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Determinants of tax incentives for investment activity of enterprises

Viktor V. Ivanov*St. Petersburg State University, St. Petersburg, Russian Federation*ORCID: [0000-0003-4121-0605](https://orcid.org/0000-0003-4121-0605)**Nadezhda A. Lvova***St. Petersburg State University, St. Petersburg, Russian Federation*ORCID: [0000-0002-9467-2785](https://orcid.org/0000-0002-9467-2785)**Natalia V. Pokrovskaja***St. Petersburg State University, St. Petersburg, Russian Federation*ORCID: [0000-0002-8314-9470](https://orcid.org/0000-0002-8314-9470)**Svetlana V. Naumenkova***Taras Shevchenko National University of Kyiv, Kyiv, Ukraine*ORCID: [0000-0001-8582-6044](https://orcid.org/0000-0001-8582-6044)

ABSTRACT

The article is devoted to the problematic issues of tax incentives for Russian companies. The main prerequisite of the research is that the domestic practice of tax incentives does not meet the interests of the state, since it is in clear contradiction with the declared principles of economic development. The provided tax privileges should promote the investment activity of business. However, tax incentives are often offered to those enterprises that are not able to use them effectively. Justification of tax benefits requires identifying enterprise's investment activity factors, the level of which is largely determined by the corporate life cycle stage and industry specificity. Hypotheses about the importance of corporate age and economic activity, formulated for the purposes of this study, have been empirically confirmed. It was proved that the investment activity of Russian enterprises demonstrated different dynamics in the conditions of the economic crisis. In the manufacturing industry, in particular, most enterprises increased the volume of fixed assets, while in the spheres of petroleum products, dairy products, chemical products, communications on the basis of wire technologies, there was a decline in investment activity. The change in investment activity in the period under study was due to various factors for both enterprises of different industries and enterprises of the same industry characterized by different corporate ages. The results obtained let us conclude that a unified approach to tax incentives for enterprises' investment activity cannot be justified. In the opinion of the authors, "targeted" tools of tax incentives are more efficient.

KEYWORDS

Tax incentives, tax benefits, investment activity, investments, corporate life cycle

JEL H22, H25, G30, G31

HIGHLIGHTS

1. Tax incentives should meet the interests of the state, contributing to the development of the economy. However, in Russia it is increasingly reduced to tax benefits, which increase in volume, but do not bring the desired effect, including the fact that they do not contribute to the growth of investment activity of enterprises
2. It was revealed that the investment activity of the enterprise depends to a significant extent on the stage of the life cycle and industry specificity, which, in the opinion of the authors, should be considered as the determinants of tax incentives. Accordingly, the authors offer the hypotheses about the importance of the corporate age and the sphere of financial and economic activity in shaping the factors of Russian enterprise investment activity
3. Investment activity models for young, adult and old manufacturing enterprises, as well as companies for the manufacture of coke and refined petroleum products, dairy products, chemicals and chemical products, and communications based on wire

technologies have been constructed. It is shown that these models have independent significance, and the factors of investment activity really depend on the corporate age and industry specificity

4. Thus, it is argued that the system of tax incentives in Russia requires development: we should abandon unsystematic tax incentives in favor of target instruments that take into account the financial characteristics of the taxpayer more flexibly

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Детерминанты налогового стимулирования инвестиционной активности предприятий

В. В. Иванов

Санкт-Петербургский государственный университет, г. Санкт-Петербург, Россия
ORCID: [0000-0003-4121-0605](https://orcid.org/0000-0003-4121-0605)

Н. А. Львова

Санкт-Петербургский государственный университет, г. Санкт-Петербург, Россия
ORCID: [0000-0002-9467-2785](https://orcid.org/0000-0002-9467-2785)

Н. В. Покровская

Санкт-Петербургский государственный университет, г. Санкт-Петербург, Россия
ORCID: [0000-0002-8314-9470](https://orcid.org/0000-0002-8314-9470)

С. В. Науменкова

Киевский национальный университет имени Тараса Шевченко, г. Киев, Украина
ORCID: [0000-0001-8582-6044](https://orcid.org/0000-0001-8582-6044)

АННОТАЦИЯ

Статья посвящена проблемным вопросам налогового стимулирования российских предприятий. Главная предпосылка исследования заключается в том, что отечественная практика налогового стимулирования не отвечает интересам государства, поскольку вступает в явное противоречие с декларируемыми принципам экономического развития. Так, предоставляемые налоговые льготы должны способствовать инвестиционной активности бизнеса. Однако, налоговые льготы зачастую представляются тем предприятиям, которые не способны использовать их эффективным образом. Обоснование системы налоговых льгот требует выявления факторов инвестиционной активности предприятий, уровень которой во многом определяется стадией жизненного цикла и отраслевой спецификой. Гипотезы о значимости корпоративного возраста и сферы экономической деятельности, сформулированные в целях настоящего исследования, получили эмпирическое подтверждение. Было доказано, в условиях экономического кризиса инвестиционная активность российских предприятий демонстрировала разную динамику. В частности, в обрабатывающей промышленности большинство предприятий наращивало объем основных средств, тогда как в сферах производства кокса и нефтепродуктов, молочной продукции, химических веществ и химических продуктов, связи на базе проводных технологий наблюдался спад инвестиционной активности. В то же время изменение инвестиционной активности в исследуемом периоде объяснялось разными факторами как для предприятий разных отраслей, так и предприятий одной отрасли, характеризующихся разным корпоративным возрастом. Полученные результаты позволили сделать вывод о том, что унифицированный подход к налоговому стимулированию инвестиционной активности предприятий нельзя признать оправданным. По мнению авторов, более эффективны «целевые» инструменты налогового стимулирования. Рекомендации в этом отношении могут представлять интерес для отечественного законодателя и тех лиц, в сферу интересов которых входит мониторинг инвестиционного климата в Российской Федерации.

