

## Toolset for financial risk strategic assessment in corporations based on stochastic modeling

### ИНСТРУМЕНТАРИЙ ДЛЯ СТРАТЕГИЧЕСКОЙ ОЦЕНКИ ФИНАНСОВЫХ РИСКОВ В КОРПОРАЦИИ НА ОСНОВЕ СТОХАСТИЧЕСКОГО МОДЕЛИРОВАНИЯ

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#### Abstract

The study substantiates the need to develop and test a model for assessment of strategic financial risk level in corporations. It implies modeling for two indicators: relative (financial leverage) and absolute (external capital of indicators). The model should also take into account influence of emergent environment factors and most stakeholder groups' interests when building scenarios for their behaviors in the financial markets –Implementation of the model allows establishing financial risk target values considering deviation calculations between the indicators' modeled and actual values simultaneously determining both tactical and strategic guidelines for Financial Risk Management Policy in corporations, which should involve stakeholders into financial risk-taking process. The model implementation also should be the basis for development and improvement of risk-based forecasting tools, business planning and stress testing. The toolkit for assessing level of current and strategic financial risks in corporations based on simulation modeling was developed and implemented with attraction of general scientific and special methods. Direct results of the study are as follows: in theoretical block of the research – essentially, main attributes of financial risks classification for corporations are identified; they are recognized by time as retrospective, current and

#### Аннотация

Исследование обосновывает необходимость разработки и апробации модели оценки уровня стратегических финансовых рисков в корпорациях. Это предполагает моделирование для двух показателей: относительного (финансовый рычаг) и абсолютного (показатель внешнего капитала). Модель также должна учитывать влияние факторов внешней среды и интересы большинства групп заинтересованных сторон при построении сценариев их поведения на финансовых рынках. Внедрение модели позволяет установить целевые значения финансового риска с учетом расчетов отклонений между смоделированными и фактическими значениями показателей, одновременно определяющих как тактическое, так и стратегическое направление политики управления финансовыми рисками в корпорациях, что должно вовлекать заинтересованные стороны в процесс принятия финансовых рисков. Внедрение модели также должно стать основой для разработки и совершенствования инструментов риск-ориентированного прогнозирования, бизнес-планирования и стресс-тестирования. Разработан и внедрен инструментарий оценки уровня текущих и стратегических финансовых рисков в корпорациях на основе имитационного

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strategic financial risks, and correct classification of the latter allows their identification, evaluation and regulation; in practical block of the research – evaluation of financial risk in corporations reveals that the risk apart from other internal factors is highly affected by the level of financial leverage, where its high value increases financial risk; still, corporations do not take into account the influence of environmental factors on its level; the role of tax risk as a part of financial risk is not significant, still it is unfortunate that the Russian legislation system allows double taxation on income tax in the form of dividends, and dividend policy of Russian corporations is unstable; in methodological block of the research – financial risk assessment model for corporations was developed and tested on a platform of a special new software product that determines the target level of financial risk; the model differs from standard approaches to financial risk assessment as it carries strategic forecasting nature and takes into account the impact of emergent environment factors; thus it promotes new areas in strategic financial risk management.

**Key Words:** strategic financial risk, financial leverage, corporation, financial risk decisions, stakeholders, stochastic modeling.

## Introduction

Financial risks of corporations take significant part in overall risk portfolio. Financial risk in business being of independent theoretical and practical significance is a key component in theory and practice of financial risk management and one of the key parts in corporation management. While researching methodological aspect of the issue it was identified that most methods for assessing financial risk in corporations reflect retrospective and current level, eliminating its assessment in perspective. Despite the fact that issues of regulating and evaluating financial risks in corporations were in development for quite a long time there is no unambiguous approach to its content and classification in financial literature, which complicates advancing assessment tools. The issue of financial risks classification remains

моделирования с привлечением общих научных и специальных методов. Прямые результаты исследования следующие: в теоретическом блоке исследования - по существу определены основные признаки классификации финансовых рисков для корпораций; они признаны по времени ретроспективными, текущими и стратегическими финансовыми рисками, а правильная классификация последних позволяет их идентифицировать, оценивать и регулировать; в практическом блоке исследования - оценка финансового риска в корпорациях показывает, что на риск, помимо других внутренних факторов, сильно влияет уровень финансового рычага, где его высокая стоимость увеличивает финансовый риск; тем не менее, корпорации не учитывают влияние на его уровень факторов внешней среды; роль налогового риска как части финансового риска незначительна, однако, к сожалению, российское законодательство допускает двойное налогообложение по налогу на прибыль в виде дивидендов, а дивидендная политика российских корпораций нестабильна; в методологическом блоке исследования разработана и апробирована модель оценки финансового риска для корпораций на платформе специального нового программного продукта, определяющего целевой уровень финансового риска; модель отличается от стандартных подходов к оценке финансового риска тем, что носит стратегический прогностический характер и учитывает влияние факторов внешней среды; таким образом, продвигает новые направления в стратегическом управлении финансовыми рисками.

