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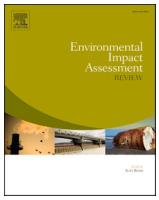

Measuring banks' sustainability performances: The BESGI score

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ABSTRACT

Internal and external pressures push the financial system towards an increasingly socially and environmentally responsible orientation. How to measure the overall ESG performance of a bank, considering both direct and indirect impacts? This study proposes a new indicator, the BESGI score (Banks' Environmental, Social, Governance and Indirect Impacts). Compared to other more traditional ESG scores, the model a) is bank-specific, b) is based on public data and then highly replicable, c) it can assess the level of a bank's sustainability both in its internal processes and procedures and in its choices about financing and investing activities, and d) is based on an innovative aggregation methodology, the Multidimensional Synthesis of Indicators, to consider the synergies among dimensions and penalize heterogeneity in the multidimensional bank results. We offer both a theoretical and an empirical contribution. First, the novel scoring model is presented, with indicators validated by practitioners and a theoretical framework rooted in organisational facades and legitimacy, signalling, and institutional theories. Secondly, we apply the BESGI scoring model to significant European banks and analyse its main determinants. Our results show relevant opportunities for banks to improve towards an overall and multi-comprehensive sustainability, especially concerning social measures and a higher focus on indirect impacts.

1. Introduction

Financial institutions are increasingly expected to orient their behaviours and managerial choices according to a sustainable approach towards stakeholders (Scholtens, 2009; Wendt, 2015; Zainuldin and Lui, 2022). Given the evolving preferences of customers and investors, as well as regulatory pressures, banks are encouraged to communicate how they are addressing their environmental, social and corporate governance (ESG) responsibilities, both in their internal processes and in their credit and investing portfolios (Bouma et al., 2017; Peillex and Ureche-Rangau, 2016).

In analysing the information made public by banks, attention should be paid to two distinct but equally dangerous phenomena: ESG-washing and ESG-bleaching. The first well-known phenomenon can be defined for the financial sector as the practice of misleading stakeholders, particularly (but not only) to gain an unfair competitive advantage, through misleading claims about the ESG characteristics of a financial product/service or a financial institution (Ghio et al., 2022; Macellari et al., 2021; Wu and Shen, 2013). On the other hand, the more recent phenomenon of ESG-bleaching occurs when financial intermediaries prefer not to define a financial product/service or institution as sustainable or ethical, in order to reduce reporting requirements and avoid associated legal risks. Regulatory uncertainties and compliance costs may paradoxically lead to less transparency and clarity in terms of ESG issues by minimising the sustainability features of a product/service/institution (Securities and Markets Stakeholders Group, 2023). Given such a context, it is increasingly relevant to evaluate holistically the ESG performances of a financial institution by penalising the heterogeneity in the results achieved in the different dimensions, which may hide the aforementioned phenomena.

It is essential that the measurement models take into account both direct and impacts produced by financial institutions, as well as the consistency between the various results achieved by the bank in the different investigated areas. This enables a distinction between an authentic, transparent and holistic approach to ESG responsibility and pure communication strategies or regulatory compliance goals (Cho et al., 2015; Jeucken, 2011; Meng-tao et al., 2023).

Against this background, this study aims to develop a new measure of the overall ESG performance of a bank, that meets the aforementioned criteria. It develops and discusses a multidimensional indicator, the

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BESGI score (Banks' Environmental, Social, Governance and Indirect Impacts score), aimed at verifying the commitment and ability of each bank to maintain high standards in a full spectrum of ESG dimensions, evaluating both the direct and indirect impacts produced. The indicator is aggregated using the 'Multidimensional Synthesis of Indicators' method (Biggeri et al., 2019; Mauro et al., 2018), which effectively combines scores relating to areas that are not reciprocally replaceable by considering the level of performance heterogeneity.

This paper intends first and foremost to propose a new theoretical model for assessing the effective and overall level of sustainability performance of financial institutions. Building off this, it contributes both theoretical and methodological, as this work also presents some first empirical results from the application of the model. The BESGI score is calculated for a wide sample of European banks, all of which are significant entities directly supervised by the European Central Bank. The measurement of direct and indirect ESG impacts is based on the information available in the public documentation, and data retrieved from Datastream and the Bloomberg Professional Service database. Such empirical data presents relevant theoretical and managerial implications that can be used directly by scholars, researchers, bank managers and supervisory authorities. Furthermore, the study proposes an analysis of the determinants of the indicator in order to carry out an initial empirical exploration of the factors, both bank-related and country-related, which can most influence banks' behaviour regarding sustainability performances.

This article is structured as follows. The next section reviews literature assessing how banks are increasingly committed to (and the disclosure of) responsible and sustainable behaviours and discusses our theoretical framework based on legitimacy, signalling, and institutional theories. Section 3 presents the regulatory framework concerning disclosure obligations for banks on sustainability matters. Section 4 discusses the most used ESG scores in the literature and identifies the contribution of the new tool presented in the study. Section 5 introduces the methodology and indicators behind the calculation of the BESGI score and its determinants, while Section 6 presents the results and scores associated with our sample of European banks. Section 7 provides some additional analyses on correlates and discusses our findings in light of the theoretical framework. Finally, the conclusive section summarises our main contributions to the literature and provides suggestions for further research.

2. Theoretical framework

The accounting and management literatures have investigated the main factors that explain why companies are interested in measuring their sustainability performances and demonstrating related good results. In particular, legitimacy, signalling, and institutional theories are explored in this section, focusing on their use in studies focused on the banking industry. Indeed, similarly to companies operating in other sectors, financial institutions are encouraged to include ESG issues in their decision-making processes. Nevertheless, differently from other industries, ESG practices have a higher role for banks, affecting both the asset and liability sides of their balance sheets and producing both direct and indirect impacts (La Torre et al., 2021).

Legitimacy theory can illustrate how companies strategically influence stakeholders' perceptions about their performances (Bowen, 2019; Gómez-Carrasco et al., 2021; Patten and Guidry, 2010; Thorne et al., 2014). Legitimacy is the circumstance in which an entity's value system is considered compatible with that of society. Proponents of the legitimacy theory emphasise that any discrepancy between community values and an organisation's impacts can be dangerous for that organisation (Deegan, 2002; Patten, 1992). Companies can disclose ESG information to decrease their external costs or the pressures exerted by stakeholders or by regulators (Adams, 2002; Ballou et al., 2006; Caron and Turcotte, 2009). In this sense, legitimacy theory explains the voluntary disclosure of certain ESG information even in the absence of particularly positive overall sustainability performances (Bai and Yao, 2023; Bellucci et al., 2021; Zhang et al., 2020). Buhr (1998) presents two dimensions at play in an organisation's efforts to attain legitimacy: action (whether the organisation's activities are congruent with social values) and presentation (whether the activities appear to be congruent with social values) (Chen and Roberts, 2010). In other words, organisations build facades to influence stakeholders' assessment of their social and institutional practices to improve perceptions related to their activities (She and Michelon, 2019). These facades are symbolic appearances used to manage organisational legitimacy (Abrahamson and Baumard, 2008; Cho et al., 2015). More specifically, a 'progressive facade' aims to show the organisation's progress towards strategic goals, while a 'reputational facade' illustrates the organisation's positive image to stakeholders (Abrahamson and Baumard, 2008).

Thus, organisations can distort their image to increase their reputation and degree of social legitimacy. This behaviour can have extreme consequences, such as manipulating the corporate image by resorting to ESG-washing policies (Clarkson et al., 2011). Indeed, artificially manipulating the appearance of an organisation is easier than actually improving one's sustainability performance or value system (Dowling and Pfeffer, 1975; Macellari et al., 2021). This distortion in behaviour is particularly accentuated in companies with significant negative direct and indirect impacts, in which authentic social legitimacy would entail a radical change in their management practices.

