

Assessing the Financial Health of Companies Engaged in Mining and Extraction Using Methods of Complex Evaluation of Enterprises



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Abstract To evaluate the financial health of a company, comprehensive enterprise evaluation methods are very important. These include, in particular, creditworthiness and bankruptcy models and economic value added (EVA). Creditworthiness models effectively evaluate a company's financial health without using statistical methods, bankruptcy models indicate a threat to the financial health of the business, and are important for many decision-making processes. The aim of this contribution is to evaluate the financial health of an average mining and quarrying enterprise using comprehensive enterprise evaluation methods. Data of companies in this industry is used—specifically, the financial statements for 2012–2016. It is the average enterprise for which these bankruptcy and creditworthiness models are applied: Altman's analysis in all modifications, indices IN (IN95, IN99, IN01, and IN05), Tafler index, Grünwald index, Kralicek's quick test in original and modified version, and index of creditworthiness. EVA is further explored in two of its variants—EVA Equity and EVA Entity. Based on the results of these comprehensive enterprise evaluation methods, it can be concluded that the mining and quarrying industry is not financially sound in the Czech Republic. It is possible to correct negative phenomena that characterize the whole industry.

1 Introduction

Tools of comprehensive evaluation of company are keys to all processes throughout the whole society. Evaluation of enterprises helps to identify not only strengths and weaknesses, opportunities and threats, but also the company's successfulness in the market compared to its competitors (Linna and Jaakkola 2010). Methods for

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complex evaluation of enterprises are capable of detecting the influence of all unwanted factors affecting the whole company (Mironiuc et al. 2011).

There are various forms of complex enterprises evaluation, including the way the enterprise treats its employees, the relations with its business partners, whether the enterprise is environmentally friendly and of course the assessment of its financial health. To assess the financial health, e.g., creditworthy or bankruptcy models can be used (Gepp et al. 2010).

According to Kubenka (2016), financial creditworthy models are popular because of their simplicity and easy application. Especially, the quantitative assessment of financial health ensures objective evaluation of the enterprise. The most frequently used creditworthy models are considered to be index of creditworthiness and Kralicek's quick test. These models have been created for the purpose of assessing creditworthiness, usually without the application of the statistical methods. Horváthová et al. (2015) state that creditworthiness models are based on theoretical findings and enable to assess the overall prosperity of the enterprise and its position in the market.

Bankruptcy or prediction models are early warning systems based on analyzing selected indicators that have the ability to indicate company's financial health threats. These models are based on the assumption that it is possible to identify symptoms of possible future problems several years before the bankruptcy (Rybářová et al. 2016). Creating reliable models for predicting bankruptcy is very important for a number of decision-making processes. Among the most commonly used models are the Altman bankruptcy model, Index IN95, and Taffler model (Mousavi et al. 2015).

Complex enterprise evaluation methods are very important for detecting financial health of an enterprise. Their advantage is that the conclusions drawn are not influenced by subjective opinions and experience of the experts, but are precise (Vochozka et al. 2017). However, their big disadvantage lies in the way and form of interpretation of partial results of analyses with the final assertion that the financial and economic condition of the enterprise is or is not ideal (Vochozka 2010).

Regarding the concrete application of the complex enterprise evaluation methods, e.g., Vochozka, Rowland, and Machová (2017) carried out an assessment of an average company engaged in electricity production in the Czech Republic between 2011 and 2015. For the purpose of complex enterprise evaluation, creditworthiness and bankruptcy models were used as well as EVA Equity and EVA Entity. On the basis of the results achieved, it is possible to state that the analysis of the branch based on the analysis of an average enterprise engaged in the specific sector of national economy comes with a very important view and recommendations for the management of all enterprises operating in this sector. It is possible to correct negative phenomena characterizing all the electricity production sectors and predict future development as well. Hašková (2017) in her contribution achieved the same results as the above mentioned authors. However, her objective was to determine the financial characteristics of an average construction company in the Czech Republic.

The above mentioned EVA is a useful and very important tool for assessing the performance of the enterprise. It combines various factors such as economics, accounting, and information on market (Issham et al. 2008). The EVA indicator is thus one of the most important indicators of value and provides several options for its calculation. The options are based either on accounting (or operational) or financial (or current values) access and particularly they apply to calculating EVA Entity and EVA Equity.