**Ключевые слова:** стратегический финансовый риск, финансовый рычаг, корпорация, решения по финансовым рискам, заинтересованные стороны, стохастическое моделирование.

debatable both in global and Russian economics, there is still no mutually accepted point of view on this issue among scholars (Baranova et al, 2019; Gnezdova et al, 2019).

The purpose of the study is to develop a scientifically based toolkit for assessing the level of strategic financial risk taking into account influence of internal and external environment factors, and to justify areas of its practical implementation in corporations. Its achievement determines completion of the following tasks: examination of economic content, classification of financial risks types justifying the author's position; evaluate both retrospective and current levels of financial risks in corporations; develop and test a model for assessing the level of strategic financial risk in corporations.

International and Russian scientists and experts' works and internal regulatory framework of corporations laid theoretical and methodological basis of the study. Logical, situational, systemic, process-based scientific approaches to assessment of financial risks in corporations represent methodological basis of the study.

Working hypothesis of the study is grounded in the need to develop modern scientifically based tools for assessing the level of current and strategic financial risks in corporations with the help of special software that optimally regulates and assesses financial risks. Theoretical significance of the study lies in the matter of expanding and deepening conceptual provisions for assessing financial risks in corporations. A number of theoretical and methodological provisions of the research are used as educational material for the students of financial disciplines as well as for the qualification upgrade courses and for advanced training of financial management specialists. Practical significance of the research is grounded in development and application of specific approaches, methods, techniques, practical recommendations that form theoretical, methodological and practical basis for development of tools for assessing the level of current and future financial corporate risks, and determining alternatives for implementation of new evaluation methods, techniques, tools and models.

## Methodology

### **Theoretical and methodological approaches to research economic content of the term "financial risk" in corporations.**

The term "risk" derived from Italian "risco" and means: a threat, to risk, bypass a cliff or a rock. From the standpoint of methodological financial risk assessment tools' development, the following interpretations are of a special interest. Utkin (1998) describes financial risk as a corporation's interrelationship with financial institutions and represents it as ratio between borrowed and own sources of finance, where its higher value indicates the stronger dependence of a corporation on stakeholders / creditors, and a greater financial risk.

Izrajleva (2007) associating financial risk with increase of capital maintenance costs and loss of funds follows Utkin (1998) and besides high ratio of external and own capital along with dependence on stakeholders adds up such causes of risk as creditors, inactivity of capital, parallel

investment of substantial funds in the same project.

Specifically interesting is the definition of "financial risk" in the corporation given by Ploshkin (2014), that is: probabilistic character of event that leads to potential financial losses in the long term, including those that occur due to genuine organization's activities under external and internal factors in the environment of economic uncertainty. The definition reveals requirement to consider influence of internal and external environmental factors at the level of financial risk in corporations.

Both definitions and classification of types of financial risks in corporations are quite multiple, still they all justify the need for its key feature, which is significance. Classification of financial risks in corporations represents systematization of risks into groups according to their individual characteristics and criteria, which integrate risk subsets into the most general concepts. As for the companies, the key feature of risks classification is the differentiation of specific risks into types. Milner and Liis (2001) identify 2 key groups for all economic risks: external (not determined by the organization's activities) and internal (determined by the organization's activities).

Sinkev (2016) identifies efficiency risks of current operations and portfolio (credit, interest rates and liquidity) as key financial risks.

Korolev (2017) distinguishes the risks of direct financial losses (exchange, selective, bankruptcy risk).

Under condition of uncertain future for financial processes considering time as classification basis, in our opinion, it is possible to distinguish retrospective, current and strategic financial risks. All types of financial risks are interconnected. Change of one type of risk causes changes in many others, escalates more dangerous ones and ultimately has a complex effect on the corporation's activities.

### **Financial risk assessment by financial leverage effect.**

Corporations apply universal tool that optimally combines regulation and assessment of financial risks in corporations which is financial leverage / gearing. The term financial leverage is applied in discussions, whereas the term gearing was not highly considered, although there are cases of its use in the foreign practice. Savitskaya (2017) identifies the concept of financial leverage,

noting that this indicator shows the percentage change in profitability / return of the own capital at the expense of the borrowings. That is, the effect of financial leverage reflects the change of assets / equity costs, obtained via loan attraction. Kovalev (2017), on the contrary, considers terminologically incorrect identification of the terms lever / leverage. In his opinion, leverage indicator shows interconnection between profit and valuation of assets / funds expenditures to obtain positive financial result. That is, leverage reflects interconnection of profit and monetary valuation of assets expenditures to obtain corresponding profit. Dontsova (2018) adheres to the opposite position, using the term lever to assess borrowed funds level used to finance various assets.

Blank (2012) calls financial leverage the main mechanism for financial management, i.e. maximizing profitability with a certain degree of financial risk. At the same time, the degree of additionally achieved financial results by means of own financial resources and attraction of borrowed finances at different specific weight is determined by the effect of financial leverage.

