

# **BANKRUPTCY RISK IN A POLISH MINING ENTERPRISE – REASONS, SYMPTOMS AND CONSEQUENCES**

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## **ABSTRACT**

*The purpose of the hereby article is to assess bankruptcy risk in one of the Polish mining enterprises, conducted in the context of specific conditions of hard coal mining functioning. In order to achieve an objective stated in such way, in the first two points there are bankruptcy symptoms presented along with models of bankruptcy risk prediction in theory and practice. Next, there are reasons and consequences of bankruptcy risk increase presented in the examined mining enterprise. The research conducted allows to state that the reasons for bankruptcy risk increase in the mining industry are mostly mistakes in management, changing mining-geological conditions as well as very strong prices and demand fluctuations concerning energetic resources. Currently, survival of the examined enterprise is only guaranteed by government's support for social-political reasons.*

## **KEYWORD**

*Bankruptcy risk, bankruptcy prediction models, mining enterprise*

## **JEL Classification**

M10, M20, Q38

## **INTRODUCTION**

Bankruptcy means the end of enterprise's life, which however, does not happen unexpectedly. The phase of declining activity is full of symptoms signaling the possibility of going bankrupt. Therefore, bankruptcy is a process not a moment in time. During bankruptcy process the enterprise has the possibility to design and implement remedial and stopping actions, followed by actions aimed at reversing the process. Consequently, monitoring of economic and financial situation of the enterprise, that constitutes an early warning system against an impending crisis, is especially important. It gains in importance even more in the contemporary turbulent environment in which still new sources of endogenous and exogenous risk keep appearing, and the sources that have already existed intensify their influence on enterprise.

A mining enterprise, apart from the sources of risk typical for any activity, is additionally exposed to risk stemming from specificity of mining natural resources. This specificity mostly entails geological and mining conditions that determine continuity of functioning both in a short-term (availability of deposit, technical and natural hazards) as well as in a long-term period (adequacy of deposits). The current situation of mining enterprises is also made more complicated by controversies concerning the traditional energy carriers which, according to the pro-ecological demands, should be gradually replaced with renewable, clean sources of energy.

Due to the specificity and increasing intensity of factors generating risk in the economic activity of mining enterprises, the purpose of this article is to assess the risk of

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bankruptcy in one of the Polish mining enterprises, conducted in the context of specific conditions of functioning of hard coal mining industry.

In the structures of the examined enterprise, currently there are 16 mining plants functioning. In terms of mining production and level of employment this is one of the largest enterprises in Europe. In the diagnosis of bankruptcy, the symptoms of bankruptcy were identified using indicators of economic and financial analysis as well as two models of predicting bankruptcy adapted to the conditions of functioning of enterprises in Poland.

In conclusion, the causes and consequences of the increase of risk of bankruptcy in the examined mining enterprise were presented.

## **SYMPTOMS OF BANKRUPTCY OF ENTERPRISES IN THEORY AND PRACTICE**

Bankruptcy of an enterprise is preceded by crisis which means the state of imbalance. One of its basic symptoms is a growing disproportion between the effects of economic activity and expenditures that accompany this activity. The crisis may be of potential, hidden or overt character. In the first case, deviations from the expected results are insignificant and may be remedied if they are recognized on time. In the second case, the enterprise does not recognize the symptoms of crisis and/or makes wrong decisions and actions aimed at removing the deviations that appeared. In the third case, that is overt crisis, means a dynamic deepening of inequality in expenditures and effects that hasten destruction of the enterprise [1]. The presented types of crises may also be the following stages of one crisis.

It is worth noting that crisis is a stage following the stage of growth and development of the enterprise [2]. Market success accompanying those two stages very often causes the company not to notice and to react with delay for the first signs of the situation becoming worse [3]. If the enterprise remains idle and the actions taken in this period are routine, corresponding to known patterns, the crisis will become deeper. A similar situation will occur if the actions taken prove to be wrong [4]. Therefore, both inaction as well as errors in decision-making may cause the enterprise to go bankrupt.

Thus, it is good to look at typical symptoms of crisis. Literature studies and research conducted among Polish enterprises make it possible to highlight some of the main causes of bankruptcy [5]. The first one is the loss of sales resulting in a decrease of revenue from sales of the enterprise, caused not only by decrease of the volume of sales but also of the price of sales. The increase of costs of conducting activity is also a symptom of crisis, which, similarly to decrease of sales revenues causes a decrease of operating profit and, as a consequence, profitability of the enterprise becomes worse. Among the symptoms of crisis, an increase of inventories is also mentioned. It is a typical phenomenon, especially in those enterprises that remain 'blinded' by their market success and fail to notice the decreasing level of sales. One of the most significant symptoms of crisis is the loss of financial liquidity, that is the ability to settle current liabilities. The symptoms presented above overlap and amplify each other. Their accumulation and intensification in time herald the inevitable end of enterprise.

