Corporate sustainable growth models: the impact of capital structure

E A Badokina*, L I Ilyina¹, I N Shvetsova¹, G A Nekrasova¹ and A S Mokieva¹
¹Pitirim Sorokin Syktyvkar State University, Russia
E-mail: irshv@mail.ru

Abstract. The key internal aim of each corporation is to reach the sustainable development for the long period of time. Capital structure is the one of the financial factors influenced on the sustainable growth of the corporations. The research is based on the hypothesis of the obvious impact of the capital structure on the sustainable growth of the corporation and is devoted to the issue of the corporate governance based on the models of sustainable growth in the case of manipulating the capital structure of corporations. The study is based on public financial statements of 50 Russian corporations - participants in the financial market for 2012-2018 years and is based on the use of the most well-known models of sustainable growth. It is established that by changing the share of borrowed capital in its total value, and using the mechanism of influence of factors of a certain model, make the right managerial financial decision, leading to its sustainable growth will be made by the management team of the corporation. At the same time, important factors influencing the choice of capital structure are as follows: industry, financial stability, the balance between the rate of accumulation and amount of dividend payments, reasonable borrowing at a high level of risk.

1. Introduction
In today's economic realities, unstable political and economic situation in the country, when relations with consumers and suppliers are disrupted, corporations need to review their goals for successful development, because the economic situation is unpredictable, uncertain and unstable. It becomes more difficult for corporations to maintain high economic indicators, as a result, their activities are reduced to a struggle for survival, so in addition to the most important goals of functioning, the desire for sustainable growth and development also becomes relevant.

The problems of sustainable growth of corporations have always been in the field of view of foreign and Russian scientists. According to a number of them, corporate growth of corporations abroad is interpreted in terms of business value growth, and in Russia the absolute dominant is sales growth. In the vast majority of Russian corporations, the growth of its absolute indicators (assets, sales and cash inflows) and their increments is not accompanied by an adequate increase in the efficiency of their financial and economic activities, which indicates extensive growth [1].

The problem of capital structure is discussed by Modigliani and Miller (1958) [2], Ross (1977) [3], Myers (1984) [4] and others and the main idea is connected with explanation the financial choices of the corporations. The theories mostly argues the instruments of balancing and optimization of the capital structure for the maximizing the corporate market value. But the key internal aim of each corporation is to reach the sustainable development for the long period of time. Capital structure is the one of the financial factors influenced on the sustainable growth of the corporations.

Content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.
The research is based on the hypothesis of the obvious impact of the capital structure on the sustainable growth of the corporation. In this regard, it is relevant to assess the impact of the capital structure on ensuring the necessary economic growth rates of Russian corporations. The article presents the results of a study of the capital structure as a factor of production and sales growth, based on testing models of sustainable growth.

2. Methods
The concept of sustainable growth has become the methodological basis for managing corporate growth since the 50s of the XX century. Many companies formulate their financial strategy in terms of targeted growth in sales, capital, and earnings per share [5].

The presented research is based on the data of public financial statements [9] of 50 Russian corporations participating in the financial market for 2012-2018 years and is based on the use of models of sustainable growth of Boston Consulting Group [1], R. S. Higgins [6], and J. P. Morgan, Van Horn [7], I. A. Blank [8].

In order to study the existence and closeness of the relationship between the capital structure and growth rates of Russian corporations participating in the financial market, the methods of correlation and regression analysis were used. The key variables in the simulation were the leverage ratio and the sustainable growth rate.

The results of statistical studies were processed using the quadratic approximation method to determine the relationship between variations.

As a result of calculations, a model of the form $\bar{y} = ax^2 + bx + c$, was obtained, which characterizes the relationship of the selected variables – the leverage ratio ($x$) and the sustainable growth coefficient ($y$).

The correlation and determination coefficients were used to identify the models with the highest binding force and taking into account the largest share of variations in the corporate sustainable growth coefficient.

3. Results
To determine the effect of capital structure on economic growth of corporations was first carried out a study of capital structure factor calculation borrowing and economic growth of the Russian corporations from the definition of the coefficient of sustained growth.

