The efficiency of engaged capital in the WIG-mining index

Kruk S
Cracow University of Economics, Department of Economics and Organization of Enterprises, Rakowicka 27, 31-510 Krakow, Poland

E-mail: kruks@uek.krakow.pl

Abstract. The main goal of the article is to analyse the relationship between the level of debt and the level of efficiency of using the invested capital. The article is based on the analysis of the subject literature and the use of financial analysis tools. The analysis confirmed the relationship between the debt ratio and Return on Invested Capital. Conducted considerations should be treated as a starting point for further in-depth analysis regarding the impact of the capital structure on the effectiveness of the enterprise.

1. Introduction
The volatility of business processes and the associated instability of the environment doesn’t have a local character, but global. This translates into business conditions which force enterprises to undertake activities aimed at proper adaptation to the changing environment. All this is related to the creation of new conception and assumptions oriented at improving the efficiency and effectiveness of operations. In connection with this, the goals and concepts of management are constantly evolving. Nowadays it is assumed that the main goal of business management is to increase its market value [1], which leads to the maximization of the owner’s benefits. These benefits are manifested in the form of dividends and / or long-term increases in the value of shares, which should be higher than the increase in inflation. It should be noted that this goal can only be achieved if the postulate of survival and development is realized, as this determines the implementation of the other objectives of the enterprise. The necessity to implement such a formulated postulate dominates especially during periods of instability of the economic system and downturn. In addition, it should be noted that the indicated goal is correlated with the goal expressed in terms of neoclassical, understood as maximizing profit. Profit as a source of paid dividends is related to the benefits of the owners.

However, the main objective, formulated as maximizing the owner's benefits, causes a number of controversies, the source or this is the approach to interest groups. The attention is drawn to the fact that the company should not act only to increase its value and maximize the benefits of the owners. Company is an integral part of society, so in the process of its activity the needs and interests of other stakeholder groups should be taken into account. Shareholders, as the last group of interest, after creditors, contractors, local and central authorities benefit in the generated value [2]. In addition, in well-run enterprises, value is created not only for owners.

The level of achievement of objectives set by the business owners, including the increase in the value of the enterprise and the profitability of the invested capital, can be determined using detailed financial measures, among which the following should be mentioned [3]:

- Earning Before Interests and Taxes – EBIT or Net Profit,
- Return on Invested Capital - ROIC,
- Return on Equity – ROE,
- Economic Value Added – EVA,
- Net Cash Flow – NCF,
- the current value of the enterprise – market or economic,
- Market Value Added – MVA.

Using mentioned measures, it is possible to set to what extent the company's activity determines the improvement of its financial results and the fulfillment of investors' expectations.

In this work, the interest is covered by the Rate of Return on Invested Capital which reflects the effectiveness of the capital made available to the enterprise by its owners and creditors. Because enterprises in Poland are eager to use foreign capital, the question is whether changes in its involvement translate into the effectiveness of using the invested capital. Thus, the purpose of the article was to check whether there are links between the debt ratio of enterprises and the effectiveness of capital employed. Therefore, a research hypothesis was put forward that assumes that changes the Debt Ratio translates into a change of Return on Invested Capital in the subsequent period.

2. The engaged capital

In the economic sense, capital means resources of produced goods that are not consumed on an ongoing basis and which have been left to continue production. Sometimes this concept is related to the aspect of human capital, understood as the skills acquired by people in the course of gaining experience or training. In the aspect of credit or loans, capital is identified with the amount of a loan or loan [4]. In the context of accounting, capital is identified with the concept of net assets, defined by the Accounting Act as assets of an enterprise less its liabilities, and therefore corresponding to its own capital (fund). However, in the analysis of the method of financing the entity, capital in a simplified way is understood as the sum of funds entrusted by investors for financing the activity.

In general, the capital financing the enterprise's activity is divided into equity and foreign capital. Equity capital is divided into share capital, supplementary capital and provisions. Foreign capital, on the other hand, includes long-term liabilities, i.e. those which maturity date is longer than one year and short-term liabilities which maturity date is not longer than one year. Every investor expects measurable benefits when deciding on the involvement of his capital in the company. Shareholders are interested in receiving dividends and increasing the value of shares, while donors of foreign capital are expected to receive a certain amount of interest. A. Duliniec draws attention to the fact that the basic measure of the effectiveness of the capital employed is Return on Invested Capital ratio. This indicator shows the profitability of equity investments in the enterprise carried out by the owners and creditors. It illustrates changes resulting from the operating activity of the company. It needs to be stressed that it is insensitive to the leverage effect. It is assumed that it should be at least equal to the rate of return expected by investors. Its level can be related to the weighted average cost of capital level. If Return on Invested Capital exceeds the weighted average cost of capital level, it means that the effects related to capital involvement exceed the costs of its acquisition and therefore the value of this capital is multiplied. And the level of Economic Value Added will take positive value [5]. If the rate of Return on Invested Capital would be lower than the level of the weighted average cost of capital, it means that the operational efficiency of the invested capital is lower than the costs of its acquisition, and therefore it will translate into a negative level of Economic Value Added.

