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Methodological Issues in Analyzing Financial Development in the Context of ESG

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ABSTRACT

The sustainable development goals formulated by the UN are embodied in various spheres of human life and economic activity. In finance, this movement has led to the emergence of a sustainable finance market in recent years. Its boundaries are set by the uniqueness of the tools and products of this market and the formation of its own rules and standards. The purpose of this study is to develop approaches to assess the development of the sustainable finance market and integrate indicators characterizing the state of individual segments of this market into the system of financial development indicators promoted by the World Bank. To achieve this goal, the paper analyzes the structure and scope of the sustainable finance market, examines the experience of monitoring the state and dynamics of this market in different aspects, and clarifies the place of existing and proposed indicators in the system of financial development metrics. As a result of the study, it was revealed that the modern practice of monitoring and analyzing the sustainable finance market is not fully adapted to the purposes of both country-based and cross-country analysis, since it is not systematized and relies mainly on absolute indicators. The authors propose the development of a methodology for analyzing the sustainable finance market by complementing existing approaches and preferentially using structure indicators and GDP-weighted indicators. Taking into account these proposals, the work presents a modernized system of financial development indicators of 5×4 dimensions, which is intended to replace the 5×2 matrix used so far in the literature on financial development. This will make it possible to more systematically accumulate information on the functioning of the sustainable finance market and use it, among other things, to find answers to the questions regarding the contribution of this market to financial development and the effects of its development on inclusive economic growth.

Keywords: financial sector; financial development; ESG; sustainable finance market; financial development indicators

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INTRODUCTION

Over the past two decades, the attention given to ESG issues has continuously grown worldwide. The impact of ESG on the financial market has led to the emergence of a distinct concept known as the *"sustainable finance market"* (SFM), encompassing tools, institutions, norms, and codes of conduct related to the implementation of ESG principles. In its structure, SFM encompasses bank lending (green loans), the capital market (sustainable bonds, ESG investment funds, The United Nations Sustainable Stock Exchanges (SSE) initiative), and insurance (insurance products with a "sustainability" label).

Commitment to ESG principles influences the behavior of companies and investors, becomes a subject of activity for international organizations, and modernizes the priorities of national financial regulators' policies. The regulatory environment is adapting, and institutions of the financial market infrastructure are beginning to take an active stance on ESG issues. Overall, there is a significant influence of the ESG agenda on financial development. Despite the obviousness of this impact, the methodological apparatus for measuring financial development has not yet adopted the innovations brought about by the process of SFM formation. Thus, addressing this issue appears to be relevant, which defines the objective of this study — the development of principles and approaches for integrating the set of SFM development monitoring metrics into the financial development indicators system.

This is particularly important in connection with the issues addressed by a significant portion of the literature on financial development, namely: the relationship between financial development and economic growth [1], productivity growth [2], and overcoming the problem of inequality [3]. Indeed, in recent years, studies have emerged that focus on the issue of the relationship between the development of individual segments of the sustainable finance market and economic growth [4–7]. However, there is still a significant lack of such work, as it covers a small number of markets and countries. Finally, the depth of research on the issue remains insufficient to comprehensively reveal the mechanisms of transmission for a "sustainable" transition to inclusive "green" economic growth.

STRUCTURE AND SCOPE OF THE MODERN SUSTAINABLE FINANCE MARKET

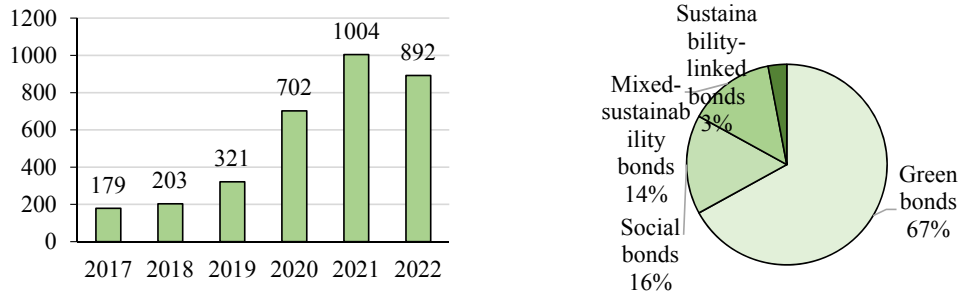
Among ESG sectors, the fastest growth is characteristic of debt instruments known as *sustainable bonds* (*Fig. 1*). This concept includes debt instruments, the net proceeds from the issuance of which are used for the partial or full financing of projects that meet environmental or social criteria. The concept encompasses: (a) *green bonds* (raising funds for projects that provide environmental benefits in accordance with the Sustainable Development Goals (SDGs)[1]); (b) *social bonds* (for projects aimed at addressing a specific social issue or mitigating its consequences, improving food security, access to education, healthcare); (c) *mixed sustainable bonds* (projects that bring both environmental and social benefits).