To eliminate terminological contradictions, it is advisable to describe in economical terms an indicator for assessing the effect of financial leverage:

$$EFL = (1 - TR) \times (EP - AEIR) \times FL \quad (1)$$

Where EFL – effect of financial leverage (degree of financial leverage), unit.

(1 – TR) – Tax corrector, unit

TR – Tax rate, unit

(EP – AEIR) – Differential, unit.

EP – Economic profitability, unit.

AEIR – Average estimated interest rate, unit.

FL – Financial leverage (attracted capital / own capital), unit.

Financial leverage makes itself evident in the situation where the sources of capital include borrowed capital attracted under a fixed interest rate. Thus, the effect of financial leverage is formed and it characterizes profitability changes in organization's own capital obtained by means of the borrowed capital. The effect of financial leverage means that every change of positive financial result before paying off interests and taxes causes the most significant change in net profit. That is, the degree of financial risk is determined by the variability of net profit (Miller et al, 2016).

Impact of factors on the financial leverage effect can be seen as follows. Tax corrector is depended on profit tax rate, profit margins and net profit mandatory expenditures. It is assumed that the tax corrector reduces profitability growth of the own capital by profit taxes. However, the practice of financial management reveals cases of low financial leverage effect with low income tax rate and vice versa. Thus, practices in the USA show slight fluctuation in financial leverage effect when income tax rates change. In Russia during the period of 1991 - 2018 income tax rates changed 3 times downwards: 32%, 24%, and 20%. Tax corrector is more efficient when borrowed capital expenses are included in the taxable income costs. Since, according to the Russian legislation (Articles 265 and 269 of the Federal Law No. 117-FL as of August 5, 2000 "Tax Code of the Russian Federation": Part 2) corporation's bank interests costs (for loans, including commodity and commercial deposits, bank accounts or other borrowings) are included in operation expenses, attraction of funds is more preferable if compared with the sources received from net profit (dividends). Tax advantage of the debt is less if consider personal taxes. From the stakeholders – investors' point of view organization's tax advantage from attracted / borrowed finances should be balanced with tax advantage of private capital and personal tax payments of investors. However, from taxation ground debt is more preferable. It should be noted that Russian legislator applies double taxation on dividends: first, 20% rate is applied, then - 13% or 15%. In practice dividend policy of most Russian corporations is unstable.

The research was selectively arranged in corporations that reflect general trend prevailing in most commercial corporations in the region.

"Arnest" JSC - processing industries / production of perfumes and cosmetics ("Arnest" Official Site);

"Soyuzpechat", JSC - wholesale and retail sales / retail trade in non-stationary facilities and markets (Official site of the Territorial body of the Federal State Statistics Service in the North Caucasus Federal District);

Baysad JSC - agriculture, forestry, hunting, fishing and fish farming / poultry breeding (Baysad Official Site);

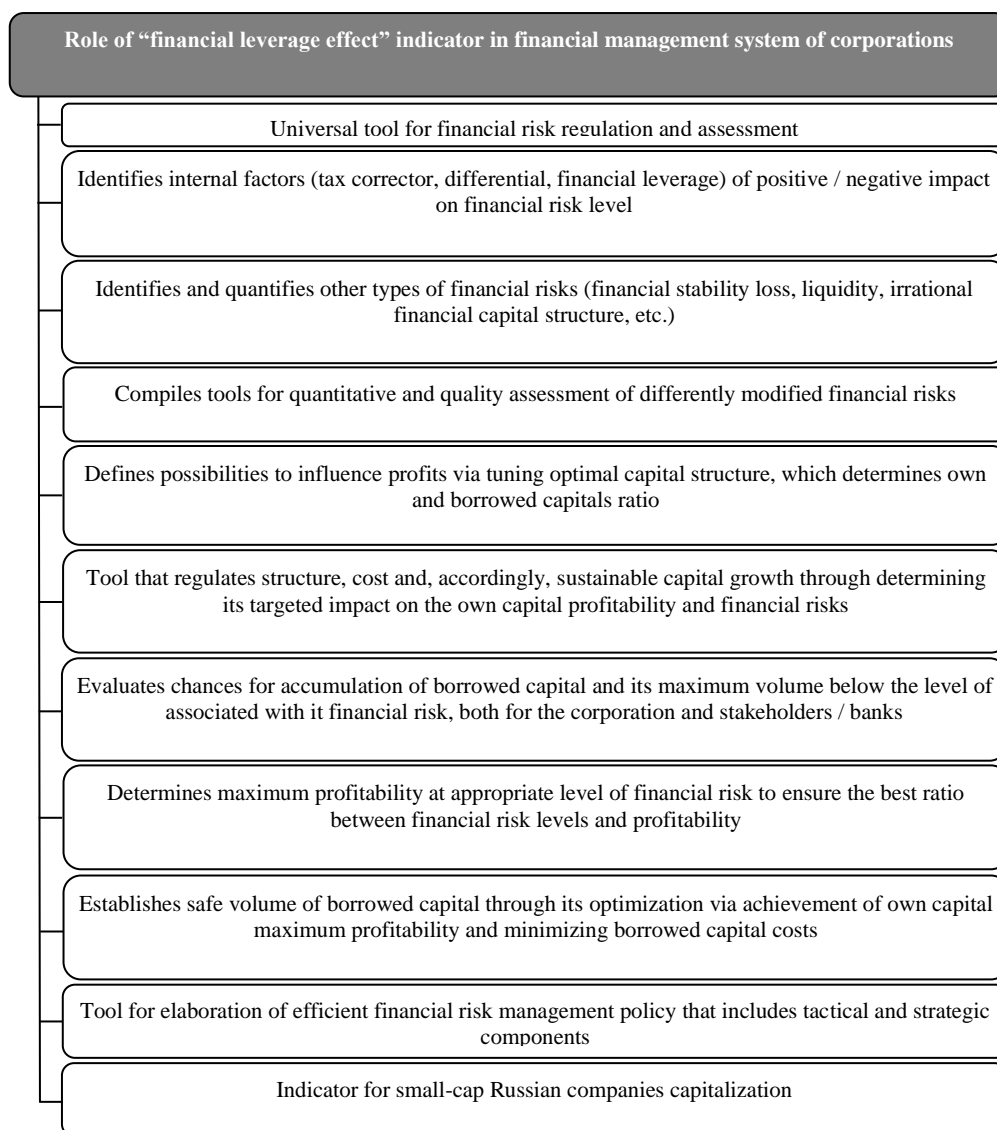
"Georgievsky Fittings Plant" LCC - processing production / production of faucets and valves (Official site of "Georgievsky Fittings Plant").