The theoretical overview of symptoms of crises enables the analysis and assessment of the risk of bankruptcy in the examined mining enterprise. It began with observation of sales revenues, costs of sales and income on sales in years 2009-2012. The results of this stage are presented in table 1.

**Table 1.** Sales revenues, own costs of sales and operational income in the examined mining enterprise in years 2009-2012

Specification	Years			
	2009	2010	2011	2012
Sales revenues [in PLN]	10 576 326 719.00	10 320 632 497.00	12 150 141 078.00	10 494 704 000.00
Change in sales revenues [in %]	-	-2.42%	17.73%	-13.62%
Own costs of sales [in PLN]	10 150 946 140.00	10 132 759 869.00	11 245 855 652.00	10 257 502 000.00
Change in own costs of sales [in %]	-	-0.18%	10.99%	-8.79%
Income on sales [in PLN]	425 380 579.00	187 872 628.00	904 285 426.00	237 202 000.00
Change in income on sales [in %]	-	-55.83%	381.33%	-73.77%

Source: own work based on data from the examined mining enterprise

According to data included in table 1, sales revenues and operational income, after a record year in these terms in 2011, undergo further deterioration. Own costs of sales do not increase but their reduction is much slower than the fall in sales revenues. There are a few reasons for presented changes. In the year 2011 demand for hard coal increased a lot in the energetic industry, what caused rise in the quantity of sales. The price of hard coal also went up on the world and domestic market, what allowed to maximize sales revenues. The year 2012 brought an economic breakdown on the market of hard coal, meaning demand fall and price decrease. These are the reasons of strong reduction of sales revenues. Own cost of sales in the Polish hard coal mining has always been high and inflexible due to bad and even deteriorating in time geological-mining conditions and also due to the share of fixed costs in total costs reaching 60% [6]. The relation of revenues and costs presented above causes that the examined mining enterprise has very limited possibilities of cost management and result on sales achieved is strongly dependent on economic fluctuations [7], which on the market of non-renewable resources is very intensive [8].

The symptom of bankruptcy risk increase is also deterioration of financial liquidity. The value of current and quick liquidity ratios in the examined period is presented in table 2.

**Table 2.** Current and quick liquidity ratios in the examined mining enterprise in years 2009-2012

Specification	Years			
	2009	2010	2011	2012
Current ratio	0.63	0.78	0.82	0.71
Quick ratio	0.39	0.45	0.56	0.29

Source: own work based on data from the examined mining enterprise

In the whole examined period the enterprise possesses neither current liquidity nor quick one. The ratios are shaped much lower than the norms postulated in the literature [9]. However, the year 2012 is the worst in terms of quick liquidity. The enterprise is able to settle only 29% of current liabilities using liquid current assets. When comparing the current liquidity and quick liquidity ratio it also indicates that the examined enterprise gains higher value of current liquidity thanks to a high level of inventories. In order to confirm this result, there is information included in table 3 about the level of inventories in the examined enterprise in years 2009-2012.

**Table 3.** Level and changes of inventories in the examined mining enterprise in years 2009-2012

Specification	Years			
	2009	2010	2011	2012
Inventories [in PLN]	727 454 636	611 287 831	309 086 511	1 267 191 100
Change in inventories [in %]	-	-15.97%	-49.44%	309.98%

Source: own work based on data from the examined mining enterprise

According to data included in table 3, the level of inventories was systematically rising. However, in the year 2012, in the course of lack of reaction to occurring fall in demand, the level of inventories increased by over 300%, reaching the highest level in the history of functioning of the examined enterprise.

Debt increase is also disturbing in the examined enterprise. During 12 months in the year 2012 the value of liabilities and provisions for liabilities has gone up by over 15%. Due to total debt increase and fall of financial result the financing structure also deteriorated – the share of foreign capital increased to over 85% (from 75%). In such structure debt/equity ratio (quantification of financing risk) equaled 5.92 whereas an optimal standard for large companies is 1. The time of settling current liabilities also stretches from 79 to 105 days. None of financing rules is fulfilled what means that fixed assets are financed neither by equity nor fixed capital. Short-term liabilities are used in their financing.

## MODELS OF DEBT RISK PREDICTION IN THEORY AND PRACTICE 1

Econometric discriminant functions (models) also belong to quantitative measures used in risk assessment. These functions are used in solving classification problems of sets of varied features. Discriminant variables differentiate the examined set. The measure of differentiation are measures expressing the relations of amounts of variability between the groups and amounts of variability inside the groups [10].

