DOI: https://doi.org/10.17323/j. jcfr.2073-0438.20.3.2025.82-98
JEL classification: G30

The Determinants of the Capital Structure of Russian Companies against the Backdrop of Financial Turbulence: Empirical Analysis Based on Panel Data

Andrei Ankudinov ✉
PhD in Physics and Mathematics, Associate Professor at the Department of Corporate Finance Management, Kazan Federal University, Kazan, Russia, ABAnkudinov@kpfu.ru, ORCID

Alina Akhmityanova
Consultant at "Technologies of Trust – Audit" JSC, Kazan, Russia, ahmityanova01@mail.ru, ORCID

Abstract

The study presents the empirical analysis of capital structure determinants of Russian companies aimed at the investigation of practical applicability of theoretical approaches amid financial turbulence. Empirical estimates presented in this paper are obtained through panel data statistical analysis (panel regression); the sample comprises data covering the 2000–2022 period for 1200 companies in the non-financial sector of the national economy. When calculating the dependent variable – leverage – both market-based and balance sheet estimates are used. The results show that it is impossible to single out a unique approach to capital structure decisions since the signs of the coefficients at traditional capital structure determinants that were proven to be statistically significant in the models under consideration are consistent with both trade-off and pecking order theories. The main hypothesis of the research was confirmed: when it comes to capital structure, Russian companies follow the approach of raising debt only when internal funds become insufficient, while at the same time supporting the balance between the risk of loss of financial independence and the benefits of debt financing. To test the obtained empirical results for robustness, the models of relations between Russian companies' capital structure and the determinants under consideration were analyzed separately for crisis and pre-crisis periods. Although certain changes in regression coefficients were observed, the impact of all major determinants appeared to be consistent and not dependent on the economic cycles. Alongside traditional statistically significant determinants, exchange rate volatility was introduced. It proved to be significant at a 10% level in the fixed effects model using balance sheet estimates. Subdivision of the sample into two subsamples depending on the public status of companies rendered no substantial impact on the major capital structure determinants with the exception of debt tax shield and exchange rate volatility estimates.

Keywords: capital structure, theories of capital structure, financial leverage, emerging markets, pecking order theory, trade-off theory

For citation: Ankudinov A., Akhmityanova A.(2025) The Determinants of the Capital Structure of Russian Companies against the Backdrop of Financial Turbulence: Empirical Analysis Based on Panel Data. *Journal of Corporate Finance Research.* 20(3): 82-98. https://doi.org/10.17323/j. jcfr.2073-0438.20.3.2025.82-98

Introduction

The problem of capital structure management is one of the most significant and debatable ones in corporate finance. Academic and, now to a greater extent, scholarly literature describes in detail relevant theories that have become classical. Also, it is important to understand that the formation of capital structure in certain cases is spontaneous; subjects of financial management do not always act reasonably and in line with conceptual approaches. Consequently, empirical studies also show rather ambiguous results both for developed and emerging capital markets. Apart from internal determinants, external factors that are beyond the control of corporate management may also influence capital structure. In modern Russia, external factors comprise periodical turbulence of different types in the global financial markets, unprecedented sanctions pressure, freezing of foreign investments and currency reserves, high interest rate volatility, etc. It is necessary to conduct statistical analysis based on panel data modeling, in particular, for the impact of these factors caused by various crises in order to reveal the specific features of formation of the financing structure for Russian companies in present-day conditions.

Actually, the polemical nature of the problem does not only concern the formation of a certain ratio between equity and debt funding sources. It is also related to this issue's general relevance: practicing managers often deny that it is necessary to manage capital structure consciously, and decisions are made ad hoc. As a result, the process gets out of control because financing decisions generally take a long time and cannot be adjusted swiftly while crises and shocks arise in unpredictable ways. Besides, in imperfect capital markets (the Russian market being one of them) financing decisions are often interrelated with investment decisions and the objective of formation of shareholder value is not specified explicitly.

Overall, global and, since recently, domestic literature has accumulated a rather representative body of studies dedicated to formation of the structure of financing sources for commercial organizations. Apart from the performative acknowledgement of seminal publications, the review below emphasizes only the empirical studies relevant for this research.

The purpose of this paper is to carry out empirical analysis based on bulk data, applicability of the main capital shareholder value creation models for Russian companies in pre-crisis and crisis periods.

The paper conceptualizes the change in the classical determinants of corporate capital structure depending on the amount of leverage against the background of financial restrictions caused by macroeconomic shocks. It seems that our statistical study may make a contribution to the accumulation of empirical evidence related to the dynamics of corporate capital structure in terms of institutional specifics of the Russian market. Econometric modeling integrates the generalized analysis of micro- and macro-estimates of the capital structure factors. The authors concentrate on replicability and robustness of empirical estimates by adding a wide range of independent and control variables, mitigating the impact of the potential endogeneity problem by means of applying econometric analysis to long-term panel data.

Literature Review and Working Hypotheses

Literature dedicated to corporate finance singles out a range of approaches to the study of the issues of management of the corporate financing structure that comprise the traditional approach [1], trade-off theory [2], Modigliani-Miller theories [3; 4], pecking order theory [5; 6] and market timing theory [7]. The key objective of the theories is to explain how the decisions on raising financial resources are made and how the presence of borrowed funds influences the cost of invested capital and consequently, the current company valuation.

Research by S. Myers and L. Shyam-Sunder is one of the earliest studies that tested theories empirically [8]. According to the authors, the pecking order theory, which substantiates financing using external debt, possesses greater explanatory power than the static trade-off theory.

M. Frank and V. Goyal conducted a more extensive empirical verification of the pecking order theory [9; 10]. They analyzed two time intervals using data on 768 American companies and concluded that the theory's applicability was confirmed for the period of 1971–1989, however, for the period of 1990–1998, the pecking order theory was no longer as closely aligned with practice.

Polling of chief financial officers from 192 publicly traded British companies carried out in paper by V. Beattie, A. Goodacre and S. Thomson [11] showed that for approximately half of the respondents the target debt level, determined by balancing the financial distress costs and the tax shield, was important. At the same time, 60% of respondents said that they were prone to follow the pecking order theory when forming the capital structure and rank the degree of funding sources' attractiveness according to it. It is important that financial managers do not consider these theories mutually exclusive.

Research by A. Iqbal and O. Kume [12] studies the influence of a financial crisis on capital structure decisions. Their sample comprises 871 non-financial companies from the UK, 564 – from France and 392 – from Germany. The time interval of data spans from 2006 to 2011. In general, the results show that the financial crisis of 2007–2008 had a significant impact on companies' leverage ratios both in the market-based (UK) and bank-based economies (Germany and France).

As compared to the papers dedicated to the analysis of developed markets, present studies based on data from emerging markets are of greater relevance. Such studies need to take into consideration the impact of a range of factors that characterize the emerging financial markets. Such determinants comprise limited access to capital markets, more pronounced information asymmetry, signif-

icant agency costs and financial distress costs, as well as macroeconomic risks caused by the aggravation of the general economic situation and its constant changes.

S. Bhaduri [13] tested the dynamic pecking order theory on the basis of a sample of 363 Indian companies. According to the obtained results, growth opportunities, company size, cash flow amount, industry characteristics and the unique nature of the company may influence the choice of the optimal capital structure. S. Bhaduri [13, p. 664] points out that although the constructed five-factor model is moderately in line with data, the results are also consistent with many other existing theories of capital structure. The revealed dependence of the debt level on shortage of cash is a significant finding of the research. This supports the pecking order theory [14, p. 49].