Despite that "Arnest" JSC Regulation "On Dividend Policy" as of 01.09.2015 implies regular dividends payment at least once a year

and not less than 25% of net profit, provided it is received in the amount stipulated in the business plan for the reporting period during the retrospective period 100% dividends were paid only in 2011–2012; dividend payout ratio was 89.1% and 60.4%, respectively. Companies “Soyuzpechat” JSC and “Baysad” JSC didn’t reveal any internal regulatory framework for dividend policy.

Effect of financial leverage (Ryzin, 2018) shows net profit variation related to bank interest payment and service fees. Identification of tax corrector influence at financial leverage effect specifies degree of tax risk in organizations’ finances.

Financial leverage is the factor that reinforces positive / negative effect arising from a certain differential. When differential value is positive (economic return on assets > average calculated interest) increase of financial leverage causes significant profitability growth for company’s own capital. When differential value is negative, leverage growth causes a reverse effect. Estimated high economic profitability contributes to a greater accumulation of borrowed capital, as the interest coverage ratio grows (economic profit before tax / average estimated rate for borrowed capital) accordingly default risk for interests on liability is reduced. As a result, economic efficiency increases along with the profitability of organizations’ own capital.



**Figure 1.** Role of “financial leverage effect” indicator in financial management system of corporations (developed by authors V. V. Manuylenko, D. A. Ryzin)

With constant differential financial leverage is the key accelerator of both own capital value and profitability rate and financial risk for profit loss. With a constant level of financial leverage its differential positive / negative dynamics influences both own capital increase / decrease and profitability rate and financial risk for profit loss. As previously noted, the Ministry of Economic Development and Trade of the Russian Federation indicates the critical value of financial leverage as  $> 70\%$ , and it defines as “golden rule of financial management” value of  $51.5\%$ . The higher financial leverage the more risky is the situation that can bring corporation to bankruptcy. High rate of financial leverage effect reveals potential threat of lack of funds in the organization, including those for liability interests.

Factors that change financial leverage effect are of high interest to stakeholders and banks. Thus, bank loan providers determine the degree of financial risk of future loans considering

financial leverage differential. The higher is the differential the lower is stakeholder’s or bank’s risk, which works vice versa. High financial leverage increases the financial risk of the stakeholder or the bank.

Based on the foregoing, in our opinion, it is fair to use the term “financial leverage” in financial management system of organizations since financial leverage effect reveals the level of borrowed capital in the corporation, which affects profitability of the own capital, determines optimal capital structure, evaluates the level of financial risk in organizations. Its omnitude in the corresponding system is manifested in the following - figure 1.

Considering the above, financial leverage effect is recognized to be a comprehensive indicator for financial risk degree in corporations. Following the logic of the study, the degree of financial risk in organizations is estimated by financial leverage effect - Table 1.

