ORIGINAL PAPER

DOI: 10.26794/2587-5671-2023-27-5-160-169
UDC 338.1(045)
JEL F64, O44

"Green" Financing and ESG: Opportunity for Sustainable Socio-Economic Development

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ABSTRACT

The implementation of the sustainable development strategy and the formation of a "green" economy model provide for the reorientation of financial resources, accounting by economic entities and public authorities and management of ESG-principles and the development of "green" financing tools. The **purpose** of the paper is to develop theoretical provisions and modeling of the impact of "green" financing on the socio-economic development of the subjects of the Russian Federation. **Methods** of data mining were used with temporary delays and corresponding lags responses of endogenous indicators, as well as cluster and correlation analysis. The result of the study was the specification of the economic content of the definition of "green" financing, as well as the construction of econometric models of the degree of interrelationship between "green" financing and the socio-economic development of the regions of Russia. The authors described the economic content of the definition of "green" financing, developed econometric models of the degree of interdependence of "green" financing and socioeconomic growth of Russia's regions, calculated an integral indicator of sustainable socio-economic development of the regions of the Russian Federation taking into account ESG-factors (social risks, environmental risks, quality of management). Clustering of Russian regions according to the level of influence of "green" financing on their socio-economic development has also been carried out. The article **concludes** that the relationship between the level of socio-economic development of the regions of the Russian Federation and the volume of "green" financing is direct, strong, and can be expressed by increasing linear regression. The prospects for further research may be related to the assessment of the real needs of the volumes of "green" financing in the context of ensuring sustainable economic growth.

Keywords: "green" financing; "green" finance; "green" economy; ESG; ESG rating; sustainable development

For citation: **Semenova N.N., Ivanova I.A., Eremina O.I. "Green" financing and ESG: Opportunity for sustainable socio-economic development. *Finance: Theory and Practice*. 2023;27(5):160-169. DOI: 10.26794/2587-5671-2023-27-5-160-169**

INTRODUCTION

The growing impact of human activity on the environment has become one of humanity's major problems in recent decades, posing risks to long-term sustainable socio-economic development. The annual World Economic Forum report on global risks notes that climate change is a catastrophic risk for world in 2021–2022 and beyond.[1] According to the report of the Intergovernmental Panel Climate Change, "Climate change: a threat to human well-being and the health of the planet", published in February 2022, in the next two decades, humanity has every chance of facing the inevitable many climate hazards, including an increase in the average ambient temperature to 1,5 °C.[2]

In this regard, the transition to a new resource-efficient economy model, in which the welfare of society, including employment, is combined with reduced environmental impact and greater environmental responsibility — the so-called "green" economy. In April 2021, the Climate Summit (with 40 participating countries) declared targets for reducing emissions and achieving carbon neutrality over the next 10–15 years. This is possible through the use of green funding tools, implementation of ESG principles, and regulatory mechanisms to accelerate the transition to a "green" economy [1, 2].

At present, greening of economic policy and "green" financing is based on the identification of new environmentally sustainable circuits and prospects for the development of the financial system through the sharp growth of the "green" segment of financial market and responsible investments [3–6]. The financing paradigm itself is changing in favor of so-called transformative investments (or influence investments) that not only meet a certain level of economic expectations, but also have the potential for social and environmental impact.

"GREEN" FINANCING AND ESG: THEORETICAL–METHODOLOGICAL FUNDAMENTS

It should be noted that there is no established definition of "green" financing in modern literature. According to the G20's approach, "green" financing is investment that contributes to improved environmental and sustainable development.[3] "Green" financing is focused on increasing the level of financial flows (bank, microcredit, insurance and investment) from the public, private and non-profit sectors to sustainable development priorities. According to A. Luzgina, "green" financing involves taking into account not only environmental but also management and social effects; its sources are the resources of banks, financial institutions, non-financial commercial institutes, individuals, the state and non-profit organizations [7].

State Corporation VEB.RF, implementing in our country the functions of a methodological center in the sphere of sustainable development. "Green" financing means the financial instruments used in the process of financing projects and activities on nature and biodiversity protection, adaptation to climate change and in the field of ecology.

