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Modelling the Development Dynamics of Small and Medium-Sized Enterprises in Russia

Моделирование динамики развития малого и среднего предпринимательства в России

Modelación de la dinámica del desarrollo del comercio pequeño y mediano en Rusia

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Abstract

The paper explores the factors in the development of small and medium-sized entrepreneurship (SME) in Russia over the past 13 years. The purpose of the article is to identify the patterns and current trends in the dynamics of the number of SMEs. The present study carries out correlation and regression analysis of the factors using the statistical data for 2006–2018. The number of the employed and the average nominal wage are the factors that exert a positive effect on the number of small enterprises, whereas tax burden, the weighted average rate for short-term loans and the inflation rate have a negative impact. The research results allowed forecasting the development dynamics of SMEs for 2020–2024. Providing that Russia follows the basic scenario of the socio-economic development and the existing trends persist, the total number of SMEs is expected to grow to 3,636 thousand (1.37 times) by 2024.

Key Words: small and medium-sized entrepreneurship (SME), economic growth, business demography, sustainable development.

Аннотация

В статье проведено исследование факторов развития малого и среднего предпринимательства (МСП) в России за последние 15 лет. Цель работы заключалась в установление закономерностей и сложившихся тенденций, главным образом характеризующих количество субъектов МСП. На основе статистических данных за 2006–2018 гг. проведен корреляционно-регрессионный анализ факторов. Положительное влияние на рост числа малых предприятий оказывают фактор численности занятых в экономике, средневзвешенная ставка по краткосрочным кредитам, средняя номинальная заработная плата. Отрицательное влияние на количество малых предприятий оказывают налоговая нагрузка и уровень инфляции. Полученные результаты позволили составить прогноз динамики развития малого и среднего предпринимательства на 2020–2024 г. При условии следования базовому сценарию социально-экономического развития России и сохранении сложившихся тенденций в секторе, можно ожидать, что их общее количество субъектом МПС к 2024 году может вырасти до 3 636 тыс. единиц (в 1,37 раза).

Ключевые слова: малое и среднее предпринимательство (МСП), экономический рост, бизнес демография, устойчивое развитие.

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Resumen

En el artículo está realizada la investigación de los factores del desarrollo del comercio pequeño y mediano (CPM) en Rusia en los últimos 13 años. El objetivo del trabajo consistía en la determinación de las conformidades con la ley y de las tendencias formadas que caracterizan principalmente la cantidad de los sujetos de CMP. Sobre la base de los datos estadísticos de los años 2006-2018 ha sido realizado el análisis correlacional regresivo de los factores. La influencia positiva sobre el crecimiento del número de las empresas pequeñas la ejercen: factor de la cantidad ocupada en la economía, tipo de descuento bancario promedio para los créditos a corto plazo, sueldo medio nominal. La influencia negativa sobre la cantidad de las empresas pequeñas la ejercen: cargamento fiscal y nivel de la inflación. Los resultados recibidos han permitido componer el pronóstico de la dinámica del desarrollo del comercio pequeño y mediano para los años 2020-2024. A condición del seguimiento al guion básico del desarrollo socioeconómico de Rusia y de la conservación de las tendencias que se han formado en el sector, es posible esperar que la cantidad total de los sujetos de CPM hasta el año 2024 puede crecer hasta 3,636 mil unidades (en 1,37 veces).

Palabras clave: comercio pequeño y mediano (CPM), crecimiento económico, business, demografía, desarrollo estable.

Introduction

In the context tough market competition, the need for the support and development of entrepreneurship is becoming increasingly urgent. This is due to the fact that small and medium-sized entrepreneurship (SME) positively affects a country's macroeconomic indicators, plays a decisive role in creation of new jobs, gives impetus to innovations and increases people's quality of life. It is widely believed that this sector of economy forms state budget revenues, meets a significant part of social needs for products and services, stimulates poverty reduction and influences the country's global image. At the same time, small business demonstrates unstable development dynamics, which is largely associated with its strong dependence on the external environment, including both STEEP factors and the factors of the competitive environment (Ivanova, 1993; Litau, 2017; Raudeliuniene, Tvaronavičiene & Dzemyda, 2014; Litau, 2018; Kiselitsa et al., 2018; Abbas, 2018). The critical exposure of small and medium-sized businesses to external uncertainty and risk makes the problem of forecasting the dynamics of the number of SMEs especially relevant (Kuzmin, 2017, 2018).

Developed nations have long realized the importance of supporting entrepreneurship to ensure sustainable economic development (Molina, Velilla & Ortega, 2016; Velilla, 2018). In the USA, about 53% of working-age population work for SMEs; in Japan – 71.7%; in the nations of the European Union, nearly half of working-age population are engaged in small business alone. Currently, the share of small and medium-sized enterprises in developed countries ranges between 70 and 90% of the total number

of companies (Zyuzina, 2019), and they provide more than half of GDP (Appendix A). Small business in Russia is known to grow at a slower pace that in other developed countries. According to the Federal State Statistics Service of Russia (Rosstat, 2017), the share of small and medium-sized enterprises in the country's GDP in 2017 amounted to 21.9% (more 20 trillion rubles, in monetary terms), which indicates the unsatisfactory state of small entrepreneurship.

