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COURSE WORK

on discipline «**Corporate finance**»

Topic: «Optimizing a company's capital structure»

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Introduction

In the modern economic science, the topic of capital theory is quite remarkable and widely-researched as a result of worldwide economic problems, when each enterprise tries to survive. Capital acts as a base in creation and development of an enterprise : capital is owned by every company involved in commercial activities, as its nature lies in a fact that it represents set of cash and material assets, financial costs for the acquisition of privileges and rights that are necessary for conducting business activities.

The elaboration of any enterprise can occur only in conditions when is resources are spent in a most effective way, if the capital is used rationally, so the topic of optimizing the structure of capital is extremely important in terms of corporate finance.

It involves identifying key assets and liabilities, assessing their impact on the organization's financial performance, and implementing strategies to enhance the organization's financial sustainability. In terms of enterprisal strategy those points are the key element of solvency and liquidity, profitability of activities, as well as financial stability. Internal analysis of the capital structure is associated with the assessment of alternative options for financing the activities of a business entity.

In this course work the process of capital structure will be optimized on a practical example of a company and strategic decisions will be made on the basis of this research.

The purpose of this course work is to study and analyze capital optimization methods for their further application on a practical example of a company to improve its capital structure and increase efficiency.

The tasks of this course work are:

1. To define the essence of capital and its structure and acknowledge the models of its optimization.

2. Give general conclusions of the economic state of the company and its capital structure in terms of its optimization.
3. Give and test the recommendations on improving the efficiency of a company.

The object of the research is the is capital structure of PJSC “PhosAgro”. The subject of this research is the totality of capital structure optimization methods. .

In the first chapter of this work the theoretical aspects of capital optimization will be presented and analyzed in terms of defining the most actual models. In the second chapter capital structure of the company will be analyzed by the means of financial ratios in order to determine the areas to improve, and the best methods of optimization will be applied. In the third chapter the general results will be presented and the recommendations will be given.

Grouping, comparison, induction and deduction methods will be used as tools.

The information base of the study is the financial statements of PJSC “PhosAgro”.

Chapter 1. Theoretical foundations for optimizing capital structure.

1.1 Capital structure: essence and characteristics.

According to federal laws on the establishment of federal accounting standards, capital must be reflected in the company's financial statements, among other things.¹

Capital on the balance sheet is the amount of cash that remains after deducting all of the company's liabilities. It appears in the Capital and Reserves section of the balance sheet. Capital structure is a way of organizing a company's capital, determining the ratio between equity and debt capital.² It includes different types of assets such as long-term and short-term investments, debt and equity. The main characteristics of the capital structure are:

1. Risk level;
2. Flexibility;
3. Cost of Capital;
4. Dividends.

So, it can be said that optimizing a capital structure is extremely important for the company in terms of investment attractiveness, which main criterion is a growth of business. This topic was studied precisely by Nobel laureates F. Modigliani and M. Miller, who in the period from 1958 to 1976 published many works on the sources of financing the activities of the enterprise. They were the first to formulate the mathematical model of managing the capital structure.

The Modigliani-Miller theorem's general conclusion is that the firm's value is not at all impacted by the level of debt, although the original theorem can be held on

¹ Part one of Article 21 of Law 402-FL

² Nekhaychuk Dmitriy Valerievich, Mikhalin Artem Yurievich OPTIMIZATION OF THE ORGANIZATION'S CAPITAL STRUCTURE IN MODERN ECONOMIC CONDITIONS // Humanities, socio-economic and social sciences. 2022. №4. URL: <https://cyberleninka.ru/article/n/optimizatsiya-struktury-ka...> (<https://cyberleninka.ru/article/n/optimizatsiya-struktury-kapitala-organizatsii-v-sovremennyh-usloviyah-hozyaystvovaniya>) (accessed: 12.11.2023), pp. 219

only under the assumptions that cannot be applied to the real economy (no taxes, symmetric market information etc.), it is used for simplified analysis and there is also an extended, more precise version of it.³

There are multiple factors that make it difficult to apply those theories fully on the Russian economy, among them baffling investment climate, low level of development of a stock market and economy in general are named, so it is needed to adjust them to be more precise. It means that it is needed to study the main models of capital optimization and acknowledge their main advantages and disadvantages and test them in terms of the correspondence to the needs of a chosen company and overall conditions of the Russian economy.

1.2 Methods of capital structure optimization.

The methods of capital optimization can be divided into quantitative and qualitative.⁴ Quantitative methods occur in the presence of various factors that are influencing the decisions on determining the capital structure and can be described mathematically.

First of all, we should consider the EBIT-EPS method, the essence of which is to assess the impact of alternative long-term financing options on the values of the EPS ratio or profit per share.⁵ An independent variable is the Earnings Before Interests and Taxes indicator, the value of which is determined solely by commercial risk. The value of Earnings Per Share, as well as the value of profit, responds to changes in operating profit in the event of placement of shares or use of borrowed capital.⁶

³ Modigliani F., Miller M. The cost of capital, corporation finance and the theory of investment // American Economic Review 1958, pp.261-297

⁴ Nitish Sardana, Sahar Shekoohi, Elyse M. Cornett, Alan David Kaye, Chapter 6 - Qualitative and quantitative research methods, Editor(s): Alan David Kaye, Richard D. Urman, Elyse M. Cornett, Amber N. Edinoff,, Academic Press, 2023, pp. 65-69

⁵ Anitha A. "A Theoretical Framework on EBIT-EPS Analysis", Research Gate. 24. 2020, pp. 15554

⁶ Anitha A. "A Theoretical Framework on EBIT-EPS Analysis", Research Gate. 24. 2020, pp. 15556

The method consists of constructing a linear EBIT-EPS dependence and choosing a capital structure for the forecast EBIT value that maximizes the EPS value.⁷

EPS value is equal to the ratio of the net profit after payments on borrowed funds, taxes and dividends on preferred shares and the number of ordinary shares of the company⁸:

$$EPS = \frac{(1-t)(EBIT-Interest)-D_{priv}}{N}, \quad (1)$$

where: t is the income tax rate;

EBIT – earnings before interest and taxes;

Interest – interest payments on loans;

D_{priv} – dividends on preferred shares;

N – the number of shares outstanding.

