

Assessing the financial stability of Warsaw-listed transport and logistics firms

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Abstract: *Purpose.* The primary objective of this paper is to evaluate the financial security of transport and logistics companies listed on the Warsaw Stock Exchange. *Methodology.* The research employs various financial security indicators such as liquidity, capital coverage of assets, working capital, and others. The study focuses on 11 companies in the transport and logistics sector listed on the Warsaw Stock Exchange in the third quarter of 2023. *Results.* The findings reveal that companies in the transport and logistics sector are highly diverse and challenging to compare on non-financial security aspects. Average data do not reflect the real situation in the sector, and individual companies significantly influence average results. The importance of maintaining an optimal structure of assets and capital for ensuring financial security is also highlighted. *Theoretical contribution.* This paper contributes to financial security in the transport and logistics sector by analysing companies listed on the Warsaw Stock Exchange. It offers a new perspective on the financial stability of these companies and the factors influencing it. *Practical implications.* The research calls for caution when assessing the financial security of enterprises in the transport and logistics sector. It also suggests expanding the research group and checking whether the entire sector has any common patterns regarding financial security. This could provide valuable insights for companies in the sector and policymakers.

Keywords: sustainability, financial security, financial liquidity, safety management, financial analysis, financial indicators

1. Introduction

Economic security is one of the foundations of overall security. It is a state of undisturbed functioning of economies. This situation maintains fundamental development indicators and ensures a comparable balance with the economies of other countries. Economic security consists of the following pillars: financial security, energy security, raw materials security, food security and access to clean water. Financial security is one of the most important dimensions of economic security. This type of

security refers to the financial aspects of the functioning of organizations and business entities. This property and financial situation are intended to ensure operational stability and enable development. Achieving financial security requires many years of effort and appropriate decisions by people who manage business entities (Duraj et al., 2020).

Economic security is defined as a condition where economies operate without disruptions. This can also be interpreted as maintaining fundamental development indicators and ensuring a balance comparable to the economies of other nations (Książopolski, 2011). Each entity aspires to operate efficiently and, therefore, endeavors to sustain economic security. This state can be controlled through various indicators. Comparing one's results with those of other entities is beneficial as it allows for continuous monitoring of one's position and fosters development.

Financial security can be viewed as the capacity to preserve financial liquidity and uphold high management efficiency.

The enterprise as an entity of financial security

Numerous entities are concerned with financial security, with enterprises being one of the most significant. Entities operating in financial markets undeniably concentrate on their financial status, with maintaining financial security being one of their primary objectives.

This type of security is a unique category within finance. It pertains to attaining suitable conditions for conducting ongoing activities effectively and continuously. It is directed towards developing business activities that enhance the enterprise's market position and value (Wojciechowska-Filipek, 2014).

The financial security of an enterprise provides a financial guarantee for the enterprise's existence and development. This is the outcome of efforts to ensure the enterprise's sound financial condition. This process consists of three stages:

- the first stage is to provide financial cover - we can assume that it is a financial base for the enterprise that will enable it to survive a certain period, creating time to obtain financial resources from its activities. Financial protection is a condition for covering the current financial needs of the enterprise, and it also counteracts the threat of bankruptcy in a short time;
- the second stage is achieving financial security - it ensures the continuation of the enterprise's operations and influences the creation of appropriate conditions for its development. It guarantees the maintenance of a stable financial position of the company and protects the company against bankruptcy both in the short and long term;
- the third stage refers to the financial freedom of the enterprise - it constitutes its financial base and is necessary for financial security; it is enlarged by inventories, enabling various investments (Karbownik, 2012).

In relation to enterprises, financial security can be understood as ensuring that the company achieves its basic profit goal. Financial security threats include unfavorable indicator values, inability to repay own liabilities on time, loss of financial support from banks or suppliers, conversion of credit sales into cash transactions by suppliers, lack of funds for investing, recording large losses from operating activities, negative net cash flow values, exceeding credit limits held (Idzik & Klepka, 2021).