A. Pahuja and A. Sahi [15, p. 76] put forward the assumption of simultaneous adherence to the pecking order theory and the market timing theory [15, p. 76]. The models constructed on the basis of data from the 30 largest public Indian companies for 2008–2010 confirmed the statistical significance of the impact of growth potential and liquidity level on the debt-to-equity ratio.

K. Bulent, C. Orman and A. Oduncu [16] conducted an empirical study of the determinants of the capital structure using data on 11,726 Turkish companies. Their conclusions indicate that the trade-off theory better describes the capital structure of the companies different in the size and type of activity than the pecking order theory. Apart from that, they found out that companies also take into account the median financial leverage, which is a component of the market timing theory.

Paper by C. Chang, X. Chen and G. Liao [17], based on data of Chinese companies, studied the traditional determinants of capital structure. Regression analysis of the sample of 13,107 observations for 1998–2009 revealed the significance of such factors as the profitability level, company's growth opportunities, influence of government control, industry-specific leverage, asset structure and company size at the 1% level. Thus, Chinese researchers believe that the pecking order theory prevails.

V. Nazarova and A. Budchenko [18] also studied the management of the corporate financing structure in the Chinese market. Based on the data on 57 Chinese companies and 90 firms operating in other BRICS markets for 2012–2016, the authors conclude that in view of a multidirectional impact of determinants it is not necessary to strictly follow a single classical concept of capital structure.

Particular attention should be heeded to the papers based on data about Russian companies. This will reveal the specific features of determining the factors that influence their financing structure formation. Among Russian authors, empirical analysis in the field of management of the corporate financing structure was performed by I.V. Ivashkovskaya and M.S. Solntseva [19], A.B. Ankudinov and O.V. Lebedev [20], N.A. Shakhina and M.S. Kokoreva [21] as well as other authors.

Paper by I.V. Ivashkovskaya and M.S. Solntseva [19] is one of the studies focused on empirical verification of the trade-off theory and the pecking order theory. Based on the panel data on 62 companies for 2002–2005, the authors tested the significance of such factors as profitability, asset structure, risk level, and size, and concluded that it was impossible to reject either of the considered theories and adopt a single theory that would perfectly describe the behavior of large public Russian companies when they choose sources of financing.

Research by N.A. Shakhina and M.S. Kokoreva [21] proves the applicability of the dynamic trade-off theory to be practically relevant. The theoretical approach was tested empirically using data about 56 non-financial companies for 2004–2008. According to the results, the essence of capital structure management lies in the search for the interval of optimal values of financial leverage instead of achieving its target level because, according to the dynamic trade-off theory, managers also take into consideration recapitalization expenditures along with costs and benefits of the optimal debt-to-equity ratio.

A study published in 2012 was based on the empirical verification of the capital structure factors of companies from several Russian regions [20]. The authors – A.B. Ankudinov and O.V. Lebedev – tested the key factors of financing structure formation on the basis of data from 600 non-financial companies in the Volga Federal District. The obtained results confirmed the significance of return on sales for all regions except for the Republic of Bashkortostan. The sign of the coefficient is negative, which is in line with the trade-off theory.

Paper by M. Klestov and I. Jindrichovska [22], based on regression analysis of traditional academic theories regarding the capital structure, also evaluated the statistical significance of a range of factors using data on 753 Russian and 292 Brazilian companies for 2020. The obtained results show that individual sets of determinants differ significantly in the explanatory power and produce a non-uniform effect when Russian and Brazilian companies are compared.

Decisions related to the financing structure are, first of all, premised on maximizing the companies' market value. Therefore, decisions related to the capital structure of small and medium-size publicly traded enterprises are considered quite rarely in the contemporary finance theory. Paper by N.S. Khotunova, A.I. Mikheev, E.D. Udaltsova and E.O. Ganazhukova [23] is a publication that explores the special features of capital structure management in small and medium-size enterprises. They verified the significance of classical determinants on the basis of panel data for 2019–2021 of 3,977 small and medium-sized companies. The obtained results show that size, age, profitability and asset structure are the determining factors in shaping the financing structure of Russian small and medium-sized enterprises. The signs of the variables' coefficients confirm the pecking order theory.

Empirical testing of the hypotheses describing the nature of dependence of the financial leverage level on tradi-

tional determinants during and after a financial crisis in the domestic market is assumed as a basis for research by V.V. Metel'skaya [24]. Data on 49 public joint-stock companies for 2011–2017 was used for econometric analysis. The author detected a negative dependence between the resultant debt variable and company size. This complies with the pecking order theory. Significance of macroeconomic factors included in the model was also confirmed.

E.A. Fedorova, M.O. Bakanova and E.S. Tepikina [25] raised the issue of the impact of capital structure on performance of Russian companies. The paper tested the hypothesis of a negative dependence of company profitability on debt value in the financing structure by applying regression analysis of panel data for 2020–2022. However, based on the obtained results the hypothesis was rejected – an increase in financial leverage has a positive impact on company performance.

Our review of empirical studies dedicated to capital structure management in developed and emerging markets allows us to put forward a number of hypotheses that will be tested below.

Hypothesis 1. With respect to capital structure formation, Russian companies follow the principle of attracting borrowed funds only out of need that arises as a result of insufficient internal resources. The trade-off between the risk of losing financial independence and advantages of attracting debt financing is maintained.

This hypothesis will be confirmed if the results of econometric modeling will show that enterprises follow both the trade-off and the pecking order theory.

As mentioned previously, S. Bhaduri [13], V. Beattie, A. Goodacre and S. Thomson [11], I.V. Ivashkovskaya and M.S. Solntseva [19], V. Nazarova and A. Budchenko [18], M. Klestov and I. Jindrichovska [22] obtained a similar result in their studies.

Hypothesis 2. The tax shield effect may be a factor of attracting debt financing for Russian companies.

This effect is rather strongly pronounced in jurisdictions with a high rate of income tax. However, in contemporary Russia the cause-and-effect relationship may be less pronounced.

Hypothesis 3. Industry-specific features of Russian companies' operation exert a significant impact on their financing structure.

In particular, papers by S. Bhaduri [13], A. Iqbal and O. Kume [12], K. Bulent, C. Orman and A. Oduncu [16] and C. Chang, X. Chen and G. Liao [17] analyzed the influence of this factor on the capital structure in developed and emerging markets.

Hypothesis 4. Financial crisis periods have a negative effect on the financial leverage indicators of Russian companies.

Papers by A. Iqbal and O. Kume [12] and V.V. Metel'skaya [24] studied the influence of crisis periods on the financing structure. However, they failed to get an unequivocal result because the relationship direction depends on the historically developed debt value in the capital structure.

Database, Description of Variables and Research Method

In this research, we applied standard regression analysis of panel data. An evident advantage of panel data analysis is the opportunity to expand the sample significantly by adding multiple observations for each individual component. As a result, an increase in the number of degrees of freedom and a reduction in correlation among the explanatory variables is observed. Consequently, the standard errors of the coefficient estimates are decreased. Apart from that, panel data analysis allows to trace the individual evolution of characteristic features for each individual sample component over a certain period and avoid specification errors caused by omission of significant factors in the model.

In the performed research we applied the pooled regression method, fixed effects model and random effects model.

The dependent variable is represented by the capital structure indicator, i.e., financial leverage calculated as a ratio of borrowed funds to the sum of equity and borrowed funds sources.

