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ECONOMIC VALUE ADDED IN METALLURGY AND MINING SECTOR IN POLAND

Economic change and increased competition in such a difficult sector as mining and metallurgy sector requires updating the existing methods of measuring the value of a company. Supporters of the shareholder value theory believe that the only aim of the company is to increase the value for the owners. Hence there is a need to indicate the measurement value of the determinant. The paper pointed out the need to adapt the tools of measurement to the current expectations and demands of the market. Among different measures Economic Value Added (EVA) is increasingly used. EVA indicates the ability of companies to generate economic value for the owners of capital.

Key words: metallurgy, mining, economic value added, weighted average cost of capital, Poland

INTRODUCTION

Mining and metallurgical industry is a strategic sector for the global economy.

The economic aspects of mining and metallurgy enterprises are an important dimension of sustainable development of current times [1]. This industry is characterized by high capital intensity. Efficient use of resources involved in the activity is, therefore, a very important factor in the company's ability to raise new capital for development. Hence it becomes necessary to measure the effectiveness of the management capital involved. The approach to the assessment of the company's activities is constantly changing. Traditional financial measures based on accounting profits are insufficient for a thorough assessment of the financial situation of enterprises, hence the need for a new approach to this issue.

The paper presents an innovative approach to assessing the performance of companies based on economic profit - economic value added, which takes into account the weighted average cost of capital. The purpose of this article is to highlight the important role of both the cost of debt as well as the cost of equity invested in the company from metallurgy and mining sector.

The presented approach, in contrast to the traditional, points out that the cost of equity, treated so far as free, has an essential influence on economic value of the company.

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The paper presents a methodology for estimating the cost of equity capital according to the Capital Asset Pricing Model (CAPM) on the example of one company listed on the stock exchange in Warsaw.

KGHM POLSKA MIEDŹ S. A. – MINING AND METALLURGY COMPANY IN POLAND

KGHM Polska Miedź S.A. (KGHM) is a global producer of copper and silver with over 50 years of experience. It has an annual production capacity of 540 thousand Mg of electrolytic copper, 220 thousand Mg of wire rod and 1 200 Mg of silver, which places the processing potential of KGHM Polska Miedź S.A. amongst the largest producers in this sector in the world. The production of metals in KGHM is based mainly on its own ore deposits and copper ore concentrate it processes in its facilities. The character of the charge material is unique due to its high copper content, the relatively low amount of sulphur, the high content of silver and lead and the high content of gangue and organic carbon. Of these qualities, only the low sulphur content and high silver content may be considered as beneficial. [2].

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The concept of economic value was discussed already in the first half of the twentieth century. Today, this concept exists in the literature and in practice under different names. It is frequently referred to as residual income (RI), economic profit (EP) or economic value added (EVA).

EVA is one of the few performance measures that integrates growth and profitability objectives into a single indicator [3].

The use of EVA is constantly increasing. It measures the company's ability to obtain economic benefits that exceed the "rent" that such a company pays for the use of the owners and lenders resources employed [4].

EVA is equal an operating conventional accounting profit less adjusted taxes and the cost of capital, both foreign and own as well. EVA by G. B Stewart is expressed by the formula [5]:

$$EVA = NOPAT - IC \times WACC$$

where:

NOPAT – Net Operating Profit after Taxes,

IC – Invested Capital which is defined as the difference between the total assets and the value of the interest-bearing debt at the beginning of the year. The last is equal net fixed assets plus net working capital or total assets minus current liabilities;

WACC – Weighted Average Cost of Capital expressed by the formula [6]:

$$WACC = R_E \times \frac{E}{V} + R_D \times (1-T) \times \frac{D}{V}$$

where:

R_E – cost of equity,
R_D – cost of debt,
E – equity,
D – debt,
T – income tax rate,
V – enterprise value; it is equal to the sum of equity and debt.

The formula for EVA can be converted as follows:

$$EVA = (ROIC - WACC) \times IC$$

where *ROIC* means Return on invested capital:

$$ROIC = \frac{NOPAT}{IC}$$

EVA indicates that economic value added is determined by two percentage rates: the rate of return which the company has developed to capital, and the cost that the company incurred to dispose of the capital.

The increase in cash, increase in EBIT, and increase in liabilities have an influence on the increase of EVA.

In contrast, the increase of accounts receivable, increase of capital expenditures and increase of costs have an influence on the decrease of EVA.

Table 1 presents selected financial data that are necessary to estimate EVA.