КЛЮЧЕВЫЕ СЛОВА

Налоговое стимулирование, налоговые льготы, инвестиционная активность, инвестиции, жизненный цикл организации

ОСНОВНЫЕ ПОЛОЖЕНИЯ

1. Налоговое стимулирование должно отвечать интересам государства, способствуя развитию экономики. Однако в России оно все больше сводится к налоговым льготам, которые увеличиваются в объемах, но не приносят желаемого эффекта, в том числе не способствуют росту инвестиционной активности предприятий

2. Выявлено, что инвестиционная активность предприятия в существенной степени зависит от стадии жизненного цикла и отраслевой специфики, которые, по мнению авторов, должны рассматриваться как детерминанты налогового стимулирования. Соответственно, сформулированы гипотезы о значимости корпоративного возраста и сферы финансово-хозяйственной деятельности в формировании факторов инвестиционной активности российских предприятий

3. Построены модели инвестиционной активности для молодых, зрелых и старых предприятий обрабатывающей промышленности, а также компаний по производству кокса и нефтепродуктов, молочной продукции, химических веществ и химических продуктов, связи на базе проводных технологий. Показано, что данные модели имеют самостоятельную значимость, а факторы инвестиционной активности действительно зависят от корпоративного возраста и отраслевой специфики

4. Таким образом, аргументировано, что система налогового стимулирования в России требует развития: следует отказаться от бессистемных налоговых льгот в пользу целевых инструментов, более гибко учитывающих финансовые особенности налогоплательщика

Introduction

Tax incentives as the most important direction of the tax policy include a set of measures to reduce the tax burden for taxpayers, encouraging them to “a certain model of behavior that meets the interests of the state” [1, p. 25]. Such a model for modern Russia is an innovation-investment model that provides high rates of labor productivity, outstripping the development of certain sectors of the national economy. Tax incentives are used as an instrument of tax policy for the model implementation. The Russian practice of tax incentives for investment activity of organizations indicates a significant increase in tax benefits provided both at the federal and regional levels (Table 1).

By the end of 2016, almost a third of the subjects of the Russian Federation received less than 10% of revenues from regional taxes and corporate profit tax (in the part to be credited to the regional budget)¹. In addition, despite the tasks

of gradual abolition of tax benefits at the federal level², the volume of falling revenues of regional budgets associated with the provision of benefits for regional taxes and corporate profit tax for 2016 increased compared to the same volume for 2015 in 57 subjects of the Russian Federation³. Until now, the Russian Federation lacks a unified system for monitoring tax benefits, assessing the effectiveness, which would allow making informed decisions as to the appropriateness of using them to stimulate investment activity of enterprises.

Tax incentives as a tool for stimulating investment activity

Tax benefits are a rather contradictory instrument of state regulation, the consequences of which are characterized by a high degree of uncertainty. The negative consequences are, in particular:

² See, for example, The main directions of the tax policy of the Russian Federation for 2016 and the planning period of 2017 and 2018. Available at: http://www.minfin.ru/common/upload/library/2015/07/main/ONNP_2016-2018.pdf/.

³ According to the Ministry of Finance of the Russian Federation, Analysis of tax privileges established by state authorities of the subjects of the Russian Federation for 2016. Available at: https://www.minfin.ru/document/?id_4=119647/.

¹ According to the report of the Ministry of Finance of the Russian Federation on the results of assessing the quality of regional finance management for 2016. Available at: https://www.minfin.ru/ru/performance/regions/monitoring_results/monitoring_finance/.

Table 1

**Shortfall in profit tax, corporate property tax and transport tax in connection
with the establishment of the appropriate tax benefits for 2006–2016 by the laws
of the subjects of the Russian Federation**

Indicator / Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Revenue from profit tax in the budgets of the subjects of the Russian Federation, billion rubles*	1,106	1,496	1,711	1,058	1,500	1,907	1,970	1,692	1,952	2,098	2,272
Shortfall in profit tax due to the tax privileges by the laws of the subjects of the Russian Federation in accordance with Clause 1 of Article 284 of the Tax Code of the Russian Federation (excluding residents of special economic zones and participants of regional investment projects), billion rubles	34.7	27.9	41.5	38.4	50.7	63.7	63.0	53.1	77.8	88.5	61.9
Percentage of the amount of revenue, % **	3	2	2	4	3	3	3	3	4	4	3
Revenue from corporate property tax in the budgets of the subjects of the Russian Federation, billion rubles*	198.0	257.0	315.0	374.0	409.0	454.0	533.0	609.0	631.0	709.0	760.0
Shortfall in the corporate property tax due to the establishment of tax privileges by the laws of the subjects of the Russian Federation in accordance with Clause 2 of Article 372 of the Tax Code of the Russian Federation, billion rubles	93.7	120.0	122.9	116.2	122.3	131.5	137.0	152.0	151.0	156.0	173.1
Percentage of the amount of revenue, % **	32	32	28	24	23	22	20	20	19	18	19
Revenue from transport tax in the budgets of the subjects of the Russian Federation, billion rubles*	24.7	36.4	45.9	49.1	56.0	66.2	82.3	99.0	113.2	135.0	135.4
Shortage of the transport tax due to establishment of the tax privileges by the laws of the subjects of the Russian Federation in accordance with Art. 356 Tax Code, billion rubles	4.7	4.6	5.1	6.0	6.2	6.6	7.3	7.7	8.7	10.5	10.6
Percentage of the amount of revenue, % **	16	11	10	11	10	9	8	7	7	7	7
TOTAL volume of tax benefits granted in accordance with the decisions of the state authorities of the subjects of the Russian Federation, billion rubles	133.0	153.0	169.4	160.7	179.2	201.8	207.0	213.0	237.5	255.0	245.5

Notes:

* Only receipts included in the budgets of the subjects of the Russian Federation (different from receipts to the consolidated budgets of the subjects of the Russian Federation for the amount of revenues to local budgets) are taken into account.

