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## THE USEFULNESS OF FINANCIAL INSTRUMENTS IN ASSESSING THE BANKRUPTCY RISK OF COMPANIES\*

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**Abstract.** The research problem relates to modern enterprises' central dilemmas, which use existing financial instruments to assess the company's situation. Issues raised in this study involve identifying matters in the financial analysis of chosen companies listed on a stock exchange, the recognition of which may improve and heal the current economic situation. For this purpose, the document analysis and analysis methods were used. Documents contain financial statements of the researched enterprises, balance sheets and income statements included therein, and the conducted source analysis of contemporary subject literature of economics, finance and statistical studies. Studies on assessing the financial situation of the researched companies were carried out according to the following structure: preliminary analysis of financial statements, preliminary analysis of balance sheet, preliminary analysis of income statement, preliminary analysis of cash flow statement, ratio analysis of financial statements, working capital and financial liquidity ratios, efficiency ratios, debt and debt sustainability ratios, capital market ratios. The article ends with the financial condition improvement recommendations. This study may be used in similar scientific publications and teaching materials, or enterprises can use it to recognize ineffective areas. It also can be used to assess the effectiveness of the early warning model.

**Keywords:** stock exchange; economic analysis; financial analysis; early warning models

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## **1. Introduction and review of literature**

In current economic realities, the international business environment is constantly affected by an increasing number of insolvent companies (Grosu et al., 2023, p. 41). A lot of scientific research is held in organizational bankruptcy risk assessment (Štefko et al. 2020; Baboyan, 2023; Cho, Shin, 2023; Jones, 2023; Ullah, et al., 2023).

Financial analysis is, therefore, one of the components without which it is difficult to imagine a proper and effective management of 21<sup>st</sup>-century enterprise. Its usefulness refers to information capable of helping a decision-making process by having confirmatory value, predictive value or both (Frendy, Semba, 2017). The business volume and asset structure matter (e.g., Harris, Raviv, 1988). Corporate control contests and capital structure.

Financial stability analysis allows us to understand cause-and-effect sequences, creating a more complete overview of the situation inside a given enterprise. There is a relationship between the capital structure and the company viability (Baha et al., 2023).

Seňová, Čulková, Taušová and Teplická (2023, p. 65) claim that the more tangible assets the company have, the higher its indebtedness. A financial analysis carried out correctly provides a lot of data affecting the bottom line and allows the development of an effective plan for improving the economic situation.

The financial information and the Management Control Information (MCI) may determine a company's success (Monteiro et al. 2021, p. 497).

The priority direction of the financial diagnosis of an enterprise is its liquidity, which directly determines its economic and financial condition. As the analysis of many early warning systems based on multivariate analysis models shows, it constitutes the most common variable from which discriminant functions are built (Antonovich et al. 2021, p. 66).

There are many financial analysis methods; and they all have a common goal. A firm is called bankrupt when its liabilities exceed the going concern value of its assets (Altman, 2019, p. 8). The financial statements can deliver signals of an increasing probability of bankruptcy (Mucko, Adamczyk, 2023). Bankruptcy risk assessment is crucial for investors who consider investing in stocks or bonds, as well as for managers taking responsibility for activities taken in the area of financing, investment and distribution (Bărbuță-Mișu, Madaleno, 2020).

Anyway, it is important to note, that information about the bankruptcy risk can still be concealed, what may result in bad decisions (Lukason, 2019, p. 1). In our paper we tackle this gap by focussing on the essential information, which is necessary for assessment of the company's situation, and making of pertinent economic decisions.

The study aims to identify issues in the economic and financial analysis of selected companies listed on a stock exchange, which recognition may improve and heal the current and predictive financial situation. From the main research problem, the research hypothesis was derived:

Are the selected enterprises in a proper financial situation and which areas in the financial structure require additional recognition in the process of bankruptcy risk assessment?

**2. Methodology**

The work uses the following research methods: deductive methods of logic and geometry, inductive methods of statistical inference, source analysis of literature on the subject, and analysis of source documents (Apanovich, 2003). This assessment is carried out primarily based on quantitative data, the primary source of which is accounting (Zaleska, 2012, p. 9), in the form of preliminary analysis of financial statements, preliminary analysis of balance sheets, preliminary analysis of income statements, preliminary analysis of cash flow statements, ratio analysis of financial statements, working capital and financial liquidity ratios, efficiency ratios, debt and debt sustainability ratios, capital market ratios. A comparative analysis of two enterprises currently active in the metallurgic sector across Poland and Europe was done. The selected systems were described following the scientific literature. The accuracy of the forecasts obtained from the systems used was evaluated based on observations of the mentioned companies (Gašioriewicz, 2011, p. 82).

**3. Characteristics of Y Holding S.A.**

Y Holding S.A. is an enterprise established in 1946, which is currently one of the largest companies in the metal products sector in Poland and Central and Eastern Europe. Today, the company that went public on the Warsaw Stock Exchange in 2005 specializes in designing, manufacturing and maintaining over 2000 products. Table 1 presents selected financial data of Y Holding S.A. from the previous years correlated with the analyzed period.

**Table 1.** Selected financial data of Y Holding S.A. from the previous years

Selected financial data	Year				
	2016	2017	2018	2019	2020
Net revenues from sales of products, goods and materials	377137	568251	617482	702823	675759
Gross profit (loss)	37932	55247	48891	62557	60120
Net profit (loss)	33490	45007	41078	56777	50537
Total assets	538601	621799	693396	722851	733049
Long-term liabilities	86442	97815	114233	142630	150619
Short-term liabilities	86466	114598	161042	175323	163654
Equity	365693	409386	418121	404898	418776
Share capital	1335	1335	1335	1335	1335
Number of shares	6676854	6676854	6676854	6676854	6676854

*Source:* own elaboration based on financial statements of Y Holding S.A.

