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THE RELATIONSHIP BETWEEN DEBT, ACTIVITY, AND THE PROFITABILITY OF COMPANY IN THE COLD SUPPLY CHAIN: AN ANALYSIS OF ROA AND ROE

Abstract: *Rapid development, constant changes in the market, changes in consumer habits and needs, numerous innovations, growth in storage and distribution costs, especially in the food industry, present challenges in supply chains and force companies to look for numerous innovative solutions for their business to survive. This paper aims to investigate the relationship between financial structure, asset turnover, and company profitability, with an emphasis on return on assets (ROA) and equity (ROE). In order to analyze the set goal, debt ratios and activity ratios were analyzed to assess their impact on the profitability of company in the cold supply chain sector. The results show that lower debt has a positive effect on ROA, while moderate debt can increase ROE through the leverage effect. Furthermore, higher asset turnover and effective accounts receivable and inventory management improve both ROA and ROE, highlighting the importance of operational efficiency in a capital-intensive industry. These findings confirm that both financial structure and asset utilization are key factors in company profitability.*

Keywords: *ROA; ROE; debt; activity; profitability; logistics; cold supply chain*

1. Introduction

In the global market, in a modern business environment, where there is a constantly increasing number of competitors, but also increasingly demanding standards related to food safety and quality, and several other different challenges, special emphasis is placed on the importance of reliable and efficient logistics, particularly within the cold supply chain. The cold supply chain involves the production, processing, storage, handling, and distribution of temperature-sensitive products under controlled conditions. Since it involves the handling and distribution of perishable food products, one of the main challenges is maintaining their quality, and especially safety in terms of consumption, from the place of their production/processing to the end consumer. Therefore, logistics processes in the cold supply chain directly affect the overall efficiency of the business, costs, and ultimately the profitability of the company. In order to make timely business decisions, management must have access to key financial data and conduct a detailed financial analysis of the company's operations. This paper aims to theoretically and descriptively link changes

in debt and activity ratios with trends in ROA and ROE, thereby highlighting the importance of optimal financial structure management and asset turnover for achieving sustainable profitability. This analysis provides insight into how financial and operational indicators function in practice, offering valuable guidance for management when making decisions related to capital structure and the efficient utilization of assets.

2. Theoretical foundations of logistics

Nowadays, many factors influence the development of logistics, such as globalization, the increase in the number of competitors, as well as the strengthening of existing ones, the internationalization of trade and production, the modernization of transport infrastructure, the development of digital technologies, the development of transport technology, the development of logistics and distribution centers, commodity terminals, the increase in the purchasing power of users, numerous directives, the development of e-commerce and many others (Krpán et al., 2014). In his work, Zekić (2017:97) describes logistics

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as the function of “organizing the infrastructure of business processes of a company that plans, implements and controls efficient and effective flows of goods, services and information between the point of origin and the point of consumption to meet the needs of the final customer”. On the other hand, Kozina and Darabuš (2013:72) define logistics as “a system of the flow of goods, materials and energy that connects purchasing markets with production and consumption locations”. Although there is no single universal definition of the term logistics, it can be concluded from the above that logistics encompasses a series of processes and activities that optimally ensure the flow of materials, value, and information from the starting point to the end point, all with the aim of meeting customer or user requirements.

2.1. Supply chain management

For a better understanding of what supply chain management (SCM) entails, it is first necessary to define the term itself. “Operations and supply chain management is defined as the design, operation and improvement of systems that make and deliver primary products and services” (Jacobs and Chase, 2016: 4). The chain itself includes many stakeholders (e.g. manufacturers, suppliers, wholesalers and retailers, logistics operators) who aim to create a certain product/service that will satisfy the needs of customers/users, but which will ultimately maximize the total value generated. Furthermore, Zelenika et al. (2007:187), as stated by Crkvenčić et al. (2018:8), the process of supply chain management itself is “an integrated process that encompasses planning and managing all activities of stakeholder selection, material procurement, transformation of materials into the final product, as well as related logistics activities within the entire chain”. Every supply chain consists of several key phases: planning and procurement phase, production phase, distribution phase, consumption phase, and return phase (Jacobs and Chase, 2016). Every company, as part of a supply chain, operates within its own competitive environment, in which certain risks are always present. Intense competition pressures companies to produce as many products as possible in the shortest time and at the lowest possible cost, which can lead to a decline in quality and an increased likelihood of returns. Moreover, if there is an interruption or a longer-term disruption in the supply chain, the consequences can be felt both locally and globally, manifesting as inflation, the growth of the black market, widening income inequality, the emergence of conflicts, environ-

mental pollution, and many other effects (Drljača, 2022).