In the financial industry, there is a growing effort by banks to obtain legitimacy in the field of sustainability. In the recent past, ethical and value-based banks have grown, increasingly structured within international networks, while a more responsible orientation has gradually developed among the so-called 'mainstream' financial intermediaries, which differ from those traditionally inspired by the principle of mutuality and lack of private speculation (Hangl, 2014; Heiko Spitzeck et al., 2012; Mews and Abraham, 2007; Puaschunder, 2019; San-Jose et al., 2011). The increasing integration of sustainability issues into the operational approach of traditional commercial banks is determined by different drivers (Benedikter, 2011; Cowton, 2002; La Torre et al., 2021; Lehner, 2016; Scholtens, 2009; Viganò and Nicolai, 2009; Weber and Remer, 2011). The increasing implementation of sustainable practices is first conditioned by the pressures of internal stakeholders. Among the internal drivers, it is possible to include the growing awareness by shareholders and managers of the strategic importance of legitimacy about sustainability (La Torre and Vento, 2008; Ramakrishnan et al., 2022;). On the contrary, unresponsive conduct or inactivity in the ESG field can produce a loss of market share and an increase in business risks, including reputational, and strategic risks (Dell'Atti and Trotta, 2016; Fiordelisi et al., 2013). The management of these risks becomes one of the main drivers of value creation for banks (Harjoto et al., 2021). The issue of reputation management is not just about what a bank does but rather how it does it and communicates it. Conduct and citizenships, including appearing environmentally conscious, showing the application of ethical governance principles, and the support for social causes are core drivers in building and preserving reputation (Reptrak, 2022). Given the critical role of Corporate Social Responsibility (CSR) in protecting a company's reputation, ESG factors are assuming an increasing relevance in the management of banks' reputational risk (UNEP Finance Initiative, 2016; Zurich Sustainability Forum, 2005).

However, legitimacy theory might not fully account for the possibility of banks engaging in ESG-washing or symbolic conformity. Banks may adopt superficial ESG practices or make misleading claims about their performance to appear legitimate without genuinely addressing the underlying issues. ESG-washing practices have increased the disappointment of investors, leading to a growth in the importance of reliable sustainability performance measurement tools, which are able to highlight inconsistent behaviours by banks (de Freitas Netto et al., 2020; Laufer, 2003; Pope and Wæraas, 2016).

Still following a goal of legitimacy, signalling theory scholars argue that organisations voluntarily disclose ESG information to emphasise

their commitment to sustainable practices (Bhattacharya et al., 2020; Clarkson et al., 2011). According to this perspective, organisations with good or excellent sustainability performances tend more easily than others to disclose these results to counter processes of 'adverse selection' (Clarkson et al., 2011). Signalling theory is suitable for discussing the behaviour of interacting parties under conditions of uncertainty and information asymmetry (Connelly et al., 2011). Where there is a lack of information, stakeholders cannot efficiently evaluate a firm's behaviours (Raithel and Schwaiger, 2015). By disclosing ESG information, managers can send signals that 'alter the beliefs of, or convey information to, other individuals in the market' (Spence, 1973), thus reducing information asymmetries. This information should enable stakeholders to holistically evaluate the firm and make decisions regarding their relationship with the firm based on their ESG preferences. According to this theoretical perspective, high levels of sustainability performances are associated with greater disclosure of ESG impacts (Clarkson et al., 2011). In particular, within the banking sector, better disclosure about corporate governance is useful to reduce conflicts of interest between shareholders and managers, reducing the agency problem (El Khoury et al., 2021).

Besides this, a bank's sustainability has an important commercial dimension (The Vienna Group, 2015). Prior research demonstrates that investors and analysts price ESG information disclosed by banks in their investment decisions and recommendations (Albarrak et al., 2018; Chen et al., 2009; El Ghoul et al., 2011, 2018; Griffin et al., 2017; Rjiba et al., 2021; Yu et al., 2022). The growing sensitivity towards ESG issues has led to a strong increase in savers and investors who are attentive to their bank's behaviour in terms of sustainability and interested in purchasing responsible financial products and services (Bellucci et al., 2012; Miralles-Quirós et al., 2019). A high ESG performance for banks can lead to increased access to capital, also thanks to the inclusion in ESG indices or sustainable investment funds (Buallay, 2019; Eccles et al., 2014; Wendt, 2015). Increased access to detailed information on the environmental and social performance of companies can help to reduce the risk premium associated with information asymmetry on issues considered to be particularly complex to assess by investors and creditors (García-Sánchez et al., 2019; Hamrouni et al., 2019; Matsumura et al., 2014; Schiemann and Sakhel, 2019; Velte et al., 2020). ESG scores are regarded as the primary financial tools used for building green portfolios and evaluating companies' ESG performances, particularly in the field of responsible investment (Friede et al., 2015).

However, by concentrating on external stakeholders' expectations, signalling theory might overlook the role of internal factors, such as organisational culture, values, and leadership, that could influence banks' ESG performance. The analysis of these aspects could otherwise be useful for distinguishing banks that perform well only on some aspects of sustainability, such as offering customers responsible and sustainable products, compared to those which anchor the non-financial goals banks into governance, organisation, control systems, reporting practices, and intentional leadership, by reinventing practices across all levels of the business (Biggeri et al., 2024).

A further external driver which encourages more responsible and sustainable behaviours is represented by the regulatory evolution in the field. With respect to this factor, institutional theory is often used to interpret how social contexts can influence the decision to disclose ESG information (Ball and Craig, 2010; Larrinaga-Gonzàlez, 2007; Milne and Patten, 2002). According to institutional and neoinstitutional theories, the decision to initiate a sustainability reporting process depends on several organisational dynamics and on a variety of regulative, normative and cognitive drivers that are strictly connected to the local context within which the organisation is rooted (Gray et al., 1995). Leong and Hazelton (2019) highlighted how decisions by organisations are not taken in a vacuum: decisions are influenced by a mix of pressures from stakeholders, including institutions and regulators. Institutional theory focuses on three drivers – normative, mimetic and coercive (DiMaggio and Powell, 1983) – that generate isomorphism in organisational processes. Normative drivers ensure that the organisation conforms to regulative norms, thus allowing it to be perceived as taking part in compliant actions (Sarkis et al., 2010). Mimetic drivers, by contrast, appear when companies imitate the actions of successful competitors in the industry in an attempt to replicate the path to success (Aerts et al., 2006). Bartolacci et al. (2022), for example, reported that organisations operating in the same institutional context are forced to make very similar decisions and demonstrate their legitimacy within their contextual environment. Lastly, coercive drivers come about due to pressures exerted by actors in powerful positions and are crucial in shaping transparency and ESG disclosure (Kilbourne et al., 2002). Normative and mimetic drivers are particularly relevant for the banking industry, one of the most regulated economic sectors due to its role in institutional investing, capital allocation, risk management, and payment systems. Banks generate, manage, and distribute information and prices. As a consequence, an improved orientation to ESG practices, from the point of view of regulators, can be an important lever to support a more rapid transition towards a low-impact economy, in line with the Sustainable Development Goals (SDGs) defined by the United Nations (Macellari et al., 2021). The regulatory evolution was also conditioned by the effects of the international financial crisis which started in 2008. Indeed, the widespread moral and social irresponsibility on the part of financial intermediaries, often associated with a very limited level of transparency and excessive sophistication of financial products, has profoundly altered the relationship between finance, the real economy and the public (Carnevale and Mazzuca, 2014; Lehner, 2016). Improved sustainability in the banking industry is capable not only of producing positive impacts for the environment and society, but also to generate direct beneficial effects for the financial system itself by increasing its stability (Saiu et al., 2022).

The high level of regulation on sustainable finance, discussed in the following section, has certainly improved the disclosure processes on sustainability matters (La Torre et al., 2021). However, the emphasis on isomorphism could have led to the homogenisation of ESG practices, stifling innovation and preventing banks from adopting effective, tailored, context-specific solutions.

In light of the theoretical framework discussed above, it is important to develop tools which are able to measure the capacity of banks to truly reassure internal and external stakeholders of their ESG performance and their ability to intercept the evolving social and environmental preferences of the community (legitimacy theory), their attitude to be transparent about good practices and above-average ESG performance without ESG-washing activities (signalling theory), and their ability to comply with the evolution of national and international regulatory norms on sustainable disclosure (institutional theory). Moreover, these theories will be used for the interpretation of the empirical results of this study.

3. Legal framework

Financial and banking regulation includes rules aimed at promoting disclosure on sustainability matters and protecting investors and depositors from ESG-washing practices. In this section, we focus on the sustainable finance regulation implemented by the European institutions, given the focus of our study and the advanced development of sustainable finance legislation in this context. Due to the potential key role of the financial sector in enabling the achievement of the SDGs, the European Commission launched an Action Plan for Financing Sustainable Growth in 2016 and created a High-Level Expert Group on Sustainable Finance. The EU's public funding to support the transition is very substantial; alone, however, it is insufficient. Private capital must therefore be mobilised, encouraging investment consistent with policy objectives on sustainability (Eurosif, 2018).