The above table shows that the company was recording an upward trend in the previous years when it comes to net revenues from sales of products, goods and materials.

It was not until 2020 that there was a fall in this value recorded in comparison to the previous year. The value of assets owned by the company was growing year by year. Long-term liabilities held by the company showed the same tendency.

To conduct a preliminary analysis of the balance sheet of Y Holding S.A. it was converted into its analytical form, presented below in Table 2.

**Table 2.** Analytical form of balance sheet assets of Y Holding S.A.

Contents	Settlement period					
	31.12.2019		31.12.2020		Deviation	
	Value [in thousands of PLN]	Structure value [%]	Value [in thousands of PLN]	Structure value [%]	Value [in thousands of PLN]	I.Dynamics value [%]
A. Capital assets	444 768	61.53%	477 584	65.5%	32 816	7.38%
I. Intangible assets	78 418	10.85%	71 636	9.77%	-6 782	-8.65%
II. Tangible non-current assets	342 691	47.41%	316 159	43.13%	-26 532	-7.74%
III. Long-term assets	2 892	0.40%		0.00%	-2 892	-100.00%
IV. Long-term investments	12 123	1.68%	81 034	11.05%	68 911	568.43%
V. Long-term prepaid expenses	8 644	1.20%	8 755	1.19%	111	1.28%
B. Current assets	278 083	38.47%	255 465	34.85%	-22 618	-8.13%
I. Inventories	115 657	16.00%	109 845	14.98%	-5 812	-5.03%
II. Current receivables	122 121	16.89%	102 352	13.96%	-19 769	-16.19%
III. Short-term investments	40 305	5.58%	43 268	5.90%	2 963	7.35%
Total assets	722 851	100.00%	733 049	100.00%	10 198	1.41%

*Source:* own elaboration based on financial statements

For Y Holding S.A. a growing trend in the proportion of capital assets in the structure of assets can be noticed, which is shown by its increase from 61.53% in the base year to 61.15% at the end of 2020.

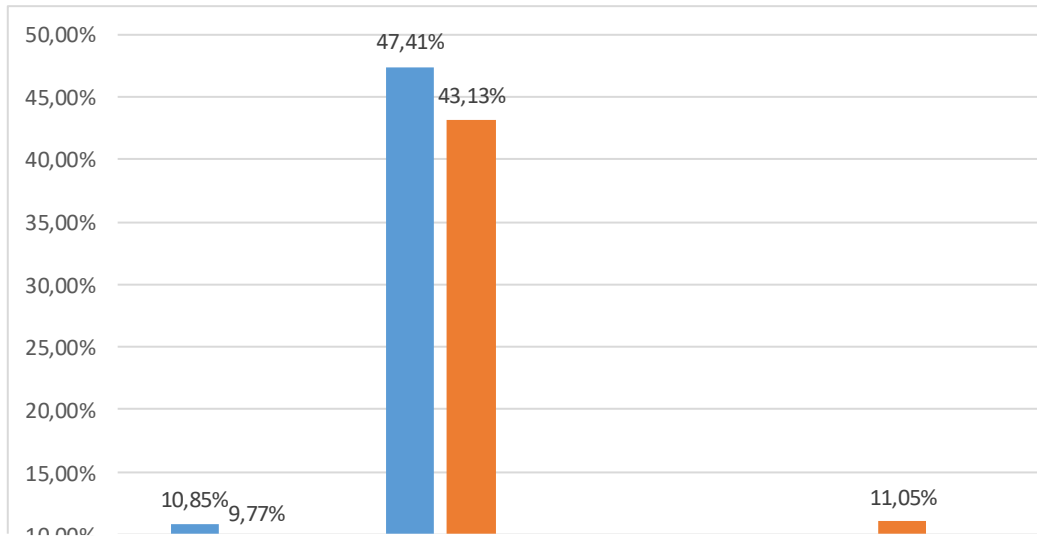
These are minor deviations resulting from the influence of many variables, one of which is a decrease in the value of property, plant and equipment. It was caused by the sale of machinery and equipment, means of transport, and purchase of land and properties in 2020.

While analyzing the categories of property, plant and equipment in further detail, it is noticed that the increase in gross value of this property compared to the base year was 1%. In contrast, a dominant effect that impacted the decrease in property, plant, and equipment was accumulated amortization and write-downs, characterized by an increase of 22% compared to the base year.

Another category that can be distinguished regarding changes in capital assets is right-of-use assets. They concern mainly all goods held under leasing and reclassification of rights of perpetual usufruct of land.

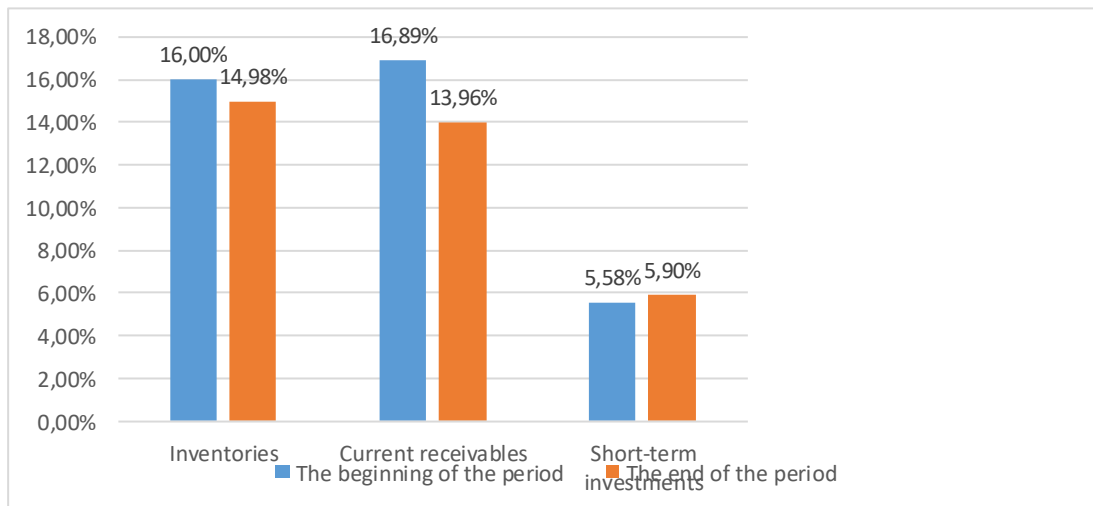
The obtained results in terms of a ratio of capital assets to total assets depend mainly on the type of industry in which the company operates.

