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A New Approach to Sustainable Financial Stability and its Prospects

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Abstract

In recent years attention has increasingly been drawn to factors that improve financial stability. The article systematizes the results of empirical scientific works which evaluate the influence of climate-related environmental factors, social factors, and factors related to the mechanisms of corporate governance (ESG) in terms of their contribution to financial stability. High ESG ratings, both within each group of factors and when they are taken as a whole, enhance the stability of the financial system. They do so both when viewed microprudentially, in reducing the aggregate individual risk of financial institutions, and when considered macroprudentially, in reducing their contribution to total systemic risk. However, there is noticeably more published work on the impact of environmental (climatic) factors and the role of corporate governance than on that social factors. At the end of this critical review of the relevant literature, possible directions for the development of this research are discussed.

Keywords: climate risk, systemic risk, financial stability

1 Introduction

In recent years economic research has begun to pay more attention to the role of environmental and social factors, together with various aspects of corporate governance. The significance of these groups of factors, which have been brought together under the abbreviation ESG, has been actively studied in relation to various economic features and processes at the micro-, macro-, and meso-economic levels. As a result, reviews and meta-analyses of the literature have already appeared, revealing the conceptual foundations of ESG factors (see, for example, Daugaard and Ding, 2022), their taxonomy, and approximating indicators (Li et al., 2021 and Widyawati, 2020), the impact on company performance (Huang, 2021), and the pricing and risks of various assets (Campiglio et al., 2022).

ESG factors have also become a focus of attention for regulators, including central banks. This is important for them both in terms of developing optimal reserve allocation strategies (Bouyé et al., 2021) and in fulfilling their monetary policy mandate and ensuring financial stability (Campiglio et al., 2018).

The results of empirical studies from recent years devoted to assessing the impact of ESG factors on financial stability are here systematized, with the emphasis placed on the macro-financial interpretation of this category. This approach thus focuses on works that consider the influence of ESG factors on indicators that characterize the stability of the financial system as a whole, particularly indicators of systemic risk and/or aggregate banking risk for a large sample of financial institutions. Additionally, the relationship of ESG factors to macroprudential policy is discussed. The method applied in the article was a literature review. The literature sources have been found with help of the following search engines: EBSCO, Emerald, Pro Quest, Springer Link, Taylor & Francis.

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2 Environmental factors

Environmental factors are perhaps the most actively researched in terms of their effect on financial stability. Initiatives have been taken to assess the environmental impact of climate-related factors in relation to financial stability, whether these have been global in scope or else taken by large regionally integrated associations, or whether they have been introduced as national measures by the most active financial regulators. Environmental degradation can affect financial strength, giving rise to three types of risk (Battiston et al., 2021): physical (physical risk), transitional (transition risk), and default (liability risk).

For example, the Financial Stability Board has developed a climate change financial risk- assessment "road map" and prepares an annual report on progress in its implementation. We note the relevant activities of the Bank for International Settlements in Basel and the Alliance of Central Banks and the role of the supervisory authorities in the development of the "green" financial system (Network for Greening the Financial System). At the beginning of July 2022, the European Central Bank (ECB) published the results of the first stress test of the banking system focused on climate risks. In addition to the central banks of the Eurosystem, the Bank of England was also involved in this.

Physical risk is identified when there is the destruction of or damage to the material assets of firms under the influence of adverse environmental (climatic) changes to the detriment of their production indicators and solvency. Accordingly, for banks lending to firms or "victims" their credit risk increases. If the banks invest in the securities of such companies, the market risk also increases.

Transition risk leads to changes in asset values that are difficult to predict when moving towards a low-carbon economy. These price shocks affect the loan portfolios of banks, the investment in securities of financial institutions, and the activities of asset management companies. For example, according to the Bank of England, if all countries strictly followed the provisions of the 2015 Paris climate agreement, then about two-thirds of the world's proven fuel reserves would remain unused. This would drastically reduce the profitability of the investments of financial institutions in the fuel and energy sector. For further information see the relevant items posted at https://www.bankofengland.co.uk, including a speech by Elisabeth Stheeman "Why macroprudential policy needs to tackle financial stability risks from climate change?"