For the purpose of this study, the regulation about disclosure on sustainability has particular relevance. It provides support for the institutional theory and encourages the publication of data useful for

measuring ESG scores. The regulation of transparency in this field has two main focuses: financial institutions and financial products/services.

Regarding non-financial reporting regulation, financial institutions, like other large and/or listed companies, have to disseminate information on the ESG profiles of their activities and communicate their commitment towards sustainability, according to the Corporate Sustainability Reporting Directive (CSRD).[1] Following the Non Financial Reporting Directive (NFRD),[2] this new rule has introduced new reporting requirements, including details about companies' impact on the environment, human rights and social standards, based on common criteria in line with EU climate goals. The reporting standards are being developed in accordance with the principle of dual materiality: companies will be required to provide information on both the environmental and social risks to which they are exposed and the impact of business activities on sustainability factors. This strand of legislation aims to introduce ESG considerations within corporate governance and risk management procedures, by increasing the disclosure of banks' internal behaviours and processes. At the same time, banks have to publish details about the effects of their activities on the environment and society. This confirms how disclosure about corporate sustainability should include considerations related to both direct and indirect impacts produced by companies, in accordance with the data collected within the BESGI scoring model.

Besides, the legal framework on financial products/services assumes that banks, through the products and services they provide to customers, can play a central role in steering the financial system towards sustainability. The introduction of indicators about responsible credit and investment products within the BESGI tool is compliant with this legal approach. In this context, European regulators have first set transparency standards to provide retail and institutional investors with detailed sustainability contents of ESG-labelled products/services. The purpose of the rules in this case is to strengthen protection for final investors, to improve information on sustainability risks and sustainable investment objectives, and to promote environmental and social characteristics of financial products/services. Financial institutions must disclose ESG-related analysis on the financial products/services they offer and promote to final investors, following the requirements of the Sustainable Finance Disclosure Regulation (SFDR).[3] This regulation requires financial market participants and financial advisers to provide all information necessary to enable end investors to make informed investment decisions and distinguish genuinely sustainable rather than ESG-washed products. Moreover, the SFDR introduced specific provisions aimed at standardizing the information that must be made available to investors regarding the integration of sustainability risks and ESG factors in the investment and advisory processes, as well as the potential adverse impacts on sustainability issues. Information on ESG risks and impacts have to be provided at the product and at the legal entity level, confirming the strong link between the sustainability of financial products/services and financial institutions.

To give substance to declarations of principle related to sustainability, regulators have also developed a green taxonomy, with the purpose of sharing a common definition of environmental sustainability. Taxonomy Regulation amended the EU framework dictated for the reporting of non-financial information, providing that entities are required to include information on how and to what extent their activities can be considered “environmentally sustainable”.[4] According to this rule, banks are required to provide a specific disclosure regarding the degree of alignment of their portfolio to the taxonomy.

It emerges that it is increasingly important for regulators to monitor and stimulate greater attention to the indirect impacts produced by the banks, stimulating them to align loans and securities portfolios with the Paris Agreement. It is then expected that, when the implementing regulation will be fully entered into force, the information necessary to assess the indirect impacts of banks within the BESGI score will consolidate.

4. The use of ESG scores in the literature and BESGI score contribution

Recently, ESG scores for organisations issuing securities on financial markets have spread widely. These scores are usually formulated by agencies specialised in collecting and analysing data on the sustainability aspects of business activities, based on the content of public and confidential corporate documents, meetings with management, supervisory authority reports, NGOs' reports, and newspaper articles, among others.

Starting from 2011, a large literature deepened the analysis of firm performances by referring to ESG scores (Hedesström et al., 2011; Mănescu, 2011). In particular, ESG scores were used, also in the financial field, to verify which factors have the greatest impact on stock values, measured in terms of earnings per share, stock price or risk-adjusted stock returns (Buallay, 2019; Carnevale and Mazzuca, 2014; Di Tommaso and Thornton, 2020) or to investigate the relationships with corporate financial performance and firm value (Brogi and Lagasio, 2019; El Khoury et al., 2021; Gholami et al., 2022; Meng-Wen et al., 2017; Miralles-Quirós et al., 2019; Peni and Vähämaa, 2012; Shakil et al., 2019; Simpson and Kohers, 2002; Siueia et al., 2019; Soana, 2011; Wu and Shen, 2013;). In these studies, ESG scores are usually used for measuring an organisation's overall ESG performance and then applied as a proxy for the level of corporate sustainability or corporate social responsibility.

Results obtained from this literature are mixed (Clément et al., 2022; Li et al., 2021; Widyawati's, 2020). Methodological and practical reasons can contribute to the divergent findings in the literature.

The first reason can be found in the methodology used for calculating the scores. First, each model implies the selection of indicators to be included in the metric. The main ESG rating agencies use 100–400 indicators to calculate their scores (MSCI, 2022; Refinitiv, 2020; Sustainalytics, 2022), included in the three main categories E - S - G (Berg et al., 2022; Ribando and Bonne, 2010). The selection of indicators varies widely among agencies, according to the way environmental consequences, as well as social and governance issues, are evaluated (Chatterji et al., 2016; Delmas et al., 2013; Eccles et al., 2020). Some ESG rating agencies also add to the three main pillars other evaluations according to the main aim of the metric (Refinitiv, 2020).

Indicators for each pillar and each pillar are then weighted for calculating the final metric, according to the relevance of the issue for the overall score defined by each ESG rating agency. In general, different agencies assign different weights to different indicators and can also differently interpret the various data sources (Escrig-Olmedo et al., 2019; Kotsantonis and Serafeim, 2019; Olmedo et al., 2010).

Finally, each score can be converted into a percentile rank across all companies in a specific sector. The final evaluation can be thus based on the highest scoring company for each factor, by normalizing the raw scores to ensure that values are not skewed by outliers. In this way, it is possible to see how well companies perform compared to their peers (Berg et al., 2022; Escrig-Olmedo et al., 2019).

The different methodological choices regarding the indicators and the pillars to be included in the measure, the way for weighting them and the normalizing process to apply produces a wide range of metrics, with low level of correlation (Berg et al., 2022; Dimson et al., 2020; Hughes et al., 2021).

The second reason why results obtained by literature that refer to ESG scores produce conflicting results is related to the way in which the scores are applied in the analysis. The effectiveness of the scores to proxy different corporate results can be affected by the scope of the analysis

[1] Directive (EU) 2022/2464.
[2] *Directive* (EU) 2014/95.
[3] Regulation (EU) 2019/2088.
[4] Regulation (EU) 2020/852.

and the original purpose of the ESG rating companies (Serafeim et al., 2019). ESG scores can be an inaccurate proxy for the level of bank sustainability or corporate social responsibility. Different authors argue that ESG scores partially integrate sustainability principles, but it is not enough for considering them as a measure of sustainability (Clément et al.., 2022; Eccles et al., 2020; Eccles and Stroehle, 2018; Escrig-Olmedo et al., 2019; Kotsantonis and Serafeim, 2019; Gillan et al., 2021; Olmedo et al., 2010; Rekker et al., 2021). At the same way, ESG scores should not be interchanged with the more complex and also qualitative concept of CSR (Cini and Ricci, 2018; Drempetic et al., 2020; Friede et al., 2015; Gillan et al., 2021; Saadaoui and Soobaroyen, 2018). According to this literature, it can be too simplistic to trace the corporate social issues to quantitative and binary variables, represented by the components of ESG scores.

The primary target end customers of ESG rating companies are portfolio managers and investors which can affect the scope and the representativity of their ESG scoring models (Eccles et al., 2020; Escrig-Olmedo et al., 2019). ESG scores issued by the agencies mainly represent the exposure of a company to the risk of facing an ESG scandal, by anticipating potential adverse financial impacts on investments (Escrig-Olmedo et al., 2019; MSCI, 2022; Olmedo et al., 2010; Refinitiv, 2020). They then originally represent the financial risk ensuing from ESG issues (Viviers and Eccles, 2011). As a consequence, they are less suited for verifying how a company contributes to the environment, the global warming or the well-being of the society (Baker et al., 2016; Bernier-Monzon et al., 2019; Escrig-Olmedo et al., 2019).

