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THE ROLE OF PROFITABILITY INDICATORS OF GDAŃSK ROAD FREIGHT TRANSPORT COMPANIES IN THE CONTEXT OF DISCRIMINANT ANALYSIS

Abstract

The article is devoted to the problem of the informational value of profitability indicators used in discriminant models of road freight transport companies. The aim of the article was to examine the impact of profitability indicators on the results of discriminant models. Discriminant models are mainly based on accounting liquidity, debt and profitability indicators. The rule is that most models use different profitability indicators. The research was carried out in relation to entities that publish their financial statements, are limited liability companies and have their registered office in Gdańsk.

Keywords: road freight transport companies, profitability indicators, discriminant methods, financial condition, assets, financial results, sales revenues

JEL: R400, R 530, G 140, G150, G170

Introduction

In the financial analysis there are two approaches regarding the role of profitability indicators in methods of assessing the financial condition of a company. On the one hand, the special significance of this criterion is emphasized, while on the other hand, it is more and more commonly believed that the monetary surplus is a more reliable measure of the assessment of the efficiency of an enterprise's management than the book value of net profit. The monetary surplus is more objective than the financial result, since its calculation has fewer manipulation

possibilities than when determining the net financial result, in which, depending on the adopted method of valuation of assets and liabilities and the method of cost accounting, the net profit of a given enterprise may have different values for the same period (Kitowski, 223). Therefore, some discriminant models include cash flow in profitability analysis.

The considerations made in the article concerned the presentation of the results of selected profitability indicators and their impact on the results of discriminant models, including an assessment of profitability indicators in these models.

The purpose of the article is to analyze the impact of profitability indicators on the results of discriminant models of selected road freight transport companies based in Gdańsk in 2013-2017.

The article presents the following research hypothesis – profitability indicators affect the results of discriminant models.

1. Profitability indicators in discriminant analysis (Research methods used)

Profitability indicators assess the level of business efficiency. They are measures of the use of company assets (including transport rolling stock) (Transport, 551).

Five discriminant models were analyzed: Altman's, Hołda's, Hadasik's, Wierzb's and Mączyńska's. These models were based on accounting liquidity, debt, rotation, profitability and turnover indicators (Tłuczak, 426). Profitability indicators are the most indicators used in the models. Their application is presented in Table 1.

Table 1. Profitability indicators used in the analyzed discriminant models

No.	Indicator formula	Model
1.	retained earnings * 100% / total assets	Altman's
2.	operating profit * 100% / total assets	Altman's
3.	(operating profit – depreciation) * 100% / total assets	Wierzb's
4.	gross profit * 100% / total assets	Mączyńska's
5.	net profit * 100% / total assets	Hołda's
6.	(gross profit + depreciation) * 100% / total liabilities	Mączyńska's
7.	gross profit * 100% / sales revenues	Mączyńska's
8.	(operating profit – depreciation) * 100% / sales revenues	Wierzb's

Source: own study.

Each of the indicators presented in the models includes a different financial result (net profit, gross profit, operating profit, retained profit) and is compared with a different comparative item (sales revenues, total assets, total liabilities). Most indicators are from the group of return on assets (5 indicators), followed by return on sales (2 indicators) and one is compared with total liabilities (Kitowski, 223). This makes them an interesting comparative base. The literature on the subject includes

examples of awkward or even wrong definitions of financial results and individual categories of income and costs, as well as inconsistent terminology of profitability indicators (Kitowski, 223). To make the indicators comparable in Tables 1 and 6-11, unified names of individual measures were used to create the indicator's morphology. The indicators presented in the table can be interpreted as follows:

1. Retained earnings indicator in relation to total assets is used to measure the profitability of retained earnings in an enterprise, and thus to determine the entity's ability to self-finance.
2. The operating profitability indicator of assets (1) illustrating the relation of operating profit to total assets, illustrates the operational potential, and thus from the company's basic activity to generate profits, which is generated from the company's assets.
3. Total operating profitability indicator (2) calculated from operating profit minus depreciation, informs about the amount of cash generated from operating activities by assets, i.e. cash efficiency of assets (Mączyńska, Zawadzki, 16).
4. The return on assets calculated with gross profit is the most capacious return on assets, since the profit is tax-free. The indicator informs about the global effectiveness of fixed and current assets (Bednarski, 252).
5. The return on assets indicator calculated with net profit illustrates a synthetic, comprehensive assessment of the effectiveness of assets. It informs about the manner of managing fixed and current assets and its ability to generate profit (Bednarski, 252).
6. The debt repayment indicator calculated with a financial surplus (gross profit + depreciation) determines the enterprise's ability to repay its total debt by means of cash flows generated from the basic activity of the enterprise (Mączyńska, Zawadzki, 18).
7. The profitability indicator calculated with gross profit illustrates the amount of profit before tax per unit of income. The higher the value of the indicator, the better the financial situation of the enterprise (Analysis, 287).
8. The operating profitability of sales indicator calculated with operating profit minus depreciation depicts the degree of cash generated from basic activity by sales revenues, and therefore the scale of generated cash by operational revenues (Forfa, 256).

2. Financial results of Gdańsk road freight transport enterprises

The selection of the research sample was deliberate, only those road freight transport companies that publish their reports in the EMIS database were included in the research. They are limited liability companies, they were in the top ten out of 484 (in the EMIS database) of Gdańsk road transport companies taking into account the achieved revenues from sales in 2013-2017 and are based in Gdańsk. The research covered 6 business entities: Skat Transport Sp. z o.o., Omida Group Sp. z o.o., Eurotrans Sp. z o.o., Sostmeier Polska Sp. z o.o., BetBud Sp. z o.o., Nosta Logistik Sp. z o.o. Tables 2-4 present the value of sales revenues, net profits achieved and the total assets of these enterprises, respectively.

The activity of road freight transport enterprises is characterized in two sections: the quantity and quality of shipment services and the monetary value of shipment services. This activity results into sales revenues generated by enterprises, which in practical terms take the form of revenues from the sale of transport services, revenues from the sale of organizing or forwarding services and revenues from the sale of ancillary services resulting from loading, storage or rental of transport means, subsidies budgetary receipts from the sale of fixed assets. Enterprises may also have revenues from the sale of fixed assets, bank deposits or term interest (Transport, 544). The own costs account includes: material costs (depreciation of transport and fixed assets, consumption of fuels, oils, tires, energy), intangible costs (salaries, delegations), financial costs (social insurance, real estate tax, tax on means of transport, fund of benefits social) (Transport, 546-547). Sales revenues of the researched enterprises are presented in Table 2.

Table 2. Value of sales revenues (PLN) of the researched enterprises

Year	Skat Transport Sp. z o.o.	Omidia Group Sp. z o.o.	Eurotrans Sp. z o.o.	Nosta Logistik Sp. z o.o.	Sostmeier Polska Sp. z o.o.	Bet-Bud Transport Sp. z o.o.
2013	184,990,992.98	82,357,747.97	18,311,452.98	No data	31,541,014.93	0
2014	282,281,168.53	169,428,698.42	22,995,202.11	4,468,373.90	29,132,457.59	2,915,230.10
2015	307,371,835.19	191,912,184.39	31,916,544.20	20,524,101.05	29,442,991.71	7,071,335.02
2016	373,316,685.77	248,666,184.33	30,187,620.56	36,438,746.40	25,130,988.98	11,400,687.60
2017	408,019,334.69	319,703,414.54	39,077,485.20	47,129,628.59	20,959,327.60	22,731,190.09

Source: own study

The value of sales revenues of the four surveyed enterprises increased over the period considered (2013-2017). Thus, it can be said that enterprises were developing and their activity was effective. One's income decreased over the period considered. One's income was variable.

The revenues and incurred costs resulted into the value of net profit. Net profits of the surveyed enterprises are presented in Table 3.