Literature determines two main methods for monetary evaluation of equity: the balance sheet and market estimates. The question of which estimates are the best indicators of the process of financing structure formation remains debatable to the present day. Some authors insist on the advantages of balance sheet estimates, asserting that they manifest better managers' actions related to capital structure formation while market indicators often depend on external factors beyond the company's control [14, p. 47]. According to S. Myers [26, p. 575], balance sheet estimates

Table 1. Substantive characteristics of explanatory variables

Indicator	Designation	Description of the indicator
Company size	Size	Natural logarithm of revenue
Company profitability	Profitability	Return on assets
Asset structure	Tangibility	Share of fixed assets in total assets
Company age	CompAge	Number of years since the date of state registration of the legal entity
Debt tax shield	DTShield	Ratio of current income tax to average annual assets

Indicator	Designation	Description of the indicator
Exchange rate volatility	VolatUSD	Variation coefficient of the official exchange rate of the currency pair US dollar/Russian rouble for a corresponding year
Fixed assets growth rate	FixAsGR	Ratio of the change of the book value of fixed assets for a year to their value as at the beginning of the year
Industry-specific effects	Industry_i	Dummy variables for certain types of activity: Industry_1 – extraction of commercial minerals, Industry_2 – agriculture, Industry_3 – machine building, Industry_4 – petrochemical industry, Industry_5 – metallurgical industry, Industry_6 – construction, Industry_7 – power industry, Industry_8 – wholesale and retail
Time effects	Dt_i	Dummy variable for corresponding time periods: Dt_2 – 2001 Dt_3 – 2002 etc.

allow to avoid the impact of market volatility on company value. This is especially important in emerging markets characterized by constant turbulence.

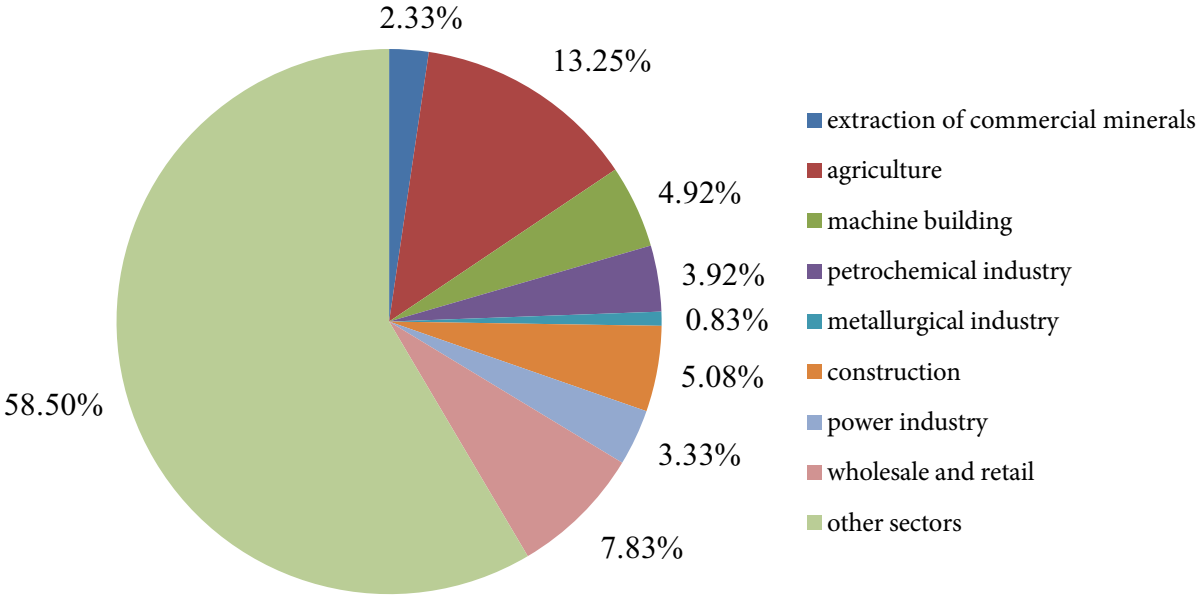
On the other hand, balance sheet estimates are indicative of past decisions while market estimates which, as stated above, are shaped under the impact of external factors, simultaneously indicating the efficiency of the current corporate financial policy.

In our research we are going to use both balance sheet and market monetary estimates of equity.

Analysis of a wide range of empirical studies allows to define some classical determinants of the capital structure. Their significance has been confirmed many times. Such determinants comprise company size and profitability, as well as the asset structure. The trade-off theory and pecking order theory interpret the nature of these factors' impact in different ways. Apart from traditional determinants, which must be present in the model, we test some other factors in this paper. Algorithms for the calculation of independent variables are presented in Table 1.

The list of independent variables is rather standard except for exchange rate volatility. The rationale behind adding this variable is as follows. In the pre-crisis period (2008), Russian companies widely used foreign-currency loans. This was driven by a quite significant foreign exchange

Figure 1. The sample structure of companies by type of activity



premium, which made borrowing substantially cheaper. Besides, a number of companies had an open foreign-currency position that could be managed only with at least a remotely predictable exchange rate. Consequently, we may presume that there is a dependence between a high volatility of the exchange rate and financial leverage.

Base regression to be tested is as follows:

$$FLev_{i,t} = \alpha + \beta_1 \cdot Size_{i,t} + \beta_2 \cdot Profit_{i,t} + \beta_3 \cdot Tang_{i,t} + \\ + \beta_4 \cdot CompAge_{i,t} + \beta_5 \cdot DTShield_{i,t} + \beta_6 \cdot Volat_{i,t} + \\ + \beta_7 \cdot FixAsGR_{i,t} + \varepsilon_{i,t}. \quad (1)$$

Later, the model will be expanded by adding new regressors: we will consider model specifications with dummy variables for the type of activity and time effects.

In the present research, we analyze a sample of data on 1,200 non-financial Russian companies in the period of 2000–2022. Data from financial statements of the analyzed companies was obtained from the SPARK reference data system. The sample structure by type of activity is presented in Figure 1.

In the course of analysis, we excluded extreme values of variables that make the sample nonuniform. In order to conduct a more detailed and high-quality evaluation of the sample, we are going to consider descriptive statistics of the variables presented in Table 2.

On the basis of the obtained data, we may make certain conclusions about the contents and structure of the sample. On average, the analyzed companies implement their financing policy in such a way that the share of borrowed funds amounts to approximately 30–40%. Some of the companies in the sample embrace a conservative financing policy, others – an aggressive financing policy when the share of debt capital amounts to 80%.

There is no strong linear relationship between the explanatory factors chosen for the model. This is confirmed by low values of pair-wise correlation coefficients. Thus, the factors may be added to the regression model without negative consequences.

When building the regression models, we decided to use (robust) standard errors consistent in the presence of heteroscedasticity because heteroscedasticity was detected in the preliminary models. It is defined as variability of error variance or variability of observations.

Analysis Results

Results of econometric modeling are presented in Table 3.

