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Investment behaviour of machine-building enterprises and the capital cost

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Abstract The formation of an effective financial and investment model of engineering production requires the organization of capital cost management. This article is intended to consider the extent to which the features of the investment behaviour of Russian engineering enterprises affect the cost of capital.

1. Introduction

The main hypothesis underlying this study is that:

- a) there are significant differences in the investment behavior of Russian machine-building enterprises [1,2,3];
- b) these differences are significant in terms of the capital cost formation of the enterprises researched[4,5,6].

2. Features of investment behavior

Investment behavior in this article is understood as the totality of financial management decisions regarding the sources, structure, forms, methods and instruments of attracting capital.

There are three main approaches to the organization of financing sources in theory [7,8,9,10,11].

1. Refusal to use external financing instruments. In this case, the only financing source is the net (“post-tax”) profit – EAT. [12,13] We deliberately exclude from the analysis such a category as depreciation, since its use as a financing tool provides only the maintenance of value at the existing level. This approach important consequence is a passive dividend policy. Dividends are paid only if the EAT exceeds the amount of the investment program. The main efforts of enterprise management should be aimed at maximizing EAT.

2. Attracting external financing from organized capital markets. The advantage of this approach is the ability to scale investment activities. [14] It is noteworthy that organized markets are equally effective in attracting investments in the form of debt and equity financing. In fact, this opens opportunities for the active management of structural capital through the existing necessary debt / equity proportions. The choice of this approach requires the management to focus on various aspects of the attractiveness of the business for market investors.

3. Attracting external financing from unorganized markets, quasi-markets and non-market institutions. [15] In our opinion, this approach is not given enough attention in economic research, while



business practice has many examples of the appropriate interactions use. The explanation for this contradiction consists, in our opinion, in the relative "closeness" of information on the relevant transactions and their parameters. In its pure form, this approach involves a shift in emphasis from the financial and economic criteria for making investment decisions in favor of the criteria of social, political, technological, etc. expediency. We emphasize that this interpretation does not contain an estimated component, i.e. it is not a question of the "incorrectness" of this approach, but only of its essential characteristics.

As a starting point for the analysis, we will take many issuing enterprises whose shares are traded on the Moscow Exchange (MOEX). The grouping of enterprises according to the sectoral characteristic "machine-building" allows the formation of the following table 1 (in descending order of capitalization).

Table 1. Capitalization of the companies.

№	Issuer Name	The code	Capitalization, thousand rubles
1	PJSC United Aircraft Corporation	UNAC	231 241 017
2	PJSC Scientific and Production Corporation "Irkut"	IRKT	38 960 854
3	PJSC "KAMAZ"	KMAZ	36 563 768
4	PJSC "Pavlovsky avtobusniy zavod"	PAZA	11 790 638
5	PJSC United Heavy Machinery	OMZZP	9 432 500
6	PJSC "SOLLERS"	SVAV	8 584 674
7	PJSC "GAZ"	GAZA	7 028 438
8	PJSC ZIL " Plant named after I.A. Likhachev"	ZILL	3 356 872
9	PJSC "Chelyabinsk Forge-and-Press Plant"	CHKZ	2 917 049
10	PJSC " Kovrov Mechanical Plant"	KMEZ	1 545 368
11	PJSC " Tuimazinskiy Zavod Avtobetonovozov"	TUZA	641 160
12	PJSC The Taganrog boiler-making works "Krasny Kotelshchik"	KRKOP	519 994

Analysis of the data presented allows us to present the following conclusions.

- The share of machine-building enterprises in the total number of issuers of the Moscow Exchange stock market does not exceed 5%.
- The total capitalization of all represented enterprises (352,582,335 thousand rubles) is comparable with the capitalization of PJSC Magnit (MGNT) – 326,625,892 thousand rubles.
- The main share in the number of machine-building enterprises listed on the stock exchange is made by automobile enterprises, and the main share of capitalization (more than 76%) falls on aircraft manufacturing enterprises.
- The above data indicate that the scale of the enterprise does not affect the availability of exchange-based equity financing instruments.

In general, the data presented allow to conclude about the insignificance of the volume of financing attracted by machine-building enterprises from the organized. Consider further how this feature of investment behavior can affect the cost of capital.

3. Impact on the cost of capital

In accordance with the WACC model, the cost of corporate capital can be determined by the formula [16,17]

$$WACC = \omega(e) \cdot r(e) + \omega(d) \cdot r(d), \quad (1)$$

где $\omega(e)$ – share of equity (E) in the total capital structure,
 $\omega(d)$ – share of debt capital (D) in the total capital structure,
 $r(e)$ – required internal rate of return on equity,
 $r(d)$ – debt financing cost.

The required internal rate of return on equity $r(e)$ and the cost of debt financing $r(d)$ are in direct proportion to the risk level of investment in this company by owners and creditors, respectively. Risk, in turn, (*ceteris paribus*) is inversely proportional to the level of publicity and openness of the business. Thus, the returns required by business investors will be lower for public companies and higher for non-public companies.

At first, it might seem that the choice of approach to the organization of financing is a consequence of the decision on the level of publicity of the business. In fact, it is not right. It is the choice of approach to the organization of financing that is primary in the chain of managerial decisions regarding the formation of a financial and investment business model.

Capital attracting from organized markets imposes external requirements to ensure publicity. In other cases, there are no external requirements for ensuring publicity. Since the ensuring publicity is not automatic and requires a certain level of costs, the lack of external requirements for publicity activities leads to a decrease of economic expediency. In addition, the implementation of the ensuring publicity procedure outside the process of attracting capital from the organized market is significantly more expensive than if it took place as part of this process.

Thus, summarizing the above, the refusal to raise capital from the organized market leads to an increase in the required rate of return on equity $r(e)$ and the cost of debt financing $r(d)$.

In addition to the rate of return influencing, the choice of the organization of financing approach also affects the capital structure, i.e. by the quantities $\omega(e)$ and $\omega(d)$.

The mechanism of this effect follows. Attraction of equity financing from unorganized markets entails a disproportionate increase in transaction costs of financing, which virtually eliminates the increase in equity from external sources. In theory, an increase in the share of equity is possible by increasing the retained profits. However, this is possible only with an extremely high return on assets, which is not typical for the engineering business. In addition, the multiplication of equity will lead to a relative decrease in return on equity (ROE) compared with the level of return on assets (ROA). Consequently, debt financing instruments should be the predominant methods in attracting financing from non-organized markets.

On the one hand, an increase in the share of cheaper (as compared to equity) debt financing should lead to a decrease WACC. On the other hand, an increase in the share of debt financing while overcoming a certain level will cause an increase in risks for both owners and creditors, which, in turn, will cause an increase in the required return rates $r(e)$ и $r(d)$.

4. Conclusion

The main feature of the investment behavior of Russian machine-building enterprises is their refusal to attract financing from organized capital markets.

Refusal to attract financing from organized capital markets entails an increase in the average weighted cost of capital of engineering enterprises.

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