Table 3. Net profit value (PLN) of the surveyed enterprises

Year	Skat Transport Sp. z o.o.	Omidia Group Sp. z o.o.	Eurotrans Sp. z o.o.	Nosta Logistik Sp. z o.o.	Sostmeier Polska Sp. z o.o.	Bet-Bud Transport Sp. z o.o.
2013	5,398,429.58	704,946.33	289,418.72	No data	1,788,446.99	-2,248.00
2014	11,725,744.00	2,025,587.24	403,310.92	-325,060.75	594,826.83	8,022.83
2015	13,336,838.99	3,717,256.96	634,614.06	332,445.49	654,178.44	-1,029,447.32
2016	15,492,800.42	6,054,091.07	469,978.30	1,175,503.72	718,996.97	-273,816.44
2017	11,442,159.00	4,867,124.90	946,223.16	1,453,502.63	-706,291.60	1,306,812.24

Source: own study

In terms of net profit, the situation of enterprises was at various levels. The results of four companies were relatively stable. Net profit of one of them decreased until it reached a loss (Sostmeier Polska Sp. z o.o.). One enterprise had unstable financial results (Bet-Bud Transport Sp. Z o.o.).

Assets of road transport enterprises are dominated by current assets, especially short-term receivables. Fixed assets consist largely of property, plant and equipment (land, buildings, structures and means of transport). The value of fixed assets of the surveyed enterprises is presented in Table 4.

Table 4. Total assets (PLN) of the surveyed enterprises

Year	Skat Transport Sp. z o.o.	Omida Group Sp. z o.o.	Eurotrans Sp. z o.o.	Nosta Logistik Sp. z o.o.	Sostmeier Polska Sp. z o.o.	Bet-Bud Transport Sp. z o.o.
2013	65,402,899.88	28,662,822.39	5,244,822.68	No data	15,045,233.27	9,202,714.09
2014	78,729,078.74	43,047,838.53	5,061,930.78	2,267,011.04	14,092,800.34	8,197,658.59
2015	85,713,506.71	57,363,084.71	6,627,145.18	3,649,788.14	15,146,288.73	2,375,341.46
2016	111,315,230.99	81,038,512.65	6,598,954.29	7,642,801.56	15,038,203.04	6,843,212.69
2017	118,942,708.49	119,593,290.90	8,890,200.12	10,075,635.82	14,331,068.68	5,045,345.56

Source: own study

The value of assets gradually increased in the four surveyed enterprises. In one it was stable and in one it was both increasing and decreasing.

Based on the above data, it can be concluded that Skat Transport Sp. z o.o. was the most developing company. The results of Omida Group Sp. z o.o., Eurotrans Sp. z o.o. they were also good, although much lower. Nosta Logistik Sp. z o.o. is the youngest of the surveyed enterprises, founded in 2014, whose results were very good and were constantly increasing. Sostmeier Polska Sp. z o.o. is a company with decreasing results, and BetBud Sp. z o.o. was characterized by unstable results over the period considered.

3. Assessment of profitability indicators of Gdańsk road transport companies in the light of assessment by discriminant methods (research results and discussion)

For the assessment of profitability, the indicators presented in the article and the companies presented above were used. The research concerns the years 2013-2017.

Taking into account the specifics of the industry, it is also necessary to present model ones, i.e. average industry values of sales profitability indicators in the analyzed period. They are presented in Table 5. These data apply to road freight transport enterprises in Poland in all voivodeships in 2014-2015.

Table 5. Model values of profitability indicators (%) of road freight transport enterprises

Formula	2013	2014	2015	2016	2017
Gross profit \times 100% / sales revenues	No data	3.30	4.00	5.20	4.30
Net profit \times 100% / sales revenues	No data	2.70	3.30	4.40	3.60

Source: own study based on <https://stat.gov.pl/obszary-tematyczne/transport-i-laczynosc/transport/transport-drogowy-w-polsce-w-latach-2014-i-2015,6,4.html>

To examine the profitability indicators of the surveyed enterprises, those that were used in the discriminant models presented in Table 1 were used. The results of these studies are presented in Tables 6-11.