The positive experience of developed countries confirms the need for shifting emphasis towards the effective development of small business in Russia to increase wealth and reduce the impact of economic sanctions on the market (Ibragimov & Yakunina, 2019). The purpose of the study is to simulate a factor-based impact on the development dynamics of small entrepreneurship in Russia and evaluate the degree of this influence. It is worth noting that the special features of the Russian economy predetermine a number of strategic problems (Smirnov, 2017; Ponomarev & Petrov, 2018, 2019). Solutions to them, as well as factor influence on the development of SME, are attributed to the formation of effective state regulatory policy in this area (Dellis, Karkalakos & Kottaridi, 2016; Trofimov, 2017). Next, we take a closer look at the special features of small and medium-sized entrepreneurship and specify what factors have a predominant effect.

Literature review

Small and medium business is a key factor in the socio-economic development and serves as a prerequisite for positive structural changes in

economy. The considerable importance of SME is confirmed through the functions it performs: promoting innovation, creating new jobs, generating employment, stimulating demand, etc. The major peculiarities of small entrepreneurship are flexibility, mobility, fast decision-making and ease of management (Baubonienė et al., 2018). However, despite the great role of business entities, their potential and development factors are still poorly studied (Fattakhudinova, 2018).

In general terms, the factors in the development of small business can be categorized into external and internal. External factors include those beyond an enterprise's sphere of influence: unemployment rate, tax burden, economically active population, per capita income, etc. This is confirmed in program documents and strategies at national level. In Russia, the main factors hampering the development of SMEs embrace (On approval of the Strategy..., 2016): ineffectiveness of tax legislation and unpredictability of tax policy; a complex system of issuing permits and their multiplicity; ineffective and uncertain state regulatory policy; non-transparency of land allotment procedures; setting the land rent and preparation of urban planning documentation; insufficient level of financial support for business entities, etc. Internal factors, on the contrary, are capable of changing if influenced by a SME.

The combination of external and internal factors influencing the efficiency of small and medium-sized businesses form a certain complex that, if explored in detail, help identify specific challenges and find ways to deal with them.

In modern conditions, a comprehensive assessment of the entrepreneur performance is of particular importance, which encompasses economic, social and labor, political and administrative-legal factors (Molchanenko, 2015). The economic factors include the following: forming an optimal tax system, improving the system of guarantees and preferences, providing financial and loan support for entrepreneurs, and establishing an appropriate structure of the business sector. The social and labor factors embrace building a system for advanced training and retraining of employees for joint ventures, forming social guarantees of employment in the business sector, and stimulating entrepreneurial activities. The administrative-legal factors include improving the legal framework for the functioning of joint ventures, developing the infrastructure of entrepreneurship, and overcoming administrative

barriers. The political factors are the level of national income, accumulation and consumption, the country's geographical position in relation to other countries, and strengthening, expanding and establishing economic relationships.

Consider the factors of direct impact on entrepreneurship more closely.

It is known that growing tax burden enhances the shadow economy, which is especially detrimental to SMEs. Modern studies show that there is a correlation between tighter fiscal regulation of entrepreneurship and the scale of the shadow economy. Tax burden as a factor was investigated in (Morozko, 2018; Maltseva & Plakhov, 2018; Khnykina & Fomichenko, 2014; Giriuniene & Giriunas, 2015). Johnson and Kaufmann (1998) find that excessive regulation of socio-economic systems increases the share of the shadow economy in relation to GDP, where an increase in the degree of state regulation of SME by 1 point, other things being equal, increases the share of the shadow economy by 8.1%. Thus, there is often a negative respond to counteraction to state measures for improving the economic situation. The global practice shows that small enterprises are free from state intervention to the greatest possible extent. From the perspective of the state, it should become the first step towards creating progressive large business (Lambert, 2017).

Prokhodenko and Trubetskaya (2017) examine the dependence of the number of small enterprises on the following factors: unemployment, the proportion of the population with income below the subsistence level, the number of students enrolled in higher education programs, total population, the number of economically active population, the average monthly nominal wage and per capita income. The authors prove that an increase in the number of students in higher education programs by 1 thousand people leads to an increase in the number of small businesses by 296 entities with a 95% probability.

Kozma (2018) explores the following factors in the development of small entrepreneurship: the number of the employed, the number of organizations, income (revenue) of small enterprises, and actual tax payments. The effect of inflation on the development of small business is scrutinized by Ruban (2018).

The conducted literature review is of high theoretical and practical importance. We have found that a massive amount of literature deals

with the aspects and methods for assessing and forecasting the dynamics of SMEs with a focus on various development factors. The factors identified in the course of the study will be included in the cohort of priority determinants for a more detailed analysis and evaluation.

