Article

An Assessment of the Financial Indicators of PJSC Gazprom

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Abstract: This assessment of the financial performance of PJSC Gazprom was carried out within the framework of modern theories of the cost of capital and capital structure: the Brusov–Filatova–Orekhova (BFO) theory and the Modigliani–Miller (MM) theory. Various methods for estimating the main parameter of both theories (BFO and MM), k0, the cost of equity, and WACC at zero leverage are discussed and applied. The analysis is based on data from official financial statements of PJSC Gazprom for the period from 2018 to 2022. Using the calculated values of k0, the main financial indicators were estimated, such as the cost of raising capital, the value of the company, and the cost of equity. The dependences of k0, k_0^*, WACC(L), V(L), and ke(L) of PJSC Gazprom on leverage level, L, for 2018–2022 were investigated. The results obtained are of forecast value, allowing a forecast of the values of financial indicators based on the particular capital structure of PJSC Gazprom.

Keywords: financial performance; capital structure; PJSC Gazprom; Modigliani–Miller (MM) theory; Brusov–Filatova–Orekhova (BFO) theory

JEL Classification: G30; G32

1. Introduction

This article is devoted to the assessment of the financial performance of PJSC Gazprom. It uses three different approaches to determine the main parameter of both theories (Brusov–Filatova–Orekhova (BFO) (Brusov et al. 2023; Brusov and Filatova 2022, 2023; Brusova 2011) and Modigliani–Miller (MM) (Modigliani and Miller 1958, 1963, 1966)), k0, the cost of equity, and WACC at zero leverage: the traditional approach, the Modigliani–Miller theory, and the Brusov–Filatova–Orekhova theory are applied. Using the calculated values of k0, we estimated main financial indicators, such as the cost of raising capital, the value of the company, and the cost of equity. The results obtained are of forecast value, allowing a forecast of the values of financial indicators based on the particular capital structure of PJSC Gazprom.

The analysis is based on data from official financial statements of PJSC Gazprom for the period from 2018 to 2022. Key data and formulas are provided in the relevant paragraphs.

2. Literature Review

This work is in great part based on the use of three different approaches relevant to the determination of the cost of capital:

1.   The traditional approach;
2.   The Modigliani–Miller approach;
3.   The Brusov–Filatova–Orekhova approach.

In the traditional approach, the weighted average cost of capital (hereinafter WACC) depends on the share of a particular type of capital in the overall financial balance of the company, as well as on the cost of obtaining it. There are two types of capital that make up the overall capital structure of the company: equity and borrowed (debt) capital.

The first type reflects the difference between the assets and liabilities of the company—i.e., it is represented by the authorized, reserve, and additional capital. In theory, the cost of equity represents the rate of return that investors expect to receive from the company as compensation for their investment and the risks that they take on. Accordingly, the cost of equity is related to the amount of dividends that a company decides to pay. Thus, its value can be found by dividing the number of dividends paid by the total amount of equity capital.

The second type of capital refers to the amount of borrowed funds. In this case, both the short-term and long-term liabilities of the company are taken into account (according to its financial statements). The cost of borrowed (debt) capital is determined by the interest rates on funds received from external creditors of the company (such as banks). In practice, the cost of borrowed funds is determined by their weighted average cost, based on the share of different sources of debt (bonds, loans, etc.) and their respective interest rates.

The traditional approach uses the following formula:

$$WACC = w_e * k_e + w_d * k_d \qquad (1)$$

Here, $w_{\mathrm{d}} = \frac{D}{D+S}$ is the share of debt capital, $k_{\mathrm{e}}, w_{\mathrm{e}} = \frac{S}{D+S}$ is the cost and the share of the equity capital of the company, and $L = D/S$ is financial leverage; D is the value of debt capital.

There is also a modified version of this formula, which takes into account the effect of the "tax shield". The main idea of this theory is that with an increase in the number of borrowed funds, there is a corresponding decline in the income tax paid. This is due to the fact that with the accumulation of debt funds, there is a proportional increase in interest payments. At the same time, these expenses are not subject to taxation. Thus, with a higher amount of borrowed funds, the company is given the opportunity to reduce its tax burden.

The modified formula is presented as follows:

$$WACC_t = w_e * k_e + w_d * k_d(1 - t) \qquad (2)$$

A new element is added to the formula—t, the tax rate on the company's income. As one can see, according to this formula, there is a connection between the share of borrowed capital and the tax rate—with an increase in the share of the debt capital or the tax rate, the total weighted average cost of capital (WACC) decreases.

Until recently, the most important theory on the cost of capital was the theory of Nobel laureates Modigliani and Miller. (See the description of the two main theories of capital structure—Modigliani and Miller (MM) and Brusov–Filatova–Orekhova (BFO) theory in Appendix A and in Review (Brusov and Filatova 2023), where an exhaustive description of all theories of capital structure is made.)

As in the case of the modified traditional approach, this theory also takes into account the role of the tax shield. But a new factor is added—k0, also known as the cost of capital of a non-leveraged company (a company that does not use borrowed funds in its capital structure).

The formula for the Modigliani–Miller approach is presented below (Modigliani and Miller 1958, 1963, 1966):

$$WACC = k_0 \cdot (1 - w_{\mathrm{d}}t) \qquad (3)$$

This theory was an important step in the development of the theory of corporate finance. For many years, many finance experts have based much of their work on this theory.