2.2. Cold supply chain in the food industry

Considering globalization, the expansion of trade into distant markets, and the need to deliver food products as quickly as possible to meet consumer demands, the cold supply chain plays a crucial role. The cold supply chain is a set of processes that include the storage, handling, and transportation of perishable products for which controlled temperature conditions must be maintained from processing to final consumption to deliver safe and high-quality products to consumers (Hundy et al., 2008, according to Fan et al., 2021). Nalietina et al. (2023) state that the main parts of the cold chain infrastructure are suppliers, transport, the warehouse, and ultimately consumers. Every supply chain, including the cold chain, has its own challenges. The first major challenge is food spoilage, which most often occurs due to temperature differences between the food and its surrounding environment. Temperature increases caused by opening and closing the doors of refrigerated compartments also negatively affect the rate of spoilage, as do refrigeration malfunctions. Additionally, the speed of transport is crucial—that is, how quickly food products reach the end customer—especially for items with a shorter shelf life. To preserve both the safety and quality of the products, it is also important to maintain the dryness and cleanliness of the refrigerated space, as well as to protect it from weather conditions, insects, fungi, and similar hazards. With regard to cold chain transport, it is governed by the provisions of the Agreement on the International Carriage of Perishable Foodstuffs and on the Special Equipment to be Used for such Carriage (ATP), signed in Geneva in 1970.² The agreement aims to improve conditions for preserving the quality of perishable products during transport and to facilitate the development of trade in these products, both domestically and later in international markets. Various forms of transport are used for the transport of food products, but the most common is certainly road transport. Road transport has numerous advantages; it is possible to transport different types of cargo, and as far as food products themselves and their transport are concerned, it is most suitable for urban areas, it is easy to find alternative routes, and the speed of transport also plays a role. On the other hand, the

² <https://www.cvh.hr/gradani/ispitivanje/atp-prijevoz-lakopokvarljivih-prehrambenih-proizvoda/>



disadvantages are the high costs associated with the vehicles themselves and their maintenance (mechanical breakdowns, cooling system failures), road infrastructure, traffic accidents, congestion, and many others. If we compare rail transport, its advantages are: the ability to transport larger quantities of goods, the simultaneous transport of products with different storage conditions, as well as lower costs. As for the disadvantages, a major disadvantage of rail transport is the length of time the transport itself takes, the insufficient development of railway infrastructure, the need for other forms of transport, and others limitations (Naletina et al., 2023).

3. Analysis of the selected company

The subject of this paper focuses on the analysis of a medium-sized company engaged in the production, processing, storage, and distribution of frozen food. Business analysis, particularly financial analysis, examines the dynamics of changes in financial statement items over time and is complemented by an analysis using financial indicators, which allows for an assessment of the company's financial position and overall performance.

This research aims to examine the impact of financial structure and asset management efficiency on firm profitability, measured by return on assets (ROA) and return on equity (ROE), with a particular focus on a company operating in the cold chain sector. To investigate the stated aim of this research, the following research questions were posed:

1. *Is there a relationship between a low level of debt and higher profitability (ROA and ROE) in the cold supply chain sector?*
2. *Can the efficiency of asset management, measured by the turnover ratios of total and current assets, receivables, and inventories, affect the profitability of companies (ROA and ROE) in the cold supply chain sector?*

Therefore, to achieve the main objective of this research, it is necessary to:

- (1) to analyse the relationship between debt ratios and ROA and ROE, that is, to assess their impact on the financial stability and profitability of the firm; and
- (2) to examine the effect of asset turnover ratios on ROA and ROE, thereby determining the extent to which efficient asset utilisation contributes to overall profitability

This research is based on a descriptive and theoretical analysis grounded in the interpretation of selected financial ratios and their trends. To achieve the stated objective and address the defined research questions, the study uses data collected for the period from 2021 to 2024. The collected data were analyzed using specific groups of indicators, namely debt ratios, asset turnover ratios, receivables turnover, inventory turnover, ROA, and ROE. The analysis provides an overview of trends across the selected years and examines how these trends relate to changes in ROA and ROE.