In these studies CAPM model is used to estimate the cost of equity, which is based on the method of estimating the risk of the company, resulting from fluctuations in the value of the company's shares relatively to the market portfolio. It describes the relationship between risk and interest income from the asset. Cost of equity is equal to the rate of return on risk-free assets and the risk premium associated with a particular company, which is given by the formula:

$$R_E = R_f + (R_m - R_f) * \beta$$

where:

R_f – risk-free rate of return,
R_m – market rate of return,
R_m-R_f – risk premium R_p, the rate of additional income required to compensate for the risk incurred,
β – a coefficient measuring the market risk.

The coefficient β can be expressed by the formula [5]

$$\beta = Cor_{(1,2)} * \left(\frac{\delta_1}{\delta_2} \right)$$

where:

$Cor_{(1,2)}$ – the correlation coefficient between the volatility in the stock market exchange rate of the audited company and the volatility of WIG index,

δ_1 – standard deviation calculated for the changes in the market shares of the audited company,

δ_2 – standard deviation calculated for the changes in the WIG index.

WIG is an acronym for Warszawski Indeks Giełdowy – Warsaw Stock Exchange.

Beta shows the volatility (risk) of shares of a company in relation to the volatility (risk) of market. It is a synthetic information about the strength and weakness of the stock due to the trend of the stock market, and is used for evaluation and economic analysis of the listed company and determines the attractiveness of ownership of the share.

Table 2 shows changes in share price of KGHM and in WIG index in 2011-2013 years that are the basis for estimation of coefficient β.

The coefficient β announces approximately by what percentage of the rate of return on the shares will rise if the rate of return of the stock index rises by 1 %. The coefficient β for the shares (portfolio) may have different values reflecting the strength and direction of its response to changes in the stock index. It is interpreted as follows [7]:

• β = 1 means that the rate of return on the stock varies as much as the rate of return on the market (average risk),

• β > 1 means that the share is characterized by higher volatility of returns than the stock exchange index (increased risk),

Table 1 **Some essential financial values of KGHM in 2011-2013 years**

	2011	2012	2013
	/ mln. EUR	/ mln. EUR	/ mln. EUR
Fixed assets	2 747	5 812	6 387
Current assets	4 192	2 410	1 923
Current liabilities	1 003	1 171	1 130
IC	4 504	5 936	7 052
Equity	5 296	5 310	5 561
Debt	1 644	2 912	2 749
Total assets	6 939	8 223	8 310
EBIT	3 196	1 580	1 038
Tax	541	394	285
NOPAT	2 655	1 186	753

Table 2 **Changes in share price of KGHM and in WIG index in 2011-2013 years**

Quotation date	Share price/ EUR	WIG index	Change in share price	Change in WIG index
2011-01-31	40,5	47156,8	-	-
2011-02-28	42,3	47540,9	0,043401	0,008146
2011-03-31	43,4	48729,8	0,026781	0,025008
2011-04-29	47,1	50009,0	0,083796	0,026250
2011-05-31	46,3	50025,6	-0,016897	0,000333
2011-06-30	47,5	48414,1	0,026042	-0,032209
2011-07-29	46,0	47152,6	-0,030964	-0,026061
2011-08-31	42,1	42222,4	-0,084337	-0,104559
2011-09-30	31,6	38268,8	-0,250572	-0,093638
2011-10-31	37,2	41160,7	0,179389	0,075568
2011-11-30	31,9	39502,0	-0,142395	-0,040297
2011-12-30	26,7	37595,4	-0,165283	-0,048265
2012-01-31	33,6	40927,8	0,262206	0,088636
2012-02-29	35,5	41560,6	0,055158	0,015461
2012-03-30	34,5	41267,2	-0,028513	-0,007059
2012-04-30	33,4	40273,7	-0,030049	-0,024075
2012-05-31	30,8	37793,6	-0,077810	-0,061580
2012-06-29	34,9	40810,9	0,132813	0,079836
2012-07-31	30,5	40163,9	-0,126207	-0,015853
2012-08-31	31,3	41573,6	0,025257	0,035098
2012-09-28	36,7	43739,8	0,173980	0,052106
2012-10-31	38,7	43232,4	0,054426	-0,011600
2012-11-30	43,1	45014,7	0,111318	0,041226
2012-12-28	43,7	47460,6	0,015669	0,054334
2013-01-31	32,4	46840,2	-0,247934	-0,013073
2013-02-28	30,7	46280,4	-0,052015	-0,011951
2013-03-28	28,4	45147,6	-0,077280	-0,024477
2013-04-30	27,8	44162,2	-0,020101	-0,021826
2013-05-14	27,9	47806,0	0,003846	0,082510
2013-06-28	28,7	44747,5	0,030226	-0,063978
2013-07-31	26,4	46925,7	-0,082645	0,048677
2013-08-30	29,1	48872,0	0,104505	0,041477
2013-09-30	29,3	50301,9	0,005710	0,029257
2013-10-30	29,6	53607,9	0,010138	0,065723
2013-11-29	28,1	54704,9	-0,048976	0,020464
2013-12-30	28,0	51284,3	-0,003799	-0,062529