Liability risk arises when individuals and companies seek compensation for damage caused by the implementation of physical or transition risk. The most significant effect of this is felt by insurance and reinsurance companies. Unlike traditional financial risks, the types of climate risk listed are much more difficult to quantify correctly. Owing to the peculiarities of the mechanism of their distribution among economic agents, which allow a "domino effect" to occur, climatic risks resemble systemic risk within the financial system. Obviously, the possibility of the systemic financial and climate risks having a combined effect cannot be excluded.

This has two important implications in terms of identifying optimal approaches to the quantitative assessment of climate risks. Firstly, the prospects for their quantification by means of dynamic stochastic general equilibrium models (DSGE) look dubious. In spite of some progress since the global financial crisis of 2007-2009, these models still fail to provide a good description of financial instability, whether with regard to general risk or with systemic risk in particular. For this reason, it is more promising to use agent-based models. At present it is this class of model that dominates research aimed at the joint study of climate change, the dynamics of credit activity and macro-economic indicators (Battiston et al., 2021; Lamperti et al., 2021).

DSGE models are based on optimization rules used by the representative agents with rational expectations that operate under conditions of complete information. Although in recent years extended DSGE models have appeared that take into account a heterogeneity of agents, the possibility of financial instability and asymmetric information, they still do not take into account the interaction of different groups of agents. In addition, they mainly consider external factors, such as the causes of crises rather than endogenous shocks. Unlike DSGE, agent-based models make it possible to take into account the dynamic relationships of different agents, including those with limited rationality. This class of model also allows for the possibility of agent training time. Thus, at this stage, agent-based models are more suitable for the study of the dynamic relationships of heterogeneous agents with each other and with the environment.

Secondly, the possible imposition of climate risks on the financial system adds urgency to the need to develop special indicators to account for a negative multiplier effect of this kind. As far as I can ascertain, only one such indicator has been proposed: the conditional lack of capital of financial institutions, adjusted for the environmental factor, namely green factor augmented SRISK, developed by Christian Brownlees and Robert Engle, (2017). This demonstrates that the gap between the book value of financial assets institutions and their market capitalization was, under the conditions of an extreme fall in the global stock market, supplemented by a consolidated rating by a group of environmental factors from the Refinitiv, formerly Thompson Reuters, database. This ESG rating database is the most popular in empirical studies, although it is not the only source; alternative ESG rating providers include MSCI and Sustainanalytics (see Dziwok et al., 2022).

Environment-adjusted conditional capital shortfall was calculated for 19 systemically important financial institutions from 12 countries for 2006-2021, including Russia's Sberbank. It was found that the impact of the environmental factor on the systemic risk of financial institutions increased significantly during periods of instability, namely the global financial crisis, the European debt crisis, and the COVID-19 pandemic. In general, financial institutions representing Western European countries were characterized by a lower level of the conditional capital shortfall, adjusted for an environmental factor, when compared to their counterparts in the countries of Central and Eastern Europe (CEE). At the same time, the most unfavorable situation was typical for the financial institutions of Romania, Russia, and Poland (NBP, 2020).

Since environmental (climatic) risks can significantly affect financial stability, their specifics should be taken into account in macroprudential policy measures. As demonstrated by the experience of the initial phase of the COVID-19 pandemic, which gave rise to risks that had common features with the physical and transitional ones discussed above, macroprudential instruments are poorly adapted to leveling threats to financial stability that originate outside the financial system (Le Quang, Scialom, 2021). Moreover, they do not properly attract green investments and thus close the “green finance gap” (D’Orazio, Popoyan, 2019).