4. Research results

Belak (2014), in his book, states that the purpose of determining key indicators is to enable an assessment of the financial position and performance trends of the observed company, as well as to evaluate its business capability. In this paper, indicators of debt, activity, and profitability were observed and analyzed, and these will be presented in the following section.

The results obtained from the analysis of the available data indicate that the observed company has a stable capital structure, high liquidity, low debt, and sustainable profitability, which confirms its financial strength as well as its resilience to market changes.

The following section presents the calculations and the relationships between the indicators in order to address the defined research questions.

4.1. Analysis of debt

To assess a company's level of indebtedness, indebtedness indicators are used to determine the structure of financing sources, evaluate whether the company can cover the costs arising from the use of external financing, and assess the effectiveness of using third-party financing sources (Ježovita, 2015). An analysis of debt indicators over the four observed years (2021, 2022, 2023, 2024) is presented in Table 1. The debt ratio is below 50%, which means that there is less financial risk, i.e., there is less risk that the company will not be able to repay its debt. On the other hand, the equity ratio throughout the observed period is higher than 50%, which indicates that the company is intensively using its own sources of financing. The equity ratio shows a downward trend over the observed years, followed by a slight

increase; however, the values remain relatively low. Despite this, the company is not expected to face significant difficulties in repaying borrowed funds or meeting interest obligations. (Magdić, 2025). The indebtedness factor also falls and rises over the period, but its values are consistently less than 3 years, which is taken as a reference value, which means that the indebtedness of the company is small, which is also confirmed through the indicators. Interest coverage indicators are quantitatively low, but their qualitative interpretation is positive, as they indicate that the company is not heavily dependent on external financing, and thus small fluctuations in interest costs do not threaten business profits (Magdić, 2025).

Table 1. Financial indicators of the debt of the observed company (Magdić, 2025)

	2021	2022	2023	2024
Debt ratio	0.112	0.089	0.115	0.085
Own financing ratio	0.888	0.911	0.885	0.915
Financing coefficient	0.126	0.098	0.130	0.093
Debt factor	0.180	0.136	0.178	0.121
Coverage Ratio I	0.968	0.952	0.801	0.709
Coverage Ratio II	0.968	0.958	0.806	0.715

4.2. Activity analysis (turnover)

Activity indicators measure how efficiently a company uses its own resources, or rather indicate how quickly assets circulate in the business process (Bolfek et al., 2012). Activity indicators are based on turnover, where higher turnover ratios are considered indicative of greater operational efficiency and are therefore desirable. By analyzing the activity indicators over the four observed years (2021, 2022, 2023, 2024) presented in Table 2., we come to the following conclusions. The total asset turnover ratio increased in 2022, but then experienced a slight decline over the following two years. A similar trend is observed in the short-term asset turnover ratio, which increased in 2022, decreased in 2023, and increased again in the subsequent year (Magdić, 2025). As for the receivables turnover ratio, it also increased in 2022, but its slight decline is visible in the following years. The inventory turnover ratio increased significantly in 2022 compared to 2021, but in the following years, its values also declined slightly. The duration of receivables collection decreased gradually until 2023, after which it began to increase slowly, with this upward trend continuing into 2024 (Magdić, 2025).

Table 2. Financial indicators of the activities of the observed company (Magdić, 2025)

	2021	2022	2023	2024
Total asset turnover ratio	0.781	0.921	0.856	0.855
Current asset turnover ratio	0.970	1.126	1.050	1.063
Receivables turnover ratio	5.683	5.811	5.157	5.092
Inventory turnover ratio	4.104	4.943	4.569	4.453
Duration of receivables collection in days	64.225	62.808	70.774	71.687

In conclusion, all activity indicators show a slight tendency to fluctuate, either decreasing or increasing; however, overall, they remain satisfactory and relatively stable within the context of cold supply chains. Based on the analyzed data, it can be concluded that the company effectively utilizes its assets to generate income and maintains adequate control over inventory and receivables. Nonetheless, in the future, the company should aim for further optimization to reduce the observed fluctuations.