The growing class of products in this market is sustainability-linked bonds, issued for projects transitioning to sustainable development. The total amount of outstanding debt on all these instruments in 2022 was $ 3.3 trillion (approximately 2.4% of the global bond market).[2]

The overwhelming majority of sustainable debt instruments are accounted for by

[1] Sustainable Development Goals of the UN. URL: https://www.un.org/sustainabledevelopment/ru/sustainable-development-goals/ (accessed on 10.01.2024).

[2] UNCTAD. World Investment Report. Investing in sustainable energy for all. New York. UNCTAD. 2023. URL: https://unctad.org/system/files/official-document/wir2023_en.pdf (accessed on 2023.12.29); BIS Statistics. Debt Securities. URL: https://stats.bis.org/statx/srs/table/c1 (accessed on 12.12.2024).



a) production volume, 2017–2022, billion USD

b) issuance structure, Q3 2023, %

Fig. 1. **Sustainable Bond Market's Features**

Source: Compiled by the authors based on UNCTAD.

developed countries. The leaders in the issuance of sustainable instruments are European countries — in 2022, they accounted for 45% of all issued sustainable bonds, 23% for Asia and Oceania (mainly due to China), the USA and Canada for 15%, and international organizations for 12%.

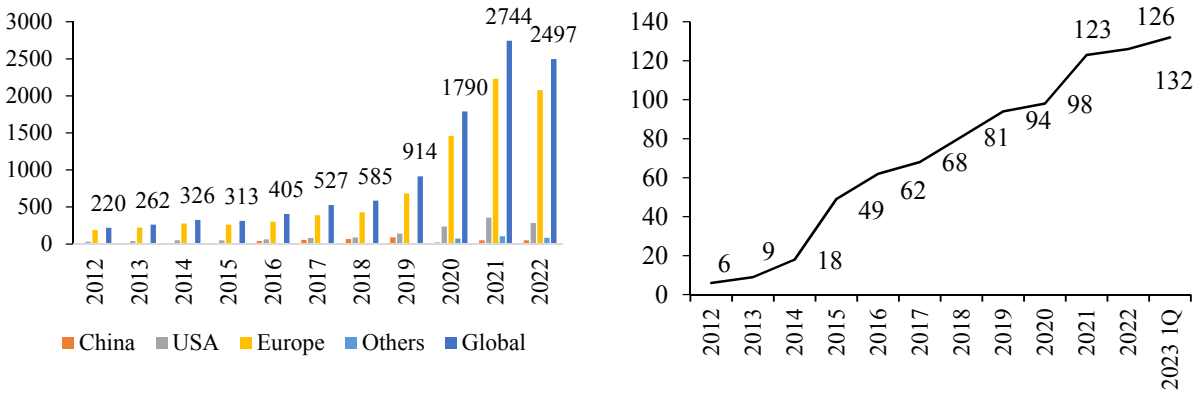
France, the Netherlands, and Germany were among the top five countries by cumulative issuance volume in 2022. A significant player in the green bond market has been China, which, along with Germany and the United States, entered the top three leaders in new issuances in 2022–2023. China accounts for a significant share of all issuances of these instruments in the group of emerging markets. The total volume of green bonds issued in China is estimated at 1.6–2.7% of GDP (2022), depending on the use of international (CBI — Climate Bonds Initiative) or national classification. Similar indicators in Russia, according to a study by IMF experts, are the lowest among BRICS countries and a number of other emerging market economies [8].