**Table 1.**  
*Degree of financial risk assessment in corporations based on financial leverage effect*

Indicators	YY							Average value	Standard Deviation
	2011	2012	2013	2014	2015	2016	2017		
<b>“Arnest” JSC</b>									
Economic efficiency, %	14,098	18,648	12,667	10,668	13,517	12,881	11,486	13,424	2,581
Tax rate, %	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,01
Average applicable interest rate, unit	7,017	7,385	6,338	6,486	9,387	9,266	7,320	7,600	1,243
Financial leverage, unit	0,834	1,108	1,027	1,102	1,300	1,236	0,958	1,081	0,159
Financial risk degree as per financial leverage effect, %	4,725	9,985	5,199	3,687	4,296	3,575	3,191	4,951	2,326
<b>“Soyuzpechat” JSC</b>									
Economic efficiency, %	15,637	14,134	7,164	5,176	5,548	4,156	1,882	7,671	5,198
Tax rate, %	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,01
Average applicable interest rate, unit	0	0	0	0	0	0	0	0	0
Financial leverage, unit	0,191	0,147	0,142	0,098	0,111	0,121	0,111	0,132	0,032
Financial risk degree as per financial leverage effect, %	2,395	1,664	0,813	0,405	0,492	0,402	0,167	0,905	0,819
<b>“Baysad” JSC</b>									

Indicators	YY							Average value	Standard Deviation
	2011	2012	2013	2014	2015	2016	2017		
Economic efficiency, %	4,680	4,526	6,027	6,555	6,911	7,378	7,054	6,161	1,146
Tax rate, %	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,01
Average applicable interest rate, unit	3,976	2,918	2,052	2,535	3,175	3,572	2,595	2,975	0,657
Financial leverage, unit	12,474	9,322	7,723	7,604	5,383	4,204	3,073	7,112	3,215
Financial risk degree as per financial leverage effect, %	7,027	11,988	24,555	24,455	16,086	12,801	10,962	15,411	6,764
"Georgievsky Fittings Plant" LCC									
Economic efficiency, %	2,989	41,861	39,476	16,403	9,854	19,383	7,263	19,604	15,406
Tax rate, %	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,01
Average applicable interest rate, unit	0,713	10,490	7,157	6,452	4,952	6,103	6,004	5,982	2,908
Financial leverage, unit	–58,328	–5,281	–3,494	–3,340	–9,529	592,011	75,233	83,896	227,454
Financial risk degree as per financial leverage effect, %	–106,2	–132,5	–90,3	–26,6	–37,4	6289,1	75,8	853,1	2398,0

Source: calculation provided by the authors V. V. Manuylenko, D. A. Ryzin (Official site of the Federal State Statistics Service - [http://www.gks.ru/accounting\\_report](http://www.gks.ru/accounting_report))

Financial leverage multiplies positive effect in "Arnest" JSC, "Soyuzpechat" JSC, and "Baysad" JSC. Negative values of financial leverage effect demonstrate that own capital is exposed to risk. Since 2015 "Arnest" JSC, "Soyuzpechat" JSC, "Baysad" JSC demonstrate progressive decrease of financial risk level, the best values of which are noted in "Arnest" JSC in 2012 - 10.0%, in "Soyuzpechat" JSC in 2011 - 2.4%, and in "Baysad" JSC in 2013 – 2014: 24.6% - 24.5% respectively. Situation in "Soyuzpechat" JSC to some extent can be explained with decrease in return on assets from 4.4% in 2015 to 1.9% in 2017.

In "Arnest" JSC and "Baysad" JSC throughout the entire retrospective period, and in "Georgievsky Fittings Plant" LCC in 2016-2017 value of financial leverage effect (i.e. its lever) is significantly more than it is recommended by the "golden rule of financial management" - 51.5%, as well as critical level recommended by the Ministry of Economic Development and Trade of the Russian Federation - 70%. "Georgievsky

Fittings Plant" LCC demonstrated negative financial leverage values in 2011 - 2015; in 2016 it exceeded critical level by more than 8 times. Accordingly, external capital of "Arnest" JSC, "Baysad" JSC, and "Georgievsky Fittings Plant" LCC is unsafe. Financial leverage in "Soyuzpechat" JSC is significantly below the recommended mark of 51.5%, not exceeding a total of 19.1%.

In the environment of uncertainty financial leverage values are influenced by an emergent nature (economic development level, banking sector extend, taxation system including dividends, bankruptcy legislation, trade unions involvement, state guarantees on debt return, etc.). In "Arnest" JSC, "Baysad" JSC, "Georgievsky Fittings Plant" LCC financial leverage indicator exceeds the average level of most countries in the world (Korea, Indonesia, Brazil, Portugal, Pakistan, Thailand, Norway, etc.).