It is established that the capital structure of Russian corporations is heterogeneous. At the same time, a large share in the capital structure was borrowed capital, and a smaller share was equity. The increase in the value of the leverage ratio for the period from 2012 to 2018 took place in most corporations, which indicates an increase in the activity of corporations in the financial markets. The largest increase in the ratio of attraction was observed in corporations of ferrous and non-ferrous metallurgy and in the sphere of communications.

According to the study, the largest increase in the leverage ratio for the period from 2012 to 2018 (23.2%) was found in corporations by type of activity "metallurgical production" according to data from 8 public joint-stock companies of ferrous and non-ferrous metallurgy.

The study of corporate growth rates of participants was carried out using the ratio of sustainable growth calculated on the basis of four models of sustainable corporate growth. The change in the values of corporate sustainable growth coefficients calculated using various models is shown in Table 1.

| Economic sectors | Sustainable growth ratio in different models, shares of unites |
|------------------|-------------------------------------------------------------|
|                  | Boston Consulting Group | R. S. Higgins | Van Horn | I. A. Blank |
|                  | 2012 | 2018 | 2012 | 2018 | 2012 | 2018 | 2012 | 2018 |
| Economic sectors |                 |               |         |       |         |      |      |      |
As shown in table 1, steady growth in sales on average was provided in the R. S. Higgins and I. A. Blank models in corporations for oil and natural gas production, electricity production, wholesale and retail trade, warehousing and auxiliary transport activities as a result of an increase in the dividend payout ratio (R. S. Higgins model) and the profit capitalization ratio (I. A. Blank model).

However, the study found that the use of models by Boston Consulting Group and J. Van Horn, did not show a steady increase in sales volumes due to a decrease in the accumulation rate.

We have found that there is a negative indicator of sustainable growth in 2018. It should be noted that the situation in the industrial sectors has worsened compared to 2012 year. This fact with the exception in the results of R. S. Higgins model is clearly seen in the Figure 1.

It should be said that some corporations did not fit into the trends noted above. For example, for the some largest oil and natural Russian gas production corporations, the ratio of sustainable growth was demonstrated using the models by I. A. Blank and Boston Consulting Group, although on average for this type of activity, as noted above, the models by R. S. Higgins and I. A. Blank were indicative.

Ratio sustainable growth had a positive impact only on the model by R. S. Higgins in corporations such economic sectors as manufacture of rubber and plastic products (plastics), production of helicopters, planes and other aircraft, as well as in the telecommunications sector, which was due to an increase in dividend payments.

|                          | year | year | year | year | year | year | year | year |
|--------------------------|------|------|------|------|------|------|------|------|
| Oil and natural gas production | 0.08 | 0.05 | 0.07 | 0.15 | 0.18 | 0.12 | 0.33 | 0.36 |
| Metallurgical production | 0.06 | 0.17 | 0.06 | 0.08 | 0.22 | -0.31 | 0.20 | -1.54 |
| Power generation         | 0.01 | 0.01 | 0.04 | 0.01 | 0.03 | 0.03 | 0.02 | 0.02 |
| Production of chemical products (fertilizers) | 0.14 | -0.02 | 0.27 | 0.21 | 0.31 | 0.02 | 0.81 | 1.31 |
| Production of rubber and plastic products (plastics) | 0.13 | 0.04 | 0.03 | 0.04 | 0.30 | 0.19 | 0.37 | 0.06 |
| Production of helicopters, planes and other aircraft | 0.35 | -1.12 | 0.05 | 0.07 | 0.03 | -0.54 | 0.07 | -15.78 |
| Wholesale and retail trade | 0.06 | 0.02 | 0.03 | 0.46 | 0.20 | 0.07 | 0.17 | 4.42 |
| Warehousing and auxiliary transport activities | 0.11 | 0.01 | 0.02 | 0.32 | 0.19 | 0.01 | 0.42 | 0.57 |
| Activities in the field of telecommunications | 0.05 | -0.14 | 0.11 | 0.21 | 0.13 | -0.11 | 0.37 | 0.27 |

*Source: compiled and calculated by the authors based on data [9].
Some chemical industry corporations have provided a steady growth in sales volumes only according to the I. A. Blank model due to an increase in the value of assets and the profit capitalization ratio. The decrease in the sustainable growth ratio based on the R. S. Higgins model resulted in a decrease in the sustainable growth ratio in the models of Boston Consulting Group and J. Van Horn led to a decrease in the rate of accumulation and return on equity of the corporation of the chemical industry. On the contrary, the growth of the above coefficients provided a steady increase in sales for these models in metallurgical production corporations (ferrous and non-ferrous metallurgy).