Production companies can reach a rate of 90%, and with the increase in value, there is also an increased risk. The dynamics value is 1.07 (nominal increase in capital assets compared to base year equals 7.38% - Figure 1). This value may be interpreted as indicator of small efforts of the company to investment activity.



**Figure 1.** Structure of capital assets of Y Holding S.A.  
 Source: own elaboration based on financial statements

Simultaneously with increasing capital assets, current assets also decrease. In the base rate, the percentage of current assets in relation to the balance sheet total is 38.47%, 34.85% in the following year, which happens because of small dynamics of 0.92. The dominant position in current assets is occupied by inventories, which constitute 41.59% of the total current assets in the base year and 43% in 2019, suggesting a minimal increase in their value. Maintaining inventory influences the necessity to ensure rhythm and regularity of production. The relation of inventory dynamics to general dynamics of sale has a decreasing tendency, which means that the cause of an increase in current assets lies in the growth of production with a tendency to have a larger share of current assets in sales. During the analyzed period, there is a decrease in inventories of 5.03%, which relates mainly to a decline in materials and goods. Figure 2 presents the structure of current assets.



**Figure 2.** Structure of current assets of Y Holding S.A.  
 Source: own elaboration based on financial statements

Finances and their equivalents in both years are around 5% of total assets (13.4% of current assets in the base year and 15% in 2019). The percentage ratio of receivables to liabilities in the base year is approximately 45%, while in the following year, it is 50%, which suggests the emergence of problems with financial liquidity and lack of effective fundraising.

One of the main changes in the analyzed period is a tenfold increase in derivative financial instruments, which amounted to 0.03% of total assets in the base year (0.01% of current assets) and 0.36% in 2019 (1% of total assets)—the increase results from the activities taken to reduce the adverse changes caused by foreign exchange transactions.

The analysis of the profit and loss account of Y Holding S.A. shows that the origin of revenues from sales of products amounted to as much as 93% in the base year and 94% in the following year Table 3). However, the remaining revenues are from sales of materials and goods (5% of total assets in 2019 and 2020) and sales of services (2% in 2019 and 1% in 2020). Thus, a downward trend is observed. Sales dynamics reached high values (0.96), meaning sales did not collapse.

**Table 3.** Profit and loss account of Y Holding S.A.

Specification	Settlement period					
	31.12.2019		31.12.2020		Deviation	
	Value [in thousands of PLN]	Structure value [%]	Value [in thousands of PLN]	Structure value [%]	Value [in thousands of PLN]	Deviation [%]
A. Net revenues from sales of products, goods and materials	702823	100.00%	675759	100.00%	-27064	-3.85%
B. Costs of sold products, goods and materials	547039	77.83%	522210	77.28%	-24829	-4.54%
C. Gross profit (loss) on sales	155784	22.17%	153549	22.72%	-2235	-1.43%
D. Sales charges	36670	5.22%	35715	5.29%	-955	-2.60%
E. General administrative expenses	49844	7.09%	50561	7.48%	717	1.44%
F. Profit (loss) on sales	69270	9.86%	67273	9.96%	-1997	-2.88%
G. Other operating income	5655	0.80%	5106	0.76%	-549	-9.71%
H. Other operating costs	11644	1.66%	7861	1.16%	-3783	-32.49%
I. Profit (loss) from operating activities	63281	9.00%	64518	9.55%	1237	1.95%
J. Financial income	3051	0.43%	735	0.11%	-2316	-75.91%
K. Financial costs	3775	0.54%	5133	0.76%	1358	35.97%
L. Profit (loss) from business activity	62557	8.90%	60120	8.90%	-2437	-3.90%
M. Result on extraordinary events	0	0.00%	0	0.00%	0	
N. Gross profit (loss)	62557	8.90%	60120	8.90%	-2437	-3.90%
O. Income tax	5780	0.82%	9583	1.42%	3803	65.80%
P. Other mandatory profit reductions	0	0.00%	0	0.00%	0	
R. Net income (loss)	56777	8.08%	50537	7.48%	-6240	-10.99%

Source: own elaboration based on financial statements

The costs of sale in the analyzed period, built by the costs of selling products, goods and materials, amounted to more than 77% of revenues from their sale. In both discussed categories, value gradually decreased, and total proceeds from sales incomes decreased by 3.85%. The most significant impact on them was caused by the revenues from sales of services, which are characterized by a decrease of almost 31% compared to the base year

and related mainly to a reduction in services in industrial automation. The decline in own selling costs by 3.49% - compared to 2019 - can also be noticed. A dominant part of total sales is the costs of products sold, showing similar values in 2019 and 2020. However, the lowest percentage corresponds to the costs of sold services, showing a decrease from 1.43% of revenues from sales in 2019 to 0.63% in 2020 (a drop of over 58%). A positive phenomenon may be coverage of sales costs with sales revenues, which allowed to generate profit on operations from basic sales.