Additional growth momentum in the sustainable instruments sector is expected from the adoption of the European Green Bond Standard. Similar events, such as the implementation of China's Green Bond Principles and the passing of the Inflation Reduction Act in the United States, could potentially accelerate growth in other regions. On a long-term growth trajectory with nearly a 14-fold increase in annual issuance from 2017 to 2022, social bonds and mixed-sustainability bonds remain. They account for approximately one-third of all sustainable bond debt. The growth of the "social" bond market was stimulated by efforts to mitigate the consequences of the coronavirus pandemic. Although the majority of the market is in the public sector, there is a noticeable increase in the issuance of social bonds by corporations and financial institutions.

A significant part of SFM is carbon markets, which are understood as complex systems where emission quotas, carbon credits, and financial instruments based on them are bought and sold. Article 6 of the Paris Agreement on Climate Change 2015 opens up the possibility for countries to use international carbon markets to meet their national commitments.[3] Countries are increasing investments in modern digital infrastructure to ensure participation in international carbon markets.

Carbon markets are divided into two main types: *compliance carbon markets* (CCM) and *voluntary carbon markets* (VCM). Mandatory ones are specific to a particular jurisdiction. Voluntary markets meet the demand for carbon credits outside of regulated

[3] Paris Agreement. United Nations. 2015. URL: https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf (accessed on 18.01.2024).



a) assets under management of RIFs, billion USD

b) the number of exchanges participating in the UN SSE Initiative

Fig. 2. **Institutional Players of the Sustainable Finance Market**

Source: Compiled by the authors based on UNCTAD and SSE database. URL: https://sseinitiative.org/data/ (accessed on 30.01.2024).

schemes and allow the buying and selling of emissions credits issued under projects aimed at reducing emissions. Participants in the voluntary market are companies and governments seeking to reduce their carbon footprint [9].

Compliance markets in 2022 were estimated at $ 979 billion in carbon credit issuance per year.[4] VCMs, valued at $ 2 billion, are a rapidly growing element of the financial landscape, providing an opportunity that most CCMs do not have: directing investment capital abroad to finance new projects aimed at reducing or preventing emissions. Thus, voluntary markets provide a cross-border channel for financing renewable energy and other climate-related projects.

One of the fundamental trends in the development of SFM is the increasing role of institutional investors in total assets, along with a slight reduction in the share of banks. Satisfying the growing demand from clients for sustainable labeled instruments, an increasing number of institutional investors are adhering to the rule of considering ESG factors in the investment process [10]. Leading managers — BlackRock, Vanguard, State Street — have established responsible investment funds (RIFs). From 2012 to 2022, the number of funds entirely focused on RIFs increased by 4.5 times. 82% of the funds are allocated to Europe, 12% to the USA, and 2% to China. The value of assets under the management of such funds in 2022 approached $ 2.5 trillion (*Fig. 2*).

State pension funds and sovereign wealth funds are also showing increasing interest in SFM. They are involved in the standardization of sustainability reporting in accordance with international standards. The Principles for Responsible Investment (PRI[5]) and the Task Force on Climate-related Financial Disclosures (TCFD)[6] are the two most commonly used reporting frameworks, followed by the Global Reporting Initiative (GRI)[7] and the Sustainability Accounting Standards Board

[4] Finance Yahoo. URL: https://finance.yahoo.com/news/global-carbon-credit-market-2023–104800429.html (accessed on 06.02.2024).

[5] Principles for Responsible Investment (PRI) — supported by the UN, an international network of financial institutions working on the implementation of six principles related to ESG investing. URL: https://www.unpri.org/ (accessed on 20.01.2024).

[6] Task Force on Climate-Related Financial Disclosures (TCFD). URL: https://www.fsb-tcfd.org/ (accessed on 20.01.2024).

[7] Global Reporting Initiative (GRI). It is an independent international organization that helps companies and organizations take responsibility for the consequences of their activities by providing them with standards to inform about these impacts. (GRI Standard). URL: https://www.globalreporting.org/how-to-use-the-gri-standards/gri-standards-english-language/ (accessed on 24.01.2024).