The main aim in this case to achieve the “critical point” while considering different capital structures. Under the “critical point” such a level of operating profit of the company, at which the value of earnings per share coincides in alternative options for the capital structure is understood: $EPS_1=EPS_2=EPS_3$ at the same EBIT level.

The critical point itself, as the EBIT value, corresponds to the equal net profit per share for all options of the company's capital structure⁹:

$$EPS_1 = EPS_2 = \frac{(EBIT^*-I_1)(1-t)-D_{priv}}{N_1} = \frac{(EBIT^*-I_2)(1-t)-D_{priv}}{N_2}, \quad (2)$$

where: t is the income tax rate;

D_{priv} – dividends on preferred shares;

$I_{1,2}$ – the total annual value of interest payments by capital structure options (in monetary terms)

$N_{1,2}$ – number of outstanding shares by capital structure options;

EBIT* – the critical value of operating profit.

⁷ Anitha A. “A Theoretical Framework on EBIT-EPS Analysis”, Research Gate. 24. 2020, pp. 15556

⁸ Anitha A. “A Theoretical Framework on EBIT-EPS Analysis”, Research Gate. 24. 2020, pp. 15556

⁹ Anitha A. “A Theoretical Framework on EBIT-EPS Analysis”, Research Gate. 24. 2020, pp. 15557

EPS only serves diagnostic purposes while comparing different debt to borrowing ratios, as the risk is not included in the model, but there are some adjustments that can be applied to make it more accurate. Financial break-even point, or EBIT'', can be estimated for each type of capital structure¹⁰ :

$$EBIT'' = I + \frac{D_{priv}}{1-t}, \quad (3)$$

where: t – the income tax rate;

D_{priv} – dividends on preferred shares;

I – annual payments on borrowed capital and planned to be raised.

The more the EBIT'' value, the more risk in the chosen structure option.

The main negative aspects of the EBIT-EPS value are that its approach does not take into account the asymmetry of the information as well as the combinatorial capability of different ways of financing.

Speaking of the importance of the valuation of company's capital, the method of Weighted Average Capital Costs should be named. The WACC model allows to determine the minimum actual value of the attracted capital. The minimum WACC value corresponds to the maximum value of the business.

The main assumption of the method is as follows: if the business makes a profit sufficient to pay interest on the existing obligations of the company and ensures a high return on the funds invested in it, it indicates that the capital structure is optimal¹¹. So, the optimal capital structure is achieved by minimizing the WACC ratio, which has the form of:

$$WACC = R_D(1 - T) \frac{D}{V} + R_E \frac{E}{V} \quad (4)$$

where: WACC is the weighted average cost of capital;

R_D – cost of borrowed capital;

R_E – cost of Equity;

T – the marginal corporate income tax rate;

¹⁰ Aisha P. "Capital Structure and Value of Firm", Accounting Notes 2020.

¹¹ Aisha P. "Capital Structure and Value of Firm", Accounting Notes 2020.

D – the market value of the firm's debt obligations;

E – the market value of the company's equity;

V=D+E – the total market value of the firm.

Both rates K_D and K_E represent the requirements to the yields, so the value of WACC represents the expenses on attracting the capital that should be covered by the company's profit¹².

The expenses on K_E are dependent on D/E and this dependency is described by β coefficient in local CAPM model, which is considered an indicator of a systematic market and us used to take into account the investment risk¹³. The formula of K_E looks like this :

$$R_E = R_f + \beta_{levered}(R_m - R_f) \quad (5)$$

where: R_E – cost of equity;

R_f – Risk-free rate of return;

R_m – Market Profitability;

$\beta_{levered}$ – A coefficient that measures a firm's systematic risk.

Beta represents a company's sensitivity to market volatility – otherwise referred to as systematic risk– compared to the broader market, which is used as the standard benchmark.

An integral component of the capital asset pricing model (CAPM), beta quantifies the relationship between systematic risk and the expected return.

Moreover, there are two distinct types of betas measured in corporate finance:

$$\beta_{levered} = \beta \left(1 + (1 - T) \frac{D}{E} \right) \quad (6)$$

The market premium is defined as the difference between the yield of shares for a long period of time and the yield of risk-free securities¹⁴. This approach is more

¹²Haag, V., Koziol, C. Company Cost of Capital and Leverage: A Simplified Textbook Relationship Revisited. Schmalenbach J Bus Res 75 (2023), pp. 37–69

¹³Haag, V., Koziol, C. Company Cost of Capital and Leverage: A Simplified Textbook Relationship Revisited. Schmalenbach J Bus Res 75 (2023), pp. 37–69

¹⁴Haag, V., Koziol, C. Company Cost of Capital and Leverage: A Simplified Textbook Relationship Revisited. Schmalenbach J Bus Res 75 (2023), pp. 37–69

suitable for the countries with more diversified stock market, so in our case there might be problems while evaluating K_E with the use of local CAPM model.

The cost of borrowed capital is determined by several factors. One is the risk-free rate, which affects the cost of companies' debt. If the risk-free rate rises, then the cost of debt also increases. Another important factor is the company's risk of default, which affects borrowing costs. The higher the risk of default, the higher the cost of debt will be. Finally, the tax benefits associated with the use of debt capital can reduce its cost. For example, if a company uses debt to finance its operations, it may receive tax benefits that will result in tax shield savings and a lower cost of debt. The formula for the expenses of the borrowed capital looks like this :

$$R_D = R_f + spread(default) \quad (7)$$

where: R_D — borrowing costs;

R_f – risk-free rate of return;

$spread(default)$ – default spread according to credit rating.

It can be concluded that the WACC method allows taking into account the investment risk of the company and the impact of changes in the capital structure on its value through the indicators K_E and K_D . In general, this method is considered to be more precise than the previous, but it is also said that it is not enough for the full analysis.

To sum up,

$$WACC = l \left(\left(R_f + spread(default) \right) (1 - T) - T\beta(R_m - R_f) \right) + R_f + \beta(R_m - R_f) \quad (8)$$

where $spread(default)$ depends on credit rating, which can be estimated using leverage:

$$l = \frac{D}{E+D} - leverage \quad (9)$$

Considering other parameters are constant, WACC is a function of leverage.

