Optimization problems of capital structure of metallurgical industry companies in the context of economy digitalization

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Abstract – The innovative way of development in the context of digitalization of the economy of the Russian Federation dictates the terms where modernization, development and strengthening of business positions on an international scale are becoming increasingly significant and obvious facts. In a number of foreign countries digital economy has already shown the feasibility of implementation and has established itself as a highly efficient tool for regulating economic processes.

In market economy, companies have different opportunities to raise funds, but the value of attracted sources and the influence of qualitative and quantitative factors, both internal and external, create a certain level of financial risks, which, ultimately, can have a negative impact on the capital structure and consequently on the company value. Because of this, top managers within the framework of financial policy develop measures aimed at maximizing business value through the specific character of monetary capital formation. Thus, the prospects for the company activities are determined primarily by an optimally balanced structure of funding sources and have a key direction in business development.

The transition from the generally accepted standards to the digital methods of financial resources management of the company will optimize the capital structure and increase the value of companies.

The subject of the study is the analysis of the monetary capital structure of iron and steel companies as well as an assessment of the weight average capital in the framework of digital economy development in the Russian Federation.

The purpose of the study – The subject of the research is to analyze the structure of the monetary capital of iron and steel companies as well as to determine its weight average price in the conditions of digital economy development in the Russian Federation, to identify problems as well as to formulate measures aimed at optimizing the capital structure and, as a result, increasing company value.

The methodological basis of this research consists of such methods of scientific research as statistical, comparative and system analyses as well as generalization and forecasting.

Key findings of the research: 1. Monetary capital of PAO Mining and Metallurgical Company Nornickel, Public Limited Company, in 2015-2017 has an upward trend due to an increase in equity sources and a decrease in dependence on external financing; 2. A comprehensive analysis of monetary capital structure of the companies and their value was carried out based on the application of the WACC methodology, ROE index, and the effect of financial leverage. According to the results of the analysis, comprehensive conclusions were made on the capital structure and its value of the two largest Russian enterprises in the non-ferrous metallurgy industry.

Keywords – digital economy, monetary capital, external and internal sources, monetary capital cost and structure, iron and steel industry, non-ferrous metallurgy.

Introduction. Within All-Russian digital transformation of the economy, the development of companies and their transition to the new standards of management, optimization of generally accepted norms, a set of rules in terms of financial management in general, and monetary capital management in particular, are becoming increasingly important. As a result it will contribute to economic growth and expansion of global economic cooperation relations of the country in general.

The problem of monetary capital structure formation and the regulation of its value have long been discussed in the scientific community of Russian and foreign researchers. Among prominent figures considering this issue should be noted such scholars as Brigham E., Gapensky L., Miller M., Modigliani F., and also Blank I. A., Veretennikova O. B., Romanovsky M. V. and etc.

I. RESEARCH METHODOLOGY

In mid-2018 the global market for non-ferrous metals was shaken due to the fact that metal prices, after a stable growth, plummeted down to the indices of 2017 and amounted to $6,065 per ton. The quotation volatility was primarily caused by the incitement of a trade war between the two powers –
the United States of America (USA) and the People’s Republic of China (PRC). This fact gave rise to pessimistic attitude of the stock market participants and led to speculative sales. At the same time, the situation was also influenced by sharp fluctuations in the American and Chinese currencies.

Today PRC is losing its position to the Russian Federation (RF) in terms of non-ferrous metals production and supply for production areas on an international scale. This statement is based on the Chinese policy of preserving and reviving the ecological situation, since the enormous emissions of heavy metals entailed negative consequences for the country’s environment.

The growth of demand for non-ferrous metals not only for the supply of traditional industries such as construction, engineering, electronics, but also for the new areas based on renewable energy has become an obvious tendency. The fact that the world copper ore reserves are being depleted raises concerns, followed by the expected growth of prices for raw materials and as a result for the final product. Being aware of the risks, Russian companies acquire the rights to develop new deposits, what requires additional investments in the implementation of promising projects.