The inconsistency of the results found in the literature can finally be connected to the use within the same studies of scores calculated by applying different weights to the individual indicators/pillars for the various sectors. This further complicates scores' reliability (Dimson et al., 2020). Usually, the models adopted by the ESG rating agencies are not specific to a sector, but they adapt the weights to the specific sector in which the company operates (MSCI, 2022; Refinitiv, 2020; Sustainalytics, 2022). Multi-sector analysis can produce divergent results also due to the different sensitivity of specific business sectors to ESG issues in terms of financial performance or value (Hoje and Haejung, 2012; Sassen et al., 2016). These analyses often exclude the financial sector, due to its specificities (Miralles-Quirós et al., 2019). In this sense, Garcia et al., 2017, as well as Kotsantonis and Serafeim, 2019, argued the difficulties in having common measures concerning ESG issues for all industries. For a more accurate measurement of banks' ESG performance, it is therefore considered appropriate to refer to indicators developed specifically for the sector.

Compared to traditional ESG scores, the BESGI score is specific to the banking industry not just for the weights assigned to indicators, but for the main contents. The score is measured by considering the structural features of the financial sector, and peculiarities of bank products/services, taking into account also the shared regulation of the field in terms of reporting and accounting (Finger et al., 2018). It directly accounts for industry materiality, thanks to the choice of indicators and areas that are more relevant and material to companies within the financial industry. Therefore, the comparative valuation that can be drawn from the application of the model intends to be more robust and accurate than that obtained from the application of the general ESG scores. To the best of our knowledge, the BESGI score is the first rating developed specifically for the banking industry, including specific indicators judged relevant to the banking industry by sector experts. In particular, the tool was fine-tuned through semi-structured interviews with key informants from the banking sector, the ethical and sustainable finance industry, as well as academics specialised in the topic.

Compared to traditional ESG scores, the BESGI score presents other originality terms. The contribution of this study is then manifold.

The large number of indicators and granularity in the data used by ESG rating agencies highlights how the calculation of the traditional scores typically requires the strong contribution of the companies being evaluated which can affect the final results. On the other hand, the BESGI score is built on public information, and it aims to be a model applicable to all banks, national and international, characterised by different legal forms and sizes. The model variables are selected considering the information that a bank usually makes available in public documentation making it possible to apply the model also to non-listed companies, for which no other assessments are available. Most indicators included in the methodology are taken from the global reporting standards issued by the Global Reporting Initiative. The model is thus highly replicable.

The number of indicators within the BESGI scoring model is quite low compared to traditional ESG scores to avoid flattening results and to better assess the degree of heterogeneity of the banks' performances in the various pillars investigated.

Indicators are specifically selected, as well as the areas. Given the peculiarities of the banking industry and their role in capital allocation, the BESGI score also includes an assessment of the indirect impacts resulting from banks' financing and investing activities. In order to evaluate the overall ESG engagement, the BESGI scoring model, unlike other tools such as scoreboards of indicators or other indices, measures simultaneously the bank's internal processes and behaviour in terms of ESG issues, and the attention paid by the bank to the level of sustainability of the counterparties that it contributes to finance. To the best of our knowledge, the BESGI score is the first model to include indicators specifically aimed at capturing the indirect impacts of bank activities.

Lastly, the BESGI score contributes to the discussion on the methodological approach to be applied to the calculation of sustainability scores, proposing an innovative methodology that allows to overcome some limitations of the traditional ESG scoring models: this study employs the Multidimensional Synthesis of Indicators (MSI) aggregation method to summarise indicators into a one-dimensional value (Biggeri et al., 2019; Biggeri and Bortolotti, 2020; Biggeri et al., 2021; Mauro et al., 2018). By applying this methodology, the aggregation of areas avoids some of the common pitfalls of composite indices, such as the use of the arithmetic mean, in which the marginal contribution of one dimension remains constant both as the dimension itself varies and as all other dimensions vary. Besides, the MSI methodology is able to overcome the problems of the geometric mean, which can too easily collapse to zero. Used for example to calculate measures of sustainability at country level, the MSI is, to our best knowledge, for the first time applied to bank performance. The final BESGI score depends on a function that takes into consideration the indicators by treating them as not fully substitutable, and that penalises heterogeneity in the bank outcomes. Consequently, a marked deficiency in a specific dimension causes not only a lower overall performance in a specific area but also negatively affects other outcomes. The difference between the BESGI and the arithmetic mean of indicators could, in fact, be used an indication of ESG-washing, as arithmetic mean hides discrepancies in outcomes. Moreover, the penalisation of heterogeneity in bank performance is flexible. Indeed, the degree of substitutability between indicators and dimensions is directly related to the bank's overall level of performance through a nonconstant function, overcoming the limits of excessive rigidity that characterize traditional ESG scoring models based on arithmetic averages of the indicators, weighted on the basis of fixed and predefined weights. The BESGI scoring tool is able to evaluate companies' levels of disclosure regarding ESG issues, with the specific aim of making a quantitative measure of the amount and the homogeneity of data communicated by the bank in this field (Franco and Suguna, 2017).

5. Methodology

5.1. Indicators for the BESGI scores

The measurement system proposed here aims to assess whether and to what extent the banks follow a sustainable approach to finance, paying attention to the ESG impacts produced.

We propose a framework that combines two main conceptual

domains: the direct impacts that arise from corporate governance models and relations with the environment and the surrounding social systems; and on the other hand, the indirect impacts that arise from the products and services offered and the investments made. This combination of two domains is useful to capture the sustainability of banks activities, which depends both on the bank's own activities and the activities the bank supports trough loans and investing in projects or other organisations.

We define each domain as composed of areas (or sub-domains) of ESG analysis: environmental, social, and governance impacts for direct impacts; loan-related activities and investment-related activities for indirect impacts. The selection of the three areas – environmental, social and governance – for the domain of direct impacts and the two areas - financing and investing - for the indirect impacts is rooted in the ESG literature discussed in the previous sections.

Each area includes dimensions, which are defined by a variable number of indicators designed to measure the sustainability of the bank's behaviour. The framework of the indicators was based on the most adopted international guidelines on sustainability reporting, namely the reporting standards issued by the Global Reporting Initiative (GRI). GRI Standards are designed to be used by organisations for reporting on their economic, environmental and social impacts. The information made available through sustainability reporting allows internal and external stakeholders to build an informed opinion and make informed decisions about an organisation's contribution to sustainable development. According to European sustainability reporting regulation, when assessing the materiality of non-financial reporting, organisations must consider a double perspective. The first is a financially related outside-in perspective, according to which all information that impacts a company's value and risk assessment is defined as material. The second perspective accounts for the external impact of a company's activities on the environment, consumers, civil society, and employees; this is the stakeholder-oriented, inside-out perspective. The text of the CSRD and the set of draft standards proposed by EFRAG (2022) confirmed the double approach to materiality and aligned the European regulator with the approach of the GRI. The BESGI model is aimed at measuring the direct and indirect ESG impacts of organisations and thus focuses on the second perspective, using a multidimensional system of aggregation to balance all the different domains, areas and dimensions.

Furthermore, the research team validated the development of the model using 9 semi-structured interviews with key informants from the banking sector, the ethical and sustainable finance industry, as well as academics specialised in the topic. Key informants have suggested changes to the indicator system during its development in order to make it robust and comprehensive. This has allowed us to correctly match our system of indicators to the characteristics of the financial players, so as to also capture the value of indirect impacts through lending and investment activities.

Table 1 reports in an analytical form the domains, areas, dimensions and indicators that are included in the measurement model. For the indicators that are in strict compliance with GRI guidelines, the relevant GRI reference is reported.[5]

The BESGI score aims to verify the commitment and capacity of each bank to maintain high standards in the full spectrum of ESG dimensions. To consider the synergies among dimensions and to thus penalize heterogeneity in the multidimensional results, we employ the MSI aggregate method (Mauro et al., 2018; Biggeri et al., 2019). This is the first time that this approach is used to measure banks' performance. The final score takes into consideration the outcomes in each area, treating them as not fully substitutable. This implies that one cannot simply substitute a low score in one dimension with a higher one in another in order to achieve a better result (Biggeri and Mauro, 2018, Biggeri et al., 2019). The MSI does not employ pre-defined weights, but rather the weights are defined implicitly by the data and the function of aggregation, as well as from the outcome score of each dimension.

[5] To verify the level of adoption of GRI Standards for reporting in Europe, with a specific focus on report on sustainability, refer to KPMG (2022). According to this study, GRI offers the only reporting standards used by the majority of surveyed companies around the world.