However, the Modigliani–Miller approach still has certain drawbacks, which, unfortunately, have been largely forgotten. One of the most serious limitations of this approach is the assumption that the company is going to be operating indefinitely. This limitation was

corrected in the Brusov–Filatova–Orekhova theory. The authors of this theory have shown that taking into account the finite life of the company leads to a radically different interpretation of the Modigliani–Miller theory and of its theorems, formulas, etc. Accounting for the company's limited lifespan can also have a significant impact on the calculated values of a number of important financial indicators, such as the capitalization of a financially dependent/independent company (with/without debt capital) and the size of the tax shield, as well as the cost of capital.

In reality, the application of the Modigliani–Miller theory leads to a significant underestimation of the weighted average cost of capital and the cost of equity of the company, as well as to an overestimation of the capitalization of financially dependent and financially independent companies. The underestimation of these key indicators leads to a distorted understanding of existing financial risks.

The formula used in the BFO approach is presented below (Brusova 2011):

$$\frac{1-(1+WACC)^{-n}}{WACC} = \frac{1-(1+k_0)^{-n}}{k_0\left[1-\omega_d T\left(1-(1+k_d)^{-n}\right)\right]}. \tag{4}$$

As can be observed, this formula is much more complex than the ones used in the previous two approaches.

3. Data Used

The analysis conducted in this paper was based on data taken from the financial statements of PJSC Gazprom for 2018–2022. The data below is measured in thousands of rubles (RUB).

The table showing the data is presented below (Table 1):

Table 1. Source data.

Indicators (Unit of Measurement—Thsnd. RUB)	2022	2021	2020	2019	2018
Total Debt capital	7,300,990,736	7,712,384,058	5,498,595,157	4,928,299,468	5,189,377,904
Long-term liabilities	5,031,069,475	4,646,338,150	3,240,395,415	2,849,533,434	3,233,837,395
Short-term liabilities	2,269,921,261	3,066,045,908	2,258,199,742	2,078,766,034	1,955,540,509
Total equity capital	16,732,810,395	17,200,795,453	10,216,921,602	11,011,505,258	10,674,755,054
Dividends paid	1,103,809,239	292,854,172	355,452,806	385,809,136	186,870,622
Dividends paid per share	51.03	12.55	15.24	16.61	8.04
Net profit	747,246,272	2,684,456,626	–706,925,987	733,993,550	934,398,300
Weighted average actual cost of attracted credits and loans	7.87%	5.16%	6.06%	5.52%	6.21%

Source: compiled by the authors based on the financial statements of PJSC Gazprom: (PJSC GAZP 2022a, pp. 10, 12, 20, 66; 2022b, pp. 13, 16, 23, 129; 2018, pp. 13, 16, 23, 129; 2019, pp. 14, 16, 23, 127; 2020, pp. 13–14, 16, 23, 127; 2021, pp. 13–14, 16, 23, 125) (number of reference; page).

It is worth noting the changes in the amount of dividends per share. For 2021, dividends were not paid at all. However, a record number of dividends were accrued in 2022. At the same time, growth in dividend payments was also observed in previous years. As an example, in 2014 and 2015, dividends per share were 7.2 and 7.89 (Brusov and Filatova 2023, p. 146), respectively. And in 2018, the amount of dividends per share had already reached 16.61. In other words, the total amount of dividends paid increased by more than two times in the span of four years.

The years 2020 and 2021 also saw an increase in short-term and long-term liabilities. In part, this trend could have been caused by COVID-19, although in 2018 and 2019, liabilities, both short-term and long-term, also grew (Kuznecova Irina Vadimovna 2020, p. 1407).

Before proceeding to the calculation of the weighted average cost of capital, it was first necessary to obtain the values of the main indicators presented in the formulas below (Table 2).

Table 2. Indicators used in the calculation of WACC.

Indicator	2022	2021	2020	2019	2018
Leverage ratio—L	0.4363	0.4484	0.5382	0.4476	0.4861
Capitalization—V (mil. rubles (RUB))	24,033,801,131	24,913,179,511	15,715,516,759	15,939,804,726	158,641,32,958
Weight of debt capital—w_d	30.38%	30.96%	34.99%	30.92%	32.71%
Weight of equity capital—w_e	69.62%	69.04%	65.01%	69.08%	67.29%
Cost of debt—k_d	7.87%	5.16%	6.06%	5.52%	6.21%
Cost of equity—k_e	6.60%	1.70%	3.48%	3.50%	1.75%
t	20%	20%	20%	20%	20%

The following formulas were used to calculate the indicators:

$$L = \frac{D}{S} \tag{5}$$

– D is the amount of debt capital (Table 1—total debt capital).
– S is the amount of equity capital (Table 1—total equity capital).

$$V = D + S \tag{6}$$

– V is the capitalization of the company.

$$k_d = \sum_{i=1} k_d^{(i)} * w_d^{(i)} \tag{7}$$

– k_d is the weighted average actual cost of attracted credits and loans. The values for this indicator were taken directly from the financial statements of the company (see Table 3).

Table 3. k_d source data.

	2022	2021	2020	2019	2018
Weighted average actual cost of attracted credits and loans	7.87%	5.16%	6.06%	5.52%	6.21%

Source: calculated based on official financial reports of PJSC Gazprom.

$$k_e = \frac{div}{S} \tag{8}$$

– div is the amount of dividends paid (Table 1—dividends paid).