Today new deposits are being developed in the Russian Federation, mining and processing plants are being built, unique production technologies are being designed. For example, at the Kyshtym Electrolytic Copper Plant a management project of electrolytic copper foil production, which is unique in Russia, is currently designed. In addition, the digitization in the production and financial sphere will allow iron and steel companies of the Russian Federation to hold positions and demonstrate the increasing efficiency and competitiveness.

The expectation of high demand for Russian non-ferrous metals is also caused by the fact that in the near future enormous growth in renewable energetics will be associated with high profitability and competitiveness of solar wind power plants in comparison with coal-fired ones. Electric transport production development, requiring several times more non-ferrous metals than for car production of a car with an internal combustion engine, is also an important fact. The forecast is confirmed by the fact that China has already banned the use of gasoline motorbikes, and by 2030 all new cars in Germany must be equipped with environmentally friendly installations.

Thus, the significance of the non-ferrous metallurgy in the Russian Federation is indisputable and it will strengthen its position in the market by means of introduction and implementation of digital technologies.

II. RESULTS OF RESEARCH

According to the leading Russian and foreign economists, to function effectively companies need a financially stable state, which is a key factor in the development of economic entities [1].

Corporations and large enterprises, including those in the industry under study, disclose information on their financial position and non-financial capital in integrated reports [2]. Official reporting data make it possible to analyze the capital structure and its funding sources. It is advisable to consider the dynamics for the period 2015-2017, to show the capital gains as well as the share of equity capital and liabilities for the analyzed period in bulk [3].

### Table 1. Funding sources analysis of the AO Uralelectromed, Public Company, 2015-2017, thousand roubles [4]

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>Increase 2016/2015, %</th>
<th>Increase 2017/2016, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity capital:</td>
<td>29359074</td>
<td>28632792</td>
<td>27462344</td>
<td>-1,11</td>
<td>-2,45</td>
</tr>
<tr>
<td>Share capital</td>
<td>5071</td>
<td>5071</td>
<td>5071</td>
<td>0,00</td>
<td>0,00</td>
</tr>
<tr>
<td>Reserve capital</td>
<td>254</td>
<td>254</td>
<td>254</td>
<td>0,00</td>
<td>0,00</td>
</tr>
<tr>
<td>Capital surplus</td>
<td>1094795</td>
<td>1095936</td>
<td>1071949</td>
<td>-1,39</td>
<td>-0,71</td>
</tr>
<tr>
<td>Undistributed profits</td>
<td>1936874</td>
<td>2041711</td>
<td>20753181</td>
<td>-1,12</td>
<td>-2,51</td>
</tr>
<tr>
<td>Liabilities:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short-term borrowed funds</td>
<td>2452581</td>
<td>4761026</td>
<td>3517465</td>
<td>22,20</td>
<td>24,96</td>
</tr>
<tr>
<td>Long-term borrowed funds</td>
<td>3429774</td>
<td>3464613</td>
<td>3174865</td>
<td>-29,23</td>
<td>-26,12</td>
</tr>
</tbody>
</table>

In the course of the analysis, a decrease in the enterprise equity capital is observed mainly due to a reduction in undistributed profits (table 1). The tendency is associated with a decrease in net profit under the influence of macroeconomic factors. The growth of debt funding sources (24,96%) in 2016–2017, which should be noted, is due to the production expansion and the gradual transition to a digitalization and automation system.

It is advisable to visualize the capital structure of the analyzed company, since own sources prevail over debt ones, what indicates the company’s ability to carry out current activities at the expense of internal resources (Fig. 1).

![Figure 1 – Capital structure of AO Uralelectromed, Public Company, 2015-2017, %](image)

The Analytical Credit Rating Agency (ACRA) data indicate a deficit of nickel, copper and platinum group metals
as a factor affecting moderate rise in prices. For example, in 2014-2017, after the sanctions regime adoption, prices showed a downward trend and dropped from $18,000 to $11,000/ton. At the same time, ACRA predicts an increase in prices up to $13,500–14,000/ton by 2021 [5].

Significant production volumes of iron and steel enterprises indicate the demand for raw materials in the world market, which makes it possible to predict stability and rise in prices of non-ferrous metals in the optimistic scenario [6]. A high level of demand will be caused by the manufacturers of stainless steel, accumulators, electric vehicles as well as those in other promising industries.