Loss in sales in the analyzed years does not reach a high value (22.17% in 2019 and 22.72% in 2020), which induces a modest increase in total revenue share.

Operating profit is characterized by a gradual increase of 1.95%, and its percentage increased to 9.55% concerning revenues. The most significant share in capital distribution is general and administrative expenses, amounting to 7.09% in 2020. The most significant change of 32.5% relates to a reduction of other operational costs, with a value of 11 644 thousand PLN in the first year (1.66% of revenues) and 7 861 thousand PLN in the following year (1.16% of revenues). Operating profit is characterized by a positive balance.

Profit resulting from financial activity in both years is about 8.90% of total revenues, and it has not lost its value in relation to sales despite a decrease of 3.90%.

Net profit showed a downward trend in 2020 (from 8.08% in 2019 to 7.48% in 2020). Both incomes and charges slightly contribute to revenue share, ranging below 1% of their sum. The presented company generates a profit before tax on financial activities due to the coverage of financial costs, proceeds and previously generated profit.

The fact that income dynamics is superior to cost dynamics benefits the company's operations. In terms of both categories, almost all components correspond to total revenues and costs. It is different with revenues from the sale of foods and materials, showing the dynamics higher than the revenue by 5%.

Higher dynamics of revenues characterize the ratio of the dynamics of proceeds and operational burdens; however, the most beneficial dynamics is illustrated by revenues (the value of 0.24) and financial costs (the value of 1.36%).

The above preliminary analysis shows significantly higher revenues from primary operating activity. The other operating costs and financial costs from revenues generated from proper activities are higher. Finally, the company generated net profit in both reporting periods. The interiority of net profit dynamics in relation to sales dynamics suggests generating profit from the current activity.

#### **4. Characteristics of X S.A.**

X S.A. is a company established in 1993. Its main activity is production and trade in tubing, supplied for the gas sector needs in Poland and Central and Eastern Europe. The company is also producing anti-corrosion coatings and is among the European leaders of this industry. Table 4 presents selected financial data of X S.A.



**Table 4.** Selected financial data of X S.A. from the previous year

Selected financial data	Year				
	2016	2017	2018	2019	2020
Net revenues from sales of products, goods and materials	210 061	379 878	563 996	808 128	717129
Gross profit (loss)	3 102	8 766	11 412	18 013	14 488
Net profit (loss)	2 456	7 093	9 136	14 473	11 900
Total assets	268 686	365 471	456 261	533 156	489 988
Long-term liabilities	25 748	33 607	31 610	31 885	35 792
Short-term liabilities	79 469	161 337	247 301	312 406	257 731
Equity	163 469	170 527	177 350	188 865	196 465
Number of shares	32 744 000	32 744 000	32 744 000	32 744 000	32 744 000

Source: own elaboration based on financial statements

As in the case of X S.A., net revenues from sales tended to increase until 2019 and decreased in the analyzed period. It is the same with the profit made by the enterprise. Value of assets owned by the company was also growing, and the first decline in several years was noted in the analyzed period. Table 5 presents the analytical form of the balance sheet assets of X S.A.

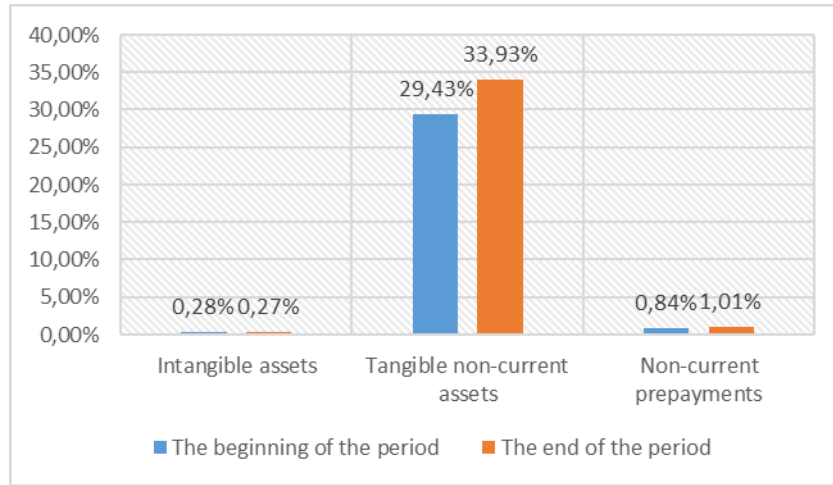
**Table 5.** Analytical form of the balance sheet assets of X S.A.

Contents	Settlement period					
	31.12.2019		31.12.2020		Deviation	
	Value [in thousands of PLN]	Structure value [%]	Value [in thousands of PLN]	Structure value [%]	Value [in thousands of PLN]	I.Dynamics value [%]
A. Capital assets	172359	30.54%	187322	35.21%	14963	8.68%
I. Intangible assets	1590	0.28%	1445	0.27%	-145	-9.12%
II. Tangible non-current assets	166049	29.43%	180522	33.93%	14473	8.72%
III. Long-term assets	0	0.00%	0	0.00%	0	0.00%
IV. Long-term investments	0	0.00%	0	0.00%	0	0.00%
V. Long-term prepaid expenses	4720	0.84%	5355	1.01%	635	13.45%
B. Current assets	391922	69.46%	344750	64.79%	-47172	-12.04%
I. Inventories	215562	38.20%	227050	42.67%	11488	5.33%
II. Current receivables	173952	30.83%	112493	21.14%	-61459	-35.33%
III. Short-term investments	2408	0.43%	5207	0.98%	2799	116.24%
Total assets	564281	100.00%	532072	100.00%	-32209	-5.71%