It is worth noting that in 2020, the cost of equity decreased and then increased significantly in 2021. In some other works, it is noted that k_e grew precisely during the COVID-19 period. However, the results obtained in this case show the opposite. This could be due to the fact that significant changes occurred around the end of 2020/beginning of 2021. Some papers choose different interpretations of the relevant period for these changes.

Compared to the data from the 2011 analysis conducted by Ak Bars Finance, the share of borrowed funds (previously 20/80) has increased (Brusov et al. 2023). The cost of both own (2011—12.2%) and borrowed (2011—6.6%) funds has also become lower.

4. WACC—Traditional Approach

When finding the WACC (weighted average cost of capital) according to the traditional approach (excluding the tax shield), the Formula (1) was used:

$$WACC = w_e * k_e + w_d + k_d$$

where w_e (w_d) is the share of equity (borrowed) funds, and k_e (k_d) is the cost of equity (borrowed funds). As a result, the following WACC values (in fractions) were obtained:

Compared to the other studies on this topic, the obtained WACC values may seem somewhat lower in comparison (see Table 4). However, the general growth/decline dynamics are very similar. For comparison, the following values were taken from two other papers that also covered the cost of capital for Gazprom:

Table 4. WACC (traditional approach).

Traditional Approach	2022	2021	2020	2019	2018
WACC	6.98%	2.77%	4.38%	4.13%	3.21%

2019: 5.5% (Petrova et al. 2020, p. 7)/6.96% (Ivashechkina and Vasilyeva 2022, p. 6)
2020: 5.8% (Ivashechkina and Vasilyeva 2022, p. 6)

In the case of the tax shield approach, a tax interest rate (t) equal to 20% was also used to find the WACC values for each year (Formula (2)):

$$WACC_t = w_e * k_e + w_d * k_d * (1 - t)$$

According to the data obtained (see Table 5), the tax shield did in fact reduce the cost of raising capital for the company.

Table 5. WACC (traditional approach—with tax shield).

Traditional Approach	2022	2021	2020	2019	2018
WACC(t)	6.50%	2.45%	3.96%	3.79%	2.80%

Regression analysis can be performed to determine k0. The value of the Y intersection will provide us with an approximate value of WACC in the case of a total absence of debt capital (L = 0). The regression results are presented in Table 6:

Table 6. Regression results.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.25421							
R Square	0.064623							
Adjusted R Square	−0.24717							
Standard Error	0.046738							
Observations	5							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	0.000453	0.000453	0.207262	0.67985			
Residual	3	0.006553	0.002184					
Total	4	0.007006						
	Coefficients	*Standard Error*	*t Stat*	*P–value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.497437	0.061065	8.146075	0.003869	0.303102	0.691772	0.303102	0.691772
WACC	−0.66959	1.470791	−0.45526	0.67985	−5.35031	4.01112	−5.35031	4.01112

According to the results of this regression, the value of k0 in the case of the traditional approach is 4.97%.

5. Alternative Approaches to the Definition of k0

The values of k0 can also be determined by using an alternative approach in the form of the Modigliani–Miller and BFO theories.

In the case of these approaches, we refer to WACC values obtained using the traditional approach. With the WACC values given, we are able to determine k0 values for each year.

In the MM approach, the following formula was applied:

$$WACC = k_0 * (1 - w_d * t)$$

Based on this formula, k0 can be defined as $k0 = WACC/(1 - w_d * t)$ (Table 7)

Table 7. k0 (MM approach).

	2022	2021	2020	2019	2018
k0—MM	6.93%	2.62%	4.26%	4.04%	3.00%

In the case of the BFO approach, the following formula was used:

$$\frac{1 - (1 + WACC)^{-n}}{WACC} = \frac{1 - (1 + k_0)^{-n}}{k0 * \left[1 - w_d * T\left(1 - (1 + k_d)^{-n}\right)\right]} \tag{9}$$

Due to the more complex structure of this formula, it was not possible to directly calculate k0. The Solver function of Microsoft Excel allowed us to determine the right values of k0, given the constraints of the formula and existing indicators.

Thus, the following k0 values were obtained (Table 8):

Table 8. k0 (BFO approach).

	2022	2021	2020	2019	2018
k0—BFO	3.25%	4.20%	4.48%	2.86%	7.08%

The following table summarizes the results of different approaches used in the course of determining the value of k0 (Table 9):

Table 9. Main results for k0.

	2022	2021	2020	2019	2018
k0—traditional approach	4.97%	4.97%	4.97%	4.97%	4.97%
k0—MM	6.93%	2.62%	4.26%	4.04%	3.00%
k0—BF0	3.25%	4.20%	4.48%	2.86%	7.08%

The data presented in this table show that there is indeed a difference in k0 values between the Modigliani–Miller and BFO approaches, although the dynamics of growth and decline are similar in places. The value of k0 in the traditional approach seems to lie somewhere in the middle of the extreme values of the other two approaches.

As expected, there are some differences between the results for the BFO and MM approaches. In the case of 2018, the BFO approach gave us a much higher value of k0. From 2019 to 2021, the dynamics of decline and growth are quite similar, though the actual differences in values are noticeable. For 2022, the BFO approach predicts a much more subdued value of k0 compared to the MM approach. This is not surprising, given that the former theory takes significantly more factors into account.