Materials and Methods

Factors influencing small entrepreneurship in quantitative terms are viewed as indicators of its performance. Based on the set of these indicators, it is possible to determine the central factors that will allow evaluating the degree of their influence on the development of entrepreneurship.

Comprehensive study of the effect of particular factors requires econometric models to be applied. Since the functioning of enterprises is influenced by numerous factors, in this study it is expedient to use a multivariate regression model. The main stages of building a model are: establishing a system of factors; collecting and performing a preliminary analysis of initial data; choosing the type of the regression model; controlling the model's quality; assessing individual factors; and producing a regression-based forecast.

The information base of the research includes statistical data on the activities of small and medium-sized enterprises, as well as macroeconomic indicators of Russia for 2006–2018. Information on the number of micro-, small and medium-sized enterprises – legal entities – is based on the results of ongoing surveys conducted by Rosstat.

One of the primary objectives of regression analysis is to establish the influence of given factors on the summarizing indicator. To do so, it is necessary to obtain a constraint equation that corresponds to the nature of the analytical

stochastic dependence between the selected attributes.

In the current research, the total number of small enterprises (Y_i) is the indicator of the development of small business. To conduct analysis and build a model, we select the following factors (The report on..., 2018; The amount of finance..., 2018; The main performance indicators..., 2019; Russia in Figures, 2016; Bank of Russia, 2019):

- tax burden, % (X_1);
- the number of the employed, million people (X_2);
- weighted average rate for short-term loans, % (X_3);
- average nominal wage, thousand rubles (X_4);
- inflation rate, % (X_5).

To study the effect of the given factors on the dynamics of the number of small businesses, correlation coefficient was applied. Paired correlation coefficients were calculated by formula:

$$r_{xy} = \frac{\overline{xy} - \bar{x}\bar{y}}{s(x) \cdot s(y)} \quad (1)$$

Due to the significant total number of indicators, we propose to select the indicators with the correlation coefficient greater than 0.6 and less than -0.6 . This will allow examining the most significant indicators and choosing among them only those exerting a strong influence on the dynamics of the number of small businesses. For this purpose, a correlation matrix is constructed (Table 1). The major objective of the correlation matrix analysis is to reveal the structure of the relationships between the indicators.

Calculations were performed using Microsoft Excel.

Table 1. Correlation matrix

	Y	X ₁	X ₂	X ₃	X ₄	X ₅
Y	1					
X ₁	-0.6049	1				
X ₂	0.7885	-0.1598	1			
X ₃	-0.0739	-0.0859	-0.3762	1		
X ₄	0.9736	-0.5699	0.7531	-0.1132	1	
X ₅	-0.6392	0.4234	-0.5798	0.3396	-0.5395	1

As seen from the matrix, tax burden (X_1) correlates with the other indicators with the following values: the relationship with the average nominal wage (X_4) is -0.5699 ; with the inflation rate (X_5), it is 0.4234 .

Similarly, the correlation of the number of the employed (X_2) with the weighted average rate for short-term loans (X_3) is -0.3762 ; with the average nominal wage (X_4) – 0.7531 ; with the inflation rate (X_5), the correlation is -0.5798 .

The weighted average rate for short-term loans (X_3) weakly correlates with the selected factors: the correlation with the number of the employed is -0.3762 ; the negative correlation with the average nominal wage (X_4) equals -0.1132 ; the positive correlation with the inflation rate (X_5) is 0.3396 .

The average nominal wage (X_4) correlates with tax burden (X_1) with the value of -0.5699 ; the

correlation with the number of the employed (X_2) is 0.7531 ; the negative correlation with the inflation rate (X_5) is -0.5395 .

The inflation rate (X_5) correlates with tax burden (X_1) with the value of 0.4234 ; the negative correlation with the number of the employed (X_2) is -0.5798 ; the correlation with the weighted average rate for short-term loans (X_3) is positive with the value of 0.3396 ; the negative correlation with the average nominal wage (X_4) is -0.5395 .

Results

In Russia, the small business sector is one of the promising forms of doing business. Statistical observations make it possible to monitor the dynamics of the main indicators for all groups of SMEs for the last several years.

We first analyze the number of small enterprises in Russia (Fig. 1).