The next approach focuses on the influence of the capital structure on the cost of business and is called Adjusted present value method. The essence of this model lies in the assumption that increasing corporate debt burdens can lead to corporate

tax savings while increasing the cost of financial instability relative to the firm's unleveraged value.¹⁵

The method proposed by Myers involves dividing the value of the company into two components: the cost of operating activities without taking into account the effect of financial leverage and the benefits from the use of borrowed capital associated with savings on tax payments.¹⁶ The cost of company in the APV method is calculated formula :

$$APV = NPV + F, \quad (9)$$

where: APV – adjusted present value;

NPV – Net Present Value;

F – funding solutions.

As it can be seen, Myles proposes an assumption not only the company's cash flow, but also its financing decisions, the tax shield effect, and the cost of financial instability¹⁷:

$$V_{levered} = V_{unlevered} + PV(TS) - PV(BC), \quad (10)$$

where: $V_{levered}$ – the value of the firm, taking into account financing decisions;

$V_{unlevered}$ – the value of the company excluding debt;

PV (TS) – the cost of the benefits of the tax shield effect;

PV (BC) – costs of financial instability of the company.

$V_{unlevered}$ is calculated on the base of projected cash flows. The costs of financial instability are influenced by the probability of a company default and a standard deviation of EBIT¹⁸. Financial instability can be defined as follows:

1. If the company cannot pay interest on its debts or repay loan debts ($EBITDA/Interests < 1$).
2. If it cannot raise borrowed funds or receive money from the sale of its assets.
3. If negotiations have begun with creditors on debt restructuring.

¹⁵ Mohammed Al-Maskari, Parul Gupta "Adjusted Present value", *WSO*, September 22, 2023

¹⁶ Mohammed Al-Maskari, Parul Gupta "Adjusted Present value", *WSO*, September 22, 2023

¹⁷ Mohammed Al-Maskari, Parul Gupta "Adjusted Present value", *WSO*, September 22, 2023

¹⁸ Felix and Ludger Schuknecht. "The Fiscal Costs of Financial Instability Revisited." *Public Economics eJournal* (2002), pp. 3-5

This method is valuable due to its complex nature, but the main disadvantage of doubtful statistical significance of the standard EBIT error makes it not appropriate for using as the only tool.

It can be seen, that each of the methods has its own advantages and disadvantages. What is more, they complement each other in terms on fulfilling the search of the optimal capital structure, which makes it necessary to use all of them to achieve the best result. The APV method will not be used in future research as it requires to use a large amount of historical data for standard EBIT error to be statistically significant, and tax shield effects can not be defined this far for the Russian Federation.

At the same time, the analysis will not be the fullest without the qualitative methods, among which the following topics are analyzed¹⁹:

1. Asymmetry of information;
2. Availability of «cheap» sources of financing;
3. Profitability of the company;
4. Opportunities for growth;
5. Asset and liabilities structure;
6. Amount of capital;
7. The stage of the company's life cycle.

The usage of qualitative methods is important as all of the qualitative's ways of interpretation are dependent on the context, which is available to determine by the stated above methods.

Overall, the methods of capital structure optimization were described, their advantages and disadvantages were given. The conclusion is that there is no way to optimize a structure of a capital using the single method, the future work will consist of their step-by-step implementation on the capital structure of a chosen company.

¹⁹ Satish Kumar "Research on capital structure determinants". International Journal of Managerial Finance (2017), pp. 4.

Chapter 2. Analysis of the capital structure of the PJSC “PhosAgro”.

2.1 General economic characteristics of the PJSC“ PhosAgro” and assessing of its capital structure.

PhosAgro produces phosphate-based fertilizers. There are more than 50 items among the products they produce.

PhosAgro Group includes Apatit in Cherepovets (Vologda Region), its branches in Kirovsk (Murmansk Region), Balakovo (Saratov Region) and Volkhov (Leningrad Region), PhosAgro-Region and the Samoilov Research Institute for Fertilizers and Insect fungicides.²⁰

The company is the largest manufacturer of these products in Europe. The products are supplied to more than 100 countries around the world on all inhabited continents, but the key market is Russia, where the company supplies more fertilizers than to any other country in the world.²¹

Speaking of the structure of equity, that can be found in the table 2.1, it can be said that major part of shares is dispersed among various shareholders, and among the private ones the largest share of 48% is held by MCLLC "Adorabella", which is an investment company.²²

Table 2.1

The structure of equity of PJSC “PhosAgro”

Shareholder	Number of shares	% of issued shares
MCLLC "Adorabella"	62 160 000	48
Tatyana Litvinenko	27 195 000	21
Other shareholders	40 145 000	31
Total	129 500 000	100

²⁰ PhosAgro website URL:<https://www.phosagro.ru/press/company/fosagro-provedet-konvertatsiyu-privilegirovannykh-aktsiy/>(date of access: 13.11.2023)

²¹ PhosAgro website URL:<https://www.phosagro.ru/press/company/fosagro-provedet-konvertatsiyu-privilegirovannykh-aktsiy/>(date of access: 13.11.2023)

²² PhosAgro website URL:<https://www.phosagro.ru/press/company/fosagro-provedet-konvertatsiyu-privilegirovannykh-aktsiy/>(date of access: 13.11.2023)

Capitalization is shown in the table 2.2, and it can be said that it has grown more than two times in 2022 compared to 2019, which indicates the economic growth.

Table 2.2

Capitalization of PJSC “PhosAgro”, mlrd. rub.

	2019	2020	2021	2022
Capitalization	311,8	406,4	756	828,5
Changes		+30%	+86%	+10%

General capital structure can be found in the table 2.3.

Table 2.3

The structure of capital of PJSC “PhosAgro”, bln. rub.

	2019	2022
Debt	53	86
Equity	125	165
D/(D+E)	30%	34%

To assess the capital structure properly, it is needed to calculate the indexes that can be found in the table 2.4.