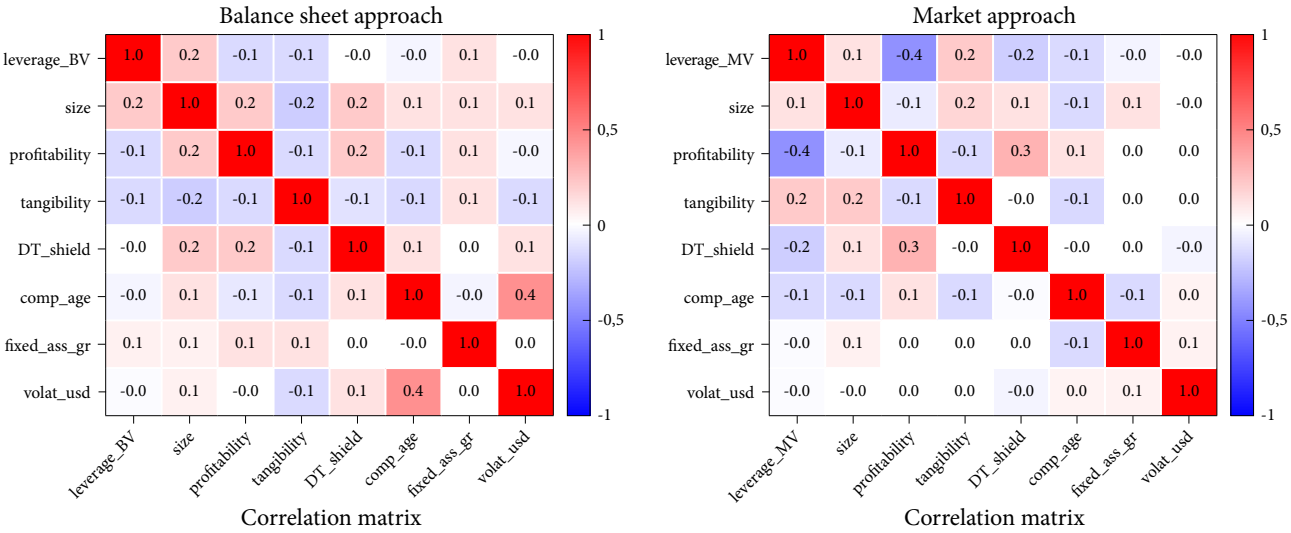
Basing on the obtained results, we can make certain conclusions. First, a positive relationship is revealed between the company size indicator and the share of debt in financing. This is consistent with the trade-off theory, which

Table 2. Descriptive statistics of variables

Variable		Observations	Mean value	Median	Standard error	Minimum value	Maximum value
FLeverage	BSA	26.610	0.3147	0.2835	0.2099	0.0000	0.8049
	MBA	577	0.3923	0.4001	0.2212	0.0001	0.8035
Size	BSA	26.541	18.4070	18.1910	2.4141	6.9078	29.7080
	MBA	577	23.9680	24.1470	2.8225	11.3500	29.7080
Profitability	BSA	26.611	0.0671	0.0387	0.1379	-0.9467	1.5892
	MBA	577	0.0955	0.0636	0.1493	-0.4108	1.3337
Tangibility	BSA	26.605	0.3979	0.3797	0.0438	0.0000	0.9997
	MBA	577	0.3529	0.3348	0.2744	0.0000	0.8972
CompAge	BSA	26.611	17	17	7.3199	0	73
	MBA	577	21.47	22.00	5.18	5.00	31.00
VolatUSD	BSA	26.611	0.0497	0.0248	0.0474	0.0127	0.1999
	MBA	577	0.0649	0.0494	0.0507	0.0182	0.1999
DTShield	BSA	21.849	0.0682	0.0111	0.2666	0.0000	9.4311
	MBA	533	0.2585	0.0703	0.6427	0.0000	6.9107
FixAsGR	BSA	26.234	0.1091	-0.0086	0.5963	-1.0000	9.9367
	MBA	568	0.1429	0.0425	0.6006	-1.0000	8.8224

Notes: BSA – balance sheet approach, MBA – market-based approach.

Figure 2. Correlation matrix of variables



Source: Made in Gretl.

states that large companies are less exposed to the risk of financial imbalance expenditures, hence, they are able to raise more borrowed funds [27; 28]. Papers by I.V. Ivashkovskaya and P.V. Makarov [14], V. Nazarova and A. Budchenko [18], N. Delcoure [29], E.V. Ilyukhin [31] also confirmed a positive impact of company size on debt level. In paper by A.B. Ankudinov and O.V. Lebedev [20], the influence of this indicator was not confirmed unambiguously. Second, negative correlation was detected between the profitability indicator and financial leverage; the coefficient significance was confirmed at the 1% level. The pecking order theory may explain this relationship: highly profitable companies have a minimal need for borrowed funds because the amount of the funds earned by the company is sufficient to finance its operations [6]. A similar result was obtained in papers by I.V. Ivashkovskaya and P.V. Makarov

Table 3. Econometric modeling results

Variable	Pooled regression	FE model	RE model
Balance sheet approach			
Constant	0.0691** (0.0426)	0.0141 (0.8107)	0.0565 (0.1846)
Company size (size)	0.0210*** (5.19e-031)	0.0252*** (2.42e-013)	0.0226*** (1.28e-021)
Profitability	-0.3492*** (1.17e-056)	-0.2395*** (5.74e-051)	-0.2465*** (2.09e-062)
Asset structure (tangibility)	-0.1533*** (4.12e-019)	-0.1868*** (1.17e-024)	-0.1830*** (9.66e-029)
Debt tax shield (dt_shield)	-0.0031 (0.6831)	-0.0198*** (0.0053)	-0.0179*** (0.0089)
Company age (comp_age)	-0.0033*** (9.13e-014)	-0.0042*** (6.59e-018)	-0.0039*** (1.37e-019)
Exchange rate volatility (volat_usd)	-0.0368 (0.2909)	0.0384* (0.0841)	0.0330 (0.1377)
Fixed assets growth rate (fixed_ass_gr)	0.0267*** (1.25e-015)	0.0216*** (1.30e-015)	0.0219*** (1.54e-016)
Number of observations	21.477	21.477	21.477
R^2	0.1182	0.5460	-

Variable	Pooled regression	FE model	RE model
Market approach			
Constant	0.2038 (0.2943)	-0.0795 (0.7464)	0.1525 (0.4615)
Company size (size)	0.0161* (0.0710)	0.0378*** (3.07e-07)	0.0225*** (0.0056)
Profitability	-0.6337*** (5.94e-09)	-0.3812*** (0.0002)	-0.3954*** (1.86e-05)
Asset structure (tangibility)	0.1513* (0.0652)	-0.1285 (0.4384)	0.0946 (0.3497)
Debt tax shield (dt_shield)	-0.0312** (0.0480)	0.0083 (0.3261)	9.69e-05 (0.9934)
Company age (comp_age)	-0.0069 (0.1711)	-0.0142** (0.0133)	-0.0114** (0.0307)
Exchange rate volatility (volat_usd)	0.0434 (0.8351)	0.0343 (0.8036)	0.0344 (0.8006)
Fixed assets growth rate (fixed_ass_gr)	0.0028 (0.9348)	-0.0385** (0.0364)	-0.0374** (0.0457)
Number of observations	278	278	278
R^2	0.2881	0.7903	-

Notes: The dependent variable is the financial leverage ratio. Standard errors consistent in the presence of heteroscedasticity are indicated in parenthesis. * significance at the 10% level; ** significance at the 5% level; *** significance at the 1% level.