Against this background, it has been proposed that macroprudential instruments should be introduced that combine incentives to increase the capacity of green finance markets and to ensure financial stability. In particular, in a work by Lamperti et al., (2021), three options for such tools are considered: 1) a "green" capital adequacy ratio, in the calculation of which zero-risk weights are set for loans issued for the implementation of "green" projects; 2) governmental loan guarantees for financing "green" projects; 3) the implementation of an indicator, taking into account the carbon footprint (carbon risk adjustment), which will allow a comprehensive assessment of the credit risk of borrowers, both from the standpoint of traditional creditworthiness and taking into account the environmental component. Using an agent-based model, Lamperti and his colleagues found that a green capital adequacy ratio promotes economic growth without causing negative consequences for financial stability, and credit guarantees and carbon footprint accounting do not rule out credit overheating developing into a banking crisis. The best solution seems to be to use all three macroprudential instruments simultaneously, which accelerates economic growth, reduces environmental damage and strengthens financial stability.

The practical application of macroprudential measures with a "green" component is still limited. Emerging market economies in South and South-east Asia, including China, India, Pakistan, Bangladesh, Vietnam, and Indonesia, have been the most active in implementing such measures (D’Orazio and Popoyan, 2019). This is due, firstly, to the fact that the countries located in these regions are subject to the most extreme effects of climate change. Secondly, the mandate of their central banks is traditionally broader than that in developed countries, which brings their functionality closer to developing banks.

The issue of the expediency of vesting the central bank with the authority to counteract environmental (climatic) risks remains debatable. Such an approach risks overstretching this mandate so that a gap emerges between the number of goals that the regulator must achieve and the range of instruments available. It is estimated that 48% of central banks in the world have neither directly nor indirectly included the fight against environmental (climate) risks in their mandate (Dikau and Volz, 2021). The objections of opponents of the expansion of the mandate of the central bank in terms of counteracting environmental (climatic) risks are based on the rule of Jan Tinbergen, according to which the number of policy instruments available should match the number of objectives. Probably, at this stage, sustainable development goals in the mandate of the central bank can serve the same purpose as financial stability goals in that they can be implicit. The main goal is still to maintain a stable price level, while the central bank takes other goals into account and takes the final decision, keeping a balance between them.

The Bank of Russia, for example, does not explicitly do this either but strives to fulfill the ESG agenda. Thus, according to its 2021 annual report, the regulator participated in the preparation of a taxonomy of sustainable development projects, revised the issuance standards for green and social bonds, and began developing new sustainable development instruments (adaptation bonds, bonds linked to sustainable development goals and climate transition bonds). On the basis of the results of a survey of financial institutions conducted by the Bank of Russia, it was concluded that companies in the financial sector do not adequately take climate risks into account. With respect to this, recommendations on improving the quality of information disclosure in the field of sustainable development were published on the website of the Bank of Russia, as well as the results of the stress test for the largest exporters and financial companies. Further actions of the Bank of Russia to implement the ESG agenda depend on the time horizon that is taken into consideration.

In the short term, it is planned to focus on the formation of a market for financing instruments for sustainable development projects and the introduction of ESG into corporate control. In the medium term, the introduction of ESG issues into prudential regulation is being considered, in which case it is necessary to promote the formation of a system for carbon regulation for exchange trading in carbon units.

3 Social factors

The social component of the ESG agenda is the most difficult to quantify objectively and comprehensively. It includes such aspects as equality in the workforce, gender equality, the protection of human rights, the safety of products and consumer services and the training of company personnel, all of which can only be assessed by experts or on the basis of sociological surveys. Due to the specific nature of the data used, there are relatively few studies that explicitly assess the impact of the social component of the ESG agenda on financial stability.

Gehrig et al. (2021) studied the impact of the social component of the ESG agenda on the systemic risk of banks, approximated by conditional capital shortage (SRISK) and conditional value at risk (CoVaR). The notional value at risk implies an assessment for the financial system as a whole when individual institutions are under financial stress (see Adrian and Brunnermeier, 2016). Their analysis was performed on a sample of 260 banks from the US and the EU. The conclusion reached was that an increase in a bank's rating in terms of the social ESG component led to a decrease in both systemic risk metrics. In the context of the components of the social ESG component, long-term aspects of business responsibility make the greatest contribution to reducing systemic risk - indicators that characterize staff training and the quality of services provided.