Table 6. Results of profitability indicators (%) of Skat Transport Sp. z o.o.

Formula	2013	2014	2015	2016	2017
Retained earnings / total assets	0	0	0	-0.0203	0
Operating profit / total assets	8.3280	12.6410	13.2748	11.8862	9.6490
(Operating profit – depreciation) / total assets	6.4378	10.6818	11.7758	10.2108	7.6853
Gross profit / total assets	10.4545	14.8937	15.5597	13.9179	9.6198
Net profit / total assets	8.2541	14.8937	15.5597	13.9179	9.6198
(Gross profit + depreciation) / total liabilities	26.8759	34.7400	39.5021	36.6578	26.1167
Gross profit / sales revenues	3.6961	4.1539	4.3389	4.1500	2.8043
(Operating profit – depreciation) / sales revenues	2.2760	2.9792	3.2837	3.0446	2.2403

Source: own study

Skat Transport Sp. z o.o. only in 2016 had a retained profit, which was a real loss. It was the only deficit indicator of this enterprise. The highest profitability indicator was demonstrated by the return on liabilities indicator. The growing value of this indicator presented financing of liabilities from the financial surplus. From 2014, the company did not pay income tax, so the values of net and gross return on assets were at the same level. The values of these indicators were at a high level and the company was a leader in the industry considering these indicators. The value of the operating profitability ratio of assets was also at a high level, which proves the efficiency of transport activities and high profit generation from possessed assets. This is also confirmed by the return on assets calculated on operating profit minus depreciation. Revenue profitability indicators were at a much lower level than the return on assets, which resulted from a higher value of revenues than assets.

Profitability results of Skat Transport Sp. z o.o. in the years 2013-2015 was growing and the profitability indicator was higher than the benchmark in the industry. The years 2016-2017 are a decline in profitability indicators and a lower profitability indicator than in the industry. These indicators did not significantly affect the condition of the enterprise calculated by discriminant models. According to the calculated

discriminant models, the company was in very good financial condition in 2013-2017 and was not in danger of bankruptcy. It is one of the best developing Gdańsk cargo transport companies.

Table 7. Results of profitability indicators (%) of Omida Group Sp. z o.o.

Formula	2013	2014	2015	2016	2017
Retained earnings / total assets	0	0.0159	0	0	0
Operating profit / total assets	4.0503	7.1791	9.5754	9.2515	6.7768
(Operating profit – depreciation) / total assets	3.8447	7.0105	9.3045	8.7284	6.3456
Gross profit / total assets	3.2161	6.2050	8.6212	9.6998	5.3406
Net profit / total assets	2.4594	4.7054	6.4802	7.4706	4.0697
(Gross profit + depreciation) / total liabilities	3.6228	7.0218	10.2690	12.3109	6.8357
Gross profit / sales revenues	1.1193	1.5765	2.5769	3.1611	1.9978
(Operating profit – depreciation) / sales revenues	1.3380	1.7812	2.7811	2.8445	2.3737

Source: own study

The retained earnings of Omida Group Sp. z o.o. was expected only in 2014. Therefore, it is difficult to assess the return on assets measured with this profit. Return on assets, calculated respectively with operating profit, gross profit and net profit should be assessed positively, as the values of ratios from period to period increased, which indicated the efficient use of the company's assets. When comparing the operating profitability indicators of assets measured by operating profit and operating profit minus depreciation, one can get the impression that they are at almost the same level, which indicates that there are no changes. Nothing wrong. Similar values of calculated indices result from growing values of indices forming the indices formula. The profitability indicator was at a low level, which indicates high operating costs. The value of the liability profitability indicator was also similar to the value of other indicators.

Profitability indicators of Omida Group Sp. z o.o. in the years 2013-2016 increased. The decrease happened in 2017. The return on sales indicator in comparison to the benchmark was almost half of each period. And here one can see the effects of profitability indicators on discriminant models. According to the calculated models of Altman, Hołda and Wierzba, Omida Group Sp. z o.o. it was in very good financial condition in the years 2013-2017. According to Mączyńska's model, she was in good condition. The Hadasik model showed poor condition in 2013, while in the following years the financial condition was good.