Table 2.4

Results of calculation of capital structure evaluation indexes of PJSC
“PhosAgro”

Index	2019	2022
Short term debt ratio	9,00%	13,47%
Long term debt ratio	8,20%	15,47%

Total debt ratio	17%	29%
Market value short term debt ratio	10,08%	14,84%
Market value long term debt ratio	9,19%	17,04%
Market value total debt ratio	19,26%	31,88%
Book value short term debt ratio	21,28%	28,00%
Book value long term debt ratio	37,20%	28,60%
Book value total debt ratio	33,46%	56,60%

In general, it can be said that long-term liabilities prevail over short-term ones and almost all of the indexes do not prevail 40%, so the conclusion is that there is an appropriate level of financial stability. At the same time, there is an exception: in 2022 book value total debt ratio is more than 40%, so the ratio of total liabilities and balance value of assets should be studied in this case more precise. It can be also stated that the economic state of the company is good and is improving.

2.2 Analysis of the efficiency of capital use.

The next step is to use the methods of optimization to :

1. minimize the cost of capital;
2. maximize the market value;
3. maximize the return on share.

The first model to apply will be WACC, to achieve the results it is needed to calculate some additional parameters. We estimate WACC on different levels of leverage using formula (8). Used exogenous parameters are:

$T = 20\%$ - corporate tax rate in the Russian Federation,

$E = 165$ bill. RUB – company equity as of 2023,

$R_f = 11.64\%$ - risk-free rate, which is assumed to be equal to government 1Y bonds return,

Spread(default) was estimated for different levels of leverage using accordance of different leverage intervals to different credit scores, and of credit scores to spread. Correspondence tables from A. Damodaran were used.

$R_m=18.40\%$ - market return, Moscow exchange MOEX index (IMOEX) year return,

$\beta_{unleveraged} = 0.249 \pm 0.026$ was calculated from OLS regression of daily PHOR returns against daily MOEX index returns using historical data of approximately 3 years.

Table 2.5

WACC calculation results

$\frac{D}{D + E}$	D	Credit score	$\beta_{levered}$	spread default	R_e	R_d	WACC
0%	0	AAA	0,249	0,69%	13,33%	12,33%	13,33%
10%	18	AA	0,272	0,85%	13,48%	12,49%	13,13%
20%	41	A	0,299	1,42%	13,66%	13,06%	13,02%
22%	47	A	0,306	1,42%	13,71%	13,06%	12,99%
24%	52	A	0,312	1,42%	13,75%	13,06%	12,96%
26%	58	A-	0,320	1,62%	13,80%	13,26%	12,97%
28%	64	A-	0,327	1,62%	13,85%	13,26%	12,94%
29%	67	A-	0,331	1,62%	13,88%	13,26%	12,93%
30%	71	BBB	0,335	2,00%	13,90%	13,64%	13,01%
34%	85	BB+	0,352	2,42%	14,02%	14,06%	13,08%
40%	110	BB	0,382	3,13%	14,23%	14,77%	13,26%
50%	165	B	0,449	5,26%	14,67%	16,90%	14,10%

The dynamics of WACC for different levels of leverage can be found in Fig. 2.1.

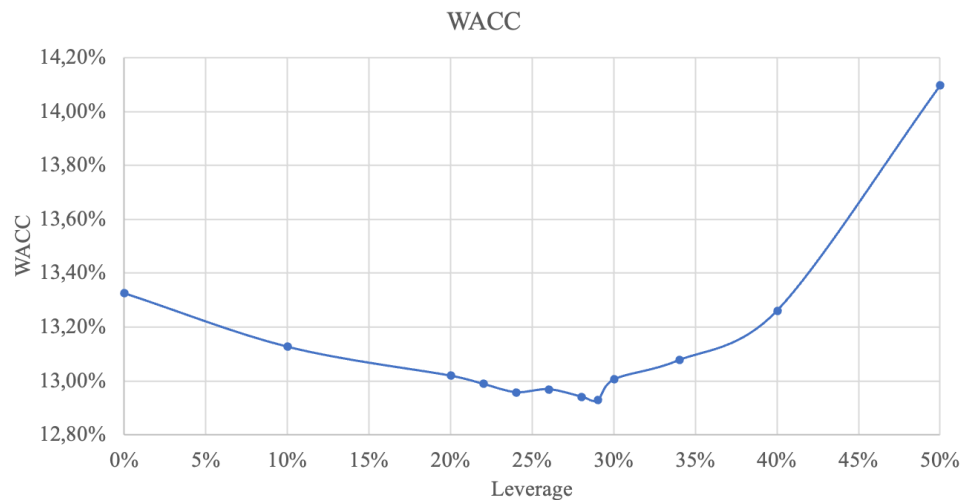


Fig. 2.1 Dynamics of WACC for different levels of financial leverage.

It can be seen from the graph that WACC is minimized by leverage $l \in [20\%, 30\%]$. Calculation with steps of 1% showed minimum is at 29%. Minimal WACC is equal to 12.93%. WACC at current leverage of 34% is 13.08%, 0.15% higher than the minimum.

The next method to consider is probability of default level.

Financial stability cannot be assured if probability of default is high. A possible way to calculate probability of default is $p_{default} = p(EBIT < D)$

Using historical data, EBIT for current year can be forecasted. Historical data from 2011 is available, however from 2011 to 2018 EBIT dynamics were unstable, as it can be seen in Fig. 2.2.

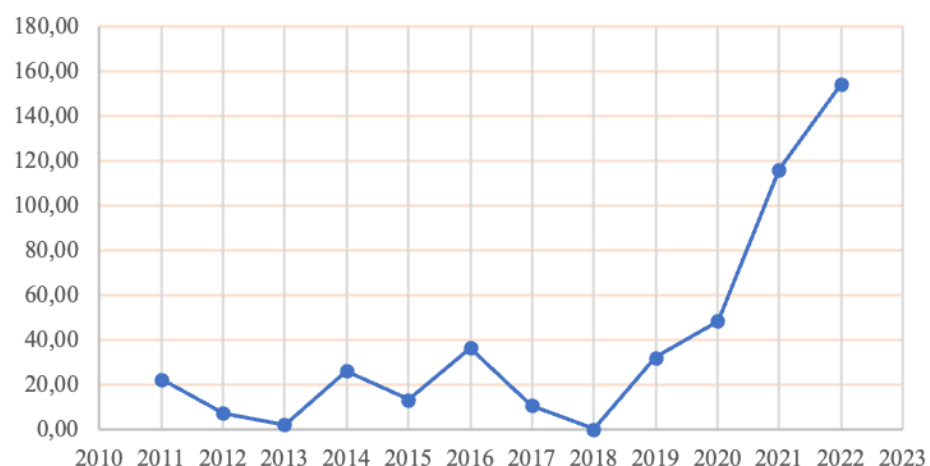


Fig. 2.2 Dynamics of EBIT, bill. RUB.