In terms of accounting access, EVA (known as EVA Entity) is described using the following equation (Bluszcz, Kijewska and Sojda 2015):

$$\text{EVA} = \text{NOPAT} - C * \text{WACC}$$

where:

NOPAT net operating profit after tax,
 C capital service generating the operating profit,
 WACC weighted average costs of equity.

EVA Equity is considered a structure revealing the fact that the economic value depends on the equity value E , on the return on equity (ROE) and cost of equity— r_e (Šalaga, Bartošová and Kicová 2015):

$$\text{EVA} = (\text{ROE} - r_e) * E$$

where:

ROE return on equity,
 r_e cost on equity,
 E equity.

2 Materials and Methods

The data for the analysis will come from the Albertina database, of which the information on mining and quarrying enterprises, i.e., section “B” (mining and quarrying) of the CZ NACE sectoral classification of economic activities. Specifically, data from subgroup 05 (mining and processing of black and brown coal), 06 (extraction of crude oil and natural gas), 07 (extraction and treatment of ores), 08 (other mining and quarrying), and 09 (mining support activities) will be used.

Additionally, a series of five consecutive business years is required for the analysis. Thus, the number of enterprises will be as follows for each year of analysis:

- year 2012: 227 enterprises,
- year 2013: 218 enterprises,

- year 2014: 212 enterprises,
- year 2015: 204 enterprises,
- year 2016: 167 enterprises.

The analysis requires the need for financial statements, namely balance sheets and profit and loss statements for all of the aforementioned enterprises in the five consecutive years. We will determine the financial characteristics of the average companies by the average of the values stated in the individual items of all the enterprises surveyed in the given year. Of course, the average value may seem inappropriate. This is because, in general, extreme values at both poles of the scale can deflect the result on one side or the other. As a result, either some of the average modifications (e.g., the harmonized average) or the modus or median are often used. In this case, however, it is not absolutely necessary. The file shows enough data to allow extreme values to exist on both sides of the scale, and their frequency will not significantly affect the result. After obtaining the financial statements of the average mining and mining company in the Czech Republic, an analysis will be carried out to assess the financial health of the enterprise.

The following methods will be used for comprehensive business evaluation:

1. Bankruptcy and creditworthiness models:
 - a. Altman indices—specifically for companies tradable on financial markets, companies not tradable on financial markets, and modification suitable for Czech companies,
 - b. Neumaier's indices, i.e., IN 95, IN 99, IN 01, and IN 05,
 - c. Tafler index,
 - d. Grünwald index,
 - e. Kralicek's quick test (both original and modified),
 - f. Index of creditworthiness,
2. Economic value added (EVA Equity and EVA Entities).

3 Results

Extensive Table 1 provides the results of applied bankruptcy and creditworthiness models.

All Altman indices, in all years, predict the decline of the average enterprise. The IN95 index shows that in 2012, the enterprise is able to survive any financial turmoil, run into bankruptcy in 2013, and from 2014 to 2016 it is in the gray zone. The IN99 index, however, denoted the company as bankrupt, in all the years under review. The IN01 index shows that in 2012, the business is in the gray zone, but in the years to come it marks the enterprise as going bankrupt. The IN05 index ranked the enterprise as bankrupt in all the years under review. Tafler's index measures the average business fairly positively, claiming it is not going to bankrupt, with respect