Ensuring financial security is a significant issue for every company. Achieving this type of security affects the smooth operation of business. This is one of their priority tasks.

2. Literature review

The primary methods of determining the financial security level include known financial liquidity indicators, which determine the company's potential ability to settle short-term liabilities. Maintaining financial liquidity is necessary for an economic entity to function correctly, especially in periods of crisis (Ang & Smedana, 2011), (DeAngelo & DeAngelo, 2007). The most popular ratios include current, quick, and cash.

Current liquidity: CR (current ratio) informs about the company's ability to meet current liabilities, as it indicates the extent to which current assets can cover current liabilities. The ratio should range from 1.3 to 2. Banks often consider the ratio to be two as the optimal value.

Fast liquidity: The quick ratio (QR) determines how many times highly liquid current assets at the company's disposal cover its current liabilities to third parties. Compared to the CR ratio, this ratio is adjusted for the least liquid current assets, i.e., inventories and prepaid expenses. The optimal value of this ratio should be 1.0, i.e. current assets should fully cover current liabilities with a high degree of liquidity. In the case of enterprises characterized by rapid asset turnover (e.g. commercial), this standard is lowered to 0.7. A low value of this ratio may indicate liquidity problems, while a high value may indicate unproductive accumulation of cash and/or the existence of a high balance of receivables, which may have an adverse impact on the company's results.

Cash liquidity: The cash ratio determines how many times the cash at the company's disposal (in hand or on a bank account) covers its current liabilities to third parties. The optimal value of this indicator is 0.2. This indicator does not play an essential role in determining the company's liquidity because, according to financial management rules, cash should be limited to a minimum, as only assets engaged in trading generate financial results.

Moreover, financial security is largely influenced by the relationship between the asset structure and the capital structure in the enterprise. The analysis of these mutual dependencies involves examining the possibility of covering long-term assets with equity capital (first degree of coverage) and long-term assets with long-term capital in the company: equity and long-term external capital (second-degree coverage) (Scarabot, 2001), (Handayani & Darma, 2018).

The first degree of coverage (the equity to fixed assets ratio): The ratio is the ratio of the enterprise's equity to fixed assets. The ratio value should be greater than 0.6, thanks to which the company ensures repayment of receivables, even in the event of bankruptcy.

The second degree of coverage (the equity and long-term liabilities to fixed assets ratio): The ratio is the ratio of the enterprise's long-term equity and external capital to fixed assets. The indicator's value should not fall below 1, which would indicate financing of fixed assets with short-term liabilities and thus increase the enterprise's risk.

The consequence of the structure of balance sheet values, both on the assets and liabilities side, is the appropriate value of working capital. Increasingly, this measure is critical in shaping financial security (Schulman & Cox, 1985). To determine this value relatively, the ratio of the share of working capital in assets can be used.

Net working capital to total assets ratio: The indicator informs about the coverage of assets with working capital. Working capital is the difference between current assets and short-term liabilities. An unfavorable situation is when working capital has a negative value, which means that fixed assets are financed with short-term liabilities. Higher values of the indicator are desirable and indicate a low share of short-term capital in asset financing.

Working capital can be treated as a synthetic link between the liquidity and solvency of enterprises (Celik & Boyacioglu, 2013; Appuhami, 2008; Chiou et al., 2006). It reflects the efficiency of managing current assets and, at the same time, draws attention to the owners' participation in financing the company's assets. Additionally, research confirms a significant positive correlation between the size of working capital and profitability and profitability (Coporek, 2017).

The analysis of the potential solvency level can be supplemented with the ratio of short-term receivables to short-term liabilities.

Covering short-term liabilities with short-term receivables: The ratio informs about the coverage of short-term liabilities with short-term receivables. A higher value of the indicator means greater liquidity. The indicator should be compared for companies from the same industry due to its diversity.