To a great extent the social components of the ESG agenda correlate with the values cultivated in financial institutions and with their organizational culture. In a study of 150 UK banks by Suss et al., (2021), it was found that a high level of organizational culture has a positive effect on the capital adequacy ratio and aggregate risk of the bank (Z-score). They considered indirect indicators of the level of organizational culture to include such factors as the number and content of consumer complaints about the quality of service and the number of internal fraudulent actions of bank employees.

A study by Bui et al. (2020) assessed the impact of collective bargaining agreements in 314 of the world's largest banks on their performance and risk during the global financial crisis. In terms of risk indicators, it was found that the conclusion of a collective agreement leads to a decrease in the probability of bank default and the risk of extreme losses from investments in its shares. Thus the presence of a staff union limits the undertaking of acceptance of excess risk by the bank's management.

The favorable influence of corporate social responsibility (CSR) on the stability of the American banking system during the implementation of the Troubled Asset Relief Program (TARP) in 2008-2014 is noted by Cooper et al. (2019). Research by Djalilov and Hartwell (2021) describes a study made of commercial banks from CEE and CIS countries in 2002-2014 which found that high CSR ratings contribute to the sustainability of credit, although the effect is significant only in a comprehensive approach and the contribution is lost if banks are selective in following the CSR components. The positive impact of CSR on banking stability (through the reduction of credit risk and liquidity risk) was also confirmed in an international study conducted by Li and her colleagues (2022).

4 Corporate governance and financial stability

Increased attention has also been paid to the role, size, and characteristics of boards of directors, and the supervision and mechanisms involved in maintaining proportionality in the remuneration of senior bank managers. This set of issues was previously studied mainly in the context of the impact on the efficiency of banks and non-banking financial intermediaries. However, in recent years the emphasis has shifted toward financial stability.

An unexpected result was obtained: high standards of corporate governance and a pronounced focus on protecting the rights of shareholders led to an increase in systemic risk (see Iqbal et al., 2015). In this study, the sizes of marginal expected shortfalls (MES) and conditional capital shortage (SRISK) were considered on the basis of a sample of 71 large US banks taken between 2005 and 2010 as measures of systemic risk. This reflects the loss of the company's capitalization during the implementation of a stress scenario in the market as a whole (see Acharya et al., 2017). A similar conclusion was reached by Andries and Nistor (2016), who studied the influence of the quality of corporate governance of 27 CEE banks on CoVaR dynamics between 2005 and 2014. The similar results can be explained by the fact that high corporate governance standards, which imply that the maximum focus of the bank managers was on meeting the interests of shareholders, force them to take an excessive level of risk in the expectation of obtaining higher profits, encouraging them to pay big dividends.

However, recent research by Gaganis and his colleagues (2020), performed on a sample of 356 banks in 50 countries between 2002 and 2017, hypothesized that an increase in risk with high corporate governance standards is possible in the absence of, or with very weak, macroprudential banking regulation. In contrast, when macroprudential policies, especially those directed at financial institutions themselves rather than borrowers, are adequate, this effect is not observed. We may then bear in mind that the authors of the work referred to use indicators of aggregate banking risk, the Z-score, the probability of default and the distance to it, and not systemic risk as a dependent variable. In an article by Anginer and his colleagues (2018), it is noted that a positive relationship between the quality of corporate management and systemic risk is observed in the case of larger banks,

as well as in countries where it is more likely that banks will be bailed out by taxpayers rather than by their beneficiaries. This study was based on US and international bank data for the period 1990-2014.

In a study by Addo and his colleagues (2021) a new approach is proposed for studying the impact of the quality of corporate governance on financial stability. The authors emphasize that systemic risk may be increased if internal and external corporate governance procedures are complementary. An example of such a "negative" complementarity can be a large board of directors (internal procedure) combined with dispersed shareholders (external). The impact of corporate governance quality on systemic risk can therefore be managed by treating internal and external procedures as substitutes. In their analysis, the authors cover the largest banks in the EU countries for the period from 2000 to 2016, using MES, SRISK, and absorption rate (AR) as indicators of systemic risk. The latter shows what proportion of the variance in the returns of the shares of these banks is explained by one (or several) of its main components. It is believed that the larger the AR, the higher the level of systemic risk (see Kritzman et al., 2011).