The situation of such individual cases indicates that there is some special factor that determines the behavior of the corporation and its financial level, for example, the style and quality of management, target settings, and so on. This requires additional research.

4. Discussion

An assessment of the dynamics of the leverage ratio revealed the excess of borrowed funds over own funds in the capital structure of most Russian corporations of various types of activities.

The analysis of the growth rates of corporate sales volumes showed on average their steady growth according to the models of R. S. Higgins and I. A. Blank under the influence of the growth of the dividend payout coefficients and the net profit capitalization coefficient. The decline in growth rates, accompanied by a decrease in the coefficient of sustainable growth, was demonstrated by the use of the models of Boston Consulting Group and J. Van Horn.

Regression equations constructed to describe the nature and closeness of the relationship between the leverage ratio and the coefficient of sustainable economic growth of corporations, calculated using various models, with a high level of confidence showed the presence of both a directly proportional and inversely proportional relationship between them.

According to the obtained models, with an increase in the share of borrowed capital in its overall structure, in most cases there was a steady increase in revenue when using The I. A. Blank model. On the contrary, with a decrease in the share of borrowed capital according to the models of R. S. Higgins in 4 out of 6 cases, and J. In 5 out of 6 cases, van horn saw a decrease in the growth rate of sales revenue. Boston Consulting Group's model factors influenced the establishment of both a direct and a feedback relationship between the leverage ratio and the sustainable growth ratio.
An inversely proportional relationship between the above coefficients occurred when the following factor indicators decreased: return on equity (model J. Van Horne); the dividend payout ratio (model R. S. Higgins); the rate of accumulation (model j. Van Horne and the Boston Consulting Group); coefficient of profit capitalization (models Boston Consulting Group, I. A. Blanca); the presence of losses (model J. Van Horn, I. A. Blank, Boston Consulting Group).

5. Summary
So, the models of I. A. Blank and R. S. Higgins can be used to a greater extent for calculating the rates of sustainable growth of Russian corporations. The greatest sustained growth according to the I. A. Blank model can be achieved with the growth of the following calculated coefficients of the model: net profit capitalization, asset leverage and asset turnover. An increase in the sustainable growth coefficient using the R. S. Higgins model will depend on the growth of such factors as ROI, dividend payout ratio, financial leverage, and a decrease in capital intensity.

The Boston Consulting Group model can be used to calculate sustainable sales growth, taking into account the following features. The growth of such a factor as the net profit capitalization ratio will show an increase in sales rates, but at an acceptable rate of accumulation and the share of dividend payments. Otherwise, a decrease in the rate of profit and an increase in dividend payments may slow down the pace of development of the Corporation.

By changing the share of debt capital in its total value, and using the mechanism of influence of factors of a certain model, the Corporation can make the right managerial financial decision that leads to its sustainable growth.

Important factors influencing the choice of capital structure are industry, financial stability, the balance between the rate of accumulation and amount of dividend payments, reasonable borrowing at a high level of risk.

6. References
[1] Khotinskaya G I 2015 Corporate growth: theory, financial indicators, empirical patterns (Manager) 4 14-15
[2] Miller M, Modigliani F 1958 The cost of capital, corporation finance, and the theory of investment (American Economic Review) 48 261-297
[3] Myers S 1984 The capital structure puzzle (Journal of Finance) 39 575-592
[4] Ross S 1977 The determination of financial structure: The Incentive signalling approach (Bell Journal of Economics) 8 23-40
[5] Limitovsky M A 2010 Sustainable growth of the company and leverage effects (Russian j. of management) 8(2) 35-46
[6] Higgins R S 2007 Financial analysis from: tools for making business decisions. Moscow: I. D. Williams LLC
[7] Van Horn J K 1996 Fundamentals of financial management. Moscow: Finance and statistics
[8] Blank I A 2013 Financial strategy of the enterprise. Kyiv: Nakasentro, Elga
[9] The financial statements of corporations. https://www.e-disclosure.ru/