Judging by the results of the analysis, in the period from 2018/2019 to 2020, there was a gradual increase in k0 values, which is most likely due to smaller dividend payments and a partial decline in the total amount of equity capital. But by the end of 2021, due to the announced temporary refusal to pay dividends, the value of k0 had decreased. In the case of the MM approach, the value of k0 increased—most likely due to the record dividend payouts. But if we are to look at the BFO approach, it can be seen that a decline was predicted instead, which makes more logical sense.

6. WACC

The values for WACC in the case of the traditional/classic approach have already been showcased previously. In the case of the MM and BFO theories, the average values of k0, equal to 4.17 and 4.37%, respectively (the average values of k0 from the previous sections), were chosen.

Table 10 shows the WACC values in the case of both MM and BFO approaches for the period from 2018 to 2022:

Table 10. WACC.

	2022	2021	2020	2019	2018
MM	4.44%	4.45%	4.48%	4.44%	4.46%
BFO	3.90%	3.95%	3.86%	3.93%	3.88%

According to these data, the values for WACC are quite similar in the case of both of these approaches. The dynamics are comparable as well. It appears that in 2020, there was a drop due to the COVID-19 pandemic and then a subsequent recovery in 2021. Changes in 2022 are quite small in comparison to the previous year-on-year dynamics.

Table 11 showcases calculated capitalization for the same period. In this case, capitalization is calculated as the sum of total debt and equity finance. Capitalization is measured in thousands of rubles (RUB) as a sum of both debt and equity capital.

Table 11. V (capitalization).

	2022	2021	2020	2019	2018
V	24,033,801,131	24,913,179,511	15,715,516,759	15,939,804,726	15,864,132,958

As can be seen in this table, the total capitalization of Gazprom kept growing from 2018 all the way to 2021, although there was a small decline in 2020, no doubt connected to the coronavirus pandemic. The decline in 2022, however, was more significant. This can be explained by the simultaneous decrease in both equity and debt capital—perhaps due to limited access to foreign capital after the enforcement of anti-Russian sanctions.

Table 12 presents the calculated values of the cost of equity capital. Ke (the cost of equity) is calculated as the amount of dividends paid divided by the total value of equity capital of the given company. It is worth noting that no dividends were paid for 2021 (this does not mean that no dividend payments were made during that year, only that in the subsequent years no dividends would be paid for the results of that year). However, the amount of dividends paid in 2022 surpassed all previous Gazprom records.

Table 12. k_e (cost of equity).

	2022	2021	2020	2019	2018
k_e	6.60%	1.70%	3.48%	3.50%	1.75%

As can be seen here, the cost of equity decreased significantly in 2021, perhaps coinciding with the recovery after the COVID-19 pandemic. However, in 2022 it rose all the way to 6.6%. This could be due to the much more restricted access to foreign capital.

7. Assessment of PJSC Gazprom Key Financial Indicators

Below is an assessment of key financial indicators, such as the cost of raising capital, the value of the company, and the cost of equity. The results obtained are of forecast value, allowing a forecast of the values of financial indicators based on the particular capital structure of PJSC Gazprom.

The k0 values from row three (k0—BF0) of Table 8 were taken as k0 because the BFO method is most accurate.

Further, substituting k_0 into the formulas below, we obtain the dependences WACC(L), V(L), and ke(L) on leverage level, L (see Table 13 and Figures 1–4).

$$\frac{1-(1+WACC)^{-n}}{WACC} = \frac{1-(1+k_0)^{-n}}{k_0 \cdot \left(1 - w_d t\left[1-(1+k_d)^{-n}\right]\right)} \tag{10}$$

$$V = \frac{CF}{WACC} \cdot \left(1-(1+WACC)^{-n}\right) \tag{11}$$

$$k_e = WACC \cdot (1+L) - L \cdot k_d \cdot (1-t) \tag{12}$$

Table 13. Dependence of WACC(L), V(L), and ke(L) of PJSC Gazprom on leverage level, L, for 2018–2022, using the above obtained values of k0.