Note that this approach is now widely distributed in modern literature. For example, B. Ilić, D. Djukic and G. Djukic consider that "green" financing includes various financial instruments that promote the development of a low-carbon economy and support investments in environmental projects [8]. According to O.V. Bogacheva and O.V. Smorodinov, "green" financial instruments allow business owners to

[1] The Global Risks Report 2022. URL: https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2022.pdf (accessed on 23.06.2022).

[2] Climate Change 2022: Impacts, Adaptation and Vulnerability: assessment report / Intergovernmental Panel on Climate Change. URL: https://www.ipcc.ch/report/ar6/wg2/ (accessed on 22.04.2022).

[3] G20 Green Finance Synthesis Report. URL: https://unepinquiry.org/wp-content/uploads/2016/09/Synthesis_Report_Full_EN.pdf (accessed on 18.07.2022).

conduct operations that improve the environment, reduce the effects of climate change, and promote more efficient use of resources [9].

It should be noted that in popular practice, among the instruments of "green" financing traditionally include: "green" bonds, "green" loans, "green" pollution liability insurance policies, "green" credit cards, " green" investment accounts, etc. Undoubtedly, the most common instrument is green bonds [10–12]. According to Climate Bonds Market Intelligence, the global market for green bonds reached 517.4 bln dollars in 2021 and will continue to expand rapidly. Thus, according to the forecast, the volume of the market of "green" bonds by 2025 will reach 5 trn dollars. More than half of all green bond settlements belong to the financial sector. In the region, the US, Germany and China lead.[4] The funds raised through the issuance of these bonds will be used to finance or refinance green projects in the areas of renewable energy; energy efficiency; sustainable waste management, water resources, land use and biodiversity conservation; clean transport; protection against climate change [13–16].

Thus, the definition of "green" financing can be described as a combination of different ways of financing technological processes and projects in the area of greening and climate change mitigation, as well as a wide range of financial instruments with an environmental component used to finance environmental programs and projects, environmental activities and biodiversity protection. In contrast to existing interpretations, in our article, "green" financing means the cost of investing in programmers, projects and activities to protect the environment and the sustainable use of natural resources, including current (operational) costs and equity investments aimed at environmental protection and the efficient use of nature resources, as well as capital repair costs of major environmental funds.

As the practice of "green" financing and responsible investment develops in the global community, a discussion has unfolded on the integration of environmental, social and governance (further — ESG) factors into the business model of operators, assessing their impact on investment attractiveness and achieving sustainable development. Among the most important ESG criteria discussed today are: 1) environmental issues; 2) relations with employees, customers and society (social); 3) corporate governance issues (corporate governance) [17–19].

The development of the ESG approach contributes to new requirements for carbon regulation, corporate non-financial reporting standards, improved green and responsible investment tools and approaches to ESG risk management. The Global Reporting Initiative (GRI) has developed ESG standards that establish the disclosure of information about those aspects of a company's activities that are socially significant and affect stakeholders of the company [20].

Currently, ESG criteria serve as the basis for various ESG ratings [21]. A significant number of rating agencies have developed their own ESG-rating methodologies, such as MSCI, S&P, Vigeo Eiris, Sustain Analytics, DEEP Ecosystems, and others. In Russia, examples of such rating agencies are the RAEX division, the NCR credit rating agency, part of the RBC media holding, which rank domestic companies and regions according to ESG criteria.

Thus, the use of "green" financing, implementation, and development of ESG principles is a modern mainstream for the global financial and investment community, increasing the transparency of international economic relations and expanding control over the social, environmental, and financial spheres of society.

[4] Emission of green bonds exceeds 500 bln dollars. URL: http://tp-bioenergy.ru/sitenews/Obiem-vypuska-zelenyh-obligacij-prevysil-500-mlrd-dollarov/ (accessed on 18.07.2022).

Table 1

ESG-Rating of Russian Regions in 2020

No.	Region	E	S	G	ESG
1	Republic of Tatarstan	19	12	1	1
2	Moscow	42	5	3	2
3	Lipetsk region	1	17	31	3
4	Khanty-Mansi Autonomous Area — Yugra	47	8	2	4
5	Kursk region	3	20	16	5
6	Tyumen region	27	13	4	6
7	Sverdlovsk region	9	30	7	7
8	Leningrad region	18	9	17	8
9	Saratov region	5	44	26	9
10	Kaluga region	7	29	28	10
….					
80	Komi Republic	82	42	48	78
81	Magadan region	79	11	75	79
82	Pskov region	66	70	79	80
83	Kabardino-Balkarian Republic	66	70	79	80
84	Republic of Tyva	15	83	80	82
85	Republic of Kalmykia	74	57	82	83

Source: European Rating Agency RAEX-Europe. URL: https://raex-a.ru/rankings/regions/ESG_raiting?#metodika (accessed on 19.07.2022).