To sum up, companies striving to maintain financial security must, in particular, take care to maintain the optimal structure of assets and capital (Modigliani & Miller, 1958) (Myers, 1984) (Newman, Sailesh & Brian, 2012). Financial liquidity is mainly dependent on the elasticity of the company's assets (Setiadharmha & Machali, 2017). In turn, the asset structure determines the company's capital structure (Norton, 1991), (Vos et al., 2007).

3. Research method

The study covered companies from the transport and logistics industry listed on the Warsaw Stock Exchange (not suspended from stock exchange quotations and reporting sales revenues). Data

will be from the third quarter of 2023. Various measures of financial security were calculated: ratios of equity to fixed assets, a ratio of long-term capital (own and long-term liabilities) to fixed assets, current liquidity ratio, quick ratio, cash liquidity ratio, ratio of short-term receivables to short-term liabilities, share ratio working capital in total assets and the share of fixed assets in total assets.

The following characteristics were performed with the use of chosen statistical measures:

1. Central tendency measure (arithmetic mean, median)
2. Dispersion measures (variance and standard deviation, range)
3. Asymmetry measure (skewness)
4. Concentration measure (kurtosis)

Central tendency measure

The arithmetic mean is the sum of a collection of numbers divided by the count of numbers in the collection. It is a number informing about the value of the feature, which population elements should have if all statistical data were equal, and the sum of these values would be the same (division of values into equal parts). The arithmetic mean is independent of distribution, and it is a consistent and neutral estimator of anticipated value. It is responsive to skewness and outliers.

Arithmetic mean
(central tendency
measure)

$$\bar{x}_n = \frac{x_1 + x_2 + \dots + x_n}{n} = \frac{\sum_{i=1}^n x_i}{n}$$

where:

$\bar{x}_n$ – arithmetic mean from the sample,

x_i – subsequent values of a given random variable in the sample,

n – sample size.

Median divides statistical data collection into two equal subsets. One includes figures lower or equal to the median, and the other includes figures higher and equal to the median. In other words, it is characterised in ordered series of the same number of observations higher and lower than the value. It is a measure much more resilient to outliers than the arithmetic mean.

Median
(central tendency
measure)

If n is an even number, the median (m) is:

$$m = \frac{\frac{x_n}{2} + \frac{x_{\frac{n}{2}+1}}{2}}{2}$$

when n is an odd number, it m :

$$m = \frac{x_{\frac{n}{2}+1}}{2}$$

Dispersion measures

Standard deviation is defined as a square of the variance. It is an arithmetic mean of square deviations of particular variables' values from the arithmetic mean of the whole set. It measures the average deviation of measurement results from the average. The bigger the standard deviation, the more dispersed the figures. Outliers have a great influence on standard deviation. Moreover, it is subjected to distortions in the case of skew distributions.

Variance and
standard deviation
(dispersion
measures)

Unbiased variance estimator (s^2):

$$s^2 = \frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x}_n)^2$$

Standard deviation of the sample (s):

$$s = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x}_n)^2}{n-1}}$$

Variance coefficient is a quotient of standard deviation divided by the arithmetical mean. Coefficient of variance shows the percentage of standard deviation about the arithmetical mean value.

Range is a difference between the highest and the lowest statistical figure. Range shows the length of the shortest section, which includes all statistical figures. Outliers distort this measure. It is not defined algebraically.

Range
(dispersion
measure)

$Range(x) = \max(x) - \min(x)$
where:
 $Range(x)$ —range,
 $\max(x)$ —maximum value of a given random variable in the sample,
 $\min(x)$ —minimum value of a given random variable in the sample.

Asymmetry measure

Skewness coefficient (asymmetry) informs how the results for a specific variable shape around the average. A classical standardized meter was used. It shows the extent to which reality is reflected by arithmetical means. If the indicator's value is high, the average will not be the best measure of situation description. A coefficient of values higher than zero indicates right-side skewness, and below zero indicates left-side distribution asymmetry.