[14], V. Nazarova and A. Budchenko [18], A.B. Ankudinov and O.V. Lebedev [20], N. Delcoure [29]. The significance of the asset structure determinant was also confirmed at the 1% level (balance sheet approach), however, the signs of the variable coefficient are different in two approaches. On the one hand, according to the pecking order theory, companies with a large share of tangible assets in its property structure are less exposed to information asymmetry, which causes a decrease in equity. Therefore, such companies have an opportunity to raise additional equity and will prefer to act in this way [9]. The trade-off theory explains the possibility of negative dependence between the asset structure factor and financial leverage by the fact that liquidity of tangible assets is rather limited, hence, companies with a large share of such assets may encounter a problem when selling them [27]. On the other hand, according to the trade-off theory, a large share of tangible assets contributes to a decrease in expenses related to financial distress; besides, such assets may act as a collateral when raising borrowed funds or may be sold in case of bankruptcy [28]. Positive dependence of the debt share on the asset structure is confirmed in studies by I.V. Ivashkovskaya and P.V. Makarov [14], N. Delcoure [29], which used data on companies from Eastern and Central Europe, and in paper by V. Nazarova and A. Budchenko [18], who worked with data on the Chinese market. Some other papers, in particular research by I.V. Ivashkovskaya and M.S. Solntseva [30], revealed the negative influence of the chosen factor on financial leverage of Russian companies. Thus, one can reject neither of the concepts in question, consequently, hypothesis 1 is accepted. We also may assume that the differences in the modeling results of the market-based and balance sheet approach may be related to sometimes inconsistent policy of Russian companies for revaluation of tangible assets and corresponding adjustment of liabilities. As a result, market-based and balance sheet estimates differ significantly.

Apart from classical determinants, in all three models the significance of the company age variable and the fixed assets growth rate variable was confirmed at the 1% level (the sign of dependence may change for the latter variable), and the significance of the exchange rate volatility variable – at the 10% level in the FE model when using balance sheet estimates. In this latter case, the sign between the variables is positive, which seems somewhat illogical given a lesser investors' disposition towards risk in case of financial turbulence. However, as a rule, serious fluctuations of the national currency exchange rate are generally indicative of economic crises. This may entail a rise in debt financing caused by internal resources (profit) deficiency. Overall, due to low statistical significance we cannot provide a definitive interpretation of the obtained result.

Table 4. Choosing the model specification

Balance sheet approach	F-test	Breusch-Pagan test	Hausman test
Statistics value	F(7.1194) = 68.5583	chi square(1) = 37190.6	chi square(7) = 55.98
p-value	2.97e-83	0.00	9.52e-10
Conclusion	FE > Pooled	RE > Pooled	FE > RE
Market-based approach	F-test	Breusch-Pagan test	Hausman test
Statistics value	F(7.53) = 11.5372	chi square(1) = 172.27	chi square(7) = 38.74
p-value	8.50e-09	2.36e-39	2.19e-06
Conclusion	FE > Pooled	RE > Pooled	FE > RE

According to the balance sheet approach, in the FE and RE models the statistical significance of the debt tax shield indicator was confirmed at least at the 5% level. This determinant has a negative relationship with the debt level in the capital structure. This may be due to the fact that the opportunity to use a tax shield is not the companies' pivotal motive for raising debt financing.

Specification tests were conducted in order to choose the best suited model: comparison of the fixed effects model to pooled regression, random effects model – to pooled regression and the random effects model – to the fixed effects model.

The F-test was applied to test the pooled regression model against the fixed effects model. In the second case, the Breusch-Pagan test was used. It allows to choose between the RE model and ordinary pooled regression, which disregards individual effects. The Hausman test was applied to compare two models of panel data analysis. It compares the FE model estimates obtained as a result of inter-group formation and RE model estimates obtained by the available generalized least squares method (GLS). The test results are presented in Table 4.

According to the Breusch-Pagan test results, the regression that takes into consideration fixed effects should be chosen because the null hypothesis, which holds that components are uniform, is rejected and nonuniformity of the sample is acknowledged, i.e., there is heteroscedasticity of data. According to the Hausman test, the value of asymptotic test statistics chi square exceeds the statistics critical value. The p-value for this hypothesis is less than 0.01, hence, the null hypothesis about consistency of GLS estimates is rejected at the 1% level. Thus, the FE model is chosen over the RE model.

After generalizing the results of specification tests, we may conclude that the fixed individual effect model that we have chosen is best suitable for initial data.

The sample comprises both public (according to SPARK, PJSC and OJSC) and non-public companies. Their decisions concerning capital structure management may differ in terms of company's information transparency. To verify whether the public status of an economic entity influences decisions concerning capital structure, the initial sample was divided into subsamples with public and non-public companies (Table 5).

According to the obtained results, non-public companies account for approximately 18% of the whole sample. As for the nature of the influence of all factors on the debt share, except for the debt tax shield, the results are similar to the previous ones, however, the power of influence of the determinants is different in the two groups. Such traditional factors as company size and profitability produce the strongest impact on the financing structure of public companies. These factors also influence the capital structure of non-public companies, but the power of influence is more pronounced in the first group. This is confirmed by different regression coefficients of variables. The asset structure indicator may be defined as the key factor for non-public companies. It exerts a negative impact on the capital structure, which may be due to the low liquidity of fixed assets. We also may conclude that the nature and power of influence of such factors as company age and fixed assets growth rate do not depend on whether the company is public or not, and they are the same in both groups of companies.

Significance of the exchange rate volatility in the FE model for public companies was not confirmed. Consequently, in the analyzed model, this factor has no significant influence on financing decisions. It is fair to assume that such companies are more resilient to exchange rate risks when they choose the capital structure, partly owing to the availability of a wider set of hedging instruments.

It should be noted that the debt tax shield indicator for public and non-public companies provided completely opposite estimates of regression coefficients. Besides, the significance of this factor was confirmed only for public companies; the sign of the coefficient is positive. Here we may presume that unlike non-public companies, public companies characterized in general by a higher level of

Table 5. Econometric modeling results

Variable	Pooled regression	FE model	RE model
Public companies			
Constant	0.0927*** (0.0097)	-0.0367 (0.5917)	0.0286 (0.5501)
Company size (size)	0.0189*** (5.21e-023)	0.0272*** (6.29e-012)	0.0233*** (3.39e-018)
Profitability	-0.3520*** (1.56e-049)	-0.2615*** (2.13e-047)	-0.2638*** (2.48e-057)
Asset structure (tangibility)	-0.1306*** (3.57e-012)	-0.1564*** (2.78e-016)	-0.1531*** (4.36e-018)
Debt tax shield (dt_shield)	0.0080* (0.0568)	0.0076** (0.0425)	0.0078** (0.0345)
Company age (comp_age)	-0.0028*** (3.38e-010)	-0.0041*** (2.26e-014)	-0.0038*** (4.30e-015)
Exchange rate volatility (volat_usd)	-0.0538** (0.0488)	0.0143 (0.4232)	0.0094 (0.5980)
Fixed assets growth rate (fixed_ass_gr)	0.0264*** (1.47e-015)	0.0202*** (4.00e-013)	0.0205*** (6.71e-014)
Number of observations	21.129	21.129	21.129
R^2	0.1077	0.5413	-
Non-public companies			
Constant	-0.0184 (0.8517)	0.1329 (0.1531)	0.1101 (0.1998)
Company size (size)	0.0267*** (1.08e-06)	0.0196*** (0.0003)	0.0208*** (1.25e-05)
Profitability	-0.3607*** (2.18e-019)	-0.1951*** (1.70e-012)	-0.2064*** (6.83e-016)
Asset structure (tangibility)	-0.1988*** (3.35e-08)	-0.2609*** (1.92e-011)	-0.2532*** (1.24e-013)
Debt tax shield (dt_shield)	-0.0025 (0.7972)	-0.0077 (0.3883)	-0.0076 (0.3948)
Company age (comp_age)	-0.0039*** (0.0009)	-0.0042*** (1.03e-05)	-0.0042*** (3.20e-06)
Exchange rate volatility (volat_usd)	0.0686 (0.3341)	0.0991*** (0.0043)	0.0972*** (0.0050)
Fixed assets growth rate (fixed_ass_gr)	0.0330*** (2.17e-06)	0.0260*** (8.23e-07)	0.0263*** (2.97e-07)
Number of observations	4.799	4.799	4.799
R^2	0.1520	0.5842	-

Notes: The dependent variable is the financial leverage ratio. Standard errors consistent in the presence of heteroscedasticity are presented in parenthesis. * significance at the 10% level; ** significance at the 5% level; *** significance at the 1% level.