Table 8. Results of profitability indicators (%) of Eurotrans Sp. z o.o.

Formula	2013	2014	2015	2016	2017
Retained earnings / total assets	0	0	0	0	0
Operating profit / total assets	7.0304	9.9778	11.6831	8.8869	13.5030

Formula	2013	2014	2015	2016	2017
(Operating profit – depreciation) / total assets	5.8021	8.2000	10.1426	7.8091	11.4208
Gross profit / total assets	7.1923	10.3498	11.7703	8.9107	13.0470
Net profit / total assets	5.5181	7.9675	9.5759	7.1220	10.6434
(Gross profit + depreciation) / total liabilities	12.1094	17.2697	18.6408	14.7097	21.7065
Gross profit / sales revenues	2.0600	2.2783	2.4440	1.9478	2.9682
(Operating profit – depreciation) / sales revenues	1.6618	1.8050	2.1060	1.7070	2.5982

Source: own study

The company Eurotrans Sp. z o.o. noted a high value of debt sustainability indicator. It did not achieve retained earnings in the examined period, which makes it impossible to calculate the return on assets indicator. Asset profitability indicators calculated with operating profit and gross profit, respectively, should be assessed positively, as the values were high, which indicated an efficient management of possessed assets. It should also be mentioned that they are at a similar level due to the lack of operations on other operating and financial activities. The profitability indicator result calculated with net profit also shows high efficiency of assets. The result of the return on sales indicator was at a low level, which proves the high operating costs.

Profitability indicators for Eurotrans Sp. z o.o. increased in 2013-2015, then slightly decreased and again increased in 2017. The profitability indicator result was significantly lower than the benchmark in the industry. The results of the indicators did not have a large impact on the results of discriminant models. Financial condition of Eurotrans Sp. z o.o. determined by means of discriminant models over the period considered was very good (Altman, Hołda, Wierzba) and good (Mączyńska, Hadasik).

Table 9. Results of profitability indicators (%) of Sostmeier Polska Sp. z o.o.

Formula	2013	2014	2015	2016	2017
Retained earnings / total assets	0	0	0	0	0
Operating profit / total assets	6.5736	4.9311	6.0454	4.2608	-1.8569
(Operating profit – depreciation) / total assets	6.1820	4.4161	5.0193	1.4421	-5.4555
Gross profit / total assets	14.7986	5.5315	5.6261	6.0773	-5.1949
Net profit / total assets	11.8871	4.2207	4.3190	4.7811	-4.9283
(Gross profit + depreciation) / total liabilities	81.2041	72.9166	64.6423	82.6259	13.9633
Gross profit / sales revenues	7.0590	2.6758	2.8942	3.6366	-3.5520
(Operating profit – depreciation) / sales revenues	2.9488	2.1363	2.5820	0.8629	-3.7302

Source: own study

The company Sostmeier Polska Sp. z o.o, similarly to others, has no retained earnings. The very high value of the debt service indicator shows low gross profit,

high depreciation and very high liabilities. This indicator proves that the liabilities are covered by a financial surplus. In the examined period, the company's financial results deteriorated, which resulted into the values of profitability indicators calculated with three levels of profit. The year 2017 brought shortages to the enterprise. A worrying fact is the loss of operating activity. The return on sales indicator in 2013-2016 was at a similar level as in competition, i.e. the activity was effective.

Sostmeier Polska Sp. z o.o. is the only enterprise surveyed whose financial results decreased over the period considered. In terms of results achieved, in 2013-2014 it is similar to its competitors, however, in the results of the indicators you can notice not only a significant drop in profitability but also a deficit (in 2017). The result of the return on sales indicator was also below the benchmark level, while in 2017 sales revenues generated a financial loss in the enterprise. Profitability indicator results are reflected in discriminant models. Sostmeier Polska Sp. z o.o. it was in good financial condition in 2013-2015, which deteriorated in 2016-2017. The Hadasik model indicates poor condition in these years. Calculated models show, however, that the company was not in danger of bankruptcy.