### Development and test of a model for strategic financial risk assessment based on special software

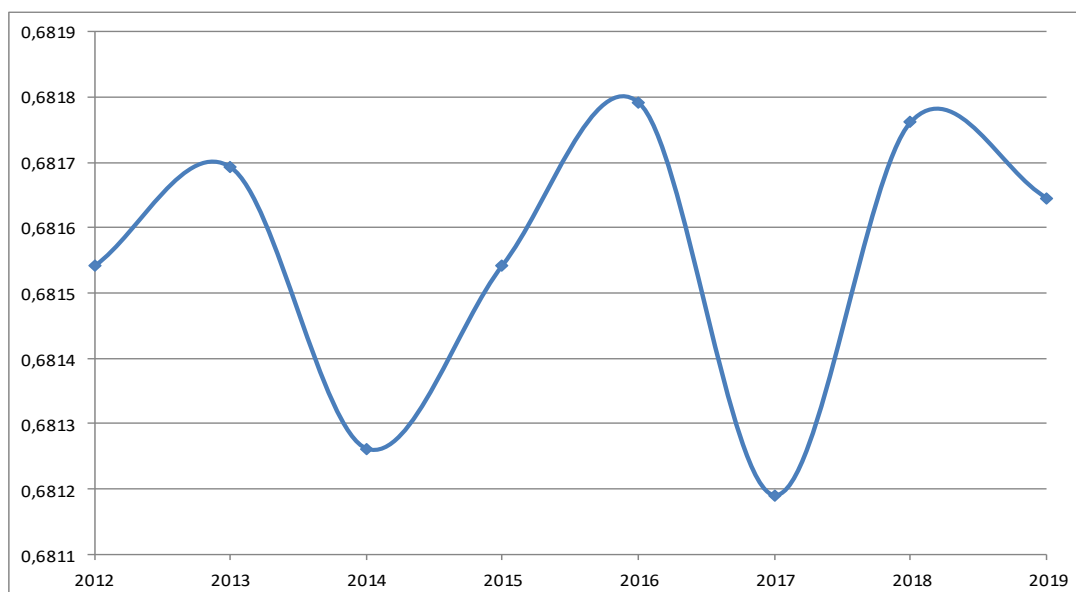
In modern conditions of uncertainty financial managers need to reassess level of financial risk in organizations since emergent environment is instantly changing. Monte-Carlo simulation method supports determination of predictive financial risk level in corporations taking into account influence of the emergent environment factors.

Considering the above, the need arises to develop a computer model for strategic financial risk level assessment based on the special Excel-VBA software product (“Software for determining strategic financial risk in corporations” (Manuylenko and Ryzin, 2018) that reflects high risk activities in organizations. When applying Monte-Carlo simulation method “financial leverage” indicator was chosen as a random variable, which is explained as follows:

- its value depends on the values of tax corrector, differential, where the effect of the latter is multiplied;
- practical studies stipulate that in hierarchical structure of internal factors affecting financial leverage effect, its values are important;
- “Georgievsky Fittings Plant” LCC demonstrates high volatility of indicator during the retrospective period, that indicates objective probability when it exceeds normal level;
- government entities at the macro level are involved and determined its critical value of > 70%.

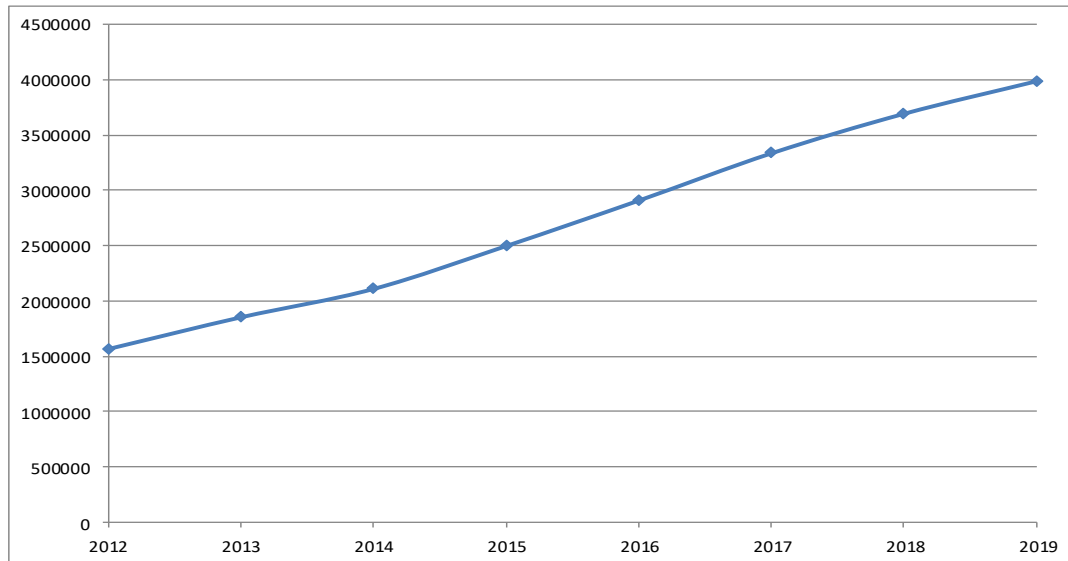
Determination of strategic financial potential level represents special interest for the scholars in the study of Manuylenko et al (2018).

Simulated values of absolute and relative levels of financial risk in corporations. Figure 2 - 3.