ESG-RATING OF RUSSIAN REGIONS

In addition to being an important problem for individual operators, supporting sustainable development is also important in preserving regional stability. Most ESG ratings are based on the principle of combining the level of exposure to risk and assessing the effectiveness of its leveling. European rating agency RAEX-Europe presented ESG-rating of Russian regions, assessing environmental and social risks and the quality of public administration (*Table 1*).

This study demonstrated that, following a crisis put on, among other things, by COVID-19, the capital agglomerations and agricultural regions are recovering fastest. Subjects with strong industrial specialization and monopolists show a longer and stronger decline, correlating with the dynamics of commodity markets. The depressed regions of central Russia, especially those specializing in mechanical engineering, continue to stagnate. The southern subjects of the Russian Federation are developing unevenly, as the dynamics of their economy substantially depends on federal funding and the implementation of large projects.

The expected growth of social risks is more balanced in the regions that lead in the social sub-rating [the sparsely populated “oil-gas” regions, capitals (Moscow, St. Petersburg) and their surroundings], as the oil-gas rent

is transformed into high indicators of health, safety, well-being and basic education. With an obvious trend towards a decrease in total pollution from industrial enterprises, environmental risk leveling indicators are largely stagnating.

Regions that combine good budgetary discipline and transparency of local authorities with a high level of investment attractiveness (Moscow, Khanty-Mansi Autonomous District, etc.) are leading in the quality of state administration. The vast majority of regional budgets in 2020 have deficits, financially stronger entities are increasing their bank borrowing and bond issuance, and regions under the Ministry of Finance of the Russian Federation's restrictions are increasing their requests for transfers from the federal center, which may result in the sequestration of several non-priority items.

MODELING THE IMPACT OF "GREEN" FINANCING ON THE SOCIO-ECONOMIC DEVELOPMENT OF REGIONS OF THE RUSSIAN FEDERATION

The study used methods and models of intelligent data analysis taking into account temporary delays and corresponding logic responses of endogenous indicators as an approach to the quantitative assessment and modeling of the impact of "green" financing on the sustainable socio-economic development of the regions of the Russian Federation and, therefore, to the analysis of the transformation of economic growth indicators to relevant changes in the investment climate.

As a model, a system of three regressions (1) is constructed, including the linear, gradual and dynamic model of Sh. Almon with distributed lags:

$$\begin{cases} Y_{1t} = \alpha_0 \cdot E_t^{\alpha_1} \cdot S_t^{\alpha_2} \cdot G_t^{\alpha_3} \cdot \varepsilon \\ Y_{1t} = \beta_0 + \beta_1 X_t + \varepsilon_t \\ \ln(Y_{2t}) = \delta + \gamma_0 \ln(I_t) + \gamma_1 \ln(I_{t-1}) + \ldots + \gamma_l \ln(I_{t-l}) + u_t, \end{cases} \quad (1)$$

where Y_{1t} — integrated indicators of sustainable socio-economic development of the regions of the Russian Federation with ESG-factors; E_t — local environmental risk indicator with the following per capita regional statistics: volume of emissions into the atmosphere of pollutants from stationary sources; proportion of neutralized atmospheric contaminants in the total quantity of contaminants from fixed sources; volume of harmful (polluting) substances emitted into the air from road transport; share of vehicles capable of using natural gas as engine fuel; discharge of contaminated wastewater into surface waters; volume of water used; proportion of waste used and disposed of in total waste generated in the production and consumption processes; share of exported and recycled solid municipal waste; S_t — local indicator "Social risk (Social)", taking into account the following indicators of regional statistics: share of the population with incomes below the subsistence minimum; amount of expenditure of the consolidated budget of the region on "social policy", adjusted for cost of living; volume of the consolidated budget of the region for "Education" per capita, adjusted for the cost of living; infant mortality rate; volume of expenditure of the consolidated budget of the region on "Health", adjusted for cost of living; number of serious crimes registered in the reporting period per 100 thous. people of the population; volume of security expenditure in the region's consolidated budget, adjusted for the cost of living; ratio of the average population in the reporting year to the average in the previous 10 years; total number of jobs created by group of organizations with an average increase in the number of employees and by newly established organizations per 1000 persons per permanent population; G_t — local governance indicator, including the following regional statistical indicators: investment attractiveness and business support, level of