Table 3 **Beta coefficient estimation for KGHM in 2011-2013 years**

	2011	2012	2013
Cor $_{1,2}$	0,859971	0,826927	0,1739299
δ_1	0,122987	0,109847	0,0852022
δ_2	0,053351	0,045538	0,0478682
β	1,982419	1,994724	0,3095837

• $0 < \beta < 1$ means that the share has a defensive character, fluctuations in the rates of return are lower than the market portfolio (low risk),

• $\beta = 0$ means that the rate of return of the stock does not react to changes in the market, and therefore the share is risk-free like in the case of treasury bills.

Table 4 **Cost of equity estimation for KGHM in 2011-2013 years**

	2011 / %	2012 / %	2013 / %
R_m	12,80	12,80	12,80
R_f	4,58	4,48	3,48
Rp	8,22	8,32	9,32
R_E	20,88	21,08	6,37

• $\beta < 0$ means that the rate of return on the stock reacts inversely to changes than the market.

Beta coefficient estimation is shown in Table 3.

Cost of equity calculation is shown in Table 4.

Cost of debt R_D takes into account the effect of the tax shield and it is calculated from the formula [8]:

$$R_D = r \cdot (1 - T)$$

where:

r – annual effective interest rate of bank credit,

T – income tax rate

Cost of debt and weighted average cost of capital are shown in Table 5.

Table 5 **Cost of debt and WACC estimation for KGHM in 2011-2013 years**

	2011 /%	2012 /%	2013 /%
WIBOR 3M	3,75	4,55	2,70
T	17,00	25,00	27
R_D	3,42	4,05	3,06
WACC	17,00	15,00	5,27

Estimation of economic value added is shown in Table 6.

Table 6 **EVA and EVA/IC estimation for KGHM in 2011-2013 years**

Indicator	2011	2012	2013
EVA /mln. EUR	1 907	315	381
EVA/IC /%	42,33	5,30	5,40

According to A. Damodaran's report carried out for 134 companies in the world for the metals and mining sector in 2014 the risk factor - β coefficient - is estimated at the level of 1,26. The average level of the cost of equity stands at 9,34 % and the average cost of debt is 6,91 %. The weighted average cost of capital (WACC) for the industry is 8,55 % [9]. As you can see all kinds of costs are much lower than in the analyzed company. It is connected with a higher risk on Polish market, which is classified as an emerging market. Usually cost of capital is connected with global market changes, especially in time of crisis [10].

The presented company - KGHM - is the best company in raw materials sector in Poland. In the financial

rankings it remained for years in the first place. However, as it can be seen from the presented calculations the value of EVA in 2012 dropped by over 83 % compared to 2011. However, this is still a positive value, which means that the company continued to generate value for its owners. The value of EVA for the year 2013 confirms the potential of generating the economic value. EVA raise by nearly 21 % compared to 2012.

There are many factors affecting the level of EVA. In any case, a thorough analysis in order to find both internal and external causes of adverse changes should be undertaken.

SUMMARY

The use of the EVA methodology in management system gives a whole range of benefits to the organization and its owners. For example:

- it combines the owners' interests with the interests of employees through a bonus system;
- it is a measure of the "true" value for the owners, whose increase causes an increase in the share price of the company. It is definitely better than indicators such as profit margin, EPS, net income, which does not always increase the growth of wealth owners.
- it is a flexible measure that can be perfectly applied at every level of the organization, from the board by directors to managers and employees. It allows to direct every business decision at increasing the value of a company;
- it is a simple and clear measure for each manager and employee who does not have financial competence;
- it is a tool for controlling the decisions and actions taken;
- it is an effective tool for communicating with investors, showing the economic situation of the company;
- provides an effective protection for the owners of capital against destruction of values.

It should be emphasized that the method of EVA is one of many proposed methods for determining the value of the company. From the authors' analysis of literature, it appears that it is one of the most popular method. However, the problem remains with a certain standardization of techniques for calculating the cost of equity and debt. It is difficult to make comparisons between different companies if there are no established rules for calculating these values.

Acknowledgments

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