(SASB).[8] More than half of the funds publish information about climate risks either in a separate section of their annual reports or in a special report on climate risks. Almost a quarter of funds specify target indicators for investments in renewable energy sources and fossil fuels.

The SFM infrastructure relies on *specialized exchanges or sections of existing exchanges*. By 2023, 69 exchanges had written recommendations on ESG reporting (compared to 10 in 2012); more than a quarter impose mandatory ESG requirements at listing. The work of stock exchanges is at the center of the UN Sustainable Stock Exchanges Initiative (SSE). The number of SSE participants in Q1 2023 was 132, meaning it is a global reach.

One of the main issues in the field of ESG development is disclosure. Securities regulators and international standard-setting bodies have made progress in codifying sustainability reporting. ISSB, preparing global ESG standards, aims to meet the need for consistent, comparable, and reliable sustainability disclosure standards. Together with the GRI standards, they are intended to form a comprehensive corporate reporting system for disclosure.

The most advanced experience is that of the EU, where the Directive on Corporate Sustainability Reporting has been in effect since 2023. The document requires large companies to report on their ESG activities. Developing their sustainability reporting requirements, the EU and the US are collaborating with the ISSB to achieve functional compatibility. Measures requiring financial institutions and companies to report on sustainability, including CO_2 emissions reports, are being introduced by the governments of developing countries (India, China, Egypt, Bangladesh, and Malaysia). Companies are actively trying to draw attention to their sustainability efforts. In 2020, 92% of firms from the S&P 500 list and 70% of firms from the Russell 1000 published sustainability reports.

Overall, in the past 15 years, there has been an active phase of the formation of SFM, which encompasses both the market for debt instruments and loans, as well as the capital market and its infrastructure. The boundaries of SFM are defined by the uniqueness of the instruments and products of this market and the establishment of its own rules and standards, aimed at distinguishing products and instruments labeled as sustainable from the broader continuum.

THE ROLE OF SFM IN THE SYSTEM OF FINANCIAL DEVELOPMENT INDICATORS

Despite the growing popularity of SFM and, obviously, its role in the financial systems of many countries, possibly due to the rapid growth of this market, there is a lag in the development of a monitoring system that could be used for statistical analysis of this process.

The emergence of SFM is part of the profound changes in the nature of the modern financial system and its role in economic development, observed since the large-scale liberalization of financial markets in the 1980s, which has gradually affected various countries and regions of the world. Financial liberalization opened up the possibility for the expansion of financial institutions into different markets and, consequently, into various sectors of the economy, stimulated financialization [11], and led to the formation of a process referred to in the literature as "financial acceleration" [12], which essentially resulted in the rapid and, apparently, unjustifiably excessive deepening of financial markets [13]. Indeed, financial markets have been actively growing in their absolute sizes and relative to the economies of their

[8] Sustainability Accounting Standards Board (SASB). International organization developing and promoting reporting standards that reflect aspects of sustainable development (SASB Standards). URL: https://sasb.org/standards/ (accessed on 24.01.2024).