| Year	L	k0	WACC	V	ke
2018	0	0.0708	0.0708	10,811,081,703	0.0708
2018	1	0.0708	0.0620	11,723,428,228	0.0743
2018	2	0.0708	0.0590	12,062,801,619	0.0775
2018	3	0.0708	0.0574	12,239,870,135	0.0808
2018	4	0.0708	0.0565	12,348,727,577	0.0839
2018	5	0.0708	0.0559	12,422,358,183	0.0871
2019	0	0.0286	0.0286	13,335,415,043	0.0286
2019	1	0.0286	0.0220	14,420,844,582	−0.0002
2019	2	0.0286	0.0197	14,822,999,790	−0.0292
2019	3	0.0286	0.0185	15,032,554,797	−0.0583
2019	4	0.0286	0.0179	15,161,224,027	−0.0874
2019	5	0.0286	0.0174	15,248,202,302	−0.1165
2020	0	0.0448	0.0448	−10,946,748,848	0.0448
2020	1	0.0448	0.0374	−11,893,181,468	0.0262
2020	2	0.0448	0.0348	−12,246,149,485	0.0075
2020	3	0.0448	0.0335	−12,430,586,553	−0.0114
2020	4	0.0448	0.0327	−12,543,906,793	−0.0302
2020	5	0.0448	0.0322	−12,620,678,887	−0.0491
2021	0	0.0420	0.0420	43,717,449,686	0.0420
2021	1	0.0420	0.0352	47,290,461,549	0.0292
2021	2	0.0420	0.0329	48,614,972,432	0.0162
2021	3	0.0420	0.0318	49,305,414,921	0.0032
2021	4	0.0420	0.0311	49,729,290,651	−0.0099
2021	5	0.0420	0.0306	50,015,722,166	−0.0229
2022	0	0.0325	0.0325	13,897,883,868	0.0325
2022	1	0.0325	0.0252	15,253,687,544	−0.01264
2022	2	0.0325	0.0226	15,766,373,287	−0.05804
2022	3	0.0325	0.0213	16,035,830,329	−0.1035
2022	4	0.0325	0.0206	16,201,943,176	−0.14899
2022	5	0.0325	0.0200	16,314,702,548	−0.1945
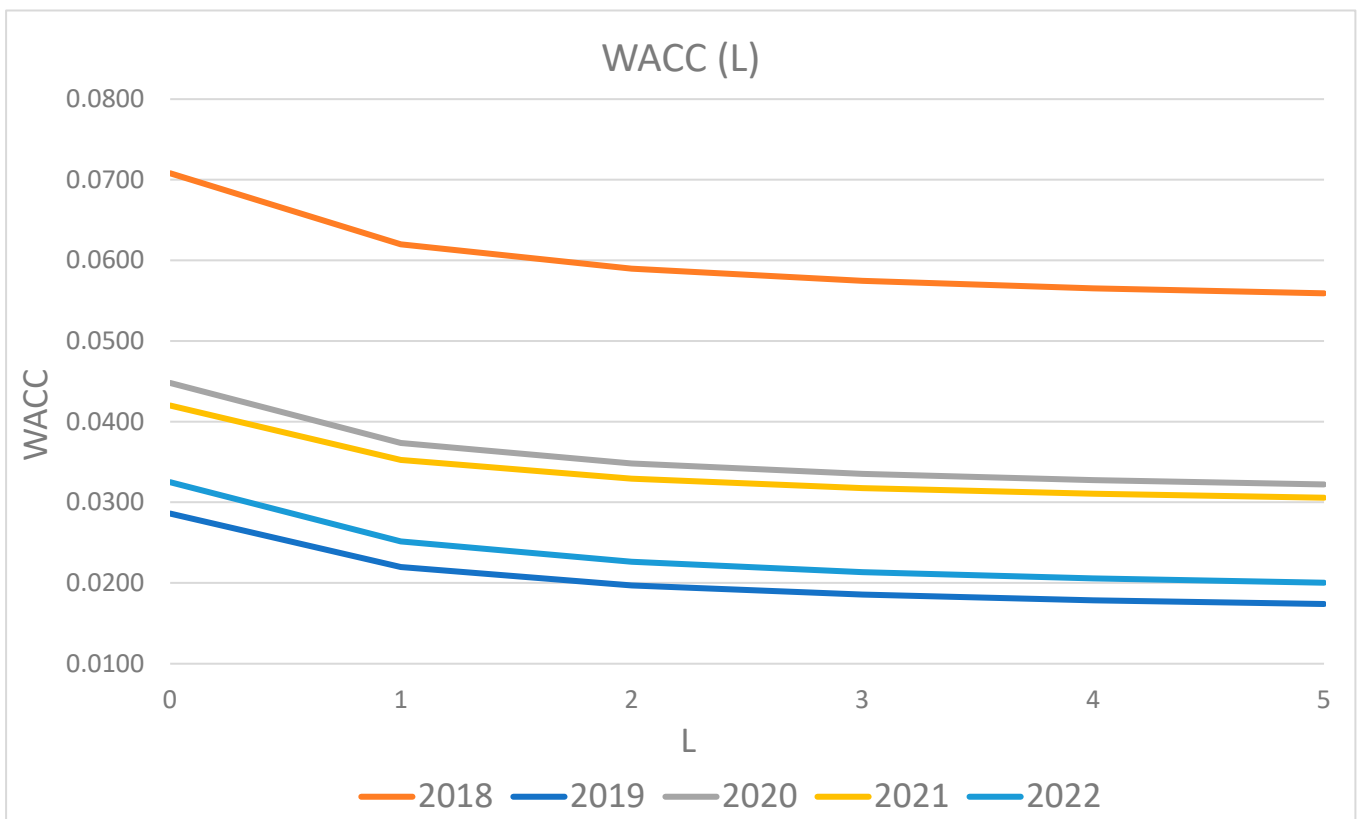
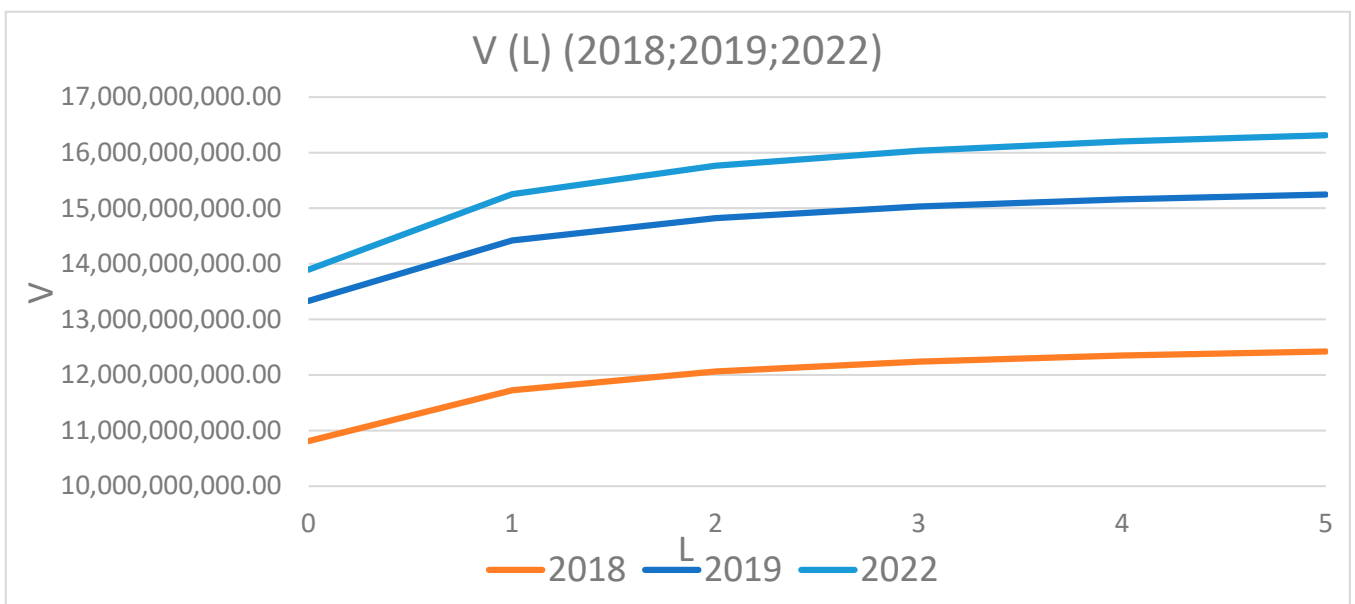**Figure 1.** Dependence of WACC(L) of PJSC Gazprom on leverage level, L, for 2018–2022.