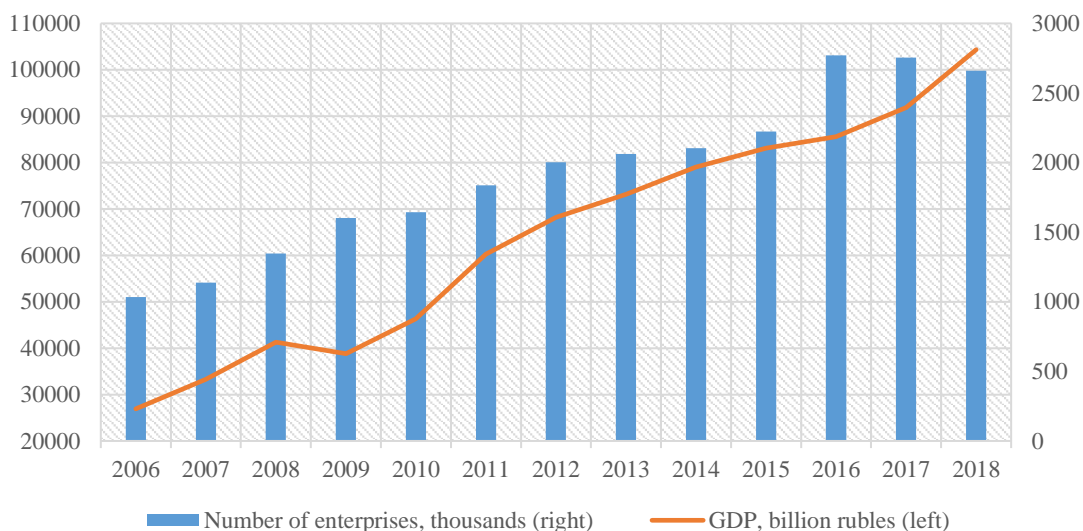


Fig. 1. Dynamics of changes in the number of small enterprises in Russia and GDP in 2006–2018
Source: (Rosstat, 2019).

As shown in Fig. 1, there was a steady upward trend in the number of small enterprises in 2006–2016. Despite state support measures, the

number of small enterprises has been declining since 2016. The growth rate of this indicator in Russia in 2006–2018 is presented in Fig. 2.

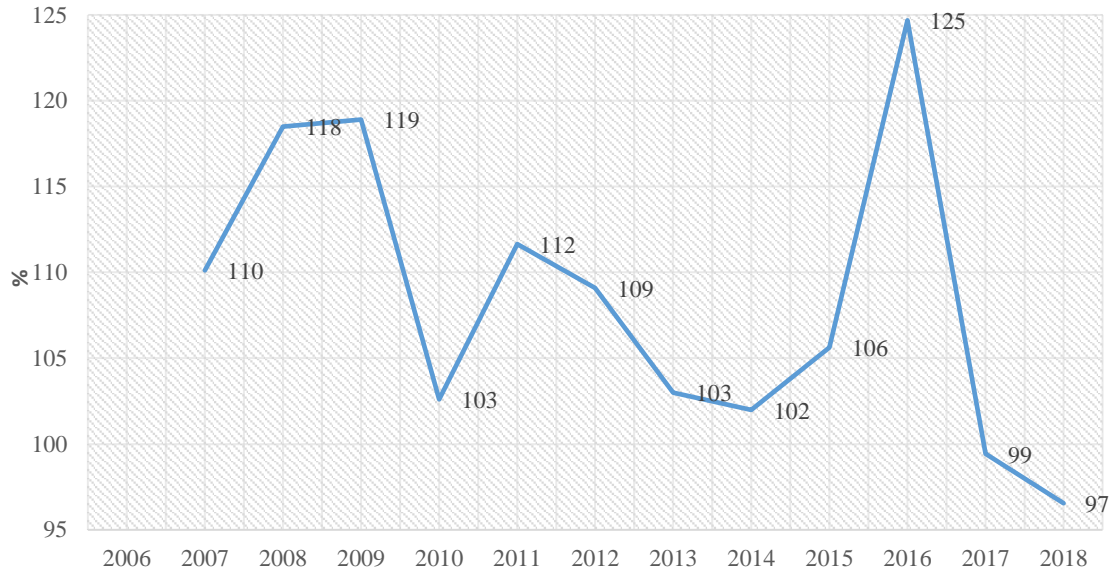


Fig. 2. The growth rate of the number of small enterprises in Russia in 2006–2018

During the period of 2010–2015, the number of small enterprises in Russia was at stable level; a sharp decline occurred in 2010, and a marked increase was observed in 2016. Further analysis of the dynamics of growth rates of small enterprises in Russia demonstrates a decrease in the number of small enterprises in 2017 by 0.58% compared to 2016, and in 2018 – by 3.44% compared to 2017.

As for the total number of SMEs, the dynamics is determined by a variation in the number of small enterprises reflecting trends similar to small businesses. The change in the share of the number of employees at SMEs is characterized by statistically significant, stable and interconnected trends, i.e. a growing share of employees at small enterprises and a decreasing share at medium-sized companies. These findings appear to be quite important as they offer guidance for government institutions for providing targeted support.

The dynamics of changes in the number of small enterprises in Russia is associated with shifts in

GDP (Fig. 1). The correlation coefficient for these two indicators is 0.958, which shows a close and direct relationship and proves the important contribution of SMEs to GDP. The data from Rosstat’s complete coverage survey conducted in 2011 allow us to elucidate the role of SMEs in the Russian economy as a whole. In fact, SMEs make up 95% of all Russia’s enterprises, employ 25% of economically active population and produce almost a third (28%) of the total revenue.

General performance indicators of small businesses in Russia according to the constructed regression model are presented in Appendix B. Let us look at pairwise relationship of each indicator.