Skewness
(asymmetry
measure)

$$G = \frac{\frac{1}{n} \sum_{i=1}^n (x_i - \bar{x}_n)^3}{s^3}$$

where:
 G – skewness.

Concentration measure

Kurtosis is a measure of concentration around the arithmetical mean. The higher the value, the bigger the tendency of variable values to concentrate around the average. Normal distribution is a reference measure. Kurtosis equals zero for normal distribution. If kurtosis is negative, the distribution is more flattened than average. If it is positive, the distribution is slenderer than the normal one.

Kurtosis
(concentration measure)

$$Kurt = \frac{n(n+1)}{(n-1)(n-2)(n-3)} \sum_{i=1}^n \left(\frac{x_i - \bar{x}_n}{s} \right)^4 - \frac{3(n-1)^2}{(n-2)(n-3)}$$

where:
 $Kurt$ —sample kurtosis.

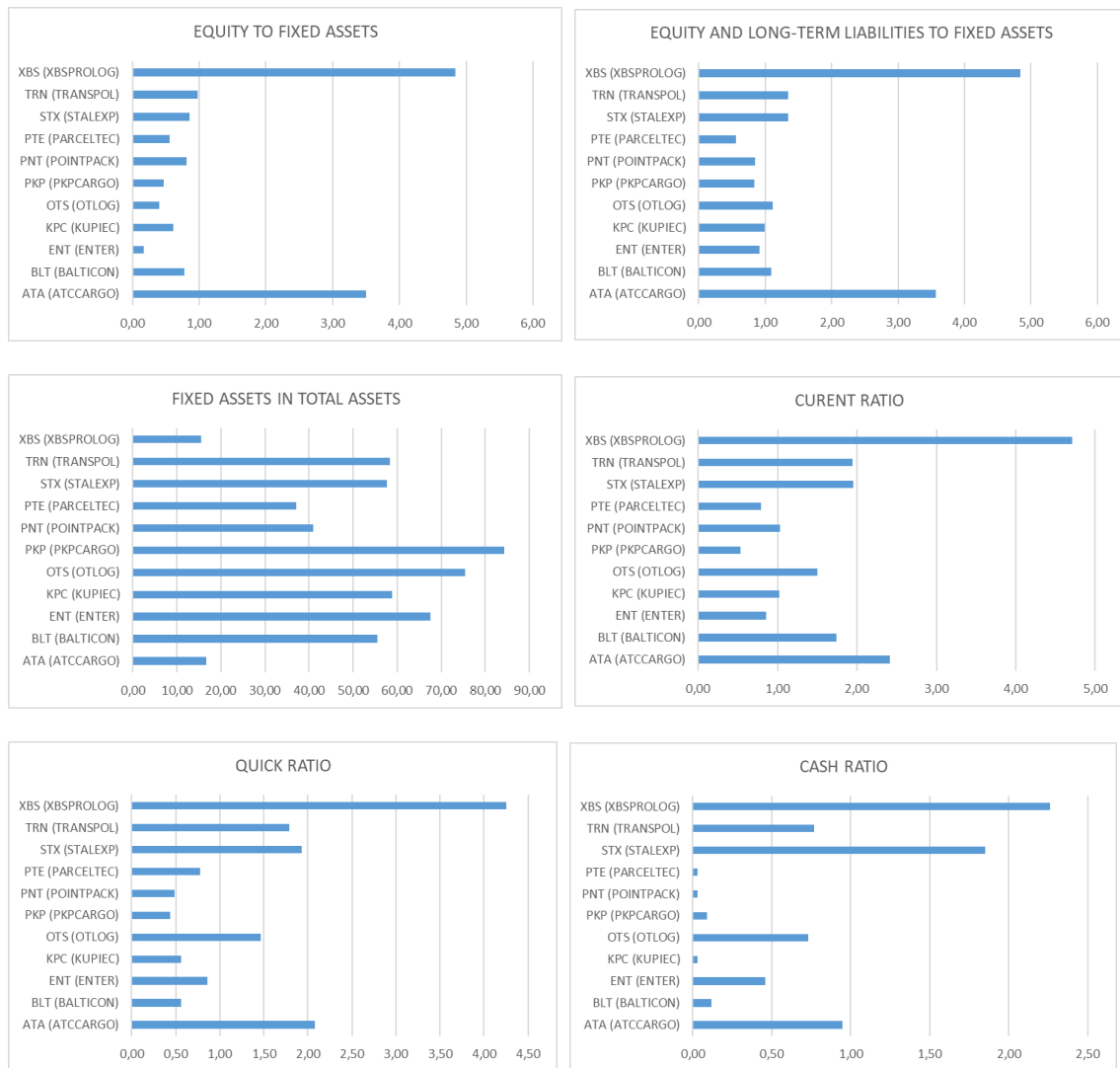
4. Results

The table presents financial security measures for enterprises from the transport and logistics sector. They were analyzed using statistical characteristics in search of regularities defining the analyzed economic sector.

Table 1: Measures of financial security of enterprises in the transport and logistics industry

	equity to fixed assets ratio	equity and long- term liabilities to fixed assets ratio	current ratio	quick ratio	cash ratio	covering short-term liabilities with short- term receivables	net working capital to total assets	share of fixed assets in total assets