**Figure 2.** Modeled values for relative indicator of strategic financial risk assessment in “Arnest” JSC (developed by authors V. V. Manuylenko, D. A. Ryzin) (Official site of the Federal State Statistics Service - [http://www.gks.ru/accounting\\_report](http://www.gks.ru/accounting_report))





**Figure 3.** Simulated values for absolute indicator of strategic financial risk assessment in “Arnest” JSC (developed by authors V. V. Manuylenko, D. A. Ryzin) (Official site of the Federal State Statistics Service - [http://www.gks.ru/accounting\\_report](http://www.gks.ru/accounting_report))

There is a direct connection between absolute (accepted value of external capital) and relative (financial leverage) indicators of the method for strategic financial risk assessment in corporations. Relative indicator includes constituent parts of the absolute indicator, i.e. strategic external capital and vice versa. Safe value of strategic external capital is calculated in accordance with absolute indicator. As a result, absolute and relative values for strategic

financial risk in organizations are determined. Financial manager can control safe value of external capital judging sufficient level of profitability of own capital of a corporation.

Main parameters for financial risk level assessment in corporations based on Monte Carlo method - Table 2.

**Table 2.**

Main parameters for financial risk level assessment in corporations based on Monte Carlo method

Comparison options	Special Excel-VBA software product “Software for determining strategic financial risk in corporations”
Absolute Indicator	Determination of current and strategic safe value of attracted capital
Relative Indicator	Current and strategic financial risk is evaluated with reference to financial leverage
Key provisions for modern financial management	Criteria of “golden rule of financial management” is applied in the software when establishing the criterion boundaries for indicators
Requirements of Government bodies for economic development of the country	Criteria limitations for indicators in the software refer to the criteria determined by the Ministry of Economic Development of the Russian Federation.
Disposition regarding financial risk decisions	Tactical and strategic financial risk limiting decision
Participation in Financial Risk Management Policy creation	Creates it tactical and strategic parts
Practical application	Financial management system in corporations with reference to assessment of stakeholders’ behavior in financial markets
Users	Internal / external (stakeholders, creditors / lenders, suppliers, etc.)

Source: compiled by authors V. V. Manuylenko, D. A. Ryzin



YY	Absolute Indicator			Relative Indicator		
	Actual external capital, in thousand rubles	Strategic external capital, in thousand rubles	Comparison (column 3 / column 2) × 100 % – 100 %	Actual financial leverage, in units	Strategic financial leverage, in units	Comparison (column 6 – column 5), in units
1	2	3	4	5	6	7
2015	21740	133711	+ 515,0	0,111	0,681542786	+ 0,571
2016	24634	138980	+ 464,2	0,121	0,681791234	+ 0,561
2017	22981	141173	+ 514,3	0,111	0,68119031	+ 0,570
2018 <sub>strategic.</sub>		146753			0,681761258	
2019 <sub>strategic.</sub>		151279			0,681645678	
“Baysad” JSC						
2012	597300	43670	– 92,7	9,322	0,681541495	– 8,640
2013	700656	61849	– 91,2	7,723	0,681692005	– 7,041
2014	981315	87922	– 91,0	7,604	0,681261515	– 6,923
2015	886234	112213	– 87,3	5,383	0,681542786	– 4,701
2016	851395	138080	– 83,8	4,204	0,681791234	– 3,522
2017	718876	159361	– 77,8	3,073	0,68119031	– 2,392
2018 <sub>strategic.</sub>		182657			0,681761258	
2019 <sub>strategic.</sub>		201924			0,681645678	
“Georgievsky Fittings Plant” LCC						
2012	173572	– 17531	– 110,1	– 5,281	0,681541495	+ 5,963
2013	278715	– 42556	– 115,3	– 3,494	0,681692005	+4,176
2014	308917	– 49349	– 116,0	– 3,340	0,681261515	+4,021
2015	402485	– 22514	– 105,6	– 9,529	0,681542786	+ 10,211
2016	413224	476	– 99,9	592,011	0,681791234	– 591,329
2017	334485	3029	– 99,1	75,233	0,68119031	– 74,552
2018 <sub>strategic.</sub>		8119			0,681761258	
2019 <sub>strategic.</sub>		12356			0,681645678	

Source: calculation provided by the authors V. V. Manuylenko, D. A. Ryzin (Official site of the Federal State Statistics Service - [http://www.gks.ru/accounting\\_report](http://www.gks.ru/accounting_report))

In accordance with provided calculations within the period of the study, in order to ensure continuous financial balance for cash flow and organizations' performance with acceptable degree of risk regardless of the random market conditions and stakeholders' behavior, it is necessary to reduce external capital in “Arnest” JSC by 28.9% - 47.6%, in “Baysad” JSC by 77.8% - 92.7%, in

“Georgievsky Fittings Plant” LLC by 99.1% - 116%. As for “Soyuzpechat” JSC it is required to mobilize external capital for the company in the amount of 363.1% - 596.9%.

Suggested tool for strategic financial risk level assessment in organizations brings together interests of individual stakeholders - Table 4.