Discriminant functions are mostly used in bankruptcy risk assessment of enterprise. At that time discriminant function constitutes a sum of ratio products characterizing financial condition of enterprise as well as model parameters indicated statistically increased by the value of absolute term:

$$Z = w_1 \cdot x_1 + w_2 \cdot x_2 + \dots + w_n \cdot x_n + w_o$$

where:

$Z$  - value of discriminant function,

$x_1$  - financial analysis ratios,

$w_1$  - weights of particular ratios.

Depending on the value of  $Z$  function, the enterprise is qualified as endangered (in a different level) on non-endangered with bankruptcy.

Discriminant function was used for the first time in bankruptcy risk assessment by E.I. Altman in 1968 [11]. Until now there have been several dozen discriminant functions elaborated, connected with research conducted by E.I. Altman. In Poland research on using discriminant analysis in the financial situation assessment of enterprise was conducted by, among others, E. Mączyńska [12], M. Hamrol [13], D. Hadasik [14], A. Hołda [15], D. Stos and J. Gajdka [16] as well as B. Prusak [17].

In the research on bankruptcy risk of the examined enterprise there was a model by J. Gajdka and D. Stos used along with a model by P. Stępień and T. Strąk – one of the latest models, created in the course of searching for models adapted best to the Polish economic reality. The results of analyses made using the models indicated are presented below:

1) discriminant model by J. Gajdka and D. Stos

$$Z = -0.0005X_1 + 2.05526X_2 + 1.7260X_3 + 0.1155X_4 - 0.3342$$

where:

$X_1$  – average value of short-term liabilities/manufacturing cost of production sold (multiplied by the number of days in a year),

$X_2$  – net income/average value of assets in a year,

$X_3$  – gross income/net sales revenues,

$X_4$  – total assets/total liabilities.

In this model the enterprise is endangered with bankruptcy if  $Z$  is lower than 0. In the examined mining enterprise  $Z$  equals -0.2.

2) logit model by P. Stępień and T. Strąk

$$Z = -19 - 11X_1 + 6X_2 + 40X_3 + 19X_4$$

where:

$X_1$  – foreign capital/total capital,

$X_2$  – quick ratio,

$X_3$  – net income on sales/total capital,

$X_4$  – sales revenues/own cost of sales.

In this model the enterprise is endangered with bankruptcy if  $Z$  is lower than 0. In the examined enterprise  $Z$  equals -5.8. However, this model is specific for very good prognostic abilities. Considering the way of selection of variables, it allows to assess bankruptcy risk in advance of eighteen months.

According to the above, beside the general symptoms of bankruptcy risk increase identified using ratios of financial analysis, the possibility of bankruptcy is also confirmed by the models of bankruptcy prediction.

## CONCLUSION

The 6 most often occurring symptoms of crisis, signaling the possibility of enterprise's bankruptcy include: sales decrease, sales revenues decrease, financial liquidity decrease, costs increase, operational income fall and inventories increase. Recently in the examined enterprise there have been 5 symptoms occurring out of the aforementioned ones (exception is own cost of sales reduction slower than sales revenues fall). Sales decrease and inventories increase is especially disturbing as it proves rising problems with sales. Additionally, already low level of current and quick ratio of liquidity is undergoing further deterioration. The possibility of bankruptcy is also confirmed by two models of bankruptcy risk prediction.

Undoubtedly, one of the reasons for deterioration of situation is a rapid economic breakdown on the market of natural resources. Nevertheless, even if the reason for crisis is a rapid deterioration of market conditions, which the enterprise has no influence on, mistake of management becomes the fact that they have not seen and foreseen changes earlier. Further mistake is that when they have already noticed changes, they have not adapted efficiently to

them. And finally, when the results of changes were visible, they were not eliminated effectively and at the same time it led to their deterioration.

In the examined enterprise the situation is also made worse by an amplifying problem of difficult mining-geological conditions which cause stoppages in extraction and increase of production costs [18]. The high share of fixed costs is also significant, in which there are salaries dominating. Salaries are not connected with work effects at all and rise constantly in the course of trade unions' pressure. The problem is also complicated because of employment excess maintained due to the necessity of providing social peace and preventing the region from pauperization [19].

In the light of the circumstances above and results of diagnosis, it seems that the lot of the examined mining enterprise is foregone in a long time perspective. It is in a deep crisis and the only decisions enabling improvement of the current situations are considered to be radical and do not find trade unions' acceptance. These days the enterprise may only be rescued by economic improvement or government's help. However, it should be emphasized that private mining enterprises, already functioning and more often established in the Upper-Silesian Coal Basin, are profitable undertakings, what allows to conclude that some of the mining plants being the part of the examined mining enterprise may be successfully demutualized.

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