ATA (ATCCARGO)	3.50	3.57	2.41	2.08	0.95	1.28	0.49	16.74
BLT (BALTICON)	0.78	1.09	1.74	0.56	0.12	0.95	0.19	55.56
ENT (ENTER)	0.17	0.92	0.86	0.86	0.46	0.38	-0.05	67.50
KPC (KUPIEC)	0.61	0.99	1.02	0.56	0.03	0.56	0.01	58.90
OTS (OTLOG)	0.40	1.11	1.50	1.47	0.73	0.73	0.08	75.52
PKP (PKPCARGO)	0.47	0.84	0.53	0.44	0.09	0.28	-0.14	84.37
PNT (POINTPACK)	0.81	0.85	1.03	0.49	0.03	0.55	0.02	40.88
PTE (PARCELTEC)	0.56	0.56	0.79	0.78	0.03	0.76	-0.16	37.11
STX (STALEXP)	0.86	1.35	1.95	1.93	1.85	0.08	0.21	57.71
TRN (TRANSPOL)	0.98	1.35	1.94	1.79	0.77	0.79	0.20	58.42
XBS (XBSPROLOG)	4.84	4.84	4.71	4.25	2.26	1.76	0.67	15.51
Mean	1.27	1.59	1.68	1.38	0.67	0.74	0.14	51.66
Standard error	0.45	0.41	0.35	0.34	0.23	0.14	0.08	6.67
Median	0.78	1.09	1.50	0.86	0.46	0.73	0.08	57.71
Standard deviation	1.48	1.34	1.16	1.13	0.77	0.47	0.26	22.12
Sample variance	2.20	1.81	1.35	1.29	0.59	0.22	0.07	489.42
Kurtosis	3.05	3.11	4.62	3.65	0.60	1.13	0.59	-0.50
Skewness	1.99	1.99	1.93	1.77	1.24	0.93	0.99	-0.46
Range	4.67	4.28	4.18	3.81	2.23	1.68	0.83	68.86
Minimum	0.17	0.56	0.53	0.44	0.03	0.08	-0.16	15.51
Maximum	4.84	4.84	4.71	4.25	2.26	1.76	0.67	84.37
Confidence level (95,0%)	1.00	0.90	0.78	0.76	0.52	0.32	0.17	14.86