**Table 4.**

Practical applications of results for strategic financial risk level assessment in corporations with stakeholders

Stakeholders	Areas of practical application
Owners	Estimate maximum profitability at appropriate level of financial risk in order to ensure an optimal balance between financial risk level and profitability, as required by the Russian Corporate Governance Code
Financial managers	Evaluate potential sustainable growth of capital via definition of its targeted impact on profitability of own capital, as well as safe volume for borrowed capital to achieve objectives set by them
Creditors	Assess the loan default risks, lack of funds for loan payments, as well as possibilities for borrowed capital accumulation to determine feasibility of subsequent lending to corporations
Lenders	Assess default risks for long-term loans / bonds
Providers	for the possible subsequent provision of long-term loans / bonds to corporations
	Assess corporation's insolvency risk

Source: compiled by authors V. V. Manuylenko, D. A. Ryzin

Testing of the model for strategic financial risk level assessment based on simulation, with support of special Excel-VBA “Software for determining the strategic financial risk of corporations” (Manuylenko and Ryzin, 2018) in financial management system of organizations allows:

- consider influence of emergent environment factors (macro-, meso-) on financial risk level;
- correct Financial Risk Management Policy, taking into account its strategic component;
- take into account interests of majority of stakeholders while creating and evaluating scenarios of their behavior in financial markets.

Model error risks are compensated by stress testing via case scenario analysis outside of standard risk models, whereas capital reserves must cover potential corporate losses.

### Conclusions

The authors believe that developed model for strategic financial risk assessment can be improved, if one takes into account different forecast periods for development and implementation of Financial Risk Management Policy. Considering specifics of its own development, each corporation can create its own model for assessing financial risk. At the same time, modeling financial risk decision making process brings it to a significantly higher level, i.e. offers and introduces modern technologies into financial risk decision making practice. The results of assessment create foundation for development of strategic financial risk decisions that define risk-oriented development of corporations.

Thus, the tool is proposed for strategic financial risk level assessment, based on the special Excel – VBA, and aimed at modification of Financial Risk Management Policy strategic aspect. Applying suggested methodological tools for assessment and elimination of financial risks, and considering its unique development, each corporation may independently develop and improve advanced tools for financial management system.

Thus, implementation of Monte Carlo based toolset for strategic financial risk assessment in corporations involves:

- expansion of its universal functional purpose in the following areas: identification of

external factors affecting financial risks; identification and quantification of other types of risks; combination of qualitative and quantitative financial risk assessment tools; detection of potential influence on profits via establishment of optimal capital structure; insurance of sustainable capital growth; evaluation of possibilities for accumulation of borrowed capital to increase own capital value and related level of financial risk associated with this for the organization and the stakeholders / banks; determination of maximum profitability at appropriate level of financial risk; establishment of safe value for borrowed capital;

- determination of strategic external capital and financial leverage, taking into account requirements of “golden rule of financial management” established by government bodies for the country’s economic development, comparison of strategic and actual values of financial risk levels, preparation of reasoned professional judgment;
- comparison of assessments for financial risk level by means of: absolute and relative indicators, assumption of key provisions of modern financial management and requirements of government bodies for the country’s economic development, attitudes to financial risk decisions, correction of Financial Risk Management Policy, practical application, users;
- preparation of recommendations for determination of financial risk target level via estimation of value deviations for strategic indicators derived from simulation;
- identification of areas for practical application of the results on strategic financial risk level assessment for stakeholders / owners, financial managers, creditors, lenders and suppliers;
- identification of multiple scenarios for corporations’ development with subsequent provision of choice for financial risk-decision and its results with future oriented development;
- its application as a supplement tool for financial risk decision making when establishing strategic areas for organizations’ development; financial risk decisions are carried out with computing support.

Universal tool for regulation and assessment of strategic financial risk level with Monte-Carlo method in various modifications was tested in financial management systems of “Arnest” JSC,

“Soyuzpechat” JSC, “Baysad” JSC and “Georgievsky Fittings Plant” LLC.

Successful implementation of alternative tools for regulating and evaluating financial risks in corporations requires adhering to a risk culture, which is an integral part of a corporate culture and involves:

- establishment of optimal ratio between risk and profitability levels, clear understanding of “risk hunger”;
- ensuring interaction between organization and stakeholders aimed at achieving common goals; corporations and stakeholders should if needed admit mistakes and be prone to dialogue;
- exclusion of both excessive evasion and constant adherence to risks, since cost is lost: in the 1st case there is loss of opportunities, in the 2nd case there is a risk of bankruptcy;
- identification of risks in the process of joint financial and intellectual capital functions (independent study of the intellectual capital of corporations is carried out by Galazova et al (2017);
- development of methods and credit risk assessment tools of various modifications including financial: Rybina et al (2017);
- development of methods and insurance instruments in various modifications: Rusetskaja et al (2016);
- development of methods and banking risks assessment tools including financial: Voronova et al (2016);
- development of methods and tools for assessing and modeling tax risks in various modifications including financial: Voronova et al (2016);
- development of methods, means and tools for evaluation of risks and uncertainty: Rutkauskas and Stasytytė (2010).

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