Table 1 Bankruptcy and creditworthiness models

Indicator	2012	2013	2014	2015	2016
Altman analysis—companies tradeable in financial markets	1.281770953	0.70191452	1.083393774	1.06271487	1.072660763
Statement	Enterprise failing	Enterprise failing	Enterprise failing	Enterprise failing	Enterprise failing
Altman analysis—companies not tradeable in financial markets	1.053090383	0.537678264	0.901050792	0.902338294	0.887002215
Statement	Enterprise failing	Enterprise failing	Enterprise failing	Enterprise failing	Enterprise failing
Altman analysis—modification suitable for Czech companies	1.281770953	0.70191452	1.083393774	1.06271487	1.072660763
Statement	Enterprise failing	Enterprise failing	Enterprise failing	Enterprise failing	Enterprise failing
IN 95	2.636517351	-0.946583609	1.099439704	1.422622504	1.053462285
Statement	Enterprise is able to survive any financial distress	Enterprise is going bankrupt	Enterprise is in the gray zone	Enterprise is in the gray zone	Enterprise is in the gray zone
IN 99	0.584531697	-0.110117759	0.365304303	0.420888902	0.294844411
Statement	Enterprise is going bankrupt	Enterprise is going bankrupt	Enterprise is going bankrupt	Enterprise is going bankrupt	Enterprise is going bankrupt
IN 01	1.204750653	-0.243166486	0.599830239	0.731964097	0.579631071
Statement	Enterprise is in the gray zone	Enterprise is going bankrupt	Enterprise is going bankrupt	Enterprise is going bankrupt	Enterprise is going bankrupt
IN 05	0.535241369	0.515829897	0.556425523	0.563599864	0.524046652
Statement	Enterprise is going bankrupt	Enterprise is going bankrupt	Enterprise is going bankrupt	Enterprise is going bankrupt	Enterprise is going bankrupt
Taffler Index	0.438465472	-0.222222983	0.207714286	0.255191193	0.215615589
Statement	Enterprise is not going bankrupt	Enterprise is going bankrupt	Enterprise is not going bankrupt	Enterprise is not going bankrupt	Enterprise is not going bankrupt
Grünwald index	0	0	7.859254561	9.108959458	0

(continued)

Table 1 (continued)

Indicator	2012	2013	2014	2015	2016
Statement	–	–	Creditworthy enterprise	Creditworthy enterprise	–
Kralicek's quick test—(original) average grade	2.5	1.5	2.5	2.5	2.5
Statement	Average enterprise	Bad enterprise	Average enterprise	Average enterprise	Average enterprise
Kralicek's quick test—(modified) average grade	2.5	1.5	2.5	2.75	2.75
Statement	Bankrupting enterprise	Bankrupting enterprise	Bankrupting enterprise	Bankrupting enterprise	Bankrupting enterprise
Creditworthiness index	1.190341415	–1.072571865	0.50354771	0.219560457	0.151808496
Statement	Good credit	Very bad credit	Certain problems	Certain problems	Certain problems

Source: Authors

to 2013 when it claims the opposite. The Grünwald Index is only able to rate the business in 2014 and 2015 (due to missing values), as a creditworthy business. The Kralicek's quick test in the original version ranks the company into average companies; only in 2013, it evaluates the enterprise as bad. The modified Kralicek's quick test characterizes the business as bankrupting in all the years under review. The creditworthiness index claims that in 2012 the company has good creditworthiness, but in 2013 it has a very bad credit rating. In the years to come, the company has some problems. Bankruptcies are considered primarily by IN99, IN01, IN05, and modified Kralicek's quick test.

The second area of an enterprise's comprehensive valuation is the EVA methods, namely EVA Equity and EVA Entities. Table 2 provides a calculation of the EVA Equity indicator.

The EVA Equity indicator evaluates the enterprise's benefits for its owner. It assesses the correctness of the investment made taking into account the level of risk with respect to other investment alternatives in the market. If the value is less than 0, the investor should consider his departure. This was exactly the case with the average mining and mining company in all the years under review. Table 3 includes the calculation and result of the EVA Entity indicator.

The EVA Entity indicator evaluates the attractiveness of the investment for the owner and the creditors of the business. As the same as above, the value above the level of 0 is desirable. The result for this indicator is the same as for EVA Equity. In all the years under review, it is negative, well below the value of 0. The following charts illustrate the comparison of both EVA indicators. Figure 1 shows the weighted average cost of capital.

The weighted average cost of capital (NN) is EVA Equity, with the weighted average cost of capital (CAPM) representing EVA Entities. The figure shows a positive development as the weighted average cost of capital declined (except for the moderate increase in the weighted average cost of capital of EVA Entities in 2016). Average capital costs for EVA Equity increased significantly in 2013, but declined significantly in the years to come, except in 2016 when their value rose again.

Figure 2 provides a comparison of the alternative costs of EVA Equity and EVA Entities.