transparency of the regional authorities and anti-corruption procedures, quality of budget management and quality of assessment of regulatory impact, expenditure of the consolidated budget of the region under article "National issues" in relation to the GRP; Y_{2t} — gross regional product of the Russian Federation per capita; X_{1t} — "green" finances of the regions of Russia, total expenditure on environmental protection and the rational use of natural resources, including current (operational) costs on the protection of the environment, payment of environmental services; capital investments aimed at environmental protection and the efficient use of natural resources, capital repair costs of major environmental funds; I_t — capital investment in the Russian Federation; $\gamma_0, \gamma_1, ..., \gamma_l$ — short-term multipliers; $\sum_{k=1}^{l} \gamma_k$ — long-term multipliers characterizing the change in performance indicators as a result of a single change in exogenous variables in each of the future periods considered.

For the identification, analysis and verification of the model (1) the methods of correlation, linear and nonlinear regression, dispersion analysis, generalized method of least squares, method of instrumental variables were used.

Gross regional product (Y_{2t}) — is an endogenous indicator operating with a certain delay under the influence of investment policy, whose effectiveness depends on the indicators of sustainable socio-economic development of the regions of the Russian Federation on the principle of ESG.

In the result of mathematical transformations, the authors constructed an econometric model characterizing the dependence of sustainable development in the regions of the Russian Federation on local indicators of environmental (E_t) and social (S_t) risks and corporate governance (G_t), in the form of the Cobb-Douglas gradual function:

$$Y_{1t} = 0.211 \cdot E_t^{0.410} \cdot S_t^{0.331} \cdot G_t^{0.706} \cdot \varepsilon, \quad R^2_{norm} = 0.86, \text{ F} = 178.99 \qquad (2)$$

or

$$\ln Y_{1t} = -1.555 + 0.410 \cdot \ln E_t + 0.331 \cdot \ln S_t + 0.706 \cdot \ln G_t + \varepsilon. \qquad (3)$$

Elasticity coefficients $\alpha_1 = 0{,}410$, $\alpha_2 = 0{,}331$, $\alpha_3 = 0{,}706$ models (2) show that with an increase of 1% in environmental, social and management components, the sustainability of the region will increase by 0.410, 0.331 and 0.706%, respectively.

The model (2)–(3) is suitable for forecasting, as regression (3) and its parameters are statistically significant under the Fisher and Stuent criteria at the significance level 0.0001; determination factor $R^2_{norm} = 0.86 > 0.5$.

In order to assess the impact of "green" financing (X_t) on the sustainable socio-economic development of the subjects of the Russian Federation (Y_{1t}) due to the heterogeneity of the ix scales, the authors preliminarily completed the grouping of regions, built 3 clusters of regions (*Table 2*) and linear regressions for them:

$$\begin{cases} Y_{11t} = 0.275 + 0.396 X_t + \varepsilon_{11t}, \\ R^2_{norm} = 0.56 \; for \; I \; cluster, n_1 = 28 \\ Y_{12t} = 22.475 + 0.510 X_t + \varepsilon_{12t}, \\ R^2_{norm} = 0.74 \; for \; II \; cluster, n_2 = 27 \\ Y_{13t} = 49.711 + 0.376 X_t + \varepsilon_{13t}, \\ R^2_{norm} = 0.60 \; for \; III \; cluster, n_3 = 30 \end{cases} \qquad (4)$$

Models (4) are suitable for reliable investigation and confirmation of the hypothesis of the direct strong dependence of the level of socio-economic regional development on the scale of "green" financing, since parameters (4) are statistically significant under the Fisher and Student criterion at the significance level of 0.0001; determination coefficients R^2_{norm} exceed 0.5.