4.3. Analysis of profitability

Profitability indicators are used to measure whether a company is able to generate profit based on the capital it has invested or the assets it has invested in. The most important profitability indicator is return on equity (ROE), which indicates how many monetary units of profit a company generates per unit of equity. From the perspective of owners who have invested in their own capital, it represents a significant measure for measuring the profitability of the company, but also a fundamental measure for profit planning (Belak, 2014). Closely related to the return on equity is the return on assets (ROA), which is an indicator for measuring the success of using the company's assets to generate its profit. If the return on equity (ROE) is higher than the return on assets (ROA), it indicates that the company has the capacity to take on additional debt.

By analyzing the profitability indicators over the four observed years (2021, 2022, 2023, 2024) presented in Table 3., it can be observed that the net profit margin declined in 2022, increased slightly in 2023, and then declined again in 2024; however, the values remain relatively stable throughout the observed period, indicating that



the company is capable of generating profit. A similar trend is observed with the gross profit margin: it decreased in 2022, increased in 2023, and declined again in 2024. However, since the values remained relatively stable over the four-year period, it can be concluded that the company maintains effective cost control (Magdić, 2025). Net return on assets (ROA) shows a slight increase until 2023, followed by a modest decline in 2024. Despite this decrease, the calculated values indicate that the company utilizes its assets very efficiently. Similarly, gross return on assets increased until 2023 but declined in 2024. Nevertheless, the values suggest that the company maintains stable profitability (Magdić, 2025). Return on equity (ROE) showed a slight increase over the first three years under review, followed by a modest decline in 2024 compared to 2023. Despite this decrease, the values remain stable, indicating that the company can effectively utilize external capital (Magdić, 2025).

Table 3. Financial indicators of profitability of the observed company (in %) (Magdić, 2025)

	2021	2022	2023	2024
Net profit margin	12.359	10.955	12.483	11.773
Gross profit margin	15.028	13.291	15.231	14.376
Net return on assets	9.647	10.094	10.683	10.069
Gross return on assets	11.730	12.247	13.035	12.296
Return on equity (ROE)	10.708	10.834	11.980	10.941
Return on assets (ROA)	9.507	9.866	10.604	10.014

In conclusion, based on the presented profitability indicators, the company demonstrates stable cost control and efficient management. The relationship between gross and net margins indicates that operating and financial costs are moderate and stable, while the high profitability of assets and equity confirms the effective use of resources.

4.4. Analysis of the results: connection between debt, activity, and profitability

Based on the previously presented data explaining indebtedness and profitability, we can conclude the following. The observed company has a very low level of indebtedness, with the debt ratio ranging from 0.085 to 0.112 during the observed period, which means that over 80% of operations are financed with their own capital. As a result, the company demonstrates high financial stability

and low financial risk, which is particularly important in the cold supply chain sector, where maintenance and infrastructure costs are high. Furthermore, profitability indicators are high and stable throughout the observed period (around 9-12%), indicating high efficiency in the use of assets and capital. Based on the presented data, it can be seen that the highest profitability of assets (ROA = 10.60%) and capital (ROE = 11.98%) was achieved at a moderately low level of indebtedness (0.115), while at the lowest level of indebtedness of 0.085, ROA and ROE decreased slightly (10.014% and 10.941%). This can be interpreted as indicating that moderate indebtedness (10–12%) has a positive effect on the growth of ROA and ROE, whereas excessively low indebtedness may limit further profitability growth due to insufficient use of financial leverage. All presented indebtedness values are low, while ROA and ROE remain high and stable throughout the observed years. There is no instance in which a higher level of debt corresponds to a decline in profitability. Based on the above, which explains the interdependence of debt and profitability, we can answer the first research question: *Is there a relationship between a low level of debt and higher profitability (ROA and ROE) in the cold supply chain sector?* A positive relationship between low debt and high profitability has been confirmed. Furthermore, based on the previously presented data explaining asset turnover and profitability, we can conclude the following. Total asset turnover ranges between 0.781 – 0.921, while current asset turnover ranges between 0.970 – 1.126, which suggests moderate efficiency in resource utilization. Receivables turnover ranges from 5,092 to 5,811, and receivables collection duration ranges from 63 to 72 days, which indicates good liquidity and good receivables management. Inventory turnover ranges from 4.104 to 4.943, indicating that inventory is turned over approximately four times on average. This reflects relatively efficient inventory management, which is particularly important in the cold supply chain. Activity and profitability indicators also demonstrate a clear connection; effective asset management, reflected in increased turnover over the observed years, positively affects profitability. Moderately high asset turnover correlates with higher ROA and ROE throughout the observed period. Analyzing the observed years, the following conclusions can be drawn. From 2021 to 2022, all analyzed activity indicators increased, and in parallel with the growth in turnover during the same period, ROA and ROE also increased, confirming the positive impact of asset efficiency on profitability. From 2022 to 2023, turnover ratios have a slight decline, although