Source: own elaboration based on financial statements

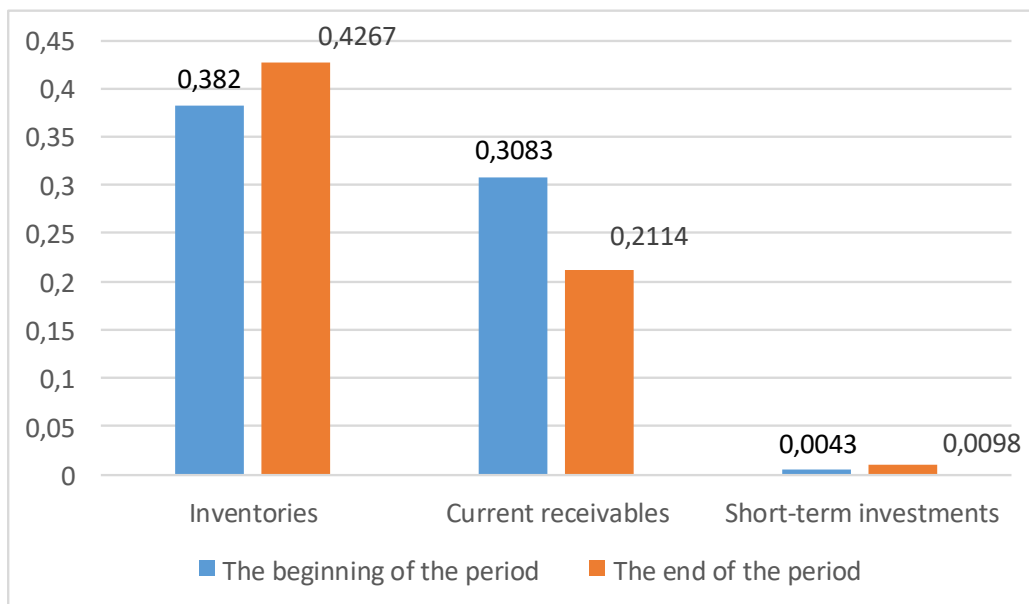
While analyzing the structure of non-current assets in X S.A. for the years 2019-2000 (Figure 3), it can be noticed that there is a significant share of property, plant and equipment in assets, amounting to 29% of total assets in 2018 and 34% in the following year. Items such as intangible assets and non-current prepayments remain at less than 1% of capital assets. The values reached a similar level in both 2019 and 2020. There is an upward trend, except for other non-material assets. Capital assets constitute almost 31% of the balance sheet total in the base year and a little over 35% in the next year. There is an incremental rise in the percentage of capital assets in the total value of the assets.





**Figure 3.** Structure of capital assets of X S.A.  
 Source: own elaboration based on financial statements

Current assets reached 69% of total assets in 2019 and 65% the following year (Figure 4). The dominant components of current assets include inventories, short-term expenditures on deliveries and services, and short-term investments. During the analyzed period, the inventories increased by 5%. Current receivables and prepaid expenses have values of 31% in 2019 and 21% in 2020. The lowest value of current assets is represented by short-term investments, which generated 0.43% of current assets in 2018 and 0.98% in 2020. The short-term investment levels have increased by 116% over the analyzed period.



**Figure 4.** Structure of current assets of X S.A.  
 Source: own elaboration based on financial statements

The ratio of capital and current assets in 2019 reached 44% and increased in 2020 to 53%. In the first year, the capital invested in current assets exceeds the capital assets twice. In the following year, property, plant and equipment were increased, and current receivables were reduced, which was the reason for the decline in the coverage of capital assets with current assets. Table 6 shows the liabilities of a balance sheet for X S.A. company.

**Table 6.** The liabilities of a balance sheet for X S.A.

Content	Settlement period					
	31.12.2019		31.12.2020		Deviation	
	Value [in thousands of PLN]	Structure value [%]	Value [in thousands of PLN]	Structure value [%]	Value [in thousands of PLN]	Deviation [%]
A. Equity (fund)	190271	33.72%	198996	37.00%	3725	4.59%
I. Registered capital (fund)	65488	11.61%	65488	12.18%	0	0.00%
IV. Supplementary capital (fund)	108897	19.30%	120489	22.40%	11592	10.64%
VII. Profit (loss) from previous years	15886	2.82%	13019	2.42%	-2867	-18.05%
VIII. Net profit (loss)	15886	2.82%	13019	2.42%	-2867	-18.05%
B. Long-term outside capital	37317	6.61%	50140	9.32%	12823	34.36%
II. Long-term liabilities	15339	2.72%	29092	5.41%	13753	89.66%
III. Non-current prepayments	21978	3.89%	21048	3.91%	-930	-4.23%
C. Short-term outside capital	336693	59.67%	283717	53.68%	-47976	-14.25%
I. Provisions for short-term liabilities	2311	0.41%	4990	0.93%	2679	115.92%
II. Short-term liabilities	134410	23.82%	113183	21.04%	-21227	-15.79%
III. Short-term inter-period settlements	199972	35.44%	170544	31.71%	-29428	-14.72%
Total liabilities	564281	100.00%	537353	100.00%	-26928	-4.78%

Source: own elaboration based on financial statements

The assessment of internal funds of X S.A. shows similar results in 2019 and 2020. The core noticeable change occurs in supplementary capital (19.3% of all funding sources in 2019 and 22.40% in 2020). There has been a decrease in the profit from the previous years over time – by 18% in 2020 in relation to 2019. The company generated a profit from earlier years and the current period.