From year 2019 until 2022 trend has changed, and this data can be used for a linear forecasting model, which is shown by Fig. 2.3.

$$EBIT \sim A \cdot (YEAR - 2019) + B.$$

$$R^2 = 95.4\%$$

$$A = 43 \pm 7; B = 23 \pm 13.$$

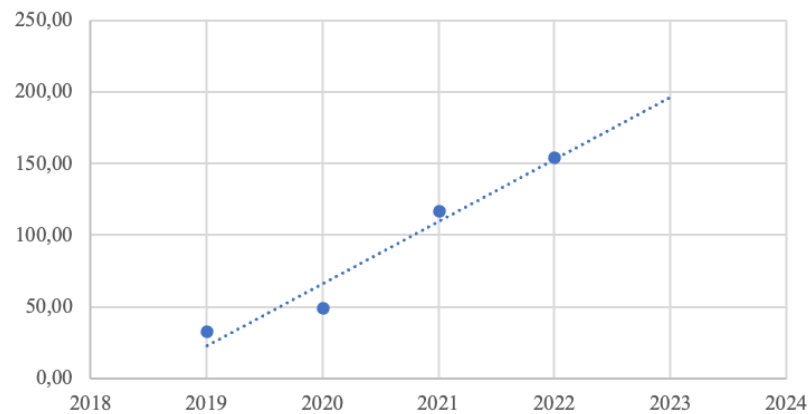


Fig. 2.3 Regression results, bill. RUB.

Overall, the forecast for 2023 EBIT:

$$\widehat{EBIT}(2023) = 196$$

$$\sigma_{EBIT(2023)} = \sqrt{(\sigma_A \cdot 4)^2 + (\sigma_B)^2} = 30$$

So, as it can be seen from Fig. 2.4, $\widehat{EBIT}(2023) \sim \mathcal{N}(196, 30)$.

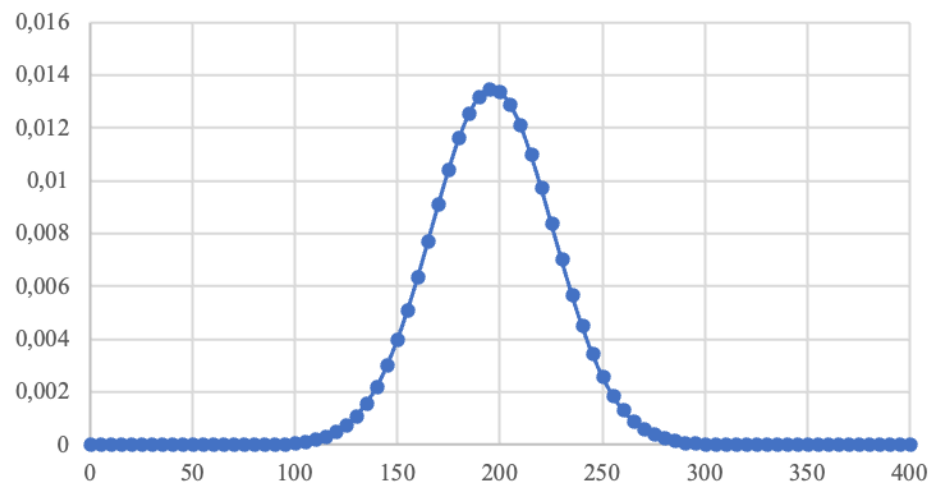


Fig. 2.4 EBITDA(2023) probability density function

$$\text{Therefore, } p_{\text{default}}(D) = p(EBIT < D) = \int_{-\infty}^D \frac{1}{\sqrt{2\pi} 30} e^{-\frac{1}{2}\left(\frac{x-196}{30}\right)^2} dx.$$

$D = \frac{E}{\frac{1}{l}-1} \cdot R_D(l)$, so p_{default} can be seen as a function of leverage l .

Calculation shows (Fig. 2.5), $p_{\text{default}} < 1\%$ for $l < 74\%$, and at $l_{\text{critical}} \approx 74\%$ p_{default} starts to rapidly increase. Both current leverage of 34% and leverage of 29% which minimizes WACC are far less than l_{critical} so the range of realistic leverage values has a low default probability.

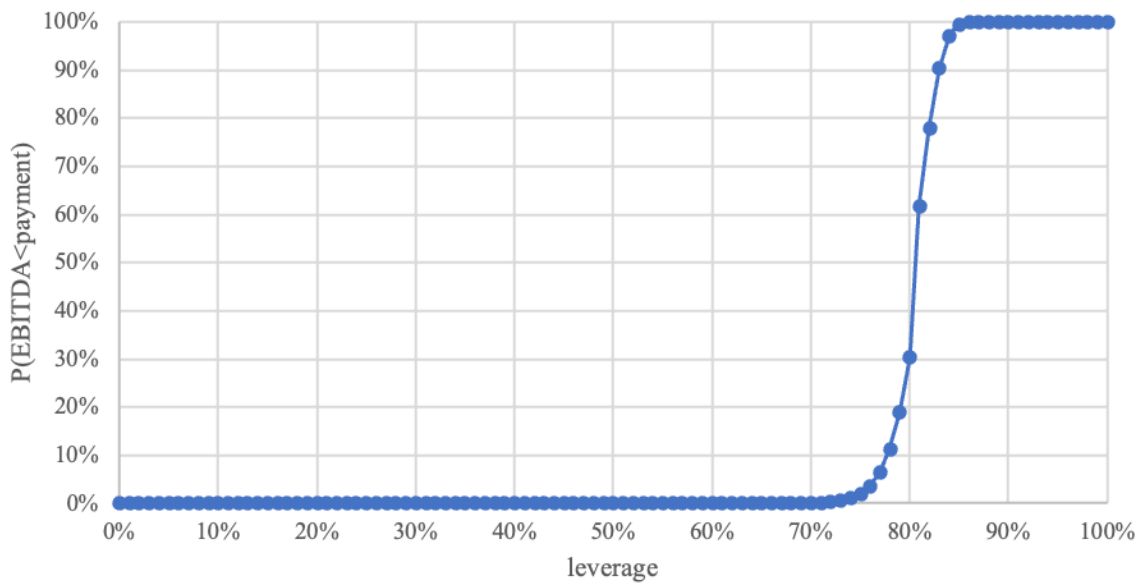


Fig. 2.5 P(EBITDA < payment)

The last method to apply is EBIT-EPS.