** The share of the shortfall is calculated as the ratio of the amount of shortfall in taxes to the amount of received and underpaid taxes (a conditional value that expresses the amount of revenue in the absence of tax incentives).

Source: compiled by the authors according to the Russian Federal Tax Service.

- a decrease in the neutrality of the tax system [2];
- dilution of the tax base, which leads to limiting the possibility of reducing tax rates [3];
- the complexity of regular monitoring of tax incentive use [4];
- the possibility of legislative establishment of tax privileges in isolation from the budgetary process [5];
- distortion of market decisions adoption, including investment [6];
- generation of numerous schemes for avoiding taxes and abuses [7];
- transfer of tax burden from some categories of taxpayers to other categories [8] or, in other words, an unfair distribution effect.

We should note that in the Russian Federation the listed potentially negative effects of tax incentives are supplemented by an ambiguous interpretation of the concept of “tax privilege”. In the Tax Code of the Russian Federation “privileges on taxes and levies are recognized as the benefits provided to taxpayers and payers of fees by legislation on taxes and fees in comparison with other taxpayers or payers of fees, including the possibility not to pay tax or levy or pay them in less”⁴, which makes it difficult to separate tax benefits from other instruments of preferential tax policy. Indication of the Tax Code of the Russian Federation that “the norms of the legislation on taxes and fees, which determine the grounds, procedure and conditions for the application of tax and fee benefits, cannot be of an individual nature”⁵, raises a number of additional problems, among which there are the problems of stimulating investment activity corporate sector. The key question in this respect can be formulated as follows: how to ensure effective stimulation of investment activity, keeping to a solid approach to granting tax benefits?

Attempts to assess the consequences of tax incentives for companies’ investment activity have been made since the

⁴ Art. 56 of the first part of the Tax Code of the Russian Federation.

⁵ Art. 56 of the first part of the Tax Code of the Russian Federation.

second half of the 20th century both in the framework of theoretical studies, and with the use of empirical data. R. Hall and D. Jorgenson became one of the first authors who devoted their research to this problem in opposition to the existing position that “the effectiveness of tax policy in altering investment behavior is an article of faith among both policy makers and economists” [9, p. 391].

R. Hall and D. Jorgenson substantiated the positive impact of the tax policy on accelerating and increasing the volume of investments in the US using the case of tax breaks 1954-1962 in the context of the neoclassical approach. Theoretical studies of these phenomena have been widely developed [10-12, etc.] simultaneously with the widespread use of tax incentives to stimulate investment in developed countries. An empirical analysis of these benefits actual results has led to mixed conclusions. Macroeconomic estimations of changes in investment activity based on time series illustrated both the existence of a connection with tax changes and their absence (for more details see [13; 14]). Obviously, the definition of interconnection in this way is extremely complicated both by the need to highlight the impact on investment of precisely tax instruments, and the averaged substantial differences in the response to tax incentives of various economic subjects. These points were mitigated when assessing microeconomic data for individual companies.

Against the background of theoretical discussions, J. Cummins, K. Haset and R. Hubbard [15] considered the ongoing tax reforms in the US as a natural experiment. Based on the analysis of enterprises panel data, the authors showed a positive increase in investments based on the results of 13 episodes of tax reforms in 1962–1988, and the investment activity of companies was higher when they received larger tax breaks. Thus, the researchers made the conclusion about the impact of long-term changes in corporate taxation on the level of investment in fixed assets. The transfer of the methodology for assessing investment activity based on the results of tax breaks on tax reforms for the

period 1982–1992 in fourteen countries [16] has led researchers to not so unambiguous results: a statistically significant positive response to investment in tax incentives was identified only for twelve countries.

In the following decades, microeconomic studies of the reaction of companies' investment activity on tax incentives continued (a detailed review: [17]), but they got the greatest depth in recent years. If the study of the tax reform consequences in the US in 1962–1988 by J. Cummins, K. Haset and R. Hubbard [15] included from 251 to 1,294 companies (depending on the analyzed year), then similar estimations for 2001–2010 were obtained on the basis of panel data for 120,000 companies [18]. The authors differentiated the effectiveness of tax incentives to stimulate investment activity both in terms of the size of companies (for small and medium enterprises it was higher than for large ones) and by the nature of benefits (greater investment activity was ensured by benefits that implied earlier savings on tax).

The work of E. Ohrne [19] was devoted to the comparison of the consequences of various tax methods to stimulate investments in fixed assets. He compares the benefits associated with accelerating the write-off of the value of fixed assets, with a reduction in corporate profit tax rates for certain areas of US companies. E. Ohrne concluded that there is the same efficiency of both tax instruments to stimulate investment activity.