The relationship between the number of small enterprises (Y) and the level of tax burden (X₁) can be expressed by the equation (Fig. 3): $Y = -212.77 X_1 + 4192.2$. As seen from Fig. 3, the number of small enterprises decreases as the tax burden grows.

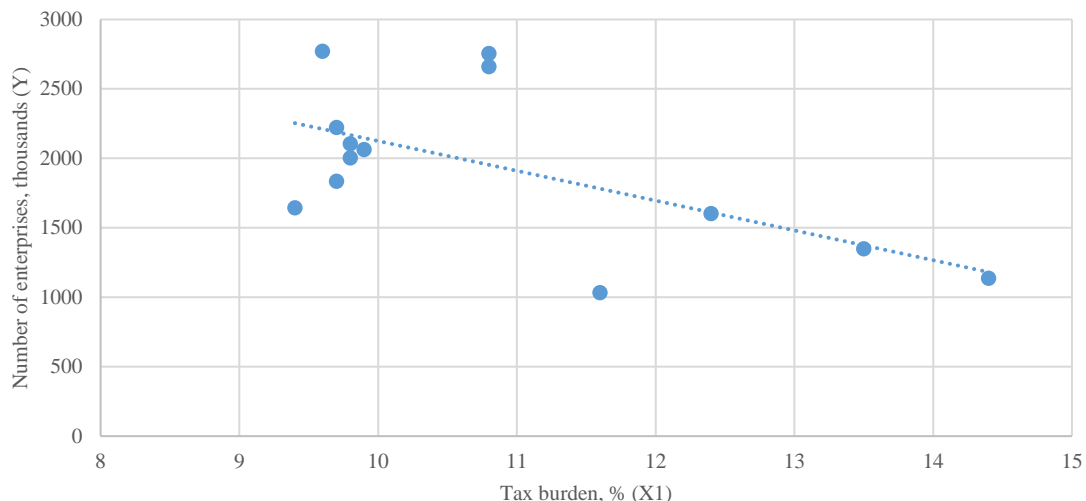


Fig. 3. Relationship between the number of enterprises and tax burden

The relationship between the number of small enterprises (Y) and the number of the employed (X₂) can be expressed by the equation (Fig. 4):

$Y = 251.98X_2 - 15395$. The analysis conducted shows that the number of small enterprises increases as the number of the employed grows.

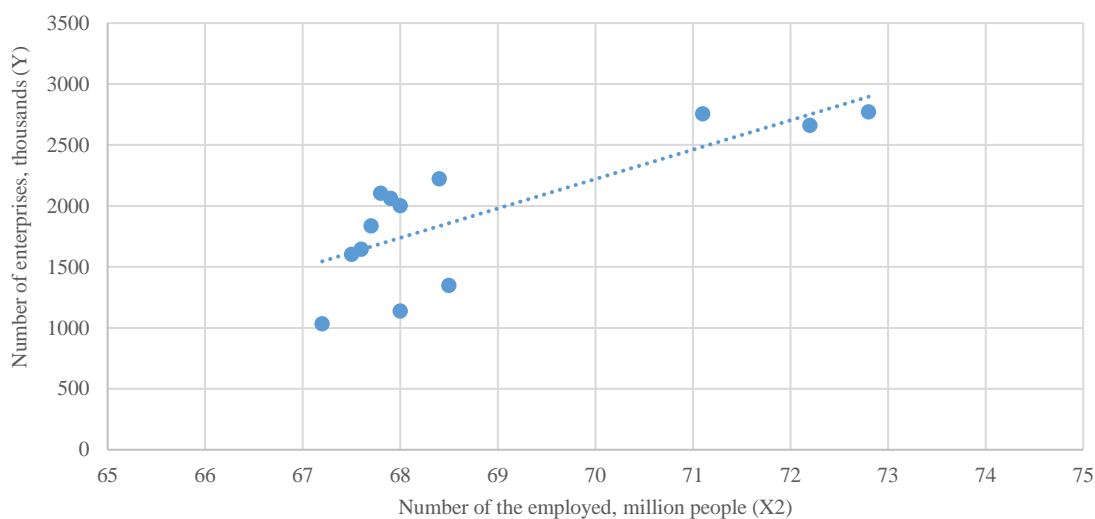


Fig. 4. Relationship between the number of enterprises and the number of the employed

The relationship between the number of small enterprises (Y) and the weighted average rate for short-term loans (X₃) can be expressed by the equation (Fig. 5): $Y = 36.148X_3 + 1443.3$. As we

can see, the number of small enterprises slightly decreases as the weighted average rate for loans grows.