A noteworthy fact is an increase in the percentage of equity in total liabilities. Internal funds reaching the value of 190 271 thousand PLN in the base year amounted to 34% of all; however, in the following year, 198 996 thousand PLN reached 37% of the total balance sheet.

A percentage of internal funds in an overall view of the company's source of financing indicates unfavourable creditworthiness. The most essential components of short-term liabilities are short-term liabilities, inter-period settlements, and short-term bank credits and loans.

Table 7 presents the profit and loss of X S.A. company.

**Table 7.** Profit and loss of X S.A.

Specification	Settlement period					
	31.12.2019		31.12.2020		Deviation	
	Value [in thousands of PLN]	Structure value [%]	Value [in thousands of PLN]	Structure value [%]	Value [in thousands of PLN]	Deviation [%]
A. Net revenues from sales of products, goods and materials	866 337	100,00%	770 331	100,00%	-96006,00	-11,08%
B. Costs of sold products, goods and materials	801 465	92,51%	716 034	92,95%	-85431,00	-10,66%
C. Gross profit (loss) on sales	64 872	7,49%	54 297	7,05%	-10575,00	-16,30%
D. Sales charges	23 926	2,76%	13 087	1,70%	-10839,00	-45,30%
E. General administrative expenses	22 571	2,61%	23 015	2,99%	444,00	1,97%
F. Profit (loss) on sales	18 375	2,12%	18 195	2,36%	-180,00	-0,98%
G. Other operating income	1 181	0,14%	2 407	0,31%	1226,00	103,81%
H. Other operating costs	1 581	0,18%	4 526	0,59%	2945,00	186,27%
I. Profit (loss) from operating activities	17 975	2,07%	16 076	2,09%	-1899,00	-10,56%
J. Financial income	3 840	0,44%	2 658	0,35%	-1182,00	-30,78%
K. Financial costs	2 020	0,23%	2 773	0,36%	753,00	37,28%
L. Profit (loss) from business activity	19 795	2,28%	15 961	2,07%	-3834,00	-19,37%
M. Result on extraordinary events	-15	0,00%	-49	-0,01%	-34,00	226,67%
N. Gross profit (loss)	19 780	2,28%	15912	2,07%	-3868,00	-19,56%
O. Income tax	3909	0,45%	2930	0,38%	-979,00	-25,04%
P. Other mandatory profit reductions	-18	0,00%	-61	-0,01%	-43,00	238,89%
R. Net income (loss)	15 853	1,83%	12 921	1,68%	-2932,00	-18,49%

Source: own elaboration based on financial statements

The company is characterized by the values illustrated above in terms of revenues and costs of sales with a visible downward trend. Also, net revenues from the sales of products, goods and materials, as well as the costs of products, services, goods and materials sold in the analyzed period, have decreased by around 11% compared to 2019. The results on sales were positive in the studied reporting periods, and sales revenues were higher than the costs of sold products and services. The dynamics of the sale results within 2020/2019 indicate a decrease of 16.30%. In the case of dynamics of costs and revenues in 2020/2019, its value fluctuates around 0.89, suggesting regular reduction of costs and sales revenues in the company.

The charges resulting from the sale amounted to 23 926 thousand in 2019, to decrease in the following year, reaching 13 015 thousand PLN. Sales profit both in 2019 and 2020 shows similar values.

Revenues in 2018 amounted to 0.44% and in 2019 to 0.35% of sales receivables, and they did not have a significant impact on the financial result, similar to financial costs equal to 0.23% in 2018 and 0.36% in 2020 of sales revenues. The financial income exceeded financial costs by 90% at the beginning of the analyzed period. The increase in financial expenses was caused by increasing costs, accruing on interests on credit, liabilities, borrowings, leasing and budget liabilities. The generated profit decreased by 19% in the following year, which amounted to 15 961 thousand PLN on 31 December 2019.

The result of extraordinary events refers to a difference between, among others, total revenues and losses incurred due to random events. In the base year, there was a loss of 15 thousand PLN, which has increased almost three times in 2019, reaching 49 thousand PLN.

In the analyzed range of years, the gross profit amounted to just over 2% of the share in net sales revenues. There is a visible decrease of 19.56% in comparison to 2019. According to the vertical analysis of the profit and loss account, the company's net profit in 2018 was 1.83% and 1.68% of net revenues from selling products, services, goods and materials in 2019. There is a decrease of 18.49% in relation to the analyzed years.

### **5. Assessment of the financial situation of the analyzed companies**

The essential aspects affecting the market in the metal industry include energy prices and customs issues between countries. A capital group of Y Holding S.A. has reached sales revenues of 676 million PLN. At the same time, the company achieved an EBITDA result of 96 million PLN in 2020, the highest result in the Group's history. The net result was fluctuating around 51 million PLN. Despite the significant economic slowdown, especially in the last quarter of 2019, the obtained net profit and EBITDA were consistent with the Management Board's forecast. The economic factors played a significant role in reducing the generated revenues from the operating activity, which were slightly different from the expectations of the Management Board.

In 2020, the X S.A. company presented record-high profits from operational activities based directly on the cash flow of 98 million PLN. As a result, the company was fine with covering capital spending of 40 million and dividend payments of approximately 31 million PLN. The company's net indebtedness remained at 44%, and the equity ratio in funding assets amounted to 56-57%. According to the analysis of three financial liquidity ratios of the company, which had values within the required ranges, the company would be able to cover all short-term liabilities in the case of need. Still, it would be necessary to liquidate some of the capital assets. Despite the relatively high cycle of receivables, liabilities and inventories, the company aims to reduce these rates yearly. The data gathered in this way proves an excellent financial situation and stable cash position on 31 December 2020. The net financial result of X S.A. company was positive in the following two years, and the dynamics in 2019/2020 showed that the company's net profit decreased by 18.49%. On 31 December 2020 the company reported sales revenues of 770 million PLN. The dynamics of revenues and the dynamics of costs from sales show a regular decrease in relation to previous years.