What difficulties do researchers face when measuring the relationship between tax incentives and business investment activity using empirical data? And why are their conclusions not always unambiguous? We are listing the main conclusions below:

- it is important to correctly determine the analyzed period, taking into account the variability of the tax policy⁶;

⁶ In particular, S. Mishchenko [20] writes that as a result of the financial crisis of 2008–2009, many countries temporarily limited tax incentives programs for their companies, including their investment activities, which, in the author's opinion, could adversely affect the pace of economic growth in the future.

- there are objective limitations related to the specifics of preparing and presenting financial statements as the main source of information about the analyzed companies;

- it is difficult to exclude distortion of data due to the growth of investment activity in the periods of tax incentives due to its artificial reduction on the eve of the introduction of benefits and the potential decrease after the abolition of benefits;

- certain external and internal conditions of the companies' activities are able to have a significant impact on their response to tax incentives, which also applies to investment activity;

- the behavior of decision-makers, including financial managers of companies, does not always correspond to theoretical assumptions based on the assumption of rationality.

In the second half of the twentieth century the analysis of taxation instruments is often supplemented by an assessment of their perceptions [21; 22], including taking into account national peculiarities [23] and economic conditions [24]. In 2008, J. Jolie [25] co-authored a survey of company executives that were subject to and not subject to a tax break stimulating investment and job creation in North Carolina, the United States. Most executives in both groups preferred a reduction in the overall corporate tax rate to the introduction of tax incentives; while only 30% of CEOs who were eligible for an investment tax credit were aware of it.

As for detailing the characteristics of companies to assess their response to tax incentives for increasing investment activity, as already indicated, a separate consideration of the investment behavior of small and large business representatives is common [18; 26]. Considering the remaining parameters is undertaken quite rarely.

In this regard, we shall note an attempt to include companies in the analysis according to the industries for which tax incentives are directed [19]. At the same time, theoretical conclusions about the different impact of tax incentives on investment activity, depending on the type of company activity, were made, in

particular by A. Auerbach and Jr. Hines [27]. E. Ohrne [19] also considers the influence of the company's age on changes in investment activity in connection with tax benefits: the performance of 25% of the oldest companies in the sample were found to be statistically significant (they showed an increase in investment activity due to a reduction in the general tax rate for profits, and less old companies reacted more to tax benefits).

In our opinion, the duration of company existence really matters to stimulate its investment in fixed assets. It is well known that enterprises are interested in increasing investment activity as long as the capital return grows. In the future their interest lies in maintaining the optimal level of capital intensity. Accordingly, the need for financial resources and appropriate sources to finance investment activity for both reaching the optimal level of capital intensity and maintaining it will vary significantly depending on the general state of the economy and, not least, on the stage of the enterprise's life cycle.

The origins of scientific ideas about the organizational life cycle (OLC) are traced in the ideas of organicism, the peak of interest in modern history falls on 1920–1930 [28]. The formation of the OLC concept occurs later – in the 1950–1960's, and since the 1980s the concept is widely used in corporate governance, forming one of the main directions of the theory of organizational change management.

The research of the OLC can be systematized in various ways [29], for instance according to the functions of corporate governance, including financial management. The most specific features of the OLC are presented in the context of strategic financial decisions. Thus, E. A. Fedorova and E. Yu. Persidskaya [30; 31] proved that corporate age⁷ is a significant determinant in capital structure management of Russian companies. This conclusion correlates with

⁷ For the purposes of the study, the corporate age will be considered as an evaluation of the enterprise's life cycle stage (respectively, young, adult or old). In this sense, the corporate age should be distinguished from the actual (the life of the enterprise from the moment of its foundation).

the results of studies by foreign authors testing factors that predetermine the capital structure of American and European companies [32– 34, etc.]. Accordingly, the stage of the life cycle must be taken into account in the management of the firm's value, which in turn is confirmed by empirical studies [35; 36, etc.]

Despite a great number of works on the financial aspects of the OLC, this area has significant development potential, which fully relates to the issues under study. It is impossible not to note the obvious conventionality of financial models of corporate age estimation based on cash flows [34; 37] or on financial ratios [31; 36; 38]. In addition, the issues of tax regulation of company investment activity, taking into account the OLC, whose importance is mostly not questioned in the "management of the taxation of an economic entity", are still little studied [39, p. 173].

An important exception is the work of Yu. B. Ivanov, characterizing the tools of tax incentives depending on the stage of the life cycle of the innovation process (for example: [40, p. 499–507]). However, according to the authors, the issue of tax incentives can be put more widely. In particular, it is advisable to formulate and verify a number of hypotheses regarding the factors of investment activity in the stages of the OLC, which determined the methodology of the study.

Methodology

To reach the objectives of the research we offered the two hypotheses:

Hypothesis 1. The corporate age (the stage of the life cycle) is a significant factor in the level of investment activity of the enterprise.

Hypothesis 2. The effectiveness of tax incentives as a tool to stimulate investment depends on the corporate age of the enterprise.

The authors made a great number of calculations to find out the factors of company investment activity among the enterprises of various industries in 2011–2016 assuming the relevance of the OLC. In general, the following facts were revealed:

1. First, in many industries there has been a significant reduction in the number of investment-active enterprises⁸.

2. Secondly, many investment-passive enterprises experienced an increase in profit before tax compared with 2015, which may reflect the presence of external restrictions on investment activity. This conclusion is correlated with Federal State Statistics Service's data, according to which among the key factors limiting the investment activity of enterprises, the most significant in 2015–016 was the factor of economic situation uncertainty in the country (Table 2).