Table 2. Funding sources analysis of the PAO MMC Nornickel, Public Limited Company, 2015–2017, thousands roubles [7]

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>Increase 2016/2015, %</th>
<th>Increase 2017/2016, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity capital:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share capital</td>
<td>15,821,539</td>
<td>15,821,539</td>
<td>15,821,539</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Reserve capital</td>
<td>2,373,737</td>
<td>2,373,737</td>
<td>2,373,737</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Capital surplus</td>
<td>4,818,799</td>
<td>4,818,799</td>
<td>4,818,799</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Undistributed profits</td>
<td>16,048,829</td>
<td>20,057,064</td>
<td>20,057,064</td>
<td>10</td>
<td>13,64</td>
</tr>
<tr>
<td>Liabilities:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short-term borrowed funds</td>
<td>12,451,743</td>
<td>12,451,743</td>
<td>12,451,743</td>
<td>-20,06</td>
<td>-16,06</td>
</tr>
<tr>
<td>Long-term borrowed funds</td>
<td>5,109,606</td>
<td>4,324,479</td>
<td>4,324,479</td>
<td>-17,27</td>
<td>-2,37</td>
</tr>
</tbody>
</table>

In common practice, the optimal structure of funding sources of capital is determined by the method of «financial leverage», which enables to see to what extent the company’s operations can be improved by attracting loans, while using its own funds. It should be noted that the optimal structure of funding sources of capital reduces the impact of such types of financial risks as credit risk, interest risk, risk of lost profits. In table 3 we consider the effect of financial leverage of the analyzed enterprises.

Table 3. Effect of financial leverage of iron and steel enterprises [4, 7, 9, 10]

| Effect of financial leverage                  | 2015     | 2016     | 2017     |
| AO Uralelectromed, Public Company            | -2,06%   | -3,35%   | -5,43%   |
| PAO MMC Nornickel, Public Limited Company   | -6,43%   | -10,96%  | -4,99%   |

According to the results of the research presented in Table 3 there is a negative effect of financial leverage, resulting in equity capital consumption, which can cause bankruptcy of the analyzed companies, and the cost of loan capital is higher than the rate of return from the property purchased for liabilities.

In Figure 3, let us show the dynamics of the cost of the analyzed steel and iron companies, the assessment of which was carried out according to the generally accepted methodology of Weight average cost of capital (WACC) and compared with the Return on Assets indicator (ROA).
The ratio of ROA and WACC of AO Uralelectromed, Public Company, indicates a decrease in the company's capital cost due to the growth of debt funding sources and their increase in the general capital structure. Macroeconomic factors, namely the effect of quotations on the stock exchange on metals, have their influence as well. In its turn, the capital of PAO MMC Nornickel, Public Limited Company, is characterized by a stable growth dynamics, which is confirmed by the research results presented in the analysis of enterprises.

III. DISCUSSION OF RESULTS

Optimization of the capital structure of iron and steel companies under the conditions of economy digitalization is a relevant and promising direction in corporate management nowadays.

Based on the research, the authors have concluded that the capital value of the analyzed companies is directly dependent on debt funding sources, which is confirmed by the results of capital assessment.

The authors emphasize that in order to optimize capital, companies are encouraged to increase their own funding sources due to the high demand for non-ferrous metals, which is predicted by the leading trends in economic development.

IV. CONCLUSIONS

The impact of innovative technologies on the all-Russian development, in terms of the metallurgical industry, is of tremendous importance, which is confirmed by the obtained results and indicates the need to consider the monetary capital structure of the enterprises based on analysis and assessment, the WACC method, the ROE index as well as the effect of financial leverage. This approach provides a reliable estimate of the companies’ monetary capital which makes it possible to predict its effectiveness.

The results of the research enable to draw conclusions about the impact on the capital structure of external economic factors, such as currency volatility, metal value on the exchange, depletion of raw materials deposits as well as dependence on the prices of raw materials for the final output production.

The authors note that the introduction of digital technologies will optimize the capital structure and increase the value of iron and steel companies as well as accelerate the growth of the Russian economy.

References