The analyzed liquidity ratio in the studied years remains relatively equal; however, it does not fit into the optimal value of this ratio, which may indicate an excessive freezing of capital in current assets. Although the company does not show problems with maintaining financial liquidity and additionally, an increasing value of ratios may suggest that the company's financial condition continues to improve, the company must liquidate capital assets to cover all liabilities.

The attention is attracted to sales profit, which does not show any improvement, but in the case of this company, it has to look mainly at the net profit. It is connected with exchange rate hedges on imported pipes and the euro exchange rate fluctuations in relation to the Polish zloty influence it. With the sales revenues obtained in the amount of 770 million PLN, the company achieved a net profit of 13 million PLN. This shows that X S.A. company reports a high sales profit and, at the same time, a relatively low net profit.

The company generated negative cash flows from operating activities. The direction of changes in the cash flow statement suggests that the company cannot generate actual cash as part of its core business. Return on assets is slow. Such values are characteristic of the industrial sector. Higher values characterize return on equity.

The debt ratios are at a similar level over the analyzed period. Total debt fluctuates between 63-65%. It shows how much of the company's assets are financed by loans and indicates its ability to meet its debt obligations. The index obtained by the X S.A., which is above 0.6, is generally considered low as there is a risk that the company will not generate enough cash flow to service its debt. When this result is maintained for an extended period, the company may have difficulty borrowing money. The debt-to-equity ratio compares a company's debt to total equity. It is 197% and 170%, which means that the company's financing comes from creditors, not from its financial sources, which may be a dangerous tendency.

## 6. The study on the risk of bankruptcy of analyzed companies

The risk of bankruptcy appears due to objective factors – usually changes in financial markets – or is caused by subjective factors coming from the financial decisions of the managers (Nguyen, Kien, 2022, p. 23). The more advanced bankruptcy-prediction models have the highest accuracy in large modern datasets they bring (Kanapickiene et al. 2023). Early recognition of bankruptcy risk is essential for immediate corrective actions. Some companies use anti-crisis management tools for deteriorating financial ratios (Garškaitė-Milvydienė, 2014). Early warning systems (EWS) increase the timeframe for efforts to reduce economic damage (Alfieri et al. 2012; Nygård et al. 2018). The carried-out verification of bankruptcy prediction aims to check whether the presented companies can be classified into a group of companies characterized by high efficiency and liquidity, as shown by the authors of the financial statements. To assess the risk of bankruptcy, models from three Polish early warning systems were examined.

The first model was created by Hadasik (1998). Taking into account the author's concept, enterprises can be divided into two groups. The first of them is under threat of bankruptcy. The second group of enterprises involves companies not at risk of bankruptcy despite financial difficulties. The ratios' values in Hadasik's model for Y Holding S.A. are presented in Table 8.

**Table 8.** The value of ratios for Y Holding S.A. by Hadasik's model

Ratio	Value of the ratio
X1 = total liabilities/balance sheet total	0.395
X2= reciveables*365/sales revenue	55.284
X3 = inventories*365/sales revenues	59.331
X4 = net financial result/inventories	0.460

*Source:* own elaboration based on financial statements of the Y Holding S.A.

The value of discriminant function of D. Hadasik's model for Y Holding S.A. is:

$$Z1 = -2.50761 \times 0.395 + 0.00141147 \times 55.284 - 0.00925162 \times 59.331 + 0.0233545 \times 0.460 + 2.60839 = 1,158$$

Table 9 shows the ratios of the early warning system for X S.A. company.

**Table 9.** The value of the ratios for X S.A. by Hadasik's model

Ratio	Value of the ratio
X1 = total liabilities/balance sheet total	0.630
X2= reciveables*365/sales revenues	53.302
X3 = inventories*365/sales revenues	107.581
X4= net financial result/inventories	0.057

*Source:* own elaboration based on financial statements of the X S.A.

The value of discriminant function of D. Hadasik’s model for X S.A. is:

$$Z1 = -2.50761 \times 0.630 + 0.00141147 \times 53.302 - 0.00925162 \times 107.581 + 0.0233545 \times 0.057 + 2.60839 = 0.11$$

In this model the critical point was 0. When the value of discriminant function for the analyzed company reaches a value lower than critical point, interpretation may suggest existing rationales for financial bankruptcy of the company. According to applied discriminant analysis appropriate for Hadasik’s model X S.A. company has reached the value of 0.11 in both analyzed years. The results obtained in this way indicate that the company is not at risk of immediate bankruptcy, but this value is very close to the critical point.

The value of the discriminant function of the model used for Y Holding S.A. was 1.158. The author of the above model did not foresee the creation of grey areas, the range of numbers that correctly characterizes values. Based on the only criterion, with the critical point equal to 0, it can be concluded that both companies are not at risk of bankruptcy.

The second early warning model created by D. Appenzeller and K. Szarzec (2004) classified both companies as having good financial condition. The borderline point of the described early warning system is 0. Table 10 presents indicators of the early warning system for Y Holding S.A.

**Table 10.** The value of the ratios for Y Holding S.A. by Appenzeller and Szarzec’s model

Ratio	Value of the ratio
X1 = current assets / short-term liabilities	1.828
X2= (current assets - inventories – short-term receivables) / short-term liabilities	0.320
X3= gross financial result/sales revenues	0.089
X4 = net financial result/average value of assets	0.069
X5 = average value of inventories * 365 / sales revenues	59.331
X6 = (liabilities+ provisions for liabilities )/(operating results +depreciation)*(12/period)	0.405

Source: own elaboration based on financial statements of the Y Holding S.A.