Table 2

**Distribution of organizations
in assessing the factors limiting
investment activity (as a percentage
of the total number of organizations)**

Factors	2000	2010	2014	2015	2016
Insufficient demand for products	10	19	23	28	27
Lack of company's own funds	41	67	60	61	61
High percentage of commercial loans	47	31	29	56	56
A complex mechanism for obtaining loans for the implementation of investment projects	39	15	16	42	46
Investment risks	35	23	30	60	50
Unsatisfactory condition of the technical base	18	5	7	18	22
Low profitability of investments in fixed assets	8	11	13	22	20
Uncertainty of the economic situation in the country	49	32	34	66	61
Imperfect regulatory framework governing investment processes	36	10	11	27	27

Source: Federal State Statistics Service of Russia.

⁸ For research purposes, investment-active enterprises are those that have had an increase in the value of fixed assets in the analyzed period. Enterprises demonstrating other dynamics of fixed assets are designated as investment-passive.

3. Thirdly, the economic crisis had a different effect on the investment activity of enterprises in certain industries. So, in 2016 in the manufacturing industry, over 60% of enterprises remained investment-active. At the same time, the share of similar companies in the spheres of manufacture of coke and refined petroleum products, dairy products, chemicals and chemical products, communications based on wire technologies did not exceed 40%.

The revealed differences correspond with the principles of sector rotation, according to which different industries react ambiguously to the dynamics of the business cycle (see, for example: [41]). Thus, the hypothesis that the tools of tax incentives for investments should be adjusted to the sectoral specifics was further considered (**Hypothesis 3**).

This hypothesis predetermined the principle of forming **industry models of investment activity**. At the same time, depending on the level of investment activity of the industry in the analyzed period, different models of corporate age scoring were used.

For investment-active industries (with a share of investment-active enterprises over 60% in the analyzed period), a corporate age assessment model was used, based on the assumption of a uniform distribution of the company population over the life cycle stages [42]. Thus, the characteristics "low" / "young" was assigned to the enterprises, where the value of the analyzed indicator corresponded to the interval up to the 33th percentile; the characteristics "middle" / "adult" corresponded to the interval from 33 to 66 percentile; "High" / "old" corresponded to the interval from the 66th percentile.

Further, by analogy with other Russian studies in the field of financial aspects of organizational change [31; 38], the authors distributed the analyzed companies by corporate age on the basis of three determinants (Table 3).

The score characteristics of the stages of the OLC is presented in Table 4.

Table 3

**Determinants
of enterprise's corporate age
in the investment-active industry**

MRETA	MSG	AGE	Score
Low	High	Young	1
Middle	Middle	Adult	2
High	Low	Old	3

Notes:

MRETA is the median of the ratio of retained earnings to total assets, MSG is the median of the growth rate of revenue, AGE is the actual age since the moment of foundation.

Median values were estimated over 3 years, including the year of the study.

Table 4

**Score characteristics
of enterprise's corporate age
in the investment-active industry**

Score	3-4	5	6	7	8-9
The OLC stage	Growth	-	Mature	-	Stagnant

Investment activity was estimated as the growth rate of fixed assets:

$$CapEx_t = \frac{FA_t - FA_{t-1}}{FA_t},$$

where:

CapEx – capital expenditure reflecting investment activity;

FA – the book value of the company's fixed assets at the beginning (*t-1*) and the end (*t*) of the analyzed period, respectively.

One year is adopted for the base reporting period.

The most relevant indicators were used as explanatory variables, namely:

- capital intensity of the company – *CI*;
- capital productivity – *CapProd*;
- lag variable of investment activity – *CapEx_{t-1}*;
- level of debt – *Debt_t*.

$$CI_t = \frac{FA_t}{TA_t},$$

where:

TA – book value of total assets.

$$CapProd_t = \frac{Rev_t}{FA_t},$$

where:

Rev – revenue.

The presence of a lagged variable of investment activity will make it possible to conclude that there continuity is or lack of continuity in the implementation of investment activities.

$$CapEx_{t-1} = \frac{FA_{t-1} - FA_{t-2}}{FA_{t-1}},$$

$$Debt_t = \frac{LTD_t}{TA_t},$$

where:

LTD – long-term debt.

For investment-passive industries (with a share of investment-active enterprises of not more than 40%), the use of the above corporate age assessment model did not adequately distinguish the corporate age, since in the crisis conditions, the overall performance of the sample deteriorated significantly.

On the one hand, this result reflects an increased risk of premature termination of the organizational life cycle. On the other hand, to admit that most of them “grow old” during the crisis would not be completely correct. This circumstance led to a more detailed approach to the assessment of corporate age, abandoning the principle of uniform distribution, which is appropriate at other stages of the business cycle. Thus, the corporate age assessment model was revised on the updated principles:

- firstly, it was further confirmed that this model should not be limited to financial characteristics, so the actual age of the companies was still taken into account;

- secondly, the financial characteristics of the OLC stages was adjusted from the position of analyzed indicators' dynamics;

- thirdly, revenue and financial results indicators (and associated coefficients) were more irrelevant, more exposed to external factors than, for example, the book value of assets. Thus, the division of enterprises into the stages of the OLC was carried out as follows (Table 5).

Table 5
Determinants of the corporate age of enterprises in the investment-passive industry

Growth of assets for 2016	Actual age	Score
More than 5% of the growth variation across the sample	From 1 year to 10 years	1
From 0 to 5% of the growth variation across the sample	From 10.5 year to 20 years	2
Negative growth	More than 20 years	3

The score characteristics of the OLC stages is presented in Table 6.