In this case, the value of the EVA Equity's alternative costs (up to 2012) is higher than the EVA Entity's alternative cost of equity. This, of course, with respect to the calculation of EVA, results in the result that is the subject of Fig. 3.

Thus, EVA Equity is lower than EVA Entities between 2013 and 2016. Only in 2012 is this value higher.

4 Discussion

The EVA Equity and EVA Entity indicators, whose values were negative in all monitored years, were completely unsatisfactory.

Table 2 EVA Equity

Designation	Description	2012	2013	2014	2015	2016
r_f	Risk-free yield	3.89%	3.70%	1.92%	2.20%	0.67%
r_{LA}	Indicators that characterize the size of the enterprise	386%	3.91%	3.88%	4.03%	3.90%
$r_{business}$	Indicators characterizing production power	0.20%	10.00%	10.00%	0.79%	10.00%
	XP	0.098	0.061	0.054	0.036	0.027
ROA	EBIT/Assets	0.055	-0.105	-0.011	0.004	-0.004
$r_{FinStab}$	Indicators that characterize asset-liability relationships	0.00%	0.00%	0.00%	0.00%	0.00%
	Current ratio	2.09	2.81	2.25	2.19	2.17
	Quick ratio	1.76	2.42	1.89	1.85	1.89
WACC	Weighted average cost of capital (NN)	7.95%	17.61%	15.80%	7.02%	14.57%
ROE	Return on equity	8.49%	-13.98%	-2.09%	-0.33%	-0.82%
r_e	Alternative cost of equity (NN)	8.75%	22.61%	22.02%	12.02%	20.18%
UZ	Payable resources (equity + bank loans + issued bonds)	451,848	434,445	446,426	397,420	437,195
d	Income tax rate of legal entities	120%	220%	320%	420%	520%
EVA	EVA Equity: (ROE-r_e) * VK	-1104	-136,205	-91,398	-41,069	-78,760

Source Authors

Table 3 EVA Entity

Designation	Description	2012	2013	2014	2015	2016
EBIT	Profit before interest and tax	49,890.1	-64,578.6	3547.3	10,135	2871.4
t	Income tax rate	19%	19%	19%	19%	19%
C	Total capital	451,741.7	429,598.3	441,509	392,201.8	431,021.7
D	Foreign capital	30,383.2	57,290.3	62,447.6	59,730.7	55,815.9
D/C	Foreign capital/Total capital	0.07	0.13	0.14	0.15	0.13
r_d	Rate for using foreign capital	15.99%	11.12%	9.44%	6.32%	5.11%
E	Equity	421,358.5	372,307.97	379,062	332,471.1	375,205.8
E/C	Equity/Total capital	0.93	0.87	0.86	0.85	0.87
r_e	Alternative costs for equity (CAPM)	21.47%	12.03%	11.68%	11.30%	11.42%
r_f	Risk-free yield	1.92%	2.20%	0.67%	0.49%	0.53%
$\beta_{\text{leveraged}}$	Beta indebted	1.34	0.76	0.76	0.73	0.77
$\beta_{\text{unleveraged}}$	Beta debt-free	1.42	0.86	0.86	0.84	0.86
$(r_m - r_f)$	Risk premium	7.08%	6.05%	6.80%	6.87%	6.69%
WACC	Weighted average cost of capital (CAPM)	20.90%	11.63%	11.11%	10.36%	10.48%
$C * \text{WACC}$	Cost of capital	94,411	49,947	49,039	40,622	45,151
EVA	EVA Entity: EBIT * (1-t) - C * WACC	-54,000	-102,256	-46,166	-32,412	-42,826