The value of discriminant function for Y Holding S.A. is:

$$Z1 = 1.28644 \times 1.828 - 1.30528 \times 0.320 - 0.22633 \times 0.089 + 3.01528 \times 0.069 - 0.00538 \times 59.331 - 0.00943 \times 0.405 - 0.661 = 1.138$$

Ratios of the next early warning system for X S.A. company are presented in Table 11.

**Table 11.** The value of the ratios for X S.A. by Appenzeller and Szarzec’s model

Ratio	Value of the ratio
X1 = current assets / short-term liabilities	1.194
X2= (current assets - inventories – short-term receivables) / short-term liabilities	0.046
X3= gross financial result/sales revenues	0.021
X4 = net financial result/average value of assets	0.024
X5 = average value of inventories * 365/sales revenues	107.581
X6 = (liabilities+ provisions for liabilities )/(operating results +depreciation)*(12/period)	0.270

Source: own elaboration based on financial statements of the X S.A.

The value of discriminant function in the applied model for X S.A. is:

$$Z1 = 1,28644 \times 1,194 - 1,30528 \times 0,046 - 0,22633 \times 0,021 + 3,01528 \times 0,024 - 0,00538 \times 107,581 - 0,00943 \times 0,270 - 0,661 = 0,301$$

The value for X S.A. fluctuated around 0. It was similar with Y Holding S.A., which obtained values above the critical point. The value of the discriminant function was 1.138. The values of discriminant functions above the critical point are caused by assigning the highest importance to the inventory turnover ratio in both enterprises.

The last model provided assessing financial threat is based on logit analysis, which, compared to previous discriminant analysis models, does not aim at meeting predetermined points assuming normality of variables distribution. It means that the effect of this function is the probability of bankruptcy of the analyzed companies or the likelihood of its non-occurrence. This method was developed by P. Stępień and T. Strąk (2004). The form of this function is drawn upon four relations based on a company's liquidity. Table 12 presents the ratios of the early warning system for Y Holding S.A.

**Table 12.** The value of the ratios for Y Holding S.A. by Stępień and Strąk's model

Ratio	Value of the ratio
X1 = outsider capital/total assets	0.429
X2 = (total current assets - inventories) / short-term liabilities	1.042
X3= net financial result/total assets	0.067
X4 = net sales revenues/operating expenses	1.294

*Source:* own elaboration based on financial statements of the Y Holding S.A.

The value of discriminant function in the applied model for Y Holding S.A. is:

$$Z1 = -11 \times 0.429 + 6 \times 1.042 + 40 \times 0.067 + 19 \times 1.94 - 19 = 9.799$$

Table 13 presents values of indicators of the same early warning system, this time for X S.A. company.

**Table 13.** The value of the ratios for X S.A. by Stępień and Strąk's model

Ratio	Value of the ratio
X1 = outsider capital / total assets	0.637
X2 = (total current assets - inventories) / short-term liabilities	1.040
X3= net financial result / total assets	0.024
X4 = net sales revenues / operating expenses	1.076

*Source:* own elaboration based on financial statements of the X S.A.

The value of discriminant function of this model for X S.A. is:

$$Z1 = -11 \times 0.637 + 6 \times 1.040 + 40 \times 0.024 + 19 \times 1.076 - 19 = 1.637$$

Comparing the obtained discriminant function values to the adopted criteria of their interpretation it can be found that both companies (Y Holding S.A and X S.A.) are not at risk of bankruptcy within one year.

Both companies Y Holding S.A. and X S.A. recorded a decrease in sales in the analyzed period and should focus on searching for a trade area and expanding it as soon as possible. They should not limit themselves only to their key customers. The solution is to strive to meet the demand of smaller contractors, especially those close to the



analyzed companies' logistics centres. An excellent way to increase sales revenue in both companies would be a greater focus on sales and producing products with the highest margin.

In the analyzed period, X S.A. company recorded an inventory turnover ratio significantly different from the benchmark, registering an increase. The high values of this ratio were mainly caused by increasing amounts of inventories that the company accumulated and the decline in sales revenues. The problem of excessive quantity of inventories could be solved by limiting the products which are less popular on the market in favor of those which are sold on an ongoing basis. These solutions would contribute to an increase in the current ratio, close to the desired value at the beginning and end of the analyzed period.

## Conclusions

Some authors believe that document analysis is not typically used for bankruptcy prediction; on the other hand, they also point out the usefulness of correctly setting up a model for this approach (Stankova, Hampel, 2023). The conducted research has shown that the situation of X S.A. company is slightly worse than Y Holding S.A. in the studied period. The dynamics of financial results showed that net profit decreased almost by 20% over the assessed time. The financial liquidity of X S.A. remains at the same level; however, the profitability ratios are not optimal. This fact indicates that there are too many frozen assets in the company's current assets. The company's debt is much higher than that of Y Holding S.A. The X S.A. company finances over 60% of its debts by loans, and outsider capital and debt ratios show that it may not generate such high cash flows to service the incurred debt. Maintaining the debt ratio at this level for a longer time may cause severe problems in the future relating to borrowing money.

Early warning models used to analyze and assess the financial condition of the studied companies showed that both companies have reached the value just above the critical point. Therefore, the financial situation of the companies is good.

The research suggests how to improve the examined companies' financial condition. It also shows EWS model implementation that companies from other sectors can easily follow. The conducted financial analysis should help investors and managers make proper financial decisions.

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