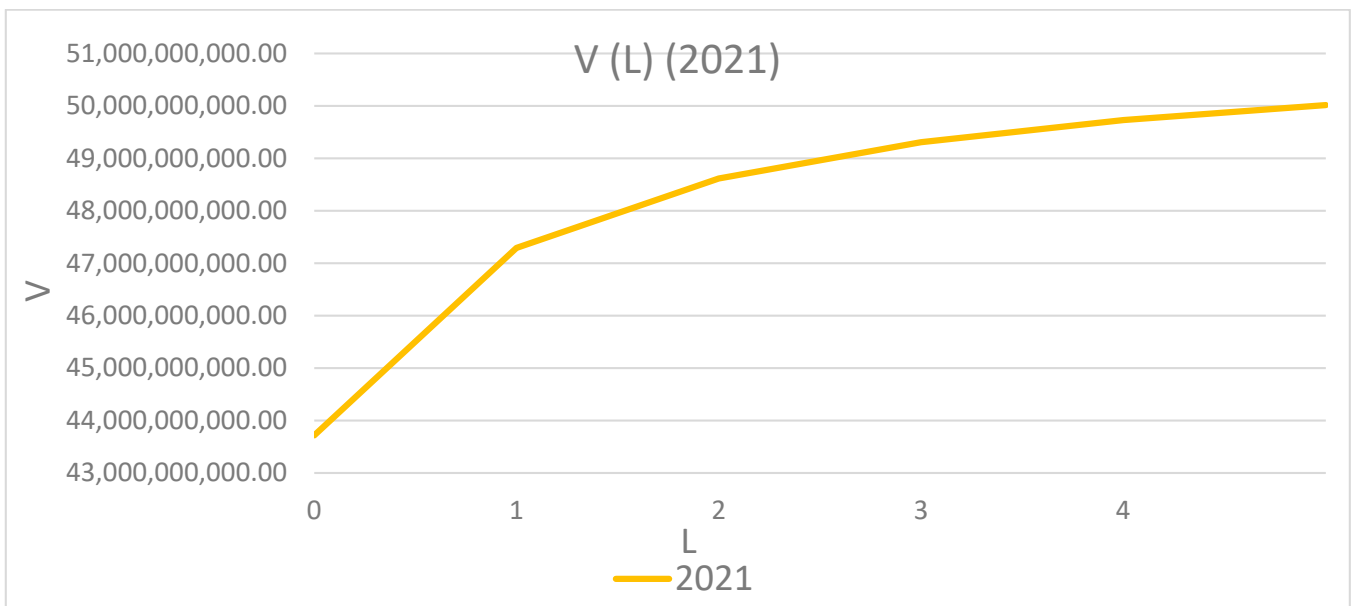**Figure 2.** Dependence of PJSC Gazprom value, V(L), on leverage level, L, for 2018, 2019, 2020.