Table 6
Score characteristics of enterprise's corporate age in the investment-passive industry

Score	2-3	4	5-6
The OLC stage	Growth	Mature	Stagnant

The model of enterprises' investment activity at the second stage of the research was also modernized. As an indicator of investment activity, the indicator of "fixed assets growth" was used in 2016 as compared to 2015:

$$CapExInc_t = FA_t - FA_{t-1},$$

where:

$CapExInc$ – capital expenditure increase reflecting investment activity in the form of fixed assets growth.

The composition of the explanatory variables was also changed. For the increase in fixed assets the following explanatory factors were used:

- profit before tax for the current period – $Profit_t$;
- profit before tax for the previous period – $Profit_{t-1}$;
- long-term liabilities for the current period – $LTDebt_t$;
- long-term liabilities for the previous period – $LTDebt_{t-1}$;
- short-term liabilities for the current period – $STDebt_t$;
- short-term liabilities for the previous period – $STDebt_{t-1}$.

The development of models was done using the LSM method in the STATA software package.

At the first stage of the survey, the sample included manufacturing companies (hereinafter referred to as "Sample 1"). The sampling process was based on the following principles:

- we included enterprises with assets of more than 10 million rubles at the end of each reporting period (from 2011 to 2015);
- the date of registration of these enterprises should be no later than 2012;
- subsidiaries were excluded;
- enterprises with transitional stages of the life cycle (scores of 5 and 7, see le 4) were not taken into account.

Taking into account the adopted principles and assumptions, Sample 1 was 2,290 enterprises-years (Table 7).

Table 7
Distribution of enterprises in Sample 1

Stage of the OLC	2011	2012	2013	2014	2015	Total number of enterprises
Growth	151	123	124	128	124	650
Mature	205	157	180	160	171	873
Stagnant	162	148	159	153	145	767
Total number of enterprises	518	428	463	441	440	2,290

At the second stage of the study, the sample included companies from the following spheres of economic activity: manufacture of coke and refined petroleum products, dairy products, chemicals and chemical products, and also the companies in the field of communications based on wire technologies⁹.

Given the dramatic change in the external business environment in 2016, it was decided to abandon the principle of combining data by years in a continuous sample, as shown in Table 7.

In addition, only investment-active companies with a non-zero positive increase in the book value of fixed assets in

⁹ We emphasize that the industries that demonstrate a different degree of sensitivity to changes in the economic environment has been specially included into the sample. In particular, communication enterprises represented the growth sectors, petroleum and chemical industry enterprises – cyclical branches, dairy enterprises – protective industries (see the classification of industries, for example: [30]).

2016 as compared to 2015 were analyzed. Accordingly, the models of investment activity for the stages of the OLC were constructed according to the data of Sample 2 (Table 8).

The system of professional market analysis and companies "SPARK" was used as a source of information.

Results

Following the results of the first stage of the study, the following models were built.

The model of investment activity of the enterprises of Sample 1, explaining 75% of the dependence, at the growth stage was as follows:

$$CapEx_t = 0.492 - 1.099CI_{t-1} + 0.672Debt_{t-1},$$

where:

CapEx – capital expenditure;

CI – capital intensity;

Debt – level of debt.

From this equation one can see that for extractive industry enterprises that are at the growth stage, there is a basic level of investment activity provided by their own funds (growth rate of fixed assets is equal to 0.492), which is adjusted by indicators of the level of debt and capital intensity in the previous period.

Moreover, if the level of debt burden, which is primarily determined by the volume of long-term debt, positively affects the investment activity growth of the enterprise (increasing the share of debt in total assets by 1% leads to an increase in the growth rate of fixed assets by 0.672%), then the level of capital intensity is a deterrent. With the growth of capital intensity in the previous period, the pace of investment in fixed assets in the next period is declining.

At the stage of maturity, the model of investment activity of the analyzed enterprises changes:

$$CapEx_t = 0.086 + 0.1992CapEx_{t-1}.$$

From this formula one can see that at the stage of maturity, the level of growth in investment activity no longer depends on the level of the debt burden or on the capital intensity ratio. The basic level of investment activity growth is 8.6% and is adjusted mainly (at $R^2 = 56\%$) by the results of the previous period ($t - 1$).

$$CapEx_t = 0.049 +$$

$$+ 0.18CapEx_{t-1} - 0.00095CapProd_{t-1},$$

where:

CapProd_{t-1} – capital productivity of the previous period.

Table 8

Distribution of fixed assets growth in 2016 by 2015 by groups of sampling enterprises and stages of the OLC

The number of enterprises	Group number			
	1	2	3	4
Total number of enterprises, units; including:	262	1,464	3,084	3,809
enterprises with a positive increase in fixed assets (Sample 2), units	96	526	984	982
Share of enterprises with positive growth of fixed assets, %	37	36	32	26
Number of enterprises according to the stages of the OLC in Sample 2, units				
Growth	36	197	349	414
Mature	42	165	391	401
Stagnant	18	164	244	167
The share of enterprises in the stages of the OLC, Sample 2, %				
Growth	37	37	35	42
Mature	44	32	40	41
Stagnant	19	31	25	17

Note:

Group 1 – manufacture of coke and refined petroleum products.

Group 2 – manufacture of dairy products.

Group 3 – manufacture of chemicals and chemical products.

Group 4 – communications based on wire technologies.