First of all, it is needed to calculate the critical point for fixed amount of capital.

The critical point itself, as the EBIT value, corresponds to the equal net profit per share for all options of the company's capital structure²³:

$$EPS_1 = EPS_2 = \frac{(EBIT^* - I_1)(1-t) - D_{priv}}{N_1} = \frac{(EBIT^* - I_2)(1-t) - D_{priv}}{N_2}, \quad (2)$$

where: t is the income tax rate;

D_{priv} – dividends on preferred shares;

²³ Anitha A. "A Theoretical Framework on EBIT-EPS Analysis", Research Gate. 24. 2020, pp. 15557

$I_{1,2}$ – the total annual value of interest payments by capital structure options
(in monetary terms)

$N_{1,2}$ – number of outstanding shares by capital structure options;

Let's assume the company needs to raise a fixed amount of capital – 10 billion RUB, for example.

Let index 1 describe the case of raising capital by gaining more debt, and index 2 – by issuing more shares.

Current number of shares is 129.5 million, each share trades for 6777 RUB. This means to raise additional 10 bill. RUB it is required to issue $\frac{10 \text{ billion}}{6777} \approx 14.8 \text{ mill. shares}$. There are no preferred shares.

Therefore, parameters for EPS calculation are:

$$D_{priv} = 0$$

$$N_1 = 129.5 \text{ million}$$

$$N_2 = N_1 + 14.8 \text{ million} = 144.3 \text{ million}$$

$$t = 20\%$$

$$I_1 = (86 + 10) \text{ bill. RUB} \cdot R_{d_1} = 13.5 \text{ bill RUB}$$

$$I_2 = 86 \text{ bill. RUB} \cdot R_{d_2} = 12.1 \text{ bill. RUB}$$

$$R_{d_1} = R_{d_2} = R_d = 14.06\% \text{ (corresponding to BB + credit score)}$$

EBIT is a varying parameter.

Calculation shows critical point is $EBIT^* \approx 136 \text{ bill RUB}$.

For $EBIT < EBIT^*$, preferable method of financing 10 bill RUB is by issuing more shares.

For $EBIT > EBIT^*$, preferable method of financing 10 bill RUB is by debt.

Forecasted EBIT of 2023 is $196 \text{ bill RUB} > EBIT^*$, meaning preferable method of financing 10 bill RUB is currently by debt.

On the Fig. 2.6 the dependence of EPS from EBIT is depicted for two different ways of financing. It can be seen that for debt and for shares emission it is almost the same, so it is needed to construct Fig 2.7 that shows the difference of EPS for both ways.

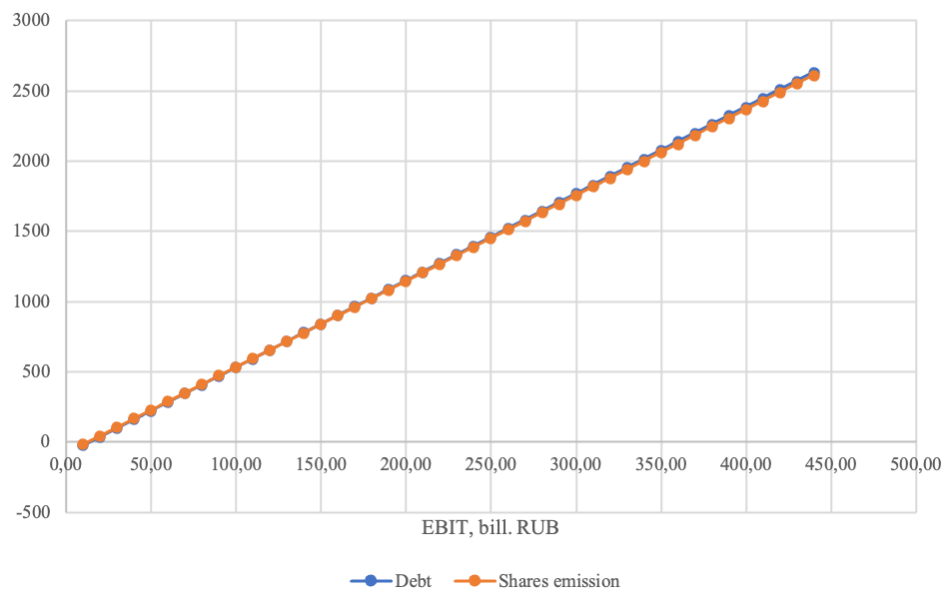


Fig. 2.6 Dependence of EPS from EBIT

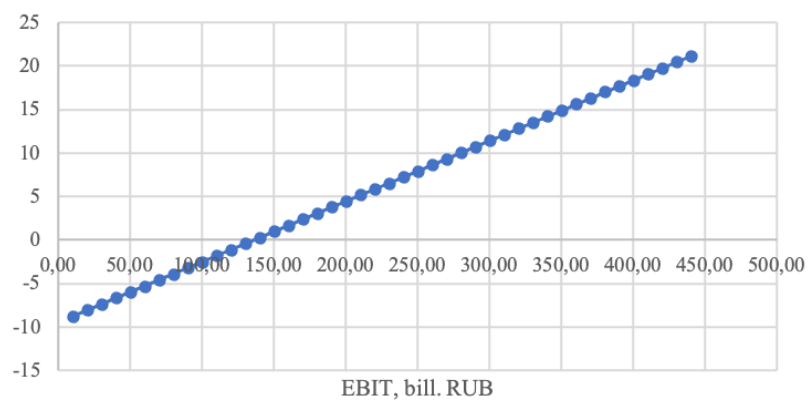


Fig. 2.7 EPS(debt)-EPS(shares), bill. RUB.