Table 6. Econometric modeling results (crisis period)

Variable	Pooled regression	FE model	RE model
Balance sheet approach			
Constant	-0.0633 (0.1379)	0.2057*** (0.0088)	0.0745* (0.0866)
Company size (size)	0.0262*** (9.70e-031)	0.0135*** (0.0018)	0.0204*** (4.26e-019)
Profitability	-0.3235*** (4.09e-028)	-0.2455*** (2.09e-024)	-0.2631*** (3.86e-032)
Asset structure (tangibility)	-0.0783*** (0.0001)	-0.1321*** (1.40e-07)	-0.1153*** (3.31e-09)
Debt tax shield (dt_shield)	-0.0001 (0.9848)	0.0085 (0.3411)	0.0043 (0.5673)
Company age (comp_age)	-0.0030*** (2.03e-06)	-0.0041*** (2.20e-011)	-0.0039*** (3.36e-012)
Exchange rate volatility (volat_usd)	-0.0142 (0.6760)	0.0204 (0.4277)	0.0119 (0.6482)
Fixed assets growth rate (fixed_ass_gr)	0.0206*** (0.0002)	0.0204*** (5.57e-05)	0.0201*** (3.36e-05)
Number of observations	6.390	6.390	6.390
R^2	0.1138	0.6923	-
Market-based approach			
Constant	-0.2348 (0.4115)	-0.0115 (0.9673)	-0.0405 (0.8645)
Company size (size)	0.0278*** (0.0076)	0.0237*** (0.0006)	0.0224*** (0.0004)
Profitability	-0.6354*** (2.21e-08)	-0.2981*** (0.0026)	-0.3757*** (2.04e-06)
Asset structure (tangibility)	0.1172 (0.2467)	0.2372 (0.3495)	0.1923* (0.0596)
Debt tax shield (dt_shield)	-0.0421 (0.2593)	0.0021 (0.8679)	-0.0094 (0.5920)
Company age (comp_age)	-0.0012 (0.8441)	-0.0087 (0.1600)	-0.0057 (0.3027)
Exchange rate volatility (volat_usd)	0.2218 (0.2813)	0.0329 (0.7941)	0.0703 (0.5601)
Fixed assets growth rate (fixed_ass_gr)	-0.0266 (0.3786)	-0.0439*** (0.0098)	-0.0462*** (0.0016)
Number of observations	145	145	145
R^2	0.2884	0.9224	-

Note: The dependent variable is the financial leverage ratio. Standard errors consistent in the presence of heteroscedasticity are indicated in parenthesis. * significance at the 10% level; ** significance at the 5% level; *** significance at the 1% level.

financial management to one degree or another take into consideration the debt tax shield factor when making decisions on financing.

In general, the public status has failed to produce a significant impact on the main determinants of the capital structure. This result does not correspond fully to the classical provision of corporate finance about the positive impact of debt on a decrease in shareholders' monitoring expenses, maintenance of information transparency, etc. This is likely the case because the majority of companies in the sample only formally meet the publicity criteria . It appears that the result could be somewhat different if, for example, companies from the Moscow Exchange quotation list were taken into account. However, it is beyond the technological capacity of the models to take this variable into consideration (limited size of the sample for the studied number of variables). It seems to be a matter for future research.

The nature and power of influence of particular determinants may differ according to the general economic situation. In order to verify the reliability of the results obtained through empirical analysis, we are going to consider the models of dependence of the financing structure of Russian companies on the chosen factors in crisis and pre-crisis periods.

We decided to add to the crisis period sample the following time intervals that were identified based on structural breaks in the Russian economy: 2008–2009 (global financial crisis), 2014–2016 (sanctions crisis and a collapse in oil prices), 2020–2021 (COVID-19 pandemic) and 2022 (geopolitical crisis). The results of modeling are presented in Table 6.

Time intervals of 2000–2007, 2010–2013 and 2017–2019, which are not considered crisis periods, represent the period of steady growth and are added to the pre-crisis sample (Table 7).

According to the results presented in Tables 6 and 7, there are significant changes in the power of influence of a series of factors, in particular, company size, asset structure and debt tax shield.

In accordance with the balance sheet and market-based approaches, both in the crisis and pre-crisis periods, the significance of the company size variable was confirmed at the 1% level in the FE model. However, the power of the positive relationship between the variables in the crisis period is twice as low as in the pre-crisis period. This indicates that the advantages of a large company size lessen during an economic crisis.

The statistical significance of the asset structure factor was confirmed at the 1% level both in the crisis and pre-crisis periods, however, the power of dependence is different. According to the FE model, the regression coefficient for this factor in the crisis period is 1.5 times lower than in the pre-crisis period. We may presume that in a stable pe-

Table 7. Econometric modeling results (pre-crisis period)

Variable	Pooled regression	FE model	RE model
Balance sheet approach			
Constant	0.1402*** (4.51e-05)	-0.0253 (0.6905)	0.0735* (0.0718)
Company size (size)	0.0184*** (1.84e-024)	0.0282*** (4.24e-014)	0.0223*** (3.44e-023)
Profitability	-0.3686*** (1.14e-056)	-0.2318*** (3.73e-035)	-0.2439*** (1.73e-044)
Asset structure (tangibility)	-0.1929*** (3.56e-028)	-0.2075*** (2.48e-027)	-0.2049*** (1.82e-034)
Debt tax shield (dt_shield)	-0.0090 (0.4281)	-0.0381*** (0.0047)	-0.0332*** (0.0099)
Company age (comp_age)	-0.0033*** (1.58e-012)	-0.0045*** (1.39e-016)	-0.0040*** (7.25e-018)
Exchange rate volatility (volat_usd)	-0.2390** (0.0385)	-0.0296 (0.6774)	-0.0502 (0.4844)
Fixed assets growth rate (fixed_ass_gr)	0.0294*** (1.86e-012)	0.0211*** (2.27e-011)	0.0219*** (3.22e-012)
Number of observationss	15.087	15.087	15.087
R^2	0.1262	0.5599	-

Variable	Pooled regression	FE model	RE model
Market-based			
Constant	0.5110** (0.0189)	-0.5909 (0.1674)	0.3571 (0.1901)
Company size (size)	0.0051 (0.6222)	0.0603*** (0.0001)	0.0125 (0.3302)
Profitability	-0.6913*** (2.37e-06)	-0.5555*** (8.52e-05)	-0.5952*** (1.08e-06)
Asset structure (tangibility)	0.1584** (0.0387)	-0.0653 (0.7945)	0.1466* (0.0673)
Debt tax shield (dt_shield)	-0.0362** (0.0430)	0.0015 (0.9272)	-0.0137 (0.2931)
Company age (comp_age)	-0.0099 (0.1248)	-0.0152* (0.0923)	-0.0105 (0.1676)
Exchange rate volatility (volat_usd)	0.9885** (0.0312)	0.4474 (0.2551)	0.5989* (0.0925)
Fixed assets growth rate (fixed_ass_gr)	0.1281* (0.0905)	-0.0355 (0.7182)	0.0156 (0.8381)
Number of observations	133	133	133
R^2	0.3602	0.8026	-

Notes: The dependent variable is the financial leverage ratio. Standard errors consistent in the presence of heteroscedasticity are indicated in parenthesis.* significance at the 10% level;** significance at the 5% level; *** significance at the 1% level.

riod the asset structure is one of the key factors of financing structure management and is indicative of the strategic decisions and operation flexibility, while in a crisis period companies turn their attention to survival at the moment and current liquidity. Apart from that, crisis may temporarily break down relationships. For this reason, the asset structure that was optimal in a pre-crisis period may become burdensome, or its influence may be mediated by the aggravated problems.

