018. The key determinants of this differentiation were again the differences in ROS and DFL indicators.

A different situation is observed in the Lodz Voivodeship (see Fig. 4 (a)). It is apparent that the ROE line of relative differences is again below the abscissa. However, this situation changed in 2020. The factor representing the key determinant of this differentiation here is the differences in the FCR index. In the Lesser Poland Voivodeship (see Fig. 4 (b)), a situation is observed where the value of ROE differences, except for 2012 and 2016, fluctuates relatively close to the abscissa. However, the differences in the DFL index being the key determinant of this differentiation. Only in 2011, a potent influence on the differentiation of the ROE of the FCR index was observed.

A characteristic situation is observed in the Masovian Voivodeship (see Fig. 5 (a)). There is quite a lot of variability in the differences in the ROE index, and in most of the years under investigation, the values are greater than zero. However, it is difficult to define the key determinant of this differentiation. For better readability of the graph, the values on the left ordinate axis were limited from 400% to −600%. In periods of high variability in the studied differentiation,

the DFL and FCR indices play a key role. Over the period of 2016-2019, the key determinant of differentiation were differences in the WCTR index. Another situation is observed in the Opole Voivodeship (see Fig. 5 (b)). Here, because of incomplete 2010 data on the DFL index, it was necessary not to show it on the chart. This results in the discontinuity of the ROE's difference line. Despite this fact, the key determinants of ROE differentiation are clearly visible. These are the differences in ROS and DFL indicators.

In the Subcarpathian Voivodeship (see Fig. 6 (a)), a relatively lower volatility of the differences in the ROE index can be observed. This situation changed in 2020. Interestingly, this change was positive. The key determinants of this differentiation were again FCR differences. The change in 2020 was, however, because of DFL differences. In the Podlaskie Voivodeship (see Fig. 6 (b)), a relatively small – except for 2012 – variability of relative differences in ROE can be seen. The differences in FCR played the greatest role in this differentiation.

A different situation is obvious in the Pomeranian Voivodeship (see Fig. 7 (a)). Again, except for 2012, there is relatively less volatility in ROE differences. However, the key determinants here are the differences between ROS and DFL. In the Silesian Voivodeship (see Fig. 7 (b)), the values of ROE differences significantly below zero are again observed. FCR differences remain the key determinants of this differentiation. For better readability of the chart, the values on the left ordinate axis have been limited to −600%. Such an enormous difference in FCR in 2017 and 2018 is mainly due to very large drops in EBIT in enterprises in section H in this voivodeship.

It is quite difficult to identify the key determinant of changes in ROE differences in the Holy Cross Voivodeship (see Fig. 8 (a)). WCTR differences are an important factor in this differentiation. However, this impact is clearly weakening year by year. FCR differences impress the differentiation of ROE, mainly in the period 2013-2016. The differences in the ROS and DFL index clearly lose their importance in the period 2015-2019. A similar situation is observed in the Warmian-Masurian Voivodeship (see Fig. 8 (b)). In this region, the differences between ROS and FCR become less important in the period 2012-2015. DFL differences impress the differentiation of ROE only in 2009 and 2020. The differences between the other two indicators do not have a significant impact on the differentiation examined in this case.

A fairly simple situation is apparent in the Greater Poland Voivodeship (see Fig. 9 (a)). In this region, the differentiation of ROE is mainly determined by the differences in ROS and DFL. Importantly, ROS differences are always positive and DFL differences are negative. In the West Pomeranian Voivodeship (see Fig. 9 (b)), quite strong diversification of ROE differences is obvious. It is also difficult to define the key determinant of this differentiation in this region. In the period 2018-2020, a powerful impact of DFL differences can be seen. This is due to relatively strong changes in the level of financial costs in relation to changes in EBIT. FCR differences strongly influenced the differentiation of ROE only in the period 2009-2012. Therefore, it can be assumed that ROS differences have the most stable impact on differentiation of ROE.

The data presented in this research study confirms that the differentiation of ROE is most often influenced by the differences in the DFL, FCR and ROS indices. This shows that the decomposition of differences is primarily determined by financial decisions (Assagaf, 2017). This means that financial management is the area wherein the greatest number of factors determining the relative differences in individual voivodeships have been identified. Operational management is the field that influences the analysed differentiation, but only in terms of the operational profitability of the sale of transport and warehouse services. The differences in TER relating to tax management had no major impact on the differentiation of ROE. The presented findings present how the value of ROE changed in different ways in individual voivodeships in Poland. Differences in elementary indicators were also identified, which significantly affected the differentiation of ROE over the period of 2009-2020.

5 Conclusion

The decomposition of profitability factors using the Du Pont model is often used in economic research. In the described research, its 5-factor version was used. It allowed to identify the structure and strength of the impact of elementary indices on differentiation of ROE. The particular value of these studies was the possibility of comparing the situation of transport and warehouse services enterprises in individual Polish voivodeships.

One of the most important elements of the company's development is the level of return on capital. This means that the company's development depends on managerial decisions. Based on the presented research results, certain conclusions can be drawn. The differences between individual voivodeships and the total services of section H in Poland are mainly justified by financial management. Operational management also turned out to be an important factor differentiating ROE, but only in terms of decisions affecting the profitability of sales. Only tax

management did not show any greater importance. This situation may mean that we are dealing with a fairly large differentiation in the effectiveness of management, primarily financial, in individual voivodeships.

These conclusions can be used in building the development strategy of individual enterprises in section H. However, development should be understood here as a desire – and sometimes even a necessity – to "catch up" with the competition. This is because of the primary purpose of the study. A certain limitation emerges in this context. It can be seen that it would be worthwhile to study the differences in the ROE index between individual departments, and not only in relation to the entire section H. Within its limits, there are 5 departments that bring together various enterprises with very different characteristics. By analysing the results of the research from the manager's perspective, it would also be interesting to identify the differences in ROE in a specific company in relation to the relevant department and possibly the entire section H. Such an analysis would reveal the most important determinants of differentiating the company's position in relation to the department and section of market services.

One more conclusion can be drawn from the presented research results. The tax effect indicator remained relatively weak. Therefore, one can risk a statement that changes in tax burdens are not significant for the differentiation of ROE. This may result from a fairly stable level of tax costs in service enterprises. Also noteworthy are the high values of the showed elementary indicators. Only 5 factors were adopted for the decomposition of ROE and the remaining ones were omitted (Eq. (5)). However, the method allows for more detailed analyses. In this context, we refer to the second-order analysis, such as $\Delta X_1 \Delta X_2 / X_1 X_2$, where the simultaneous effect of changing the variable X_1 and X_2 cannot be assigned to only one of them. Because of editorial limitations, such a detailed analysis was omitted from the studies described.

Ultimately, it can be concluded that the hypothesis presented in the introduction has proven to be correct. In this research study, it has been confirmed that individual elementary indicators influence changes in the ROE value very differently. The thesis should be approached differently. Based on the presented results, and the conclusions drawn, it turned out that the differentiation of profitability of enterprises in section H in individual voivodeships depends mainly on financial management. Operational management affects this differentiation only in terms of decisions regarding the profitability of sales. The tax ordinance had no major impact on the changes in the ROE differences.

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