The next step is to research fixed EBIT.

Required capital of 10 bill. RUB was chosen arbitrarily and can vary in reality. So, another way of analysis is fixing the parameter of EBIT to our forecast of 196 *bill RUB* and varying amount of required capital while simultaneously calculating corresponding number of shares to be issued, leverage and corresponding R_d .

Fig 2.8 depicts the EPS for two ways of financing depending on the amount of capital, while Fig. 2.9, again, the difference of EPS for both ways of financing.

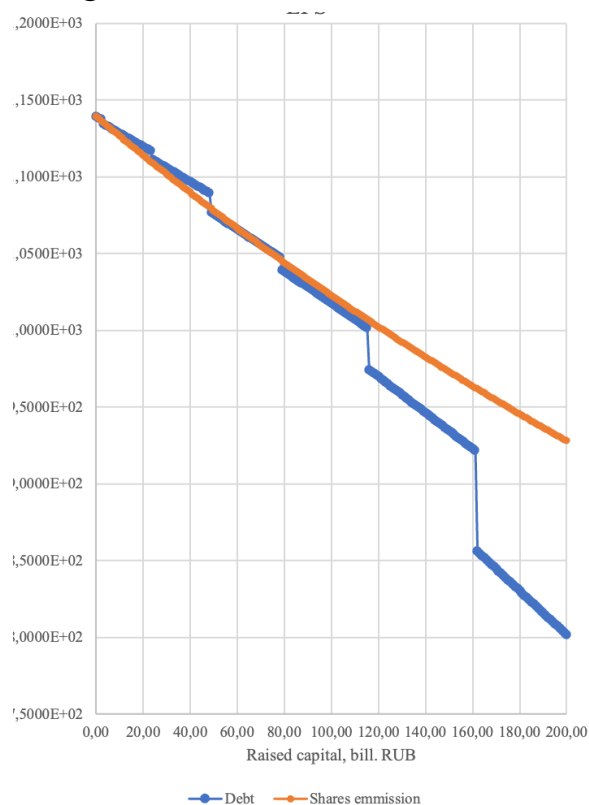


Fig. 2.8 Dependence of EPS from EBIT

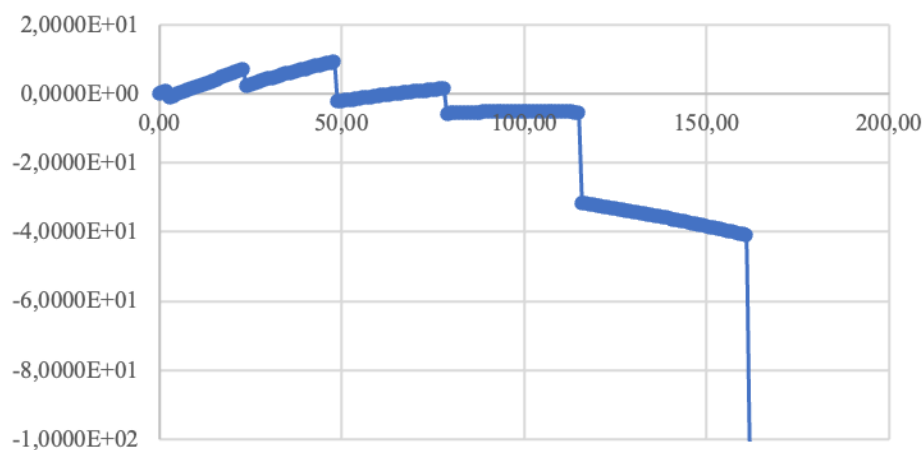


Fig. 2.9 EPS(debt)-EPS(shares), bill. RUB.

For raised capital $\in (0,3) \cup (6,49) \cup (64,79)$ bill. RUB EPS from financing by debt is higher.

For raised capital $\in (3,6) \cup (49,64) \cup (79, +\infty)$ bill. RUB EPS from financing by shares emission is higher.

Neglecting the differences of order of 1 RUB, or approximately 0.1% of EPS, there is one critical point at $EBIT^* \approx 79$ bill RUB. For $EBIT < EBIT^*$ $EPS_{emission}(EBIT) \gtrsim EPS_{debt}(EBIT)$. For $EBIT > EBIT^*$ $EPS_{debt}(EBIT) \gtrsim EPS_{emission}(EBIT)$.

It can therefore be concluded that at the current level of EBIT smaller investments should be financed by debt, and large ones – by emission.

The general conclusion is that the structure of capital of the PJSC “PhosAgro” is in good state, but there are certainly the areas to improve.

Chapter 3. Measures to improve the management of the capital structure of the PJSC “PhosAgro”.

3.1 Qualitative analysis of the capital structure of the PJSC “PhosAgro” in terms of strategic decision-making.

In the previous chapter the quantitative methods of optimization as well as the general financial analysis were applied to the structure of capital of PJSC “PhosAgro”. As a result, the following conclusions can be made:

1. Minimal WACC is equal to 12.93%, while WACC at current leverage of 34% is 13.08% which is 0.15% higher than the minimum, so the capital structure is optimal;
2. Long-term liabilities prevail over short-term ones and almost all of the indexes do not prevail 40%, so there is an appropriate level of financial stability.
3. Both current leverage of 34% and leverage of 29% which minimizes WACC are far less than $l_{critical}$ so the range of realistic leverage values has a low default probability.
4. At the current level of EBIT smaller investments should be financed by debt, and large ones – by emission.

The general conclusion is that the structure of capital is close to optimal, the current volume of debt in the structure of capital is significant, although long-term liabilities are prevalent and the default probability is low. Moreover, the recommendations on the sources of funding are also already achieved by a company. At the first glance, there are no major areas of improvement, except the minimizing of debt, that in the light of stated above factors can lead to the lack of cash and the loss of liquidity without any major practical sense.