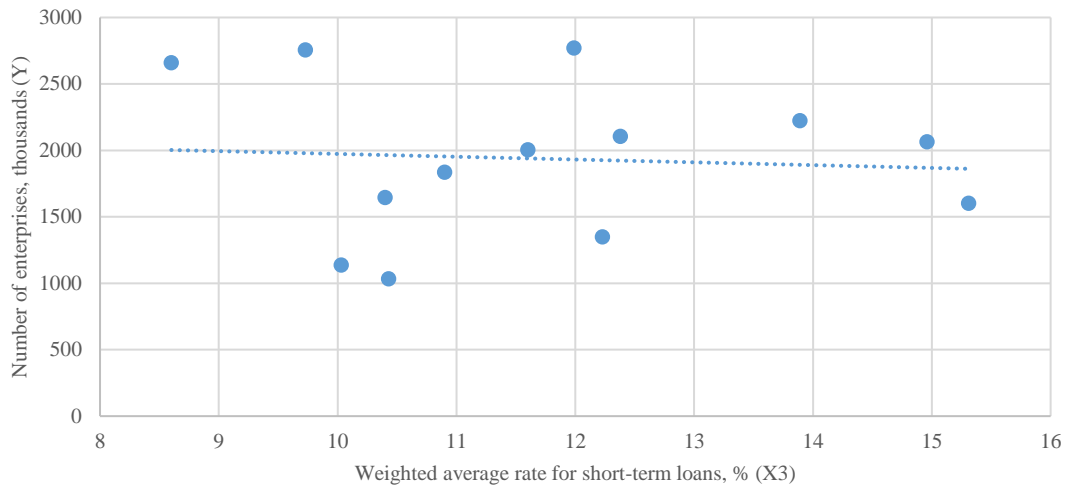


Fig. 5. Relationship between the number of enterprises and the weighted average rate for loans

The relationship between the number of small enterprises (Y) and the average nominal wage (X₄) can be expressed by the equation (Fig. 6):

$Y = 59.164 X_4 + 387.14$. The data show that the number of small enterprises increases as the average nominal wage rises.

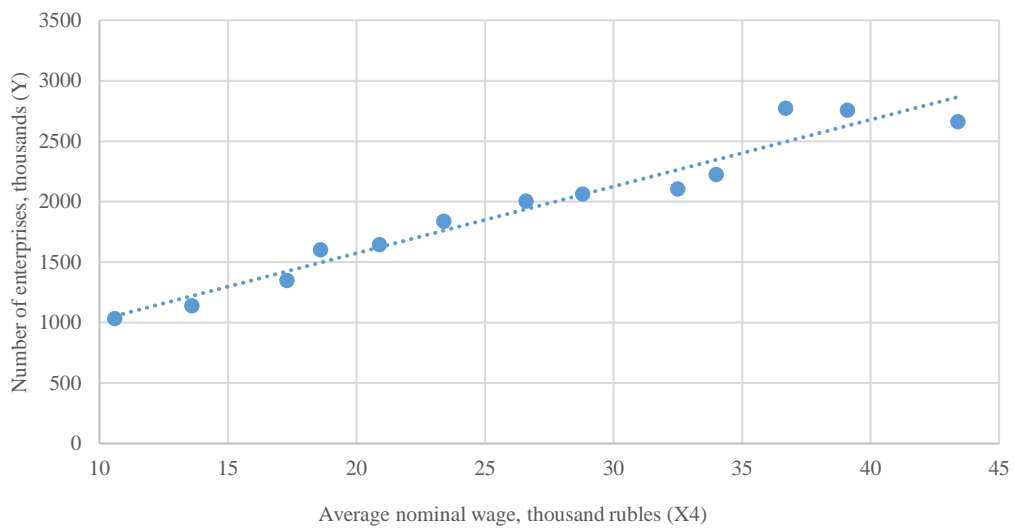


Fig. 6. Relationship between the number of enterprises and the average nominal wage

The relationship between the number of small enterprises (Y) and the inflation rate (X₅) can be expressed by the equation (Fig. 7):

$Y = -98.663 X_5 + 2725.1$. The diagram displays a negative relationship between the number of enterprises and the inflation rate.