Invested Capital can be defined as the sum of cash invested by investors, but the sources of their origin are irrelevant [6]. It includes both own capital and foreign capital. At the same time, it does not include liabilities from which interests are not paid, including, for example, liabilities towards suppliers, payroll liabilities, interest-free loans, etc. According to T. Dudycz, when determining the value of invested capital, investments in progress, including advance payments, should not be included in the estimation of the invested capital because they do not contribute to the profit before they are used. The capital invested should therefore be determined according to the following formula [7]:

\[
\text{Invested Capital} = \text{Total assets} - \text{Intangible goodwill} + \text{Capitalized operating lease} - \text{Non interest bearing liabilities (short term liabilities excluding loans and borrowings and from issuing debt securities)} - \text{Passive Accruals} - \text{Provisions for liabilities} - \text{Fixed assets under construction including advances}
\]  

\[ (1) \]
E. Maćkowiak emphasizes that the invested capital includes ordinary equity, preferred shares, minority share packages, interest-bearing debt and the current value of operating lease [8].

3. Methodology and data

The companies listed on the Warsaw Stock Exchange and qualified for the WIG-mining sector as at June 24, 2019 were admitted to the study. This sector has been taken into account, as it is one of the most important industries and is closely related to the energy security aspect of the country and the issue of environmental protection. The following entities were included: Lubelski Węgiel Bogdanka SA (BOGDANKA), Jastrzębska Spółka Węglowa SA (JSW), KGHM Polska Miedź SA (KGHM), and Prairie Mining Ltd (PRAIRIE). The financial statements based on which the research was conducted were taken from the Notoria Serwis SA database, an enterprise dealing, among others, in the collection and delivery of financial data. The time range of the research was limited by the availability of data and covered the years 2012-2018, which was caused by the lack of availability of the data of the company Prairie Mining Ltd. For the purpose of the analysis, consolidated reports were adopted due to the lack of annual report for Prairie Mining Ltd., which is listed on the Warsaw Stock Exchange since September 2015. It is worth noting that in the companies BOGDANKA, JSW and KGHM the main shareholder is the State Treasury. However, PRAIRIE has Australian roots and is also listed in Australia and London.

Return on Invested Capital has been determined as the Net Operating Profit After Taxes over Invested Capital relationship:

\[
ROIC = \frac{NOPAT}{IC}
\]  

where:

\[
ROIC \rightarrow \text{Return on Invested Capital}
\]

\[
NOPAT \rightarrow \text{Net Operating Profit After Taxes}
\]

\[
IC \rightarrow \text{Invested Capital}
\]

NOPAT was calculated by adjusting operating profit by income tax. Net operating profit after taxes indicates the effects that were obtained from the basic activity of the company, and therefore the one for which it was established [9]. It therefore shows the company's ability to generate income from capital that has been involved in operational assets. At the same time, the origin of capital is not important [3]. Because the tax is calculated from the level of operating profit, it is called the adjusted one, because it does not take into account the benefits obtained by the company and resulting from the use of foreign capital of an interest nature.

The Invested Capital was calculated as equity capital increased by foreign capital on an interest basis. However, its book value was determined, not the market value. In order to calculate the invested capital, the following categories have been adopted, listed in the reports available on the Notoria service: equity shareholders of the parent, non-controlling interests non-current liabilities from derivatives, non-current loans and borrowings, non-current liabilities from bonds, non-current liabilities from finance leases, other non-current liabilities, liabilities from derivatives, financial liabilities (loans and borrowings), bond liabilities and liabilities from finance leases. Because it is important to adopt the value of capital, which was related to the company in individual considered periods, the value of invested capital from the beginning of the year was taken into account for calculations within a given year.

The Debt Ratio was calculated as the relation of sums of liabilities to the value of total assets. This indicator shows the level of involvement of foreign capital in financing the company's assets. Its level illustrates the size of the company's financial risk, and therefore if it reaches too high a level, it implies a risk of losing the ability to service debt. According to the golden rule of financing, it should amount to 50 percent, however, because many enterprises need a larger share of debt to develop their business, it is assumed that it should be in the range of 57-67% [10].
4. Results and analysis

Net operating profit after taxes was calculated as operating profit adjusted by income tax - tab. 1.