If the stated above quantitative points will be considered the only decision to be made is to continue the current strategy and not to change anything. However, there are qualitative factors that are needed to be considered, as it was stated in the chapter 2.1 and among of them it is needed to consider the following:

1. Availability of «cheap» sources of financing

2. Profitability of the company;
3. Opportunities for growth;
4. Asset and liability structure;
5. Amount of capital;
6. The stage of the company's life cycle.

In terms of cheap sources of financing it can be said that PJSC “PhosAgro” is quite self-sufficient in terms of production. It provides itself 100% phosphoric acid, 87% sulphuric acid and 90% ammonia. The available reserves will provide the company with resources for about 50 years. This factor indicates financial stability and independence.²⁴

Speaking of the opportunities for growth it is needed to say that PJSC “PhosAgro”, unlike many other companies, did not refuse to pay record final dividends for 2021 which was positive for its shares. PhosAgro sells through a network of its own trading offices to more than 100 countries in Europe, Asia, Africa, North and South America. The company exports about 70% of its products. Those facts illustrate the innovativeness of approach as well as the reliability in the eyes of society.

The uniqueness of the enterprise also lies in a fact that the igneous origin of the ore mined on the Kola Peninsula provides PhosAgro with exceptional purity of phosphate rock and allows it to produce environmentally friendly products that are in demand in premium foreign markets. Thanks to this, the company occupies a strong position in the market.²⁵

More than that, it should be mentioned that the U.S. has added fertilizers to the list of essential goods, which excludes any bans, and the EU also has no restrictions for this category of goods. While the demand for fertilizers is growing, the shortage of supply caused by the rise in the price of raw materials and energy as well as the export restrictions of phosphate exports by China sets strong price dynamics. All

²⁴ PhosAgro website URL: <https://www.phosagro.ru/press/company/fosagro-provedet-konvertatsiyu-privilegirovannykh-aktsiy/> (date of access: 13.11.2023)

²⁵ PhosAgro website URL: <https://www.phosagro.ru/press/company/fosagro-provedet-konvertatsiyu-privilegirovannykh-aktsiy/> (date of access: 13.11.2023)

these factors ensure in the irresistibility of PhosAgro in terms of foreign trade restrictions.

All of the stated above points are proved by the growth of profitability. In 2021, PhosAgro showed a moderate increase in fertilizer production and sales. In 2022 PhosAgro's revenue increased by 65.6% to RUB 420.5 billion. EBITDA increased 2.2 times year-on-year to RUB 191.8 billion. Net profit increased 7.7 times to RUB 129.7 billion, and net profit adjusted net of exchange rate differences amounted to RUB 130.2 billion, which is 3 times higher than in 2020. ²⁶

In terms of the structure of liabilities it can be said that although more than 90% of PhosAgro's loan liabilities are denominated in US dollars, the debt structure is not a major concern. The short-term part of the debt is only about 7%, and the bulk of it (65.6%) is represented by Eurobonds maturing no earlier than 2025.

As a result of qualitative analysis and the general overview of the company's actions during the period of instability it can be concluded that the current strategy of capital formation is optimal. The main concern that was left after the quantitative analysis was the overall level of debt, that could have been decreased in order to increase WACC, but the main part of the loan liabilities of the company are long-term, for the company to have the opportunity to adjust the system of repayment and have the flexibility in the current market situation. The urgent repayment of loans will lead to the decrease in liquidity due to the lack of the most liquid assets.

3.2 Development of proposals to optimize the company's capital structure.

In the process of the development of proposals to optimize the company's capital structure the companies are usually proposed the following measures:

1. To assess the company's current capital structure and financial position.
2. To develop a management strategy that takes into account the company's long-term goals and financial capabilities.

²⁶ PhosAgro website URL: <https://www.phosagro.ru/press/company/fosagro-provedet-konvertatsiyu-privilegirovannykh-aktsiy/> (date of access: 13.11.2023)

3. To determine the optimal share of equity capital in the total capital structure of the company.
4. To develop a debt restructuring plan that will take into account repayment terms, interest rates, and repayment terms.
5. To optimize the use of credit resources by selecting the most favorable financing conditions and reducing dependence on a single source of financing.
6. To improve the management of capital risks by developing an effective system for controlling and monitoring the company's financial operations.
7. To improve the efficiency of capital management through the introduction of new technologies and methods of data analysis.

Overall, these measures will help improve PhosAgro's capital management and ensure its stability and sustainability in the market.

The effectiveness of the measures taken to improve the capital management of a company can be assessed as follows:

1. Comparison of the company's financial performance before and after the implementation of measures.
2. Analysis of capital risks before and after the implementation of measures.
3. Survey the company's clients and investors to get feedback on how the company has changed after the implementation of capital management measures.
4. Conducting a competitor analysis to determine how competitive the company remains in the market.
5. Evaluation of the effectiveness of the company's capital management strategy in the long term.

In case of PJSC “PhosAgro” it can be said that their strategy has already included those points, that is why using the means of qualitative and quantitative analysis it can not be proposed to implement any measures, as they had already been taken and the capital structure is as optimal as it could be in the current period of company development.

Conclusion.

The purpose of this course work was to study and analyze capital optimization methods for their further application on a practical example of a company to improve its capital structure and increase efficiency, which was achieved by implementing the following tasks:

1. The essence of capital and its structure were defined, the methods of its optimization were acknowledged.
2. The general conclusions of the economic state of the company and its capital structure in terms of its optimization were given.
3. The recommendations on improving the efficiency of a company were given.

The quantitative methods of capital structure optimization indicated that:

1. Minimal WACC is equal to 12.93%, while WACC at current leverage of 34% is 13.08% which is 0.15% higher than the minimum, so the capital structure is optimal;
2. Long-term liabilities prevail over short-term ones and almost all of the indexes do not prevail 40%, so there is an appropriate level of financial stability.
3. Both current leverage of 34% and leverage of 29% which minimizes WACC are far less than $l_{critical}$ so the range of realistic leverage values has a low default probability.
4. At the current level of EBIT smaller investments should be financed by debt, and large ones – by emission.

In general, it can be said that PJSC “PhosAgro” has a well-balanced capital structure and wise capital management strategy that takes into account all the necessary points, so, there are no recommendations on the optimization.

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