5.2. Sample description and empirical model

For the empirical application of the index, we selected the overall sample of financial institutions directly supervised by the European Central Bank (ECB) (as of 1 July 2021; full list in Appendix). The sample of intermediaries directly supervised by the ECB reflects the supervisory body's decisions on their significance and allows for a homogeneous set of financial institutions, subject to common rules also in terms of reporting. Data was collected from Datastream and Bloomberg databases, which provide comparable and reliable data for a large number of financial institutions, both on financial and ESG issues. In case of missing values, data was retrieved from the documents published directly by the banks. Specifically, the following documents were used: consolidated financial statements (2019, 2018 and 2017); non-financial statement or sustainability report or equivalent documents (2019); integrated report, which brings together consolidated financial statements and non-financial disclosure (2019 and 2018); pillar III public disclosure document (December 2019); documentation on the group's remuneration policies (2019); corporate governance report (2019); other relevant documentation such as code of ethics, disclosure on group policies for CSR, group website.

Systematic data collection led to the construction of a database for 111 of the original 114 institutions considered. Three had to be dropped from the sample due to lack of data.

Each indicator has been standardised using the 'max-min' method: subtracting the minimum from each value, and dividing by the difference between maximum and minimum. This results in a value between 0 and 1. For some indicators the maximum and the minimum were taken from the theoretical reference values (for example, when dealing with a percentage), while for the other values it was decided to use the 1st and 99th percentiles as reference points to neutralise the weight of outliers. Table 2 summarises the standardised indicators for each year.

As first and second steps, we aggregate indicators dimensions, and then dimensions into areas. For these steps we used the arithmetic mean of the scores. Subsequently, the areas were aggregated in the BESGI score using the MSI method (eq. 1). This method of aggregation is an approach that has characteristics similar to the geometric mean but which overcomes some important limitations. The main idea is that the weighting of dimensions is implicit in the data and the aggregation is based on the bank's achievements in each dimension, rather than being predetermined. The BESGI has been constructed following eq. 1:

$$BESGI_{it} = 1 - \left[1 \Big/ 5 \sum_{jt} \left(1 - x_{jit}\right)^{\mu_{it}} \right]^{1/\mu_{it}}$$

Where x_{ijt} is the achievement of bank i in dimension j (therefore comprised between 1 and 5) at time t, while μ_{it} is the mean of the dimensions of bank i at time t. In the generalised MSI model g can be any function, allowing for flexibility in the aggregation. We employ the mean as the simplest way to weigh dimensions, with the implications that banks with higher averages will be less penalised for their heterogeneity of outcomes, and vice-versa. The same method has been applied to construct five other sub-scores, using the same method: two for the domains (direct and indirect impacts) and one each for the dimensions of Environment, Governance, and Social impacts. This allowed us to perform additional analysis to uncover how different aspects of banks' ESG performance are related.

The empirical application is done in two steps: we first calculate the BESGI for our sample to test its practical application. Secondly, we build an empirical model based on a multivariate analysis, in which we use

Table 1
Domains, areas, dimensions and indicators of the model.

Domain	Area	Dimension	Indicators	GRI reference
Direct Impacts	***Environmental***	*Inputs*	Energy consumption per employee (GigaJoule / per capita)	GRI 302–1
			Paper consumption per employee (kg / per capita)	GRI 301–1
			Percentage of electricity from renewable sources	GRI 302–1
		Outputs	Direct emissions per employee in metric tonnes of carbon dioxide equivalent (tCO_2eq)	GRI 305–1
			Indirect emissions per employee in metric tonnes of carbon dioxide equivalent (tCO_2eq)	GRI 305–2
			Amount of waste produced (kg) per capita	GRI 306–2
			Environment management team (1 if yes)	
	Social	*Internal: Personnel*	Employee turnover	GRI 401–1
			Gender wage gap (overall)	GRI 405–2
			Max / min salary ratio value (Chief Executive Officer and average status employees)	GRI 102–38
			Employee satisfaction surveys and their frequency (0/4)	GRI 102–29
			Ratio of women / men promotions	
		External: Society and community	Economic value distributed to the community / total economic value	GRI 201–1
			Contributions to the local community (y/n)	GRI 413–1
			Quality of suppliers (0–5): Local suppliers; suppliers chosen according to environmental criteria; action taken about negative environmental outcomes in the supply chain; suppliers that respond to social criteria; action taken about negative social consequences in the supply chain.	GRI 204–1, GRI 308–1, GRI 308–2, GRI 414–1, GRI 414–2
		Transparency and disclosure	Composite indicator 0/7 which aggregates the following binary variables: disclosure of conflicts of interest (1/0); disclosure of corruption and actions taken (1/0); anti-competition action disclosure (1/0); disclosure of non-compliance with environmental laws (1/0); disclosure of marketing (1/0); privacy complaints disclosure (1/0); disclosure of non-compliance with socioeconomic laws (1/0).	GRI 102–25, GRI 205–3, GRI 206–1, GRI 307–1, GRI 417–3, GRI 418–1, GRI 419–1
	Governance		Composite indicator 0/2 which aggregates the following binary variables: information on the identification, selection and involvement of stakeholders (1/0); ESG stakeholder engagement information (1/0).	GRI 102–42, GRI 102–43
			Presence of information on ESG risks within the Basel Third Pillar communications (0/2).	
		Corporate bodies	Percentage of non-men on the Board of Directors.	GRI 405–1
			Composite indicator 0/4 which aggregates the following binary variables: accountability: presence of responsibility / delegation / committee on the Board of Directors about ESG (1/0); responsibility/delegation/committed among managers; sustainability compensation incentives (1/0); policy executive compensation ESG performance (1/0)	GRI 102–18, GRI102–20, GRI 102–22 (vii)
			Percentage of independent directors on the Board of Directors	GRI 102–22 (ii)
			Attendance rate at Board of Directors meetings.	
Indirect Impacts	***Financing***	*ESG loans and lending policies*	Amount of financing with environmental impact (e.g. financing disbursed for the green economy, support for the circular economy, waste management, organic agriculture, urban regeneration, etc.), and with social impact (e.g. loans to the third sector, for starting up entrepreneurial activities, for social inclusion and socio-welfare initiatives, credits to social housing, loans to international cooperation, female entrepreneurship, financing for innovation, micro-credit to families and/or businesses, etc.) on the average of total financing 2018–2019.	
			Non-performing loans (over total loans).	
			Composite indicator (0/7) on the presence of a formal policy for exclusion of the arms sector, fossil fuels, violation of human rights in financing activities. It is made up of the sum of the three dummies (0/2), respectively for armaments, human rights and fossil fuels, plus the presence of information on the carbon footprint of funding (YES/NO).	GRI 102–12: GRI 102–16, GRI 408–1, GRI 409–1, GRI 412–1, GRI 412–3
			Sustainable investments: equity ESG funds and ethical funds / total placed (indirect funding).	
	Investments	*ESG investment and investment policies*	Composite indicator (0/3) which aggregates the following binary variables: issue of green bonds / social bonds / sustainability bonds (2/0); presence of infrastructure investments with an impact on local economies and communities (1/0).	GRI 203–1
			Composite indicator (0/4) on the presence of a formal policy for exclusion of the arms sector, fossil fuels, and projects with clear violations of human rights in investment activities. This is obtained from the sum of the three dummies (YES/NO), respectively for armaments, human rights and fossil fuels, plus presence of information on the carbon footprint of investments	GRI 102–12: GRI 102–16, GRI 408–1, GRI 409–1, GRI 412–1, GRI 412–3

both country and bank-level variable, to explore the index's relationships with corporate and institutional characteristics. s. The summary statistics are reported in Table 3.

Among bank-level covariates, we consider variables which indicate the size of the financial institution, proxied by the natural logarithm of its total assets; the level of capitalisation, measured by the equity over total assets ratio; the risk appetite, measured by the risk weighted assets density (risk weighted assets over total assets); and the bank business model, proxied by the gross loans over total assets (Jizi et al., 2014; Cornett et al., 2016).

The country-level covariates are related to the different aspects of sustainability, and are divided into financial, governance, and

Table 2
Indicators' mean and observations by year.