Table 1. NOPAT in WIG-mining index in the years 2012-2018 (in thousands of PLN)

| Specification | 2012   | 2013   | 2014   | 2015   | 2016   | 2017   | 2018   |
|---------------|--------|--------|--------|--------|--------|--------|--------|
| BOGDANKA      | 215 249| 315 266| 344 090| 293 475| -264 239| 191 976| 686 289|
| JSW           | 2 193 885| 1 059 642| 163 539| -627 588| -3 155 760| 183 546| 2 524 365|
| KGHM          | 10 717 920| 5 244 750| 3 541 320| 2 773 440| -3 900 960| -2 607 390| 1 035 990|
| PRAIRIE       | 921 | -41 | -3 563 | -5 645 | -5 644 | -4 147 | -4 619 |

Sources: Own study based on Notoria Serwis S.A.

Analysis of data presented in tab. 1. allows to conclude that the companies in question in most cases showed positive effects on the basic activity. The best situation was recorded in BOGDANKA, and the worst in PRAIRIE, which in six out of 7 periods considered showed a loss at the operating level, which was caused by low level of sales revenues and high remaining operating costs and relatively high in relation to the level of sales revenues, general management costs. In addition, BOGDANKA showed a systematic increase in the operating profit in 2012-2015. During this period, revenues from sales grew faster than the costs of obtaining them. Other entities in the period indicated a gradual decrease in the level of net operating profit after tax. The critical period was 2016, when all analyzed enterprises showed a loss at the operational level. In the last two years, in the following companies: BOGDANKA, JSW and KGHM, there was an increase in revenues from core operations in relation to costs related to operating activities.

The level of invested capital is presented in tab. 2. As part of the capital invested, none of the companies reported non-current liabilities from finance leases and liabilities from finance leases during the period under consideration.

Table 2. Invested capital in WIG-mining index in the years 2011-2017 (in thousands of PLN)

| Specification | 2011   | 2012   | 2013   | 2014   | 2015   | 2016   | 2017   |
|---------------|--------|--------|--------|--------|--------|--------|--------|
| BOGDANKA      | 2 483 646| 2 737 374| 3 081 763| 3 337 989| 2 844 017| 2 915 762| 3 223 646|
| JSW           | 8 872 300| 8 839 800| 8 668 700| 8 797 700| 5 556 100| 5 759 700| 7 599 700|
| KGHM          | 24 558 000| 25 027 000| 26 017 000| 31 519 000| 28 601 000| 25 440 000| 25 977 000|
| PRAIRIE       | 19 236| 24 230| 13 013| 21 332| 9 399| 18 152| 19 479|
| Average       | 8 983 295| 9 157 101| 9 445 119| 10 919 005| 9 252 629| 8 533 403| 9 204 956|
| St. dev.      | 11 033 035| 11 203 818| 11 614 459| 14 202 005| 13 096 200| 11 512 223| 11 604 990|

Sources: Own study based on Notoria Serwis S.A.

The highest level of invested capital in all analyzed periods was demonstrated by KGHM. At the same time, this entity showed the highest value of equity. PRAIRIE showed the lowest value of equity, however, it should be noted that this company financed its operations mainly by equity. There were no long-term liabilities in any of the periods considered, while in the area of short-term liabilities, financial liabilities appeared only to a small extent in the last three considered periods.

The situation of PRAIRIE company is different, which can be explained by the different specificity of this entity. This company has been listed on the Warsaw Stock Exchange since 2015. In 2012, it obtained a license for the exploration of hard coal deposits and since 2012 it has been focusing on the Jan Karski hard coal project in the Lublin Coal Basin. In 2014, exploratory drilling was completed and at the beginning of 2018, the results of tests showing the presence of type 34 coking coal with low ash content were announced. Additionally, in 2016, the company acquired the Dębieńsko Coal Mine to extract coking coal type 35. The presented situation undoubtedly translates into a negative level of operating profit.

In tab. 3. the level of the Return on Invested Capital ratio was presented.
ed periods recorded a positive level of operating profit, the rate of return on invested capital in the following year, with the change taking the opposite direction in 19 of the 24 cases considered. In 2011-2018:

### Table 3. Return on invested capital in WIG-mining index in the years 2012-2018

| Specification | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  |
|---------------|-------|-------|-------|-------|-------|-------|-------|
| BOGDANKA      | 8.67% | 11.52%| 11.17%| 8.79% | -9.29%| 6.58% | 21.29%|
| JSW           | 24.73%| 11.99%| 1.89% | -7.13%| -56.80%| 3.19% | 33.22%|
| KGHM          | 43.64%| 20.96%| 13.61%| 8.80% | -13.64%| -10.25%| 3.99% |
| PRAIRIE       | 4.79% | -0.17%| -27.38%| -26.46%| -60.05%| -22.84%| -23.71%|
| Average       | 20.46%| 11.07%| -0.18%| -4.00%| -34.94%| -5.83%| 8.70% |
| St. dev.      | 17.70%| 8.66% | 18.82%| 16.75%| 27.20%| 13.47%| 24.71%|

Sources: Own study based on Notoria Serwis S.A.