Table 9

Dynamics of Selected Financial Indicators of Sample 2

Average indicator increase in 2016, rubles / Industry	Communication on the basis of wire technologies	Manufacture of coke and refined petroleum products	Manufacture of dairy products	Manufacture of chemicals and chemical products
Fixed assets	25,533,481	2,491,212,833	31,506,502	62,829,375
Revenue from sales	-3,050,146	-663,101,281	7,180,017	-40,534,055
Profit before taxation	43,934,299	886,997,104	2,756,053	67,517,084
Long term liabilities	33,821,561	1,595,209,948	4,406,825	-95,950,303

As the stagnation phase begins, the basic level of investment activity of the sample enterprises decreases from 8.6% to 4.9%, the influence of the investment activity factor of the previous period (from 0.1992 to 0.18) reduces, and the return on capital ratio becomes the main deterrent to investment. In other words, the rate of decline in investment activity is proportional to the growth of capital productivity in the previous period.

Thus, getting more significant revenue, aging enterprises do not seek to invest it, being satisfied with the available fixed assets. The additional revenue, closely related to the increase in retained earnings, after covering all necessary expenses is used for other purposes.

In general, the first stage of the study confirms the main hypotheses. First, corporate age is important in the investment activity of enterprises, reflecting various significant factors. Secondly, the provision of tax incentives to enterprises at the stage of maturity and stagnation will not directly affect their investment activity, while at the growth stage it will reduce dependence on long-term borrowings and, thereby, improve financial stability.

In the second phase of the study, there were significant industrial differences in the available sources of investment financing (Table 9).

As one can see from table 9, the enterprises of the sample engaged in the manufacture of dairy products, as well as coke and refined petroleum products, had the growth in long-term liabilities which almost doubled the increase in profit before tax. Accordingly, the investment activity in the period under review was mainly dependent on long-term borrowings.

The situation is different with the investment activity of enterprises operating in the manufacture of chemicals and chemical products. There was a significant decrease in the volume of long-term liabilities, which significantly exceeded the growth of profit before tax.

These differences are demonstrated in the investment activity models summarized in Table 10.

As one can see from Table 10, different factors of investment activity are significant for different stages of the OLC and different industries. Thus, the first hypothesis on the importance of corporate age is confirmed¹⁰.

At the same time, different models of investment activity lead to the conclusion that tax incentives will have an ambiguous impact on the investment activity of enterprises of different corporate ages and different industries, which confirms the second and third hypotheses of this research.

Conclusions

The study showed that the system of tax incentives in Russia requires development taking into account the factors and conditions of enterprises' investment activity. Among the defining conditions for investment activity is the corporate age, which should be analyzed in the context of the industrial specifics and economic condition. In many cases, tax incentives will not bring the desired effect, contributing not to reinvestment, but to the withdrawal

¹⁰ It is noteworthy that the model of investment activity dependence on the identified financial determinants turns out to be insignificant throughout the sample without considering corporate age.

Table 10

Characteristics of models of investment activity

Stage of the OLC	Model	Significant factors*						R ² , %
		Profit _t	Profit _{t-1}	LTDebt _t	LTDebt _{t-1}	STDebt _t	STDebt _{t-1}	
<i>Communications based on wire technologies</i>								
Growth	$CapExInc_t = 0.57Profit_t + 1.08LTDebt_t - 1.17LTDebt_{t-1} + 0.9STDebt_t - 0.921STDebt_{t-1}$							95
Mature	$CapExInc_t = 0.75Profit_t + 0.7Profit_{t-1} + 1LTDebt_t - 1.1LTDebt_{t-1} + 0.74STDebt_t - 1STDebt_{t-1}$							87
Stagnant	$CapExInc_t = 0.2Profit_t - 0.16Profit_{t-1} + 0.27LTDebt_t - 0.41LTDebt_{t-1} + 0.4STDebt_t - 0.22STDebt_{t-1}$							80
<i>Manufacture of coke and refined petroleum products</i>								
Growth	$CapExInc_t = 1.23Profit_t - 1.21Profit_{t-1} + 2.15LTDebt_t - 2.56LTDebt_{t-1} + 0.5STDebt_t$							97
Mature	$CapExInc_t = 1.4Profit_t - 0.44Profit_{t-1} + 0.35STDebt_t$							95
Stagnant	$CapExInc_t = 0.7Profit_t + 0.3LTDebt_t - 0.13LTDebt_{t-1} - 0.47STDebt_{t-1}$							80
<i>Manufacture of chemicals and chemical products</i>								
Growth	$CapExInc_t = 1.25Profit_t - 1.05Profit_{t-1} + 0.27LTDebt_t + 0.62STDebt_t - 0.65STDebt_{t-1}$							99
Mature	$CapExInc_t = -1.07Profit_{t-1} + 0.65LTDebt_t - 0.53LTDebt_{t-1} + 0.27STDebt_t - 0.22STDebt_{t-1}$							90
Stagnant	$CapExInc_t = -0.18Profit_t + 0.16Profit_{t-1} + 0.16LTDebt_t - 0.1LTDebt_{t-1} + 0.1STDebt_t$							86
<i>Manufacture of dairy products</i>								
Growth	$CapExInc_t = 1.25Profit_t - 1.05Profit_{t-1} + 0.27LTDebt_t + 0.62STDebt_t - 0.65STDebt_{t-1}$							63
Mature	$CapExInc_t = -1.07Profit_{t-1} + 0.65LTDebt_t - 0.53LTDebt_{t-1} + 0.27STDebt_t - 0.22STDebt_{t-1}$							92
Stagnant	$CapExInc_t = -0.18Profit_t + 0.16Profit_{t-1} + 0.16LTDebt_t - 0.1LTDebt_{t-1} + 0.1STDebt_t$							21

Notes:

* Gray indicates the factors that are significant in the models at the 5% level.