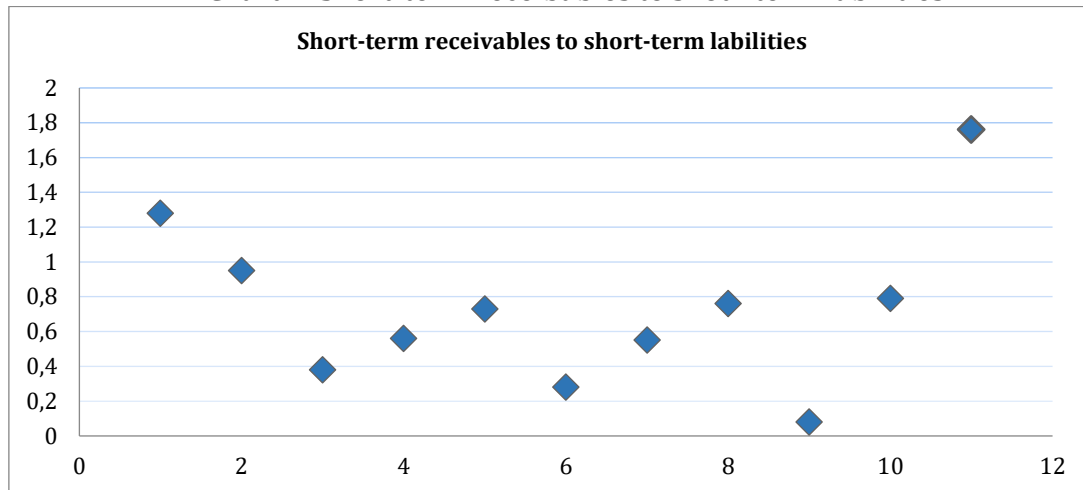
Data analysis indicates the maintenance of liquidity and financial security of enterprises from the transport and logistics industry listed on the stock exchange. Such a conclusion can be drawn by assessing the value of the analyzed indicators on an average basis for the studied group. The indicators determining the coverage of fixed assets by equity and long-term capital: equity and long-term liabilities on average (!) show almost model values. However, it turns out that the achievements of individual entities vary greatly. The average values are much higher than the median for the sample, which means that most enterprises have lower values than the arithmetic mean. The range is very high, and the values of the indicators range from 0.17 to 4.84 for the first analyzed indicator (a slightly smaller range occurs in the indicator of coverage of long-term assets by long-term capital). Additionally, the positive skewness suggests a left-sided distribution of the surveyed enterprises, and its height suggests that the arithmetic mean definitely does not reflect the real situation in the industry. A high and positive flattening index (kurtosis) indicates a slender distribution of the group (compared to the normal distribution) and concentration around the mean value. With such a small group, it is easy to see that the average data is strongly influenced by two companies that showed very high indicators, far from the accepted standards and the average value.

Chart 1: Measures of financial security of enterprises in the transport and logistics industry

A similar situation applies to liquidity ratios (current, quick and cash), but the differentiation is slightly weaker. As in the previous case - the median is lower than the arithmetic mean, and the measures of individual enterprises are more concentrated around the average.

Also noteworthy is the high variation in the share of working capital in total assets, which ranges from -16% to 67%.

The situation regarding the ratio of short-term receivables to short-term liabilities seems interesting. The literature on financial analysis does not provide the desired level of the indicator and requires industry comparisons to be made, considering that short-term payment management is a particularly characteristic feature of a specific economic sector. In the study group, short-term liabilities were covered by short-term receivables by 74% on average, and the average value was very similar and amounted to 73%. However, the remaining statistical characteristics do not confirm the homogeneity of the group, and the similarity of these two measures is accidental. The range of results for the group is 176%, and the group is very diverse.

Chart 2: Short-term receivables to short-term liabilities

Companies in the industry turned out to be difficult to compare, and in this case, industry membership alone cannot be the primary determinant of the possibility of comparison. As shown by the asset structure analysis, enterprises in the transport and logistics industry are very different. The theory of financial analysis often indicates the transport and logistics industry as a sector heavily burdened with fixed assets (and, consequently, high fixed costs for enterprises). The analysis of the surveyed group does not confirm this and indicates highly diversified asset liquidity: the range of results is almost 70 percentage points.