Table 2

Results of the Classification of Regions of Russia by Level of Impact of "Green" Financing on Socio-Economic Development

Cluster number	Regions
I	Kursk region, Novgorod region, Tver region, Nenets Autonomous District (Arkhangelsk region), Chuvash Republic, Kaluga region, Republic of Adygea, Tyumen region, Lipetsk region, Saratov region, Ryazan region, Republic of Dagestan, Kostroma region, Ulyanovsk region, Republic of Tatarstan, Voronezh region, Moscow, Khanty-Mansi Autonomous Area — Ugra, Leningrad region, Sakhalin region, Yaroslavl region, Tula region, Sverdlovsk region, Chukotka Autonomous District, Novosibirsk region, Republic of Mari El, Smolensk region, Bryansk region
II	Republic of Mordovia, Republic of North Ossetia-Alania, Altai region, Yamal-Nenets Autonomous District, Penza region, St. Petersburg, Vologda region, Khabarovsk Territory, Moscow region, Rostov region, Samara region, Chelyabinsk region, Krasnoyarsk region Republic of Sakha (Yakutia), Vladimir region, Republic of Altai, Irkutsk region, Kaliningrad region, Belgorod region, Stavropol, Republic of Karachay-Cherkessia, Orel region, Kirov region, Ivanovo region, Tomsk region, Republic of Ingushetia, Omsk region
III	Amur region, Republic of Buryatia, Chechnya Republic, Krasnodar region, Jewish Autonomous District, Tambov region, Trans-Baikal Territory, Nizhny Novgorod, Republic of Bashkortostan, Orenburg region, Primorsk Territory, Udmurt Republic, Murmansk region, Kamchatka region, Kabardino-Balkarian Republic, Republic of Kalmykia, Republic of Tyva, Magadan region, Pskov region, Kurgan region, Astrakhan region, Volgograd region, Republic of Karelia, Perm region, Republic of Khakassia, Arkhangelsk region, Kemerovo region, Komi Republic

Source: Compiled by the author.

Gross regional product (Y_{2t}) — is an endogenous indicator operating with a certain delay under the influence of investment policy, so the model of the dependency of the volume of gross regional product per capita (Y_{2t}) from the amount of equity investments aimed at environmental protection and sustainable use of natural resources (I_t),is constructed in the form of a dynamic regression model with a distributed lag:

$$\ln(Y_{2t}) = \delta + \gamma_0 \ln(I_t) + \gamma_1 \ln(I_{t-1}) + \ldots + \gamma_l \ln(I_{t-l}) + u_t. \quad (5)$$

The study determined the maximum values of lag l and the degree k of the polynomial (6), describing the structure of the lag for (5).

$$\gamma_i = d_0 + d_1 i + d_2 i^2 + \ldots + d_k i^k. \quad (6)$$

At the same time, by experimental means (using correlation-regression analysis, testing of the Hypotheses of Student criteria, assessment of *t*-statistics) it was shown in this study that it is advisable to use 3rd degree polynomials to evaluate the parameters of γ_i regression (5):

$$\gamma_i = d_0 + d_1 i + d_2 i^2 + d_3 i^3. \quad (7)$$

Using the method of instrumental variables, for model (5) the parameters for the new variables Z_0, Z_1, Z_2 were accessed:

$$\ln(Y_{2t}) = -9584.50 + 0.37 \cdot Z_0 - 0.46 \cdot Z_1 + 0.14 \cdot Z_2 + \varepsilon_t, \quad F = 201.46. \quad (8)$$

Following the Sh. Almon method's reverse transformations of the model's parameters (8), estimates of the parameters (5) of

dynamic regression with distributed lag were obtained:

$$\ln(Y_{2t}) = -9584.50 + 0.37 \cdot \ln(I_t) + 0.05 \cdot \ln(I_{t-1}) + \\ + 0.01 \cdot \ln(I_{t-2}) + 0.27 \cdot \ln(I_{t-3}) + u_t. \quad (9)$$

Analysis of the model (9) suggests that an increase of 1% in equity investments aimed at environmental protection and the sustainable use of natural resources (I_t) will mean an average increase of 0.366% in regional gross per capita product (Y_{2t}) in the current period; 0.413% in the next year; 0.426% in the following year; and 0.693% in two years.