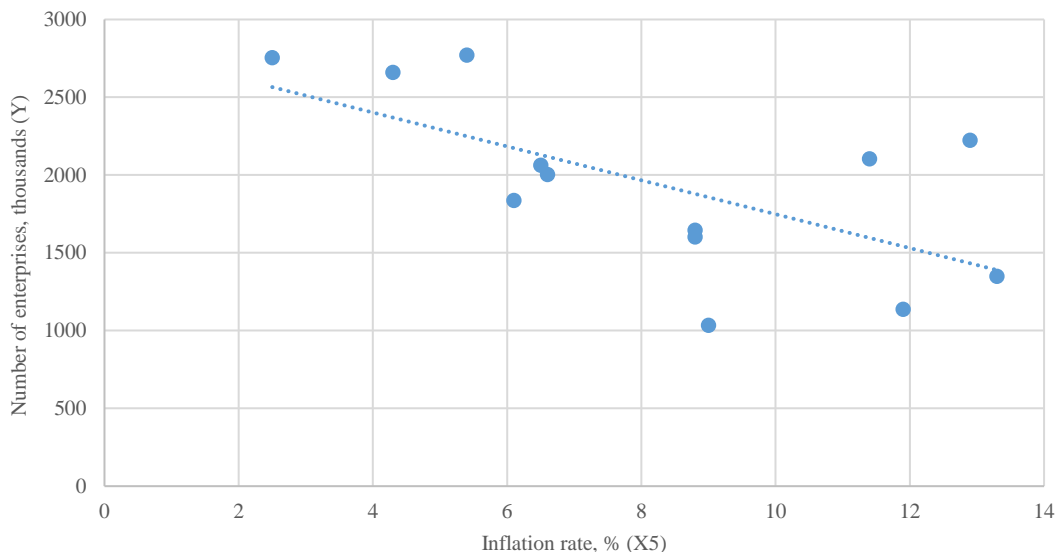


Fig. 7. Relationship between the number of enterprises and the inflation rate

The regression statistics data are presented in Table 2.

Table 2. Regression statistics data

Regression statistics	Value
Multiple R	0.9931
R-squared	0.9862
Normalized R-squared	0.9764
Observations	13

As a result of the calculations, the multiple regression equation was obtained:
 $Y = -3682.1405 - 40.5325X_1 + 69.901X_2 + 35.6418X_3 + 38.4122X_4 - 23.055X_5$.

The following economic interpretation of the model's parameters is possible: an increase in tax burden by 1% leads to a decrease in the number of small enterprises by an average of 40.533 thousand entities; if the number of the employed increases by 1 million people, the number of small enterprises increases by an average of 69.901 thousand entities; an increase in the weighted average rate for short-term loans by 1% decreases the number of small enterprises by an average of 35.642 thousand entities; an increase in the average nominal wage by 1 thousand rubles causes an increase in the number of small enterprises by an average of 38.412 thousand entities; an increase in the inflation rate by 1% reduces the number of small enterprises by an average of 23.055 thousand entities. Judging by the maximum coefficient $\beta_4=0.677$, we can

conclude that the factor of the average nominal wage has the most profound effect on the number of small enterprises.

The statistical significance of the equation is verified using the coefficient of determination and the *F*-test. It is found that in the situation under study 98.62% of the total variability of the number of small businesses is due to change in the selected factors.

Discussion

Based on the results obtained, we can make a forecast of the development of small entrepreneurship in Russia. To identify the trends in the development of small entrepreneurship, we recommend applying extrapolation that allows

producing accurate short-term statistical forecasts. Prognostication should be implemented according to the scenario of the general concept of socio-economic development. In the given study, the scenario for assessing the potential number of small and medium-sized enterprises is based on the Concept of the Socio-Economic Development of Russia for the Period until 2024 (The forecast of..., 2018). According to the Concept, the structure of GDP use is expected to undergo significant changes. This transformation will occur under the influence of the implementation of state investment projects, change in the structure of consumption, shift in the structure of foreign trade and measures for supporting entrepreneurial activity.

Based on the data and the regression equation obtained, we can forecast the number of small enterprises (Table 3).

A number of assumptions were made when making calculations:

- a) tax burden. In 2015, a moratorium on increasing tax burden was introduced in Russia, which is believed to ensure the stability of the tax system and improve its attractiveness for investors (Zamakhina, 2019). Thus, for the entire period, this factor will be equal to 10.8%;
- b) the weighted average rate for short-term loans. According to expert estimates, the Central Bank of Russia will not be able to move to neutral monetary policy until 2024 because of a rise in the inflation rate. Experts suppose that the key rate of the Central Bank will remain 3–4 points above the inflation rate. Such an outcome will not allow expanding the investment sector of companies (Kopeykina, 2018).

Table 3. Forecast of the number of small and medium-sized enterprises in Russia in 2020–2024

Indicator	2020	2021	2022	2023	2024
Tax burden, %*	10.8	10.8	10.8	10.8	10.8
Number of the employed, million people	72.1	72.5	72.9	73.4	73.9
Average annual inflation, %	3.0	3.7	4.0	4.0	4.0
Weighted average rate for short-term loans, %*	6.5	7.2	7.5	7.5	7.5
Average nominal wage, thousand rubles	48.9	51.9	55.3	58.9	62.9
<i>Projected number of SMEs, thousands</i>	<i>2963.8</i>	<i>3114.9</i>	<i>3275.0</i>	<i>3447.8</i>	<i>3636.2</i>

Note: * Calculated according to the assumptions.

Hence, if the number of SMEs rises at a stable rate, by 2024 their total number will amount to 3,636 thousand entities (1.37 times increase).

To ensure the successful implementation of the Concept of the Socio-Economic Development of Russia and keep the number of SMEs at forecast levels, it is required to focus on the existing problems. There is a dire need to enhance the role of the state so as to resolve them.

It is widely accepted that the primary objectives of state policy aimed at stimulating the development of entrepreneurship in Russia should embrace the following (Guseynov, 2017; Sibirskaya & Oveshnikova, 2013; Karpov, Korableva & Mozzherina, 2015; Vlasova & Lyapina, 2015):

- to reduce the number of regulatory acts and simplify authorization and government control procedures;

- to improve and simplify tax accounting;
- to engage business entities in supplying products (services, works) for state and municipal needs;
- to provide financial support for small and medium-sized enterprises;
- to develop the infrastructure of entrepreneurship;
- to introduce the mechanisms for promoting and stimulating innovation activity; etc.