ROA and ROE increased again in 2023. Therefore, in this year, the growth of ROA and ROE cannot be directly connected to turnover ratios, suggesting that profitability was influenced by other factors. From 2023 to 2024, turnover ratios declined slightly, remaining relatively stable, while ROA and ROE also decreased in the same period. This indicates a positive relationship, as a decrease in activity is accompanied by a decline in profitability. Based on the above, it can be concluded that there is a connection between activity and profitability. In the observed years, when activity indicators showed a slight increase, ROA and ROE also experienced a modest rise, and conversely, in years when activity indicators slightly declined, ROA and ROE also decreased. This confirms the importance of effective asset management for achieving sustainable profitability. Following all of the above, we can answer the second research question: *Can the efficiency of asset management, measured by the turnover ratios of total and current assets, receivables, and inventories, affect the profitability of companies (ROA and ROE) in the cold supply chain sector?* Effective asset management, as measured by the turnover ratios of total and current assets, receivables, and inventories, can affect the profitability of companies (ROA and ROE) in the cold supply chain sector.

5. Research limitations and recommendations for further research

Based on the conducted research, certain limitations of the study can be identified, as well as recommendations for future research. Despite the valuable insights presented, the research has several limitations. The study focuses on a single company from the cold chain sector, which limits the ability to generalize the results to the entire sector or other industries. Furthermore, the four-year observation period provides only short-term trends, which is not sufficient to capture all cyclical and structural developments that may influence the results. The analysis relies exclusively on financial indicators, specifically on a selected group of debt, activity, and profitability indicators, while non-financial indicators such as ESG factors, management quality, and operational risks are not included, although they are particularly important in the cold supply chain. The research also does not include a comparison with other companies in the same industry, which would allow more precise conclusions regarding efficiency and competitiveness.

As for recommendations for future research, it would be advisable to expand the sample and to include a larger number of companies from the cold supply chain in order to generalize the results and identify sectoral patterns. Similarly, analyzing financial indicators over a longer period, for example ten years, would provide a better understanding of long-term trends and changes that may affect outcomes. Furthermore, it would be beneficial to incorporate non-financial indicators (ESG, sustainability, digitalization), especially in the cold chain sector, which is energy-intensive and logistically demanding. Including benchmarking against competitors would also help assess efficiency and identify specific strengths or weaknesses of the companies analyzed.

6. Conclusion

The analysis of the selected company presents data on debt, activity, and profitability in the cold chain supply sector. Analyzing the debt indicators, the company shows extremely low values throughout all four years, which indicates financial stability and suggests that it is almost entirely financed by its own capital. The low values of the financing coefficient confirm the company's minimal dependence on liabilities, and it operates with virtually no debt. In conclusion, in terms of indebtedness, the company is extremely financially stable, its liabilities are minimal, and asset coverage with equity is exceptionally high.

The values of the activity indicators show certain fluctuations (decline/growth), but overall, asset management is stable. Although asset utilization for generating income is somewhat slower, it remains efficient.

Regarding profitability indicators, the results show that the company is capable of generating profit from sales, exercises good cost control, and achieves stable business performance. Return on equity (ROE) values are stable, and through the use of external financing sources, the company achieves high profitability for its owners. Return on assets (ROA) is also stable and positive. The company demonstrates stable profitability and the ability to generate profit with effective cost management and efficient use of capital.

In conclusion, the findings of this research confirm the research questions posed. The analysis of indebtedness, activity, and profitability revealed clear relationships and correlations. The study confirms the connection between debt and prof-



itability, as the low level of indebtedness during the observed period had a positive effect on both ROA and ROE. Furthermore, the analysis of the relationship between activity (turnover) and profitability also confirms a significant link, with the company's stable activity indicators contributing to sustainable profitability.

The results are particularly relevant for the cold supply chain sector, demonstrating that an optimal level of profitability arises from a combination of low indebtedness and operational efficiency. Recognizing the importance of financial data in company management, especially in a sector that is capital-intensive, operationally complex, and logistically demanding can support financial stability and long-term resilience.

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