The remuneration of senior bank managers can also affect the level of systemic risk. In a study by Iqbal and Vähämaa (2019) it is noted that such a relationship is unstable over time. At the same time, the closer the relationship between the remuneration (through the option scheme) and the volatility in terms of return on the shares of the corresponding bank, the greater its systemic risk. In this paper, as in an article by Iqbal and colleagues in 2015, a sample of 71 large US banks was analyzed in the period 2005-2010, and MES and SRISK were used as indicators of systemic risk. The results obtained by Armstrong and his colleagues (2021) broadly support the finding that a higher sensitivity regarding the remuneration of the senior manager leads to increased systemic risk to the bank where a stock return option scheme operates and returns are volatile. At the same time, their analysis of a wide sample of American banks for the years 1995 to 2016 and the MES and CoVar indicators of systemic risk enables this effect to be clarified when observed in the conditions of an economic downturn, although its significance decreases on the upward wave of the business cycle. The study identified the channels leading to the negative effect of the option remuneration scheme on financial stability: the procyclicality of bank investments in the stock market, the attraction of more short-term resources and the maintenance of relatively low values of the capital adequacy ratio in the first tier. Another study based on data from American banks showed that bonus payments, along with an option scheme for the remuneration of top bank managers, also increase systemic risk (Zelenyuk, Faff, 2022).

The empirical results obtained confirm the feasibility of the measures to reform the remuneration of top managers of financial institutions that were adopted in many countries in the wake of the global financial crisis and aimed at linking rewards with the achievement of long-term rather than short-term financial goals. Research has indicated the effectiveness of such reforms, at least in the world's leading financial centers. Thus in the work of Kleymenova and Tuna (2021), using data from British banks, it is noted that a change in approach to the remuneration of top managers reduced the systemic risk of those banks, but significantly increased staff turnover among top managers in the post-crisis period. In an article by DeYoung and Huang (2021) reform in managerial remuneration shows an even greater external sensitivity in the US data reported from the years 1994-2016. Along with a decrease in systemic risk, the volume of liquidity created by banks has decreased. A bank's propensity to create liquidity through the attraction of short-term deposits and their transformation into long-term loans in fact decreases along with an increase in the sensitivity of remuneration of top managers in response to the volatility of the bank's shares.

5 ESG factors as an integral element of financial stability

In addition to works that study the influence of individual groups of ESG factors on financial stability, there are studies that evaluate their cumulative effect. Since higher ratings within factor groups tend to be associated with greater financial stability, pooled studies predictably report a similar effect. Nevertheless, there is no consensus among researchers about which group of factors makes the most significant contribution to this integral effect.

On the basis of a sample of 43 banks representing ten EU countries between 2002 and 2016 (Scholtens, van't Klooster, 2019), it was found that the consolidated ESG rating reduces both the bank's aggregated individual risk (Z-score) and its systemic risk (SRISK). At the same time, the statistical significance of such a result is, as the authors show, ensured by a cluster of social factors, while the influence of environmental (climatic) factors is significant only at the level of 10% and factors related to corporate governance have no significance at all. On the contrary, in the recent work of Aevoae and his colleagues (2022), covering 367 banks from 47 countries for the years 2007-2020, it is noted that the generalized effect of ESG factors is induced by corporate governance quality factors. The authors used CoVaR as a systemic risk metric. In the research carried out by Chiaramonte and others (2021) a generalized positive effect of ESG factors on financial stability was revealed and it was noted that all three groups felt this effect. However, it was the social factor grouping that made the greatest contribution. The

results obtained by Chiaramonte et al. (2021) diverge from the findings of Scholtens and van't Klooster and Aevoae and colleagues but cannot be directly compared, since the authors of the former work focused on the aggregated individual risk of banks (distance to default and Z-score), without considering systemic risk metrics.