Significance of the debt tax shield variable in the FE model was confirmed at the 1% level with a regression coefficient of -0.0198. In the pre-crisis model, according to the balance sheet approach, the significance of the determinant was also confirmed at the 1% level with a regression coefficient of -0.0381. In the pre-crisis period, the factor is insignificant. This result indicates that benefits from debt tax shield during a crisis period become irrelevant or minimal because of increasing unprofitability of business. It should also be noted that in the crisis period access to borrowed funds is limited sharply as credit terms are tightened. Consequently, high costs of debt may negate the net benefit of tax shield.

It is important to note that in the models for the balance sheet approach, statistical significance and level of relationship with such factors as profitability, company age, exchange rate volatility and fixed assets growth rate have not changed significantly in the course of transition from the pre-crisis period to the crisis period. According to the balance sheet approach, the regression coefficients are statistically significant at a comparable level in FE models for both periods. Thus, the relationship between these factors with the resultant indicator is stable and does not depend on the economic cycle phase (Table 8).

The results obtained earlier were confirmed in the models constructed by means of adding new variables. Traditional capital structure determinants influence financial leverage, at the same time variable coefficient signs prevent us from making an unambiguous conclusion and, thus, choose one of the theories. Significance of dummy variables for certain types of activity was confirmed at the 1%, 5% or 10% levels. In particular, in the balance sheet approach, the positive impact of the type of activity factor was confirmed for companies involved in wholesale and retail and construction, and the negative impact – for agricultural enterprises. It should be acknowledged that it is currently impossible to explain the obtained results concerning the type of activity variable in complete detail. Reasoning from this fact, hypothesis 3 is rejected with a certain degree of conditionality.

Paper by E.V. Ilyukhin [31] also confirms the significance of industry specifics. In particular, it was discovered that the debt share in the financing structure of oil and gas, as well as steel, companies is lower than that of companies involved in other activities.

Table 8. Econometric modeling results with the type of activity as the dummy variable

Variable	Pooled regression	FE model	RE model
Balance sheet approach			
Constant	0.0604* (0.0974)	0.0141 (0.8107)	0.0515 (0.2468)
Company size (size)	0.0208*** (2.24e-026)	0.0252*** (2.42e-013)	0.0227*** (6.67e-020)
Profitability	-0.3356*** (8.11e-055)	-0.2395*** (5.74e-051)	-0.2455*** (1.20e-061)
Asset structure (tangibility)	-0.1382*** (1.03e-015)	-0.1868*** (1.17e-024)	-0.1809*** (1.02e-027)
Debt tax shield (dt_shield)	-0.0065 (0.4059)	-0.0198*** (0.0053)	-0.0182*** (0.0081)
Company age (comp_age)	-0.0032*** (1.07e-012)	-0.0042*** (6.59e-018)	-0.0039*** (2.68e-019)
Exchange rate volatility (volat_usd)	-0.0255 (0.4670)	0.0384* (0.0841)	0.0333 (0.1348)
Fixed assets growth rate (fixed_ass_gr)	0.0261*** (5.15e-015)	0.0216*** (1.30e-015)	0.0218*** (2.33e-016)
Dummy variable – extraction of commercial minerals (industry_1)	-0.0119 (0.6539)	-	-0.0310 (0.3259)
Dummy variable – agriculture (industry_2)	-0.0264** (0.0224)	-	-0.0263** (0.0258)
Dummy variable – machine building (industry_3)	0.0116 (0.5491)	-	0.0077 (0.6853)
Dummy variable – petrochemical industry (industry_4)	0.0186 (0.4178)	-	0.0065 (0.7723)
Dummy variable – metallurgical industry (industry_5)	0.0314 (0.5077)	-	-0.0176 (0.7254)
Dummy variable – construction (industry_6)	0.0466** (0.0181)	-	0.0468** (0.0149)
Dummy variable – power industry (industry_7)	0.0143 (0.5355)	-	0.0025 (0.9197)
Dummy variable – wholesale and retail (industry_8)	0.0376** (0.0164)	-	0.0306* (0.0513)
Number of observations	21.477	21.477	21.477
R^2	0.1257	0.5460	-
Market-based approach			
Constant	0.2975 (0.1699)	-0.0795 (0.7464)	0.1597 (0.4789)
Company size (size)	0.0148 (0.1225)	0.0378*** (3.07e-07)	0.0223*** (0.0075)
Profitability	-0.6226*** (3.30e-010)	-0.3812*** (0.0002)	-0.4130*** (8.21e-06)
Asset structure (tangibility)	-0.0611 (0.5071)	-0.1285 (0.4384)	-0.0869 (0.3700)
Debt tax shield (dt_shield)	-0.0159 (0.3716)	0.0083 (0.3261)	0.0008 (0.9482)

Variable	Pooled regression	FE model	RE model
Market-based approach			
Company age (comp_age)	-0.0104** (0.0291)	-0.0142** (0.0133)	-0.0125** (0.0152)
Exchange rate volatility (volat_usd)	0.0814 (0.6578)	0.0343 (0.8036)	0.0748 (0.5967)
Fixed assets growth rate (fixed_ass_gr)	-0.0045 (0.8948)	-0.0385** (0.0364)	-0.0368* (0.0580)
Dummy variable – extraction of commercial minerals (industry_1)	0.0220 (0.7385)	-	-0.0008 (0.9926)
Dummy variable – machine building (industry_3)	0.1330 (0.3108)	-	0.1655 (0.1455)
Dummy variable – petrochemical industry (industry_4)	0.2006*** (0.0048)	-	0.2041** (0.0165)
Dummy variable – metallurgical industry (industry_5)	0.0599 (0.3667)	-	0.0459 (0.5550)
Dummy variable – construction (industry_6)	0.0326 (0.4477)	-	0.0335 (0.4732)
Dummy variable – power industry (industry_7)	0.2804*** (3.16e-05)	-	0.2879*** (2.89e-05)
Dummy variable – wholesale and retail (industry_8)	0.0768 (0.2361)	-	-0.0259 (0.8088)
Number of observations	278	278	278
R^2	0.4052	0.7903	-

Notes: The dependent variable is the financial leverage ratio. Standard errors consistent in the presence of heteroscedasticity are indicated in parenthesis.* significance at the 10% level;** significance at the 5% level; *** significance at the 1% level.

In order to test hypothesis 4, we built models with dummy variables. In the balance sheet approach the time period spans 2000–2022, in the market-based approach – 2011–2022. The results show that in the RE model with the balance sheet approach, the significance of the coefficients of time variables responsible for 2002, 2008, 2010–2013 and 2015–2021 was confirmed.

In the market-based approach, the time variables had no statistical significance. The obtained results confirm that, unlike the balance sheet approach, application of the market-based approach to evaluation of company equity allows to take into consideration the consequences of financial crises and their impact on the companies and their financing structures. Signs of the variables were positive, thus, we cannot accept hypothesis 4.

Main Conclusions, Possible Limitations of the Analysis and Future Research Avenues

The main result of our analysis is the confirmation of the first hypothesis. At the same time, it is impossible to make an unambiguous conclusion and choose one of the theories because there are components of both approaches – the trade-off theory and pecking order theory.