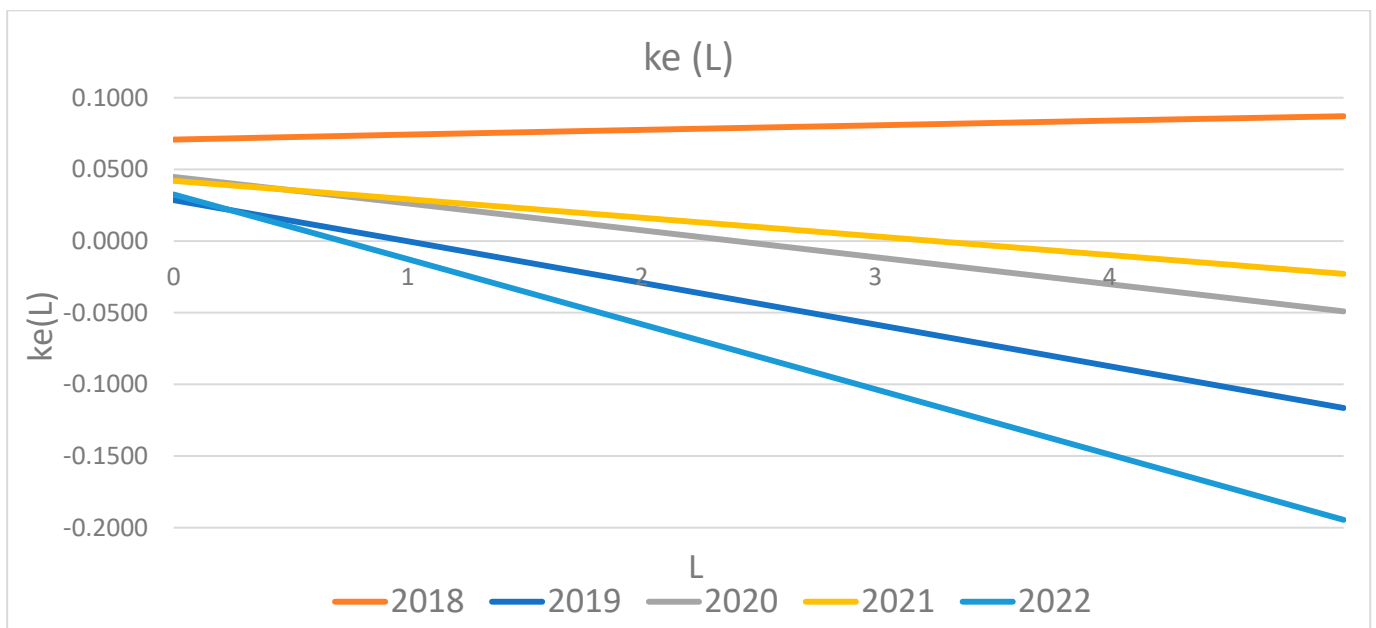**Figure 3.** Dependence of PJSC Gazprom value, V(L), on leverage level, L, for 2021.

Figure 4. Dependence of equity cost, ke(L), of PJSC Gazprom on leverage level, L, for 2018–2022.

Figure 1 shows that WACC decreases with leverage level, L, at all years. This leads to an increase in the value of the company V(L) with leverage level, L (see Figure 2). Points from which WACC starts to decrease with leverage level, L, depend on the values of k_0.

Figure 2 shows that values of the company V(L) increase with leverage level, L. Points from which V(L) starts to increase with leverage level, L, depend on the values of k_0 and correspond to points from which WACC starts to decrease (see Figure 1).

We show the dependence of PJSC Gazprom value, V(L), on leverage level, L, for 2021 separately in Figure 3, since the V(L) value for 2021 is significantly higher (more than three times) than for other years.

Figure 4 shows that the cost of equity, ke, decreases linearly with leverage level, L, in all years except 2018. The negative slope ke(L) is explained by the fact that the cost of debt k_d is greater than k0.

8. Conclusions

Gazprom is one of the biggest oil and gas companies in Russia. Before the beginning of the SMO, Russia supplied ~46.8% of gas to the EU countries.

In this paper the following methodology has been developed: using the data of the financial report and statistical data, we estimate the value of WACC using three methods: the empirical traditional approach, the Modigliani–Miller (MM) approach, and the Brusov–Filatova–Orekhova (BFO) theory. Based on the found values of WACC, the parameter k0 is estimated. The results of all three methods are compared. Knowing the parameter k0 value and some other parameters, such as the cost of debt, the level of debt burden, the tax rate, etc., we evaluate the main financial indicators of PJSC Gazprom. The assessment of the financial performance of PJSC Gazprom was carried out in the framework of modern theories of the cost of capital and capital structure: the Brusov–Filatova–Orekhova (BFO) theory and the Modigliani–Miller (MM) theory. Various methods for estimating the cost of raising capital (the cost of equity and WACC) are discussed and applied. The analysis is based on data from official financial statements of PJSC Gazprom for the period from 2018 to 2022. Using the calculated values of k0, we estimated the main financial indicators, such as the cost of raising capital, the value of the company, and the cost of equity. The dependences of k0, k_0^*, WACC(L), V(L), and ke(L) of PJSC Gazprom on leverage level, L, for 2018–2022 have been investigated. These indicators help us understand how external market shocks affect the company—whether in terms of the cost of capital attraction or in its dividend payout structure. The indicators also help us to understand how the different possible changes in its capital structure could affect its main financial indicators.

Based on the results of the analysis, all three approaches provide us with different interpretations of the financial status of PJSC Gazprom.

The traditional approach seems to be the most limited one. The MM theory is much more nuanced. However, it is superseded by the BFO approach. Despite this, the results obtained from the latter two approaches have both significant similarities and differences. Both show the changes correlating to the COVID-19 pandemic, as well as the anti-Russian sanctions in 2022.

Nevertheless, this similarity only shows that the BFO approach provides the most accurate interpretations without going to extremes. Its similarities to the results of the MM theory may simply be due to the fact that the source data obtained from the financial reports are more than enough to draw a clear picture of the financial situation of the company.

Our results also show the following.

The company has been severely and negatively affected by the COVID-19 pandemic due to the collapse of energy demand and supply chains.