The rate of Return on Invested Capital in the analyzed enterprises decreased in 2012-2016. In 2012, KGHM showed the highest ROIC level. It amounted to 43.64%, which means that one zloty of invested capital brought benefits corresponding to 43.64% of their value. In 2016, all analyzed entities showed a negative level of ROIC, which means that in the analyzed entities the invested capital was not used effectively. In medium terms, the rate of return on invested capital showed positive values in three of the seven periods considered. From the perspective of the rate of return on invested capital, BOGDANKA should be assessed most positively, as in six of the seven periods analyzed, the capital employed in the company brought the desired results.

The worst performance in the indicated range was demonstrated by the PRAIRIE company, which only in the first of the analyzed periods recorded a positive level of operating profit, and thus a positive ROIC level. The level of debt ratio in the WIG-mining index companies is presented in tab. 4.

### Table 4. The debt ratio in WIG-mining index in the years 2012-2018

| Specification | 2011  | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|
| BOGDANKA      | 30.35%| 34.11%| 36.12%| 42.17%| 41.75%| 39.68%| 30.23%| 25.00%|
| JSW           | 37.99%| 39.05%| 39.75%| 52.71%| 66.69%| 64.67%| 45.23%| 38.64%|
| KGHM          | 23.68%| 35.47%| 33.08%| 36.77%| 44.47%| 52.42%| 47.88%| 48.37%|
| PRAIRIE       | 0.64% | 0.45% | 5.80% | 4.63% | 9.90% | 6.02% | 43.81%| 26.77%|
| Average       | 23.17%| 27.27%| 28.69%| 34.07%| 40.70%| 40.70%| 41.79%| 34.69%|
| St. dev.      | 16.12%| 18.00%| 15.50%| 20.71%| 23.38%| 25.27%| 7.89% | 10.94%|

Sources: Own study based on Notoria Serwis S.A.

In medium terms, the share of liabilities and provisions for liabilities increased in subsequent periods. Their highest level was achieved by companies in 2014-2017. In 2017, liabilities and provisions for liabilities corresponded to 41.79% of the value of assets. This was the result of a significant increase in the debt ratio in the PRAIRIE company. The indicated company incurred Financial liabilities (loans and borrowings) during the period and benefited from trade payables which was much larger than in previous years. In addition, in the area of non-current cases, it showed a significant level of non-current provision.

The purpose of the study was to check whether, along with the change in debt, the rate of return on the capital invested changes. Comparison of changes in the Debt Ratio and the rate of Return on Invested Capital allows to conclude that the change in the Debt Ratio in a given year did not translate into a change in the rate of Return on Invested Capital in the same period.

However, it should be noted that the change in the rate of debt preceded the change in the rate of return on invested capital in the following year, with the change taking the opposite direction in 19 of the 24 cases considered. In 2011-2018:
- an increase in the Debt Ratio preceded the fall of Return on Invested Capital in the next period in 12 of the 24 cases considered,
- the decline in Debt Ratio preceded the increase of Return on Invested Capital in the next period in 7 out of 24 cases considered,
- the decline in Debt Ratio preceded the fall of Return on Invested Capital in the next period in 3 out of 24 cases,
- increase in debt ratio preceded the increase of Return on Invested Capital in the next period in one case.

Therefore, it should be stated that the change in the size of debt affects the change in the effectiveness of the use of capital employed, while in the vast majority of cases it takes the opposite direction.

5. Conclusions
Efficiency is considered as the most important manifestation of rational management, which is one of the conditions for survival on the market [11]. Economic efficiency is defined by the relation of results to expenditures necessary to bear in order to obtain specific effects.

This study attempts to indicate whether the change in the size of debt translates into a change in the Return on Invested Capital. As key findings, it should be pointed out that in 79.17% of cases the change in debt ratio preceded the change in Return on Invested Capital in the next period. In over 63.16% of cases, the increase in debt translated into a decrease in the efficiency of invested capital, and in 36.84% of cases the decline in debt translated into the increase of Return on Invested Capital. This implies the legitimacy of conscious shaping of the capital structure and the use of foreign capital in a way that enables the company to improve the efficiency of its operation, manifesting itself, inter alia, an increase in the level of profit from operating activities, thus improving the efficiency of using the capital employed.

However, due to the relatively small research sample, it seems reasonable to conduct analogous tests for other indices listed on the Warsaw Stock Exchange. In order to obtain confirmation of the conducted analyses, it would be recommended to identify companies with a positive and negative operating profit level, and then carry out analogous considerations in such grouped entities.

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