Since financial shocks may be associated with non-banking financial institutions as well as with banks themselves, a work of interest is that by Cerqueti and his colleagues (2021), which analyzes the impact of the integral ESG rating on the stability of mutual funds during periods of low and high volatility in the securities market. It is shown here that the losses of the funds included in the top quintile according to the ESG rating are significantly lower than those of the 20% of outsiders included in this indicator. However, it has to be made clear that this result is stable only under low volatility conditions. During periods of market stress, this is not, according to the authors, always demonstrable.

Eratalay and Angel (2022) analyze the impact of the generalized ESG rating for 350 blue-chip stocks included in the S&P Europe index on systemic risk. To approximate to this, they built an index similar to the absorption rate indicator mentioned above. The analysis of companies in various sectors for the period 2016-2020 showed that higher ESG ratings led to lower systemic risk. When the integral rating was disaggregated into groups, it was found that social factors and a group of corporate governance quality factors made the greatest contribution to this decline. The positive impact of the integrated ESG rating on financial stability was confirmed in the recently published work of Bax and her fellow researchers (2022), which used data from almost 300 European and American companies and applied CoVaR variation as an indicator of systemic risk.

6 Conclusions

On the basis of a review of the empirical literature, it can be concluded that strengthening the positions of banks and non-banking financial institutions with respect to the ESG ratings corresponds to an increase in their stability through a decrease in aggregated individual risk. Accordingly, investments in ESG projects would seem to be justified. This is consistent with the "stakeholder theory", which postulates a positive relationship between the successful development of companies and their investments in terms of ESG. In addition, a higher position in the ESG ratings generates a positive externality, reducing the contribution of banks and non-banking financial institutions to aggregate systemic risk. Thus in the microprudential and macroprudential aspects, there is a positive influence on financial stability. There are, however, limitations and certain questions remain unanswered.

Firstly, ESG ratings can vary significantly for the same company across different data providers (Berg et al., 2022). Moreover, the data providers may revise their data within five years of publication (Sahin et al., 2022). Studies of the relationship between these ratings and financial stability for different samples and time periods should therefore continue. Nevertheless, there are ample grounds for asserting the favorable positive impact of higher ESG ratings on financial stability.

Secondly, it is necessary to take into account the possibility of cascading instability among financial institutions caused by the risk of a dramatic downgrade of these ratings by one or more market participants. The answer to this question requires network analysis. However, as far as can be known, such work has yet to be published, although the spread of environmental (climatic) risks has been modeled. On the basis of the network approach and the assessment of special metrics of influence within networks (as measures of centrality), it is advisable to rank global financial institutions according to the criterion of vulnerability to ESG risks and the ability to infect other market participants with them.

Thirdly, it is necessary to study in more detail the opportunities for the practical implementation of macroprudential instruments that take into account the influence of ESG factors. To date, a few studies have provided conceptual justification for this, but this has generally not been calibrated using real data. In general, given the global convergence of regulatory norms, at the conceptual level, the implementation of "green" macroprudential regulation can take place taking into account the initiatives proposed by the world community such as the European Commission's High-Level Expert Group on sustainable finance. In particular, all three pillars of the Basel Accords await revision, taking into account the ESG agenda. The revision of the first pillar may affect not only the capital adequacy ratio, but also other indicators, especially liquidity requirements, which guide banks to shorter-term assets and longer-term sources of funding, reducing their incentives for long-term green lending. Changing the second pillar involves strengthening the supervision of financial markets, taking into account the ESG agenda. An official taxonomy is also needed by which projects and tools can be labeled as "green." Finally, changes need to be made to the third pillar, regarding information disclosure, in terms of the publication of ESG reports by companies.

In order to mitigate the pain of changes in regulation for financial institutions, it is necessary to ensure their implementation in stages, in a manner analogous to that in which all the Basel Accords were applied. By the time the new regulations are introduced banks should be familiar with new climate risk hedging opportunities and new sustainable financial instruments (Nyka M., 2020). There is also a need to encourage more active co-operation

between banks and insurance companies. A further option that may be considered is that of a countercyclical capital buffer, as proposed in the work of D'Orazio and Popoyan (2019). Their idea is to create a certain reserve for banks during intensive lending to high-carbon industries, which they can use during the transition period during which lending to such industries will be reduced.

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