A wide range of stakeholders may use the research results: corporate managers – in order to shape policy related to the capital structure, liquidity management and financing planning; banks and institutional investors – to conduct proactive underwriting, price formation and stress-testing

practices; analytical organizations – to refine factor models and early warning systems; regulators (Bank of Russia, Ministry of Finance, public markets) – to substantiate the requirements to information disclosure, develop the local debt market.

It is necessary to point out some limitations of analysis. Since some of the studied companies are non-public, it is difficult to consider the line of reasoning from the point of view of information asymmetry between insiders and outsiders unequivocally relevant. It is more likely that in contemporary Russia (even more so in the current circumstances of extremely high cost of borrowed funds), corporate management relies on internal financing sources as much as possible. Apart from that, it should be noted that certain companies have an opportunity to obtain credits on non-market terms or against government guarantee. As a result, the capital structure is distorted significantly, which skews it towards higher leverage.

From the technical point of view, it is necessary to acknowledge a certain limitation of the sample size, specifically, for the number of studied variables. Hopefully this limitation will be eliminated in the future as data is accumulated.

References

1. Durand D. Cost of debt and equity funds for business trends and problems of measurement. *Conference on Research in Business Finance*. 1952;215-262.
2. Kraus A., Litzenberger R.H. A state-preference model of optimal financial leverage. *The Journal of Finance*. 1973;28(4):911-922. DOI: 10.1111/j.1540-6261.1973.tb01415.x
3. Modigliani F., Miller M.H. The cost of capital, corporation finance and the theory of investment. *The American Economic Review*. 1958;48(3):261-297. DOI: 10.2307/1809766
4. Modigliani F., Miller M.H. Corporate income taxes and the cost of capital: a correction. *The American Economic Review*. 1963;53(3):433-443. DOI: 10.2307/1809167
5. Donaldson G., Fisher A.J. Corporate debt capacity: a study of corporate debt policy and the determination of corporate debt capacity. *The Journal of Finance*. 1961;17(3):554. DOI: 10.2307/2977084
6. Myers S.C., Maljuf N.S. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*. 1984;13(2):187-221. DOI: 10.1016/0304-405X(84)90023-0
7. Baker M., Wurgler J. Market timing and capital structure. *Journal of Finance*. 2002;57(1):1-32. DOI: 10.2139/ssrn.267327
8. Shyam-Sunder L., Myers S. C. Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics*. 1999; 51:219-244. DOI: 10.1016/S0304-405X(98)00051-8
9. Frank M.Z., Goyal V.K. Testing the pecking order theory of capital structure. *Journal of Financial Economics*. 2003;67(2):217-248. DOI: 10.1016/S0304-405X(02)00252-0
10. Frank M.Z., Goyal V.K. Capital structure decisions: which factors are reliably important? *Financial Management*. 2009;38(1):1-37. DOI: 10.2139/ssrn.567650
11. Beattie V., Goodacre A., Thomson S.J. Corporate financing decisions: UK survey evidence. *Journal of Business Finance and Accounting*. 2006;33(9-10):1402-1434. DOI: 10.1111/j.1468-5957.2006.00640.x
12. Iqbal A., Kume O. Impact of Financial Crisis on Firms' Capital Structure in UK, France, and Germany. *Multinational Finance Journal*. 2014;18(3-4):249–280.
13. Bhaduri S. Determinants of capital structure choice: a study of the Indian corporate sector. *Applied financial economics*. 2002;12(9):655-665. DOI: 10.1080/09603100010017705
14. Ivashkovskaya I.V., Makarov P.V. Do companies from emerging markets follow classic theories of capital structure choice? Empirical study on companies from Central and Eastern Europe. *Korporativnye finansy = Journal of Corporate Finance Research*. 2010;4(3):47-62. DOI: 10.17323/j.jcfr.2073-0438.4.3.2010.47-62 (In Russ.).
15. Dr. Anurag Pahuja, Ms. Anu Sahi. Factors affecting capital structure decisions: empirical evidence from selected Indian firms. *International journal of marketing, financial services & management research*. 2012;3(1):76-86.
16. Bulent K., Orman C., Oduncu A. Determinants of capital structure: evidence from a major emerging market economy. *MPRA Paper*. 2013;48415.
17. Chang C., Chen X., Liao G. What are the reliably important determinants of capital structure in China? *Pacific-Basin Finance Journal*. 2014;30:87-113. DOI: 10.1016/j.pacfin.2014.06.001
18. Nazarova V., Budchenko A. Capital structure in emerging markets: evidence from China. *Journal of Corporate Finance Research*. 2020;14(1):1-19.
19. Ivashkovskaya I.V, Solntseva M.S. The Capital Structure of Russian Companies: Testing Trade-off Theory versus Pecking Order Theory. *Korporativnye finansy = Journal of Corporate Finance Research*. 2007;1(2):17-31. DOI: 10.17323/j.jcfr.2073-0438.1.2.2007.17-31 (In Russ.).
20. Ankudinov A.B., Lebedev O.V. An empirical study of capital structure factors: analysis of companies in the Volga Federal District. *Finance and Credit*. 2012;11(491):24-29 (In Russ.).

21. Shakhina N., Kokoreva M. Empirical Testing of Dynamic Capital Structure Choice: Case of Russian Companies. *Korporativnye finansy = Journal of Corporate Finance Research*. 2010;4(16):31-40 (In Russ.).

22. Klestov M. Jindrichovska I. The determinants of debt load for companies in emerging markets. *Journal of Corporate Finance Research*. 2021;15(3):39-59.

23. Khotunova N.S., Mikheev A.I., Udaltsova E.D., Ganazhukova E.O. Factors in the structure of company financing: the experience of Russian enterprises. *The Eurasian Scientific Journal*. 2023;15(s3):60FAVN323. Available at: https://esj.today/PDF/60FAVN323.pdf. (In Russ.)

24. Metel'skaya V.V. Formation of optimal capital structure of domestic corporations in times of crisis: Econometric analysis of determinants. *Finance and Credit*. 2023;4(832):910-937. DOI: 10.24891/ea.19.2.374 (In Russ.).

25. Fedorova E.A., Bakanova M.O., Tepikina E.S. The impact of capital structure on the performance of companies in Russia. *Finance and Credit*. 2024;11(851):2508-2522. DOI: 10.24891/fc.30.11.2508

26. Myers S.C. The capital structure puzzle. *The Journal of Finance*. 1984;39(3):574-592. DOI: 10.1111/j.1540-6261.1984.tb03646.x

27. Myers S.C. Capital structure. *Journal of Economic Perspectives*. 2001;15(2):81-102. DOI: 10.1257/jep.15.2.81

28. Titman S., Wessels R. The determinants of capital structure choice. *The Journal of Finance*. 1988;43(1):1-19. DOI: 10.1111/j.1540-6261.1988. tb02585.x

29. Delcoure N. The determinants of capital structure in transitional economies. *International Review of Economics and Finance*. 2007;16:400–415.

30. Ivashkovskaya I.V., Solntseva M.S. Determinants of strategic decisions on financing large companies in emerging capital markets: the example of Russia, Brazil and China. *The Russian Journal of Management*. 2009;7(1):25-42. (In Russ.).

31. Ilyukhin E. V. The Determinants of Capital Structure: Evidence from Russia. *Journal of Corporate Finance Research*. 2017;14(4):54-69.

Contribution of the authors: the authors contributed equally to this article.

The authors declare no conflicts of interests.

The article **was submitted on** 10.07.2025; **approved after reviewing on** 08.08.2025; **accepted for publication on** 09.09.2025.