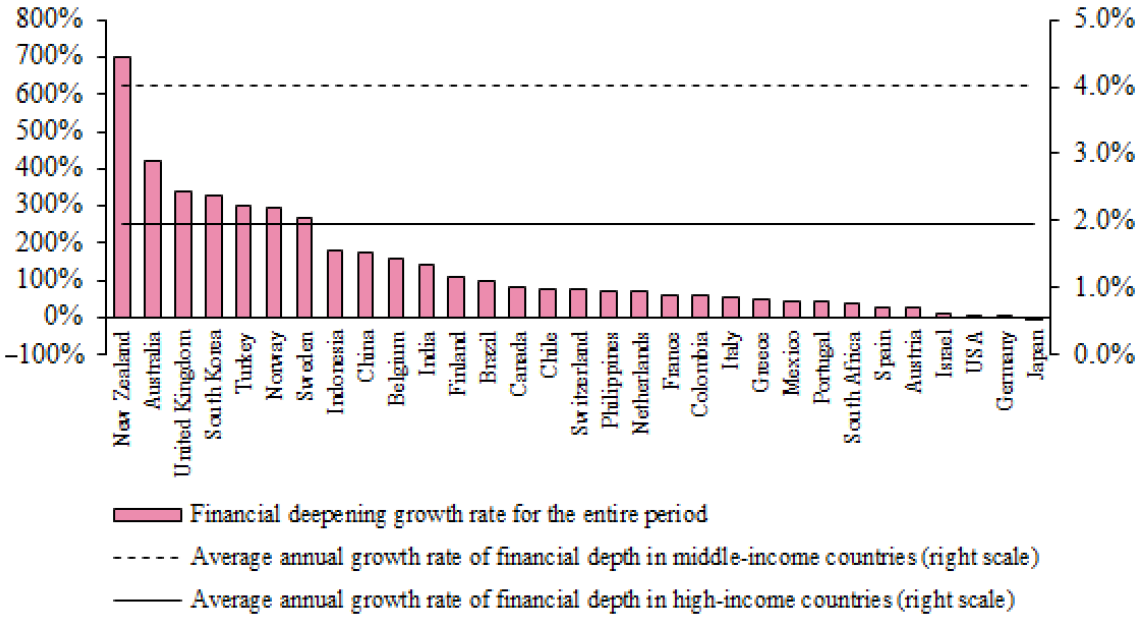


Fig. 3. **Increase in Financial Depth Across Countries, 2021 to 1981**

Source: Compiled by the authors based on the World Bank. URL: https://www.worldbank.org/en/publication/gfdr/data/global-financial-development-database (accessed on 21.12.2023).

Note: Private credit by deposit money banks to GDP is taken as a benchmark for financial depth.