Conclusion

Small and medium-sized enterprises, being one of the driving forces in creating jobs and promoting innovation, serve as the basis for the sustainable economic development. However, high exposure of SMEs to risk and uncertainty under the influence of some factors significantly impedes their steady growth. It is noteworthy that Russian small enterprises in recent years have

been demonstrating positive development dynamics with the annual number of newly formed companies exceeding the number of dissolved ones. Using the correlation analysis, we have identified the most significant factors in the development of SMEs, such as tax burden, the number of the employed, the weighted average rate for short-term loans, the average nominal wage and the inflation rate. The research results show that the number of small enterprises increases as the number of the employed and the average nominal wage rise; the number of small enterprises declines as the weighted average rate for loans, the inflation rate and tax burden increase. Providing that Russia follows the basic scenario of the socio-economic development and the existing trends in the SME sector persist, the total number of SMEs is expected to grow to 3,636 thousand (1.37 times) by 2024.

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Appendix A

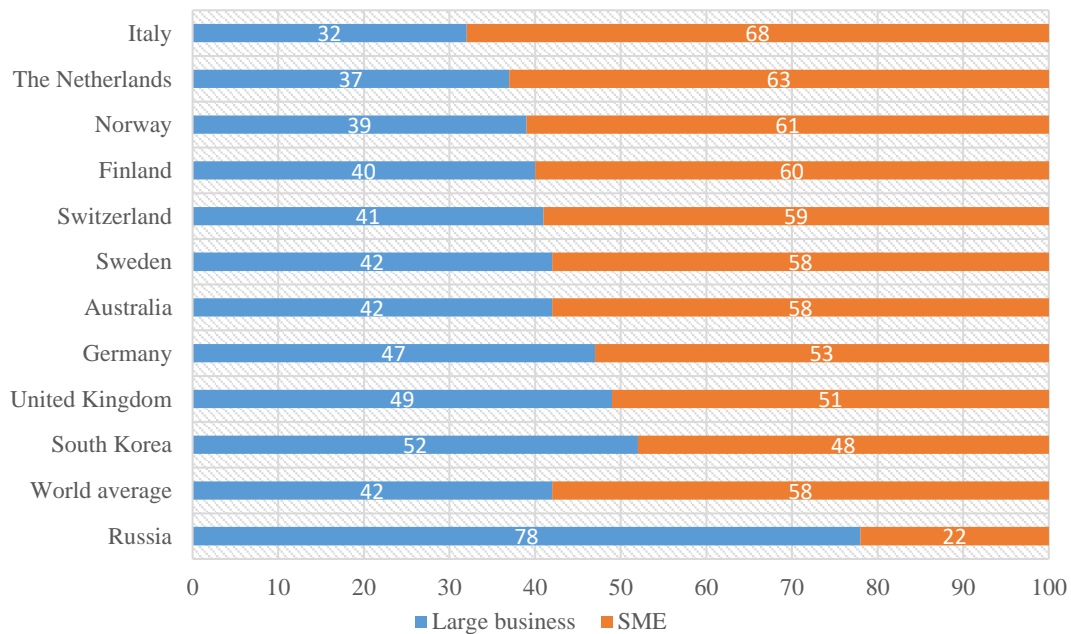


Fig. Share of small and medium-sized enterprises in GDP by country in 2017
Source: (Titov, 2018)

Appendix B

Main factors affecting the development of small entrepreneurship in Russia in 2006–2018

Year	Number of enterprises, thousands	Tax burden, % (X ₁)	Number of the employed, million people (X ₂)	Weighted average rate for short-term loans, % (X ₃)	Average nominal wage, thousand rubles (X ₄)	Inflation rate, % (X ₅)
2006	1032.8	11.6	67.2	10.43	10.6	9.0
2007	1137.4	14.4	68.0	10.03	13.6	11.9
2008	1347.7	13.5	68.5	12.23	17.3	13.3
2009	1602.5	12.4	67.5	15.31	18.6	8.8
2010	1644.3	9.4	67.6	10.40	20.9	8.8
2011	1836.0	9.7	67.7	10.90	23.4	6.1
2012	2003.0	9.8	68.0	11.60	26.6	6.6
2013	2063.0	9.9	67.9	14.96	28.8	6.5
2014	2104.0	9.8	67.8	12.38	32.5	11.4
2015	2222.4	9.7	68.4	13.89	34.0	12.9
2016	2771.0	9.6	72.8	11.99	36.7	5.4
2017	2755.0	10.8	71.1	9.73	39.1	2.5
2018	2660.0	10.8	72.2	8.60	43.4	4.3

Source: (The report on..., 2018; The amount of finance..., 2018; Rosstat, 2019; Bank of Russia, 2019).