In result, model of the impact of "green" financing (X_t) on the sustainable socio-economic development of the regions of the Russian Federation (Y_{1t}) and, therefore, on the volume of gross regional product per capita (Y_{2t}) depending on the change in the amount of capital investments aimed at environmental protection and the rational use of natural resources (I_t), is as follows:

$$\begin{cases} Y_{1t} = 0.211 \cdot E_t^{0.410} \cdot S_t^{0.331} \cdot G_t^{0.706} \cdot \varepsilon_t \\ Y_{11t} = 0.275 + 0.396 \cdot X_{1t} + \varepsilon_{11t}; \\ Y_{12t} = 22.475 + 0.510 \cdot X_{2t} + \varepsilon_{12t}; \\ Y_{13t} = 49.711 + 0.376 \cdot X_{3t} + \varepsilon_{13t}; \\ \ln(Y_{2t}) = -9584.50 + 0.37 \cdot \ln(I_t) + 0.05 \cdot \ln(I_{t-1}) + \\ + 0.01 \cdot \ln(I_{t-2}) + 0.27 \cdot \ln(I_{t-3}) + u_t. \end{cases} \quad (10)$$

CONCLUSION

At present, "green" financing is the world's dominant trend in the development of the economy, contributing to its structural and technological modernization. The growth of "green" financing suggests a progressive transition to ESG principles.

The survey, using official data of the Federal State Statistics Service of the Russian Federation for 2000–2021, as well as the results of ESG-ratings of Russian regions, assessing their environmental and social risks and the quality of public administration, builds:

- integral indicator of sustainable socio-economic development of the regions of the Russian Federation with ESG-factors in the form of the gradual regression model of Cobb-Douglas;
- three clusters of regions and linear regression for each of them in order to assess the impact of green financing on sustainable socio-economic development of the subjects of the Russian Federation due to the heterogeneity of their scale;
- model of the dependency of the volume of gross regional product per capita from the amount of capital investments aimed at the protection of the environment and the rational use of natural resources in the form of a dynamic regression model with a distributed lag Sh. Almon.

The scientific and practical significance of the study is that its results can be used by public authorities and management in the development of strategic program documents in the field of the development of the "green" economy and tools of "green" financing.

REFERENCES

1. Eremin V.V., Bauer V.P. Green financing as a trigger of positive climate transformations. *Ekonomika. Nalogi. Pravo = Economics, Taxes & Law.* 2021;14(4):65–73. (In Russ.). DOI: 10.26794/1999–849X-2021–14–4–65–73
2. Yakovlev I.A., Kabir L.S. Climate finance in the context of sustainable development. *Ekonomika. Nalogi. Pravo = Economics, Taxes & Law.* 2019;12(5):44–51. (In Russ.). DOI: 10.26794/1999–849X-2019–12–5–44–51
3. Sedash T.N., Tyutyukina E.B., Lobanov I.N. Directions and instruments of "green projects" financing within the concept of sustainable development of the economy. *Ekonomika. Nalogi. Pravo. = Economics, Taxes & Law.* 2019;12(5):52–60. (In Russ.). DOI: 10.26794/1999–849X-2019–12–5–52–60