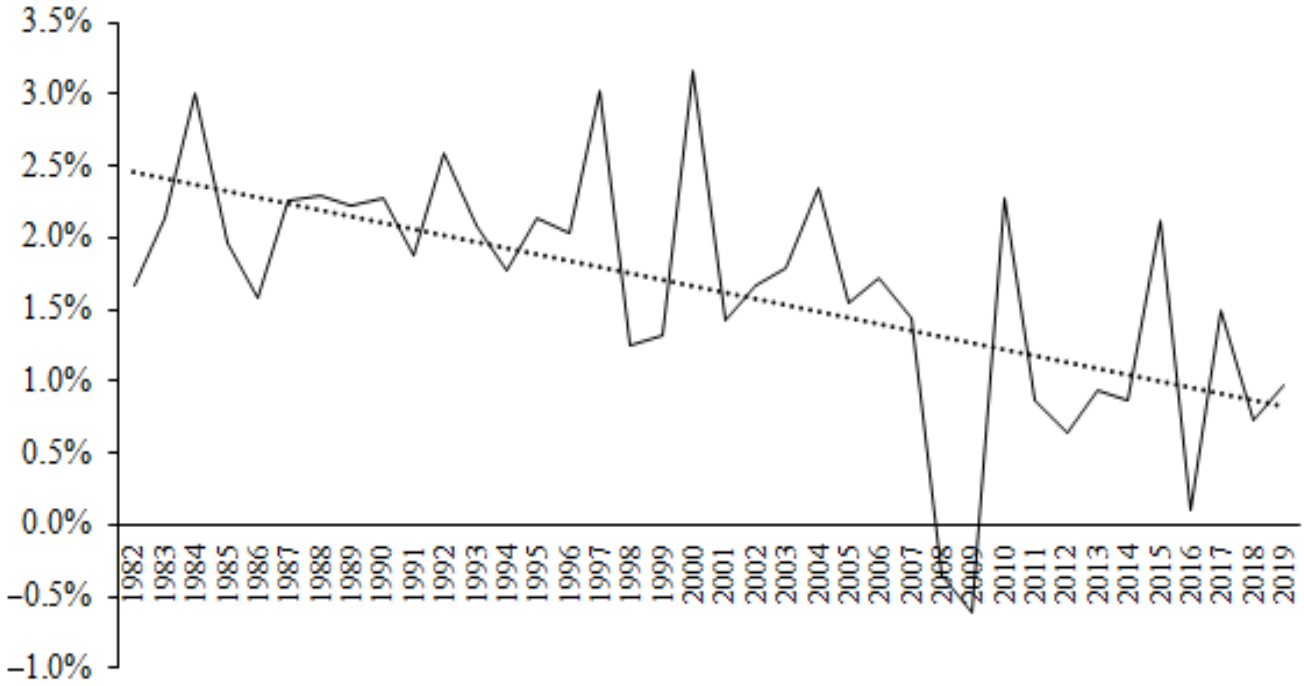


Fig. 4. **Labor Productivity Growth Rate**

Source: Compiled by the authors based on OECD. URL: https://data.oecd.org/lprdty/gdp-per-hour-worked.htm (accessed on 03.02.2024).

Note: The labor productivity indicator is "GDP per hour worked"; calculated for a sample of OECD countries for the period from 1981 to 2019; the dotted line is the trend line.

presence, although this process has not been uniform across countries (*Fig. 3*).

At the same time, the analysis shows that the real sector of the economy did not manage to effectively utilize the opportunities of growing financial depth and progressing inclusivity, considering that this progress did not necessarily lead to an increase in economic productivity, but rather, when evaluating global trends, was accompanied by a diminishing returns effect (*Fig. 4*).

The damage inflicted on the environment, which arose as economies grew, constitutes another aspect of economic development driven by financial acceleration [14]. The awareness of the need to respond to this type of externalities has led to a broad movement for environmentalization, supported by the global community.[9] In this context, the sprouts of ESG segments in the financial market should be seen as a result of rethinking its role as a mechanism supporting economic growth. Essentially, the social demand that has been forming in recent years is prompting the modernization of the economic financing mechanism, the settings of which are being supplemented with components for monitoring environmental, social, and governance aspects of development.

Approaching the problem from the perspective of assessing the adequacy and sufficiency of the tools used to measure financial development and subsequently project its results onto growth aspects, one can note a significant lag of the existing assessment tools behind the current agenda set by ESG. As sources of the relevant metrics and generators of the methodologies used to construct them, in most cases, the IMF and the World Bank are referred to. The IMF accumulates a significant amount of information regarding financial development and provides the opportunity to use it in the form of databases: International Financial Statistics,[10] Financial Development Index Database,[11] and Financial Soundness Indicators.[12] Not long ago, a dataset titled "Climate Change Indicators Dashboard" was added to these databases.[13] In the section Climate Finance, it contains statistics on green bonds (Green Debt) and the carbon footprint of bank loans. (Carbon Footprint of Bank Loans).[14]

The World Bank supports a project called the "Global Financial Development Database" (GFDD).[15] The formation of GFDD was preceded by immense intellectual work, which traces back to the efforts of outstanding representatives of the scientific field of the *finance-growth nexus*. Among them is R. Goldsmith [15] with his discovery of comparative financial morphology, the methodology for calculating the coefficient of financial interconnections in the economy, and innovations in the use of metrics for cross-country studies aimed at explaining the financial component in the economic growth of countries; R. King, R. Levine [16], R. Atje, B. Jovanovic [17], S. Zervos [18], who introduced key indicators designed to track financial development, such as "Liquid liabilities of the financial system to GDP", "Bank credit to the sum of bank credit and central bank domestic assets", "Volume of credit allocated to private companies to GDP", "Market capitalization of the stock market to GDP", "Turnover of the stock market to GDP".

The number of financial development indicators (hereinafter — FDI) rapidly

[9] The most vivid manifestation of this movement is the UN climate conferences.

[10] URL: https://data.imf.org/?sk=4c514d48-b6ba-49ed-8ab9–52b0c1a0179b

[11] URL: https://data.imf.org/?sk=f8032e80-b36c-43b1-ac26–493c5b1cd33b

[12] URL: https://data.imf.org/?sk=51b096fa-2cd2–40c2–8d09–0699cc1764da

[13] URL: https://climatedata.imf.org/pages/climate-finance/#cf2

[14] The carbon footprint of bank loans reflects the banks' exposure to transition risk (the shift to a low-carbon economy), which is comparable between countries. The higher this indicator, the higher the carbon intensity of the banking portfolio of the respective country.