	Mean	N 2017	Mean	N 2018	Mean	N 2019
Energy consumption per capita (giga-joule)	0.99	110	0.98	110	0.96	110
Paper consumption per capita (kg)	0.97	110	0.97	110	0.97	110
Electric energy from renewable sources (%)	0.54	111	0.52	111	0.52	111
Direct emissions per capita (tonnes of CO_2 equivalent)	0.94	110	0.96	110	0.97	110
Indirect emissions per capita location-based (tonnes of CO_2 equivalent)	0.94	110	0.97	110	0.98	110
Waste per capita (kg)	0.95	110	0.97	110	0.96	110
Bank has environment management team (YES/NO)	0.45	88	0.43	108	0.47	109
Turnover	0.72	111	0.71	111	0.70	111
Women's wages as share of men's (%)	0.44	111	0.43	111	0.52	111
Ratio of Chief Executive Officer remuneration/average wage	0.88	110	0.87	110	0.90	110
Employee satisfaction surveys	0.36	109	0.35	110	0.40	111
Promotion of women/men (%)	0.91	111	0.92	111	0.92	111
Economic value to community/generated value	0.01	111	0.02	111	0.03	111
Contribution to local community (YES/NO)	0.53	109	0.52	110	0.51	111
Suppliers' characteristics	0.21	109	0.23	110	0.27	111
Level of disclosure (0/7)	0.32	109	0.31	110	0.34	111
Stakeholder involvement	0.84	109	0.83	110	0.90	111
Communication ESG risk (Basel)	0.23	109	0.27	110	0.42	111
Women on Board of Directors (5)	0.53	111	0.57	111	0.61	111
Share of women managers	0.65	111	0.66	111	0.69	111
ESG accountability (0/4)	0.18	94	0.20	109	0.25	111
Independent administrators on the Board of Directors (%)	0.97	111	0.97	111	0.96	111
Participation to Board of Directors meetings (%)	0.93	111	0.93	111	0.91	111
Lending with social and environmental impacts (%)	0.01	95	0.02	94	0.01	93
Non-performing loans (% of total)	0.78	95	0.80	94	0.83	93
Lending policies (0/5)	0.33	111	0.37	111	0.41	111
ESG investments over total (%)	0.03	74	0.00	70	0.01	72
Sustainable investments (0/3)	0.16	110	0.18	111	0.22	111
Investment policies (0/4)	0.42	111	0.46	111	0.55	111

Source: Authors.

environmental factors. For the financial variables, we employ the indices developed by the International Monetary Fund for the Financial Development Index (Svirydzenka, 2016), in particular, we use the dimensions of depth, access and efficiency related to the financial institutions, as they are more directly relevant for our index. These indices are constructed based mostly on FinStats data and other official sources. The financial institutions' depth sub-index is derived from the standard banking sector depth measure used in the literature (bank credit to the private sector) to include other financial institutions, such as the assets of pension funds and insurance. The access indicator is constructed using the number of branches and ATMs per 100,000 adults, while the efficiency indicator is derived from information on three aspects of bank efficiency: efficiency in intermediating savings to investment, operational efficiency measures, and profitability measures (Svirydzenka, 2016). All three indicators have a range of 0 to 1. The 'voice and accountability' indicator is developed by the World Bank's Worldwide Governance Indicators. We use this indicator as a measure of societal pressure. The indicator is constructed to capture perception of the ability of a country's citizens to participate in their government, as well as a measure of freedom of information and expression. The indicator takes values between −2.5 and 2.5, and is constructed from a range of different sources, such as Freedom House. Finally, the environmental covariates we selected are the share of energy from renewable sources, and the share of recycling on the total amount of waste. Both indicators were chosen as a proxy for the country's attitude and policies towards the environment.

6. BESGI score: Main results

Table 4 summarises the main results for the BESGI score and its sub-indices and dimensions, by year, as well as the correlation between components with the overall BESGI score and with the total assets. The average BESGI score has increased by four points between 2017 and 2019, reflecting an increased attention to ESG topics signalled by the overall sample.

Concerning the direct impact index components, the environmental sub-index is the highest, while the social component remains the lowest in all three years.

The greater attention paid to environmental variables since the beginning of the period observed is consistent with a more rooted attention to the issues of ecological transition and climate change by both economic actors and European regulators, who have also adopted an environmental perspective for the taxonomy of sustainable activities. The greater sensitivity of the market towards activities that can substantially contribute to environmental objectives, like climate change mitigation and adaptation, ecosystem protection, circular economy transition or pollution prevention, has contributed to increase the disclosure of banks with respect to these issues, with a positive impact on the measures of the BESGI indicator for the environmental component. The growing environmental concerns of consumers and investors about climate change reduce the legitimacy of businesses that do not report a commitment consistent with the preferences of their stakeholders on these issues. Furthermore, institutional and legislative pressures are driving companies, including banks, to improve (the disclosure of) their ESG performance. It should also be emphasised that the banking industry is by nature characterised by a limited direct environmental impact and a high ability to carry out projects capable of producing environmental benefits, as confirmed by their relevant role as issuers of green bonds. Within the environmental area, output performance, related to the emissions of CO_2, production of waste, and use of paper, is the dimension that performs best.

As shown in Table 2, the environmental sustainability index is the dimension that has a more stable trend over the years. Banks had already achieved a fairly high level of disclosure on environmental performance in 2017, but over the three-year period analysed, there are no significant improvements in the results achieved by the banks, which therefore seem to have reached a point of equilibrium in their ecological transition path and in disclosure on environmental matters.

The social sustainability sub-index is the one with the biggest difference across its components: the dimension of internal personnel is quite high, with a score between 0.66 and 0.69, but the dimension related to society and community is the lowest, with a score around 0.25. The data shows a very different level of disclosure regarding commitments towards stakeholders. The banks in the sample seem to pay limited attention to the impact generated by their activities on society and local communities, as may be expected from large banks operating internationally. In general, the significant banks belonging to the sample have more capital to invest in sustainable projects, as

Table 3
Covariates by year.

	Mean	N 2017	Mean	N 2018	Mean	N 2019	Correlation with ESGI	Correlation with Assets
Total asset (ln)	24.16	111	24.18	111	24.26	111	0.59	0.71
Equity/total assets	0.10	102	0.09	102	0.09	102	−0.17	−0.34
Risk Weighted Assets/total assets	0.46	81	0.47	81	0.46	81	−0.13	−0.42
Gross loans/total assets	0.55	72	0.56	72	0.54	70	−0.06	−0.29
Voice and accountability	1.20	111	1.19	111	1.15	111	−0.05	0.07
F.I. Depth	0.71	111	0.70	111	0.70	111	−0.02	0.13
F.I. Access	0.71	111	0.68	111	0.67	111	−0.11	0.14
F.I. Efficiency	0.58	111	0.58	111	0.58	111	0.02	0.09
Renewables (% sub energy)	14.97	110	15.95	110	16.84	110	0.17	−0.06
Share of recycling (% total waste)	28.44	108	28.79	108	29.77	78	0.11	−0.04

Source: Authors' elaboration based on International Monetary Fund, World Bank and SDG data.

Table 4
Scores and dimension averages and correlations with BESGI and assets (N = 111).

	2017	2018	2019	Correlation with BESGI	Correlation with assets
BESGI score	**0.47**	**0.48**	**0.51**	**1.00**	**0.47**
Direct impact index	**0.57**	**0.57**	**0.60**	**0.41**	**0.18**
Indirect impacts index	**0.25**	**0.27**	**0.31**	**0.63**	**0.30**
Environmental sustainability index	**0.83**	**0.82**	**0.83**	**0.67**	**0.35**
Environment: inputs	0.83	0.82	0.81	0.85	0.36
Environment: outputs	0.84	0.83	0.84	0.86	0.52
Social sustainability index	**0.40**	**0.40**	**0.42**	**0.31**	**0.04**
Society and community engagement	0.25	0.25	0.27	0.36	0.25
Internal personnel	0.66	0.66	0.69	0.59	0.29
Governance index	**0.55**	**0.55**	**0.60**	**0.17**	**0.07**
Openness and disclosure	0.46	0.47	0.56	0.67	0.38
Administrative bodies	0.67	0.67	0.68	0.61	0.28
Lending: types and policies	**0.34**	**0.36**	**0.38**	**0.86**	**0.38**
Investment: types and policies	**0.21**	**0.23**	**0.28**	**0.80**	**0.53**
Share of missing indicators	3.55	2.52	2.20	−0.97	−0.16

Source: Authors.

confirmed by the positive correlation between the score and the bank size, but they seem to demonstrate less sensitivity towards the local territory.