Table 10. Profitability indicators results (%) of Bet-Bud Transport Sp. z o.o.

Formula	2013	2014	2015	2016	2017
Retained earnings / total assets	0	0.0274	0	-15.0433	-25.8310
Operating profit / total assets	-0.0244	-0.3840	-55.6782	-4.0012	28.9473
(Operating profit – depreciation) / total assets	-0.0244	0.1208	-43.3389	-4.0012	28.9473
Gross profit / total assets	-0.0244	0.12082	-43.3389	-4.0012	28.9473
Net profit / total assets	-0.0244	0.0978	-43.3389	-4.0012	25.9013
(Gross profit + depreciation) / total liabilities	-1.4986	4.4010	-16.4553	-1.3918	33.5519
Gross profit / sales revenues	0	0.3397	-14.5580	-2.4017	6.4250
(Operating profit – depreciation) / sales revenues	0	0.3397	-14.5580	-2.4017	6.4250

Source: own study

Assessing the results of Bet-Bud Transport Sp. z o.o. it should be noted that in the years 2013-2016 it was mainly an area of deficit and the condition should be considered poor. The enterprise mainly achieved a loss on operating activities, which resulted into gross and net financial result due to the lack of revenues from other operating and financial activities. The high value of assets increased the value of deficit indicators. The company's sales were also in short supply. However, 2017 is an improvement in results and high profitability indicators for both assets and sales. The condition in 2017 could be considered good.

In 2017, the profitability indicator result significantly exceeded the reference value. In the years 2013-2016, the values of deficit indicators had a huge impact on discriminant models. Altman, Hadasik and Wierzby models pointed to the threat of continuing operations.

Table 11. Results of profitability indicators (%) of Nosta Logistik Sp. z o.o.

Formula	2013	2014	2015	2016	2017
Retained earnings / total assets		0	-8.9062	0	0,00
Operating profit / total assets		-13.0740	12.2670	18.9785	21.0746
(Operating profit – depreciation) / total assets		-13.8210	11.1535	18.1192	20.7533
Gross profit / total assets		-14.3387	10.6589	19.2929	18.0437
Net profit / total assets		-14.3387	9.1086	15.3805	14.4259
(Gross profit + depreciation) / total liabilities		-12.1210	11.9604	24.0268	23.9423
Gross profit / sales revenues		-7.2746	1.8954	4.0463	3.8574
(Operating profit – depreciation) / sales revenues		-7.0120	1.9834	3.8003	4.4367

Source: own study

Nosta Logistik Sp. z o.o. is a young company. The first year of Nosta Logistik Sp. z o.o., associated with the start of operations, showed poor financial results. The company showed a deficit in all indicators. This can also be seen in discriminant models. Mączyńska and Wierzba's models showed that the continuation of operation was at risk. The Hadasik model indicated a poor condition. However, since 2015 the company has been growing and its revenues have been growing and its condition could be described as good. The results of the return on assets indicators showed their efficient use. Sales profitability was also at a very high level. The results of the indicators allowed to catch up with competitors and the value of the return on sales indicator was very close to the benchmark. Discriminant models also showed good condition.

Conclusion

The financial results and the profitability indicators do not sufficiently accurately reflect the financial effectiveness of the entity's management and do not constitute a sufficiently accurate measure for measuring the value of an enterprise. However, they are used to assess the condition of the enterprise in the examined period and affect the results of discriminant models.

It should be noted that the rank of profitability indicators in discriminant models depends on the sectoral affiliation of a given enterprise, which results, for example, in the different structure of revenues generated or the value of retained earnings. The road transport of loads shows the correlation between the results of profitability indicators and the results of discriminant models. The research therefore confirms the hypothesis set out in the introduction, and the extension of the above research may become the starting point for further research and creating a model focused on examining the financial condition of road freight transport enterprises.

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