[15] URL: https://www.worldbank.org/en/publication/gfdr/data/global-financial-development-database

Table 1

ESG Indicators Collection Designed for Financial Development Analysis

No.	Systematization criterion	Indicator, calculation method	Sources
–	**Group 1. Секторы SFM**		
1	Release of ESG tools	The volume and dynamics of issuing green, social, and sustainable bonds; the issuance of green, social, and sustainable loans. The share of ESG instruments in the total volume of bonds (loans). The ratio of the volume of outstanding ESG bonds (ESG loans) to GDP	Climate Bond Initiative, Environmental Finance, authors' developments
2	ESG investing	Volumes and dynamics of ESG investing: absolute and relative indicators; total net assets (TNA) of ESG funds. The share of ESG investments in the total volume of net assets of funds. Private TNA of ESG funds to GDP	UNCTAD; Environmental Finance, authors' developments
3	Effectiveness of ESG funds	The return on ESG investments and ESG funds in the form of an annual rate and spread to the benchmark.	Bloomberg, Refinitiv, S&P, MSCI, Morningstar
4	Trading carbon units	Volumes and dynamics of carbon credit trading	European Union Emission Trading System The Chinese national carbon trading scheme, Chicago Mercantile Exchange, European Energy Exchange, other climate exchanges
–	**Group 2. The involvement of economic entities in the sustainable agenda**		
5	Disclosure of information in accordance with TCFD	The number of companies disclosing information according to TCFD recommendations. The share of the capitalization of such companies in the total market capitalization.	Financial Stability Board, authors' developments
6	Commitment to PRI UN	The number of PRI signatories; the amount of assets under their management. The share of assets under the management of PRI signatories from the total assets of financial intermediaries.	United Nations Environment Programme Finance Initiative, UN Global Compact, FSB, authors' developments
7	Commitment to the UN SSE Initiative	The number of subscribers and their share in the financial market (number of listed companies)	Stock and futures exchanges
8	Participation in NGFS	Number of subscribers	Central banks

Source: Compiled by the authors.

Table 2

Modernized Matrix of Financial Development Indicators

Category	Sector			
	Financial institutions		Financial markets	
	GFDD Indicators	ESG Classification Indicators	GFDD Indicators	ESG Classification Indicators
Financial inclusion	AI.01 – AI.36	The share of ESG lending in the total volume of loans	AM.01 – AM.04	The share of ESG fund assets in the total volume of net assets of collective investment institutions
Financial depth	DI.01 – DI.14	ESG lending to GDP, % ESG fund assets to GDP, % Assets under management of PRI signatories to GDP, %	DM.01 – DM.16	The volume of outstanding sustainable bonds to GDP, % The volume of outstanding green bonds to GDP, % The volume of outstanding social bonds to GDP, % The volume of outstanding sustainable ETFs to GDP, % The capitalization of companies listed on exchanges that have joined the SSE to GDP, %
Efficiency	EI.01 – EI.10	The return of ESG funds in the form of an annual rate and distance from the benchmark The volume of carbon unit trading to the volume of CO_2 emissions	EM.01	Publication of ESG reports,% of the number of companies (separately for large companies and those in the SME category) The share of companies disclosing information according to TCFD recommendations among the total number of large companies, %
Financial stability	SI.01 – SI.07	–	SM.01	–
Other	OI.01 – OI.20	The share of PRI signatories among the total number of financial institutions, % Participation in the Network for Greening the Financial System (NGFS) (binary indicator)	OM.01 – OM.02	The market share of sustainable bonds in the total volume of outstanding private sector bonds (by market value) The market share of sustainable bonds in the total volume of outstanding public sector bonds (by market value)

Source: Compiled by the authors.