The governance sub-index sees a marked increase, from 0.55 in 2017 to 0.67 in 2019. The component with the greatest growth is 'openness and disclosure', which testifies to the strong increase in the level of transparency in ESG matters, as also highlighted by the literature on the subject, connected to legitimacy, signalling and institutional theories, and supported by the evolution of the regulation on the matter.

With reference to indirect impacts, the scores relating to both the investment component and the lending component are very low. In particular, the type of investments and policies related to investment activities shows the lowest score compared to all other BESGI components. From the point of view of direct impacts, the banking sector, with specific reference to the most significant banks, presents a satisfactory situation, especially with reference to environmental and governance aspects. On the other hand, ample improvements are still possible with reference to indirect impacts. This is consistent with the boost that regulators wanted to give in the most recent past to increase the responsibility of banks in their investment and lending activities.

As shown in Fig. 1, the BESGI scores do not show marked differences at a geographical level. Moreover, all geographic areas show an increase in the three-year period considered. Contrary to what might be expected, southern Europe has the highest BESGI score, higher than continental and northern Europe. Eastern Europe has the lowest average score. This is true for both direct and indirect components, although the indirect component remains low for all regions and years.

The relationship between the BESGI and other metrics is not clear-cut, due to the different selected indicators, the different areas investigated, as well as the different method of aggregation of the scores attributed to the single areas (MSCI, 2022; Refinitiv, 2020; Sustainalytics, 2022). As an example, compared to the scores provided by Refinitiv, the correlation between the two is positive but medium-low: 0.31. However, the Refinitiv ESG score has a very large number of indicators, and therefore it is possible it loses information power, mixing too many aspects of a bank's sustainability performance. Additionally, the literature finds that most ESG indexes tend to give inconsistent measurements due to the very different methodology and set of indicators and sources used (Clément et al., 2022). When compared to other aggregation methods such as the arithmetic and the geometric mean, the BESGI performs as expected: higher than the geometric mean, and lower than the arithmetic mean (see appendix for the results).

One important point is whether the business model of the bank influences the score.

The relationship between the BESGI score and the bank's business model, measured by the ratio of total loans over total assets, is a complex one. As shown in Fig. 2, a slightly negative relationship seems to emerge, highlighting a worsening of the indicator as the weight of loans on the bank's overall business increases. It seems that traditional banks, more focused on credit intermediation, perform worse on average in terms of direct and indirect sustainability impacts than other financial institutions more specialised in financial or securities brokerage activities.

Other than size and business models specifically regarding the financial institutions, macro-economic factors can also be related to the index detecting the level of a bank's sustainability. In order to identify a tendency of banks to isomorphism, it is possible to investigate both sustainability policies at national level, as well as the prevalent characteristics of the financial system in which the banks operate. These factors are analysed in the following section, together with some regressors studied at the banking level.

7. Correlates of BESGI score

To better understand the relationship between the BESGI score and the bank's and broader contextual and institutional factors, we perform a multivariate pooled linear regression on the BESGI score on the relevant covariates related to the theoretical framework, as described in the methodology section. The chosen variables are both at bank and country level: this is based on the assumption that both the bank business model and performances, and the broader contextual factor, have an impact on the bank's sustainability performances (Jizi et al., 2014; Cornett et al.,

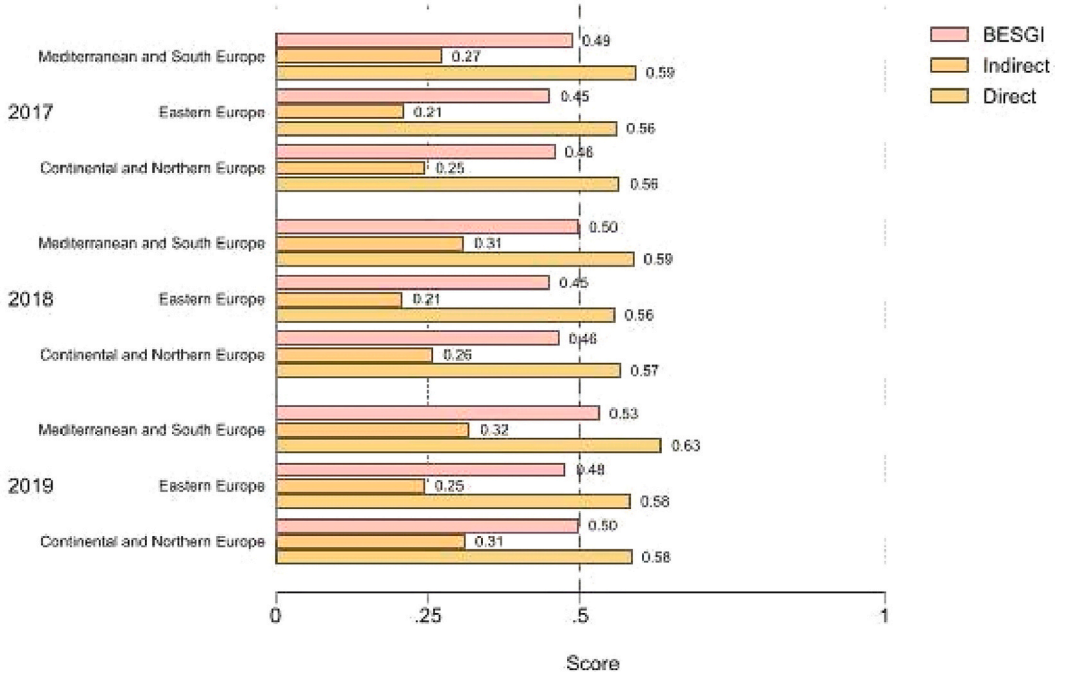

Fig. 1. BESGI score, direct and indirect impacts 2017–2019, by region.

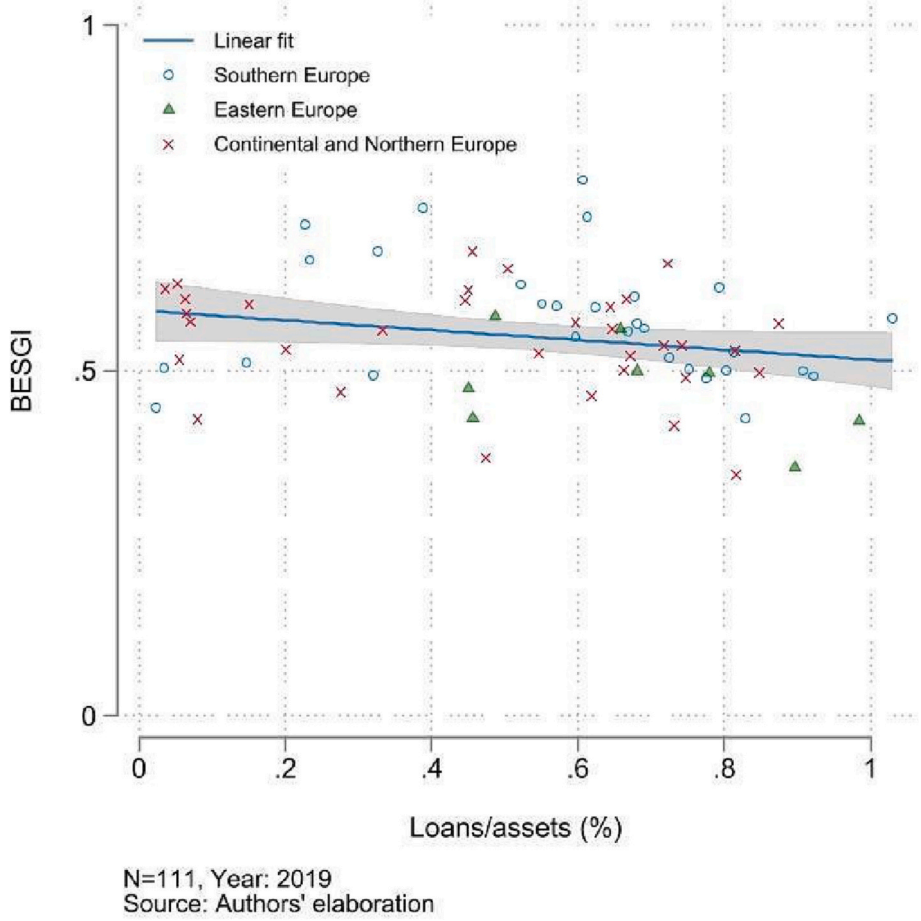

Fig. 2. Relationship between BESGI score and banks' business model.