$CapExInc_t$ – capital expenditure increase; $Profit_t$ – profit before tax for the current period; $Profit_{t-1}$ – profit before tax for the previous period; $LTDebt_t - 1$ – long-term liabilities for the current period; $LTDebt_{t-1}$ – long-term liabilities for the previous period; $STDebt_t$ – short-term liabilities for the current period; $STDebt_{t-1}$ – short-term liabilities for the previous period.

of profits. In this regard, it is worth noting the extremely low investment activity of the analyzed enterprises in 2016. And this applies not only to enterprises that are in the stage of stagnation, but also to the companies at the stage of maturity and even growth.

Summarizing the foregoing, one should once again ask the principal question: how expedient is the use of tax incentives in current conditions to stimulate enterprises' investment activity, given that many need support?

In our opinion, the use of the "tax incentive" tool in the current business environment in Russia can hardly be considered justified to encourage the investment activity of enterprises. Here, "point" and "targeted" instruments of tax incentives are appropriate, such as:

- reduction of taxable profit by the amount of investment in fixed assets;
- tax holidays for profit tax, which is directly related to investment activities (for enterprises using their own sources of investment financing);
- postponement of payment of profit tax received as a result of implementation of investment projects;
- reduction of the taxable base for corporate property tax on fixed assets purchased in the current period.

Developing a system of tax incentives seems to be one of the most important factors for increasing the investment activity of Russian enterprises, which in

turn is a necessary prerequisite for intensive economic growth and ensuring national competitiveness. The obtained results develop the scope of using the OLC concept, which, according to the authors, should be more widely used in financial research, including the justification of methodological approaches to investment management and company taxation. This conclusion corresponds to the position of individual authors (see, for example: [39, p. 173; 40, p. 499–507]), which, however, is not currently widely accepted.

We also note that the findings of the survey as a whole do not contradict the results of the analysis of various tax policy instruments to stimulate the investment activity of the corporate sector in the United States [19]. However, it was revealed that the transformation of the enterprise's calendar age into a corporate one improves the evaluation methodology, allowing for more accurate results.

Author's model of assessing the corporate age of the organization contributes to the development of financial management, which overcomes the limitations of the simplest scoring model [30; 31; 38; 42]. The search for effective approaches to the financial evaluation of organization's corporate age, in turn, seems to be the most important prerequisite for further research on the determinants of tax incentives for enterprises' investment activity.

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Authors

Viktor V. Ivanov – Doctor of Economics, Professor, Head of the Chair of Credit Theory and Financial Management, St. Petersburg State University (7/9 Universitetskaya nab., 199034, St. Petersburg, Russian Federation); ORCID: [0000-0003-4121-0605](https://orcid.org/0000-0003-4121-0605); e-mail: viktor.ivanov@spbu.ru

Nadezhda A. Lvova – Doctor of Economics, Associate Professor, Professor of the Chair of Credit Theory and Financial Management, St. Petersburg State University (7/9 Universitetskaya nab., 199034, St. Petersburg, Russian Federation); ORCID: [0000-0002-9467-2785](https://orcid.org/0000-0002-9467-2785); e-mail: n.lvova@spbu.ru

Natalia V. Pokrovskaya – PhD in Economics, Associate professor, Associate Professor of the Chair of Credit Theory and Financial Management, St. Petersburg State University (7/9 Universitetskaya nab., 199034, St. Petersburg, Russian Federation); ORCID: [0000-0002-8314-9470](https://orcid.org/0000-0002-8314-9470); e-mail: n.pokrovskaya@spbu.ru

Svetlana V. Naumenkova – Doctor of Economics, Professor, Professor of Chair of Finance, Taras Shevchenko National University of Kyiv (90 Vasil'kovskaya St., 03022, Kyiv, Ukraine); ORCID: [0000-0001-8582-6044](https://orcid.org/0000-0001-8582-6044); e-mail: naumenkova@knu.ua

Информация об авторах

Виктор Владимирович Иванов – доктор экономических наук, профессор, заведующий кафедрой теории кредита и финансового менеджмента, Санкт-Петербургский государственный университет (199034, Россия, г. Санкт-Петербург, Университетская наб. 7/9); ORCID: [0000-0003-4121-0605](https://orcid.org/0000-0003-4121-0605); e-mail: viktor.ivanov@spbu.ru

Надежда Алексеевна Львова – доктор экономических наук, доцент, профессор кафедры теории кредита и финансового менеджмента, Санкт-Петербургский государственный университет (199034, Россия, г. Санкт-Петербург, Университетская наб. 7/9); ORCID: [0000-0002-9467-2785](https://orcid.org/0000-0002-9467-2785); e-mail: n.lvova@spbu.ru

Наталья Владимировна Покровская – кандидат экономических наук, доцент, доцент кафедры теории кредита и финансового менеджмента, Санкт-Петербургский государственный университет (199034, Россия, г. Санкт-Петербург, Университетская наб. 7/9); ORCID: [0000-0002-8314-9470](https://orcid.org/0000-0002-8314-9470); e-mail: n.pokrovskaja@spbu.ru

Светлана Валентиновна Науменкова – доктор экономических наук, профессор, профессор кафедры финансов, Киевский национальный университет имени Тараса Шевченко (03022, Украина, г. Киев, ул. Васильковская, 90); ORCID: [0000-0001-8582-6044](https://orcid.org/0000-0001-8582-6044); e-mail: naumenkova@knu.ua

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