4. Li S. Making green finance mainstream: The way ahead for China. ICF International Inc. Jun. 06, 2019. URL: https://www.icf.com/blog/policy-and-regulation/china-global-green-finance (accessed on 18.07.2022).
5. Frolova E. E., Zankovsky S. S., Dudin M. N., Zinkovsky S. B., Kirsanov A. N. Studying concepts of the breakthrough economic reforms in selected countries and regions of the world: Economic and legal aspects. *Journal of Advanced Research in Law and Economics*. 2019;9(4):1236–1242. DOI: 10.14505/jarle.v9.4(34).08
6. Altunina V. V., Alieva I. A. Current trends in the development of a green finance system: Methodology and practice. *Baltic Region*. 2021;13(S 2):64–89. DOI: 10.5922/2079–8555–2021–2–4 (In Russ: *Baltiiskii region*. 2021;13(S 2):64–89. DOI: 10.5922/2079–8555–2021–2–4).
7. Luzgina A. Green banking: Essence, instruments and prospects of development. *Bankauski vesnik = Banking Bulletin*. 2021;(3):31–42. (In Russ.).
8. Ilić B., Stojanovic D., Djukic G. Green economy: Mobilization of international capital for financing projects of renewable energy sources. *Green Finance*. 2019;1(2):94–109. DOI: 10.3934/GF.2019.2.94
9. Bogacheva O. V., Smorodinov O. V. Challenges to green finance in G20 countries. *Mirovaya ekonomika i mezhdunarodnye otnosheniya = World Economy and International Relations*. 2017;61(10):16–24. (In Russ.). DOI: 10.20542/0131–2227–2017–61–10–16–24
10. Ermakova E. P. The development of the legal framework for "green" finance in Russia, the EU and China: A comparative legal analysis. *Vestnik Rossiiskogo universiteta druzhby narodov. Seriya: Yuridicheskie nauki = RUDN Journal of Law*. 2020;24(2):335–352. (In Russ). DOI: 10.22363/2313–2337–2020–24–2–335–352
11. Zimmerman R., Brenner R., Abella J. L. Green infrastructure financing as an imperative to achieve green goals. *Climate*. 2019;7(3):39. DOI: 10.3390/cli7030039
12. Bobylev S. N., Kiryushin P. A., Koshkina N. R. New priorities for the economy and green finance. *Ekonomicheskoe vozrozhdenie Rossii = Economic Revival of Russia*. 2021;(1):152–166. (In Russ.). DOI: 10.37930/1990–9780–2021–1–67–152–166
13. Demirel P., Li Q. C., Rentocchini F. Tamvada J. P. Born to be green: New insights into the economics and management of green entrepreneurship. *Small Business Economics*. 2019;52(4):759–771. DOI: 10.1007/s11187–017–9933-z
14. Bhattacharyya R. Green finance for energy transition, climate action and sustainable development: Overview of concepts, applications, implementation and challenges. *Green Finance*. 2022;4(1):1–35. DOI: 10.3934/GF.2022001
15. Tarkhanova E. A., Fricler A. V. Green financing: Global understandings and Russian practices review. *Journal of New Economy*. 2020;21(4):45–62. DOI: 10.29141/2658–5081–2020–21–4–3
16. Issenov A. S. Formation of institutional structure of the global green finance market. *Upravlenie = Management (Russia)*. 2021;9(4):100–111. (In Russ.). DOI: 10.26425/2309–3633–2021–9–4–100–111
17. Linnenluecke M. K. Environmental, social and governance (ESG) performance in the context of multinational business research. *Multinational Business Review*. 2022;30(1):1–16. DOI: 10.1108/MBR-11–2021–0148
18. Spiridonova L. A., Korneeva T. A. Application of ESG principles in the management accounting system of Russian companies. *Vestnik Samarskogo gosudarstvennogo ekonomicheskogo universiteta = Vestnik of Samara State University of Economics*. 2022;(3):82–90. (In Russ.). DOI: 10.46554/1993–0453–2022–3–209–82–90
19. Albitar K., Abdoush T., Hussainey K. Do corporate governance mechanisms and ESG disclosure drive CSR narrative tones? *International Journal of Finance & Economics*. 2022. DOI: 10.1002/ijfe.2625
20. Zhukova E. V. Key trends in ESG-agenda development: Reviewing the situation in Russia and the world. *Vestnik Rossiiskogo ekonomicheskogo universiteta imeni G. V. Plekhanova = Vestnik of the Plekhanov Russian University of Economics*. 2021;18(6):68–82. (In Russ.). DOI: 10.21686/2413–2829–2021–6–68–82
21. Gurkova M. D. Absolute and relative assessment of enterprises' ESG-sustainability: Domestic experience. *Ekonomika i biznes: teoriya i praktika = Economy and Business: Theory and Practice*. 2022;(5–1):199–203. (In Russ.). DOI: 10.24412/2411–0450–2022–5–1–199–203

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N. N. Semenova — formulation of the problem, development of the concept of the article, description of the results and formation of the conclusions of the study.
I. A. Ivanova — tabular and graphical representation of the results, construction of an economic and statistical model.
O. I. Eremina — collection of research material, critical analysis of the literature.

Conflicts of Interest Statement: The authors have no conflicts of interest to declare.

The article was submitted on 22.07.2022; revised on 16.08.2022 and accepted for publication on 26.09.2022.
The authors read and approved the final version of the manuscript.