Note: The indicators in the 3rd and 5th columns are calculated based on individual countries data; the indicators are calculated on a quarterly or annual basis.

increased, prompting attempts to structure them into a unified system. Thus, T. Beck et al. proposed distributing the financial development indicators (FDIs) within a 2 × 3 matrix, in which they were divided into those related to financial institutions or liquid capital markets, and then categorized by depth, efficiency, or accessibility [19, 20]. The extended classification of FDI was presented by M. Chihak et al., who added a fourth category of FDI addressing financial stability [21]. The 4 × 2 classification was used by the World Bank in labeling GFDD indicators. Later, GFDD was expanded to a 5 × 2 dimension with the addition of "other" indicators and currently includes a total of 112 different metrics; however, none of them indicate an attitude towards the climate agenda.

Thus, we find that, since the indicators related to the SFM category appeared only in one of the IMF databases, and the coverage of these indicators is more than limited, work in this direction, considering the significance of the ESG agenda and the relevance of developing research on the role of SFM expansion for the economy, has great prospects.

MODERNIZATION OF THE FINANCIAL DEVELOPMENT INDICATORS SYSTEM

As part of this study, the authors undertook work on monitoring and systematizing approaches to measuring the development of the SFM and the corresponding indicators. For this purpose, reports from international organizations that facilitate the mobilization of global capital to combat climate change (Climate Bonds Initiative), materials from major business information aggregators (Bloomberg, Refinitiv, Morningstar), rating agencies (S&P), specialized exchanges (European Energy Exchange, Global Carbon Credit Exchange, etc.), and media outlets specializing in sustainable investing, green financing, and the activities of companies in environmental markets (Environmental Finance), among others, were analyzed.

Such analysis allows for the extraction of numerous sets of indicators, which are represented by several related classification groups. We use two out of many possible criteria: the classification of indicators (1) into different SFM sectors and (2) into measuring participants' commitment to principles and initiatives that reflect a sustainable agenda. By supplementing the metrics used in the sources with those that would best suit the tasks of cross-country comparisons, we will obtain a catalog of ESG indicators (*Table 1*).

Thus, the authors' position is that the prevailing method of using absolute indicators of the value volumes of SFM or quantitative statistics of participants who have demonstrated commitment to ESG principles should be supplemented by an approach that allows for the assessment of the weight of the SFM segment in the corresponding sector of the financial market (structure indicators), the significance of such a segment in the economy (depth indicators), and the measurement of market participants' engagement in ESG initiatives (inclusivity indicators).

The existing experience in assessing SFM progress is proposed to be supplemented by a methodology for evaluating financial development implemented by the World Bank, with a range of quantitative and qualitative indicators (*Table 2*) that take into account the positions of countries regarding the depth of SFM and the effectiveness of the penetration of the ESG agenda into the sphere of investors, corporations, financial institutions, and regulators.

CONCLUSION

Let's summarize the results of the conducted analysis. ESG tools, products, and mechanisms (green and social bonds, sustainable loans, investment funds, etc.) are gaining an increasing share of the financial market. Work on establishing principles of responsible behavior and standardization allows for a clearer definition of the boundaries of SFM

compared to what it could have been seen as 10 years ago.

The rapid growth of SFM has led to the system of indicators reflecting this process lagging somewhat in its development, complicating analysis at the country level or by country. As shown in the study, documents covering ESG markets rely on a poorly structured system of metrics, largely using absolute quantitative indicators. The authors have conducted a systematization and classification of the existing SFM development indicators, compiling a catalog of indicators based on two groups of classification criteria: (1) SFM sectors and (2) the commitment of participants (companies, regulators) to principles and initiatives reflecting the "sustainable" agenda (PRI, Equator Principles, SSE), participation in intergovernmental coordination bodies (NGFS). This catalog is filled with indicators, the approach to constructing which is based on the principle of structure and significance in the economy, making these indicators more suitable for intra- and inter-country analysis.

Taking into account the need for the unification of the FDI system and relying on their own classification of SFM development indicators, the authors proposed a modernized FDI system in which the 2x5 matrix is transformed into a 4x5 matrix, highlighting separate subgroups within the "financial institutions" and "financial markets" groups, consisting of indicators taken from ESG classifications. This will allow for the inclusion of aspects arising from the progress of SFM in the analysis of financial development, assess the impact of the establishment of SFM on financial depth and accessibility in specific countries, make cross-country comparisons, and build models to evaluate the relationship between SFM dynamics and economic development.

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