Source: Authors

Fig. 1 Weighted average cost of capital. *Sources* Authors

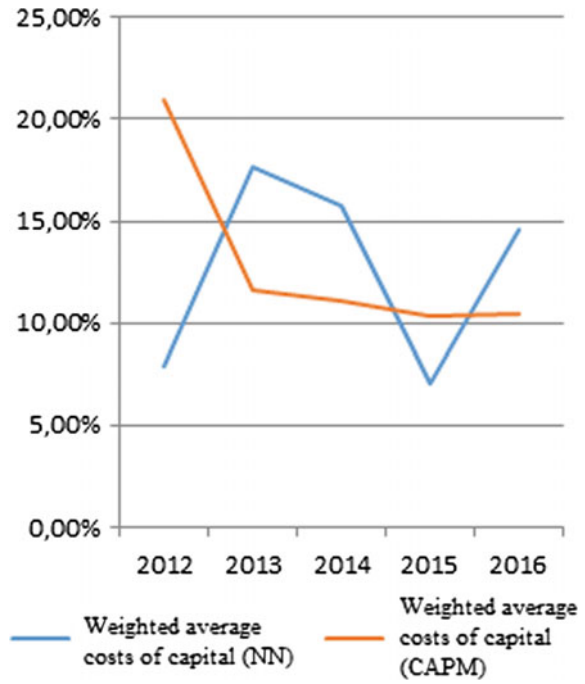


Fig. 2 Alternative cost of capital. *Sources* Authors

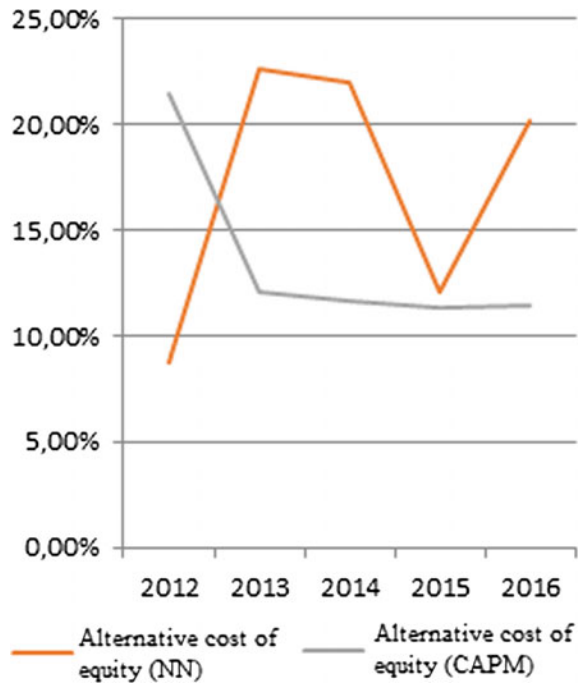
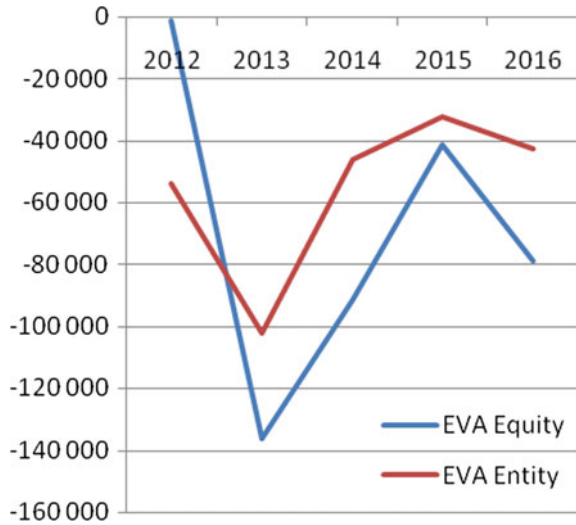


Fig. 3 Economic value added. *Sources* Authors



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5 Conclusions

The aim of the contribution was to determine the financial characteristics of the average mining and quarrying enterprise in the Czech Republic. The aim of the contribution was fulfilled. An average business was established and a complete analysis performed.

It can be said that mining and quarrying is not financially sound and promising in the Czech Republic. The results at the beginning of the reference period were generally more favorable than at the end of the reference period.

However, we must point out that we are presenting the results of the industry with an average business, that is, the sector with the eyes of one enterprise. It is therefore obvious that some facts might be presented differently from the corporate viewpoint. It is good to note, for example, that the number of enterprises surveyed has changed over time. Different partial interpretations, however, do not mean that the situation has been simplified. On the contrary, the situation has been so simplified that it is comprehensible and understandable. Based on the results obtained, it is clear that the analysis of the sector, based on the analysis of the average enterprise operating in the given sector of the national economy, provides an interesting view and recommendations for the management of all enterprises operating in the sector. It is possible to correct negative phenomena that characterize the whole industry.

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