At the same time, a solid relationship between the structure of assets and the ability to maintain financial security can be confirmed. Enterprises with a low share of fixed assets had very high coverage of these long-term assets by equity and long-term external capital, and liquidity ratios even showed financial over-liquidity. In turn, enterprises with a high burden of fixed assets had problems maintaining adequate liquidity and financial security. The above situation does not apply to all companies. The diversity of the studied group means that individual companies strongly influence the average data.

5. Discussion of results

Maintaining financial security is a fundamental condition for an enterprise's continued operation and development. This is in the interest of the company and other entities operating within the broader environment. The transport and logistics sector is critical to the 'economic puzzle'. Much like a puzzle, the complete picture cannot be assembled without each piece. Consequently, the author is interested in examining the level of safety of transport and logistics enterprises to identify patterns within this industry.

The study underscores the need for considerable caution when assessing the financial security of enterprises in the transport and logistics industry. It is possible that entire industries, not just listed companies, are highly diverse and, as a result, challenging to compare in aspects unrelated to financial security. It should be emphasized that average data should not be based on average results for the industry. However, such comparisons are often necessary - they provide a benchmark for the achievements of a given company. These comparisons are used, for example, to identify the best directions for development, estimate market opportunities, and ultimately - improve financial management. The sector in which the company operates appears to be a natural point of reference.

We require this knowledge: only by comparing a company's economic activity measures with those obtained by its competitors can we conclude the level of management efficiency or the maintenance of an appropriate level of financial security. In the case of profitability or operational efficiency indicators, the literature does not suggest what values are considered correct or desirable. Conversely, many measures relating to the liquidity or solvency of enterprises have their own norms: the desired range of a given indicator (this applies particularly to liquidity indicators). Alternatively, averages for specific economic sectors are used for comparative purposes. It is assumed that the type

of activity carried out by an enterprise largely determines its 'appearance' and manner of functioning, including, for example, the structure of assets, the method of its financing, the specificity of contacts with contractors, etc.

However, the group of enterprises studied was highly heterogeneous, and the analysis did not indicate any particular regularities relating to the sector.

The results obtained during the analysis are not satisfactory. This applies particularly to the asset and capital structure and the specific matching of the maturity of assets and liabilities on the balance sheet. Long-term assets that are not very liquid, difficult to convert, etc. should be financed with long-term capital, or in a more rigorous version: simply with the company's own capital. This situation emphasizes the participation of the company's owners in bearing economic risk. This condition, i.e., covering fixed assets with equity, is met by only two companies out of eleven included in the study. At the same time, these are companies that differ significantly from others in terms of asset structure: there is a very large predominance of current assets, so meeting the requirement was not difficult. The situation is slightly better when analyzing the ratio of coverage of fixed assets with long-term capital: equity and long-term liabilities, which means that enterprises compensate for the low share of equity by financing assets with long-term debt.

This is still not a satisfactory scale. Further analysis of the share of working capital showed their relatively low share in total assets. This means that enterprises in the transport and logistics sector have not provided themselves with a sufficiently large safety 'buffer', which is especially needed in periods of economic downturn or other sudden crisis situations.

The study indicates the need for great caution in assessing the financial security of enterprises in the transport and logistics industry. It is very possible that entire industries, and not just listed companies, are very diverse and, consequently, difficult to compare in aspects other than those related to financial security. It should be strongly emphasized that average data cannot be based on average results - average results for the industry. Yet we often need such comparisons - a reference point for the achievements of a given company. We do this, for example, to search for the best solutions, development directions, estimate market opportunities, and finally - better financial management. The sector in which the company operates seems to be a natural reference.

The presented analysis requires in-depth study. First of all, expanding the research group. Perhaps the entire sector, not just listed companies, has some common relationships regarding the level of financial security.

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Conflicts of interest

The author declares no conflict of interest.

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