The company did not see much downturn due to the SMO and anti-Russian sanctions. Many European countries still have a high demand for Russian gas. However, it is certain that the sanctions introduced additional hurdles to the supply and payment processes. Moreover, the company is likely to seek out new markets to which it can branch out.

The following can be considered as positive factors of the current situation of decreasing gas demand: (1) at the country level, this has led to greater access to gas for the population and wider gasification of the population; (2) at the international level, this has led to a change in the logistics of supplies and the redirection of gas flows to the East and Asia.

The results obtained are of forecast value, allowing a forecast of the values of financial indicators based on the particular capital structure of PJSC Gazprom.

The approach developed, which includes the correct assessment of the main parameter ko and, once that is known, the assessment of all the main indicators of the company, can be useful for assessing the financial performance of any company and forecasting its financial condition.

Forecasting the financial condition of PJSC Gazprom can be implemented as follows.

We studied the debt dependence of the main financial indicators. If we could predict the level of leverage in the future (this is standard planning), we could estimate all the

main indicators (the cost of equity, ke, WACC, company value V (L), etc.) using the debt dependencies of the main financial indicators.

Appendix A

Main theories of capital structure.

Historically, the first quantitative theory of capital structure was the Modigliani—Miller theory. One of the most important restrictions of the Modigliani—Miller theory is that all financial flows and all companies are present in perpetuity. In 2008, this limitation was lift out by Brusov–Filatova–Orekhova, who created the BFO (Brusov–Filatova–Orekhova) theory—a modern theory of capital cost and capital structure for companies of arbitrary age.

There are two versions of the Modigliani–Miller theory: without taxes and with taxes. Without taxes, the following expressions are for V, $WACC$, and k_e:

$$V = V_0 = \frac{EBIT}{k_0}, \tag{A1}$$

where V_0 stands for the unlevered company value, EBIT stands for earnings before interest and taxes, and k0 stands for the equity cost at zero leverage level, L.

From (A1), one obtains the weighted average cost of capital, WACC:

$$WACC = k_0 \tag{A2}$$

From the expression for WACC

$$WACC = k_0 = k_e w_e + k_d w_d. \tag{A3}$$

and accounting (A1), one obtains the equity cost, k_e:

$$k_e = \frac{k_0}{w_e} - k_d \frac{w_d}{w_e} = \frac{k_0(S + D)}{S} - k_d \frac{D}{S} = k_0 + (k_0 - k_d)\frac{D}{S} = k_0 + (k_0 - k_d)L \tag{A4}$$

Here, D stands for debt capital value; S stands for equity capital value; k_d and w_d stand for the cost and share of the company's debt capital; and k_e and w_e stand for the equity capital cost and share. It is seen from (A4) that the equity increases linearly with the leverage level.

The Modigliani–Miller theory with taxes.

Within the framework of the Modigliani–Miller theory with taxes (Brusova 2011), the following expression was postulated for the value of a company using borrowed funds, V:

$$V = V_0 + D \cdot t. \tag{A5}$$

The expression for WACC immediately follows from (A5):

$$WACC = k_0 \cdot (1 - w_d t) \tag{A6}$$

The following formula for the cost of equity, ke, can be obtained from (A6) within the framework of the Modigliani–Miller theory with taxes:

$$k_e = k_0 + L \cdot (k_0 - k_d)(1 - t) \tag{A7}$$

Two formulas (A7) (MM with taxes) and (A4) (MM without taxes) differ by the multiplier $(1 - t)$, called the tax corrector. It is less than the unit; thus, the ke(L) curve slope decreases when accounting for the taxes.

The restriction associated with the infinite life of companies and the eternity of cash flows within the framework of the MM theory was removed in 2008 by Brusov, Filatova, and Orekhova, who created the modern theory of the cost of capital and capital structure—the BFO theory, which is valid both for companies of arbitrary age and for companies with an arbitrary lifetime. A generalization of the assessment of the tax shield (TS) and the value of the company without leverage V_0 and with leverage V was required to modify the theory of MM (see the formulas below):

$$TS = k_d DT \sum_{t=1}^{n} (1 + k_d)^{-t} = DT \left[1 - (1 + k_d)^{-n} \right]. \tag{A8}$$

$$V_0 = CF \left[1 - (1 + k_0)^{-n} \right] / k_0; \ V = CF \left[1 - (1 + WACC)^{-n} \right] / WACC. \tag{A9}$$

$$\frac{1 - (1 + WACC)^{-n}}{WACC} = \frac{1 - (1 + k_0)^{-n}}{k_0 \left[1 - \omega_d T \left(1 - (1 + k_d)^{-n} \right) \right]}. \tag{A10}$$

Here, S stands for the equity capital value, $w_d = \frac{D}{D+S}$ stands for the debt capital share, $k_e, w_e = \frac{S}{D+S}$ stands for the equity cost and the equity capital share, and $L = D/S$ stands for the value of financial leverage. D stands for the debt capital value.

The results of the modern BFO theory turn out to be quite different from the results of the Modigliani–Miller theory. They show that the latter, through its perpetuity, underestimates the weighted average cost of capital and the cost of equity of the company and significantly overestimates the company's capitalization.

Such an incorrect assessment of key performance indicators of companies' financial performance led to an underestimation of the associated risks and the impossibility of, or serious difficulties in, making adequate management decisions, which were among the implicit causes of the 2008 global financial crisis.

Within the framework of the new theory of capital cost and capital structure (BFO theory), many qualitatively new results have been obtained.

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