2016). Specifically, the quality of financial institutions, as well as the relevance of civic society, and the country's attitudes towards sustainability, can influence a bank's commitment and therefore performance to sustainability.

To estimate the relationship between the covariates and the BESGI score we use a pooled linear regression with clustered standard error at country level, defined in eq. 2:

$$BESGI_j = \beta_0 + \beta_1 X_j + \beta_2 C + \tau_y + \rho_k + \varepsilon$$

Where $BESGI_j$ is the score of a bank j, X_j is a set of characteristics of bank j, C is a set of country's characteristics, τ_y is a set of time dummies (y: 2017, 2018, 2019), ρ_k is a set of dummies for the regions (k: 1,2,3), and ε is the error term.

Fig. 3 illustrates the regression results (regression table in Appendix A3). The results are reported for the total BESGI score, and separately for the components of direct and indirect impacts.

The variable of loans on total assets has been transformed into a quantile, with three levels. The highest category (=3) includes the banks that are in the top third of the distribution regarding the share of loans on the total asset. The results confirm a slight negative relationship between the relevance of the lending activity and the BESGI score, but without a real statistical significance. On the other hand, a high level of significance and a positive relationship is confirmed for the total asset, both for the overall BESGI score and its components, as well as the relevance of the share of equity. Big and well capitalised banks present on average a high level of sustainability in their internal processes and external attitudes. The risk-weighted assets density has a negative relation with the BESGI score, in particular with reference to direct impacts. The higher the banks' risk appetite is, the lower is the level of sustainability measured by the score, confirming that where there is a higher specialization in lending activities, traditionally related to a greater propensity to risk, the more the score worsens. The bank-specific variables confirm the signalling theory hypotheses. Banks with greater resources can invest in projects and communication activities aimed at signalling their competitive advantage in terms of sustainability. In particular, the banks more oriented to asset management and security brokerage activities show a greater willingness to demonstrate their commitment to ESG practices. Relatively small banks and financial institutions, more oriented to the traditional lending business, are less likely to report themselves as good practices in the sustainability field. This could mean a reduced need for legitimacy by this type of bank, given their smaller size, the more limited scrutiny by stakeholders, and the more traditional lending activity.

To verify the institutional theory and the isomorphism of banks belonging to the same institutional context, we include three measures of the financial system's characteristics to address its role in conditioning banks' level of sustainability. The 'access' indicator, which measures the number of branches and ATMs per 100,000 adults, emerges as a statistically significant determinant of the BESGI score, with a positive relationship with the index. The greater the penetration of banks and the territorial capillarity of their distribution channels, the higher the sustainability indicator, especially with reference to direct impacts. This can mean that when a bank is deeply rooted in a territory with a high number of branches and ATMs per population, it has a greater incentive to behave in line with a sustainable approach and to communicate its good practices.

In the same way, the indicator of 'voice and accountability' remains positive and statistically significant, suggesting that countries with a more engaged public opinion and more freedom have better results. These results can be related to the legitimacy theory, according to which companies gain legitimacy by emphasising attention to sustainability issues, even independently of their actual ESG performance. Since banks invest in communication in order to respond to stakeholders' expectations, results confirm that societal pressure is able to affect the level of banks sustainability, in both its direct and indirect components. Although not causal, these relationships give an indication of how both bank business model, if more oriented towards risk, or with a stronger diffusion on the territory, and the wider societal and financial context can influence the sustainability performances of a bank.

The empirical analysis has some limitations. First of all, available

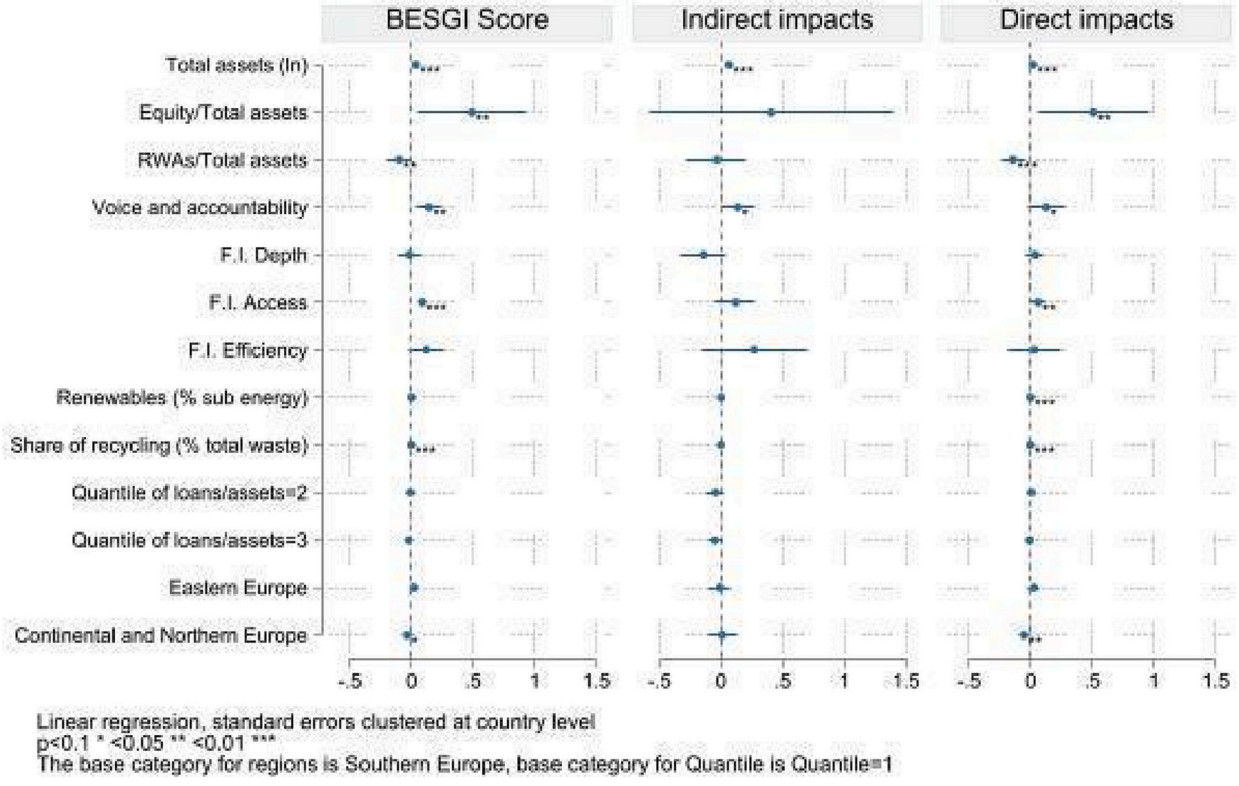

Fig. 3. Covariates of the BESGI score.

data is restricted to only three years, limiting the scope of the analysis. This could be addressed in future research when time series for the indicators become more accessible. Second, despite the efforts from the authors in filling the gaps in the data using multiple sources, including bank's financial and non financial declaration, gaps still remain. As banks become more open in their disclosure, this problem could be solved. Third, the choice of indicators, although validated and carefully discussed, is still partially limited by available data. We argue however that our contribution still presents the best available application of the proposed approach.

8. Conclusions

The study proposes a new indicator – the BESGI score – for assessing the banks' sustainability performances, by capturing both the direct and indirect impacts of corporate action.

The indicator measures banks' sustainability performances by adopting a holistic, multidimensional approach considering both material issues for a bank and the main criticalities that may characterize significant institutions operating in the financial industry.

The work offers both a theoretical and an empirical contribution. First, a new model for measuring sustainability is presented, with a theoretical approach rooted in legitimacy, institutional, and signalling theories, and a new methodology applied for the calculation of the final score. The proposed model may be applied by scholars, researchers, managers and supervisory authorities to other samples or specific institutes, for trend studies as well as synoptic analysis.

The proposed index is then applied to a large sample representative of the European financial system., Additionally, an explorative empirical analysis of the internal and external determinants that can affect banks' sustainability performances is performed.

According to our results, the situation of the banks analysed shows relevant opportunities for improvement in the direction of genuine sustainability. Concerning the direct impact index components, the environmental sub-index is the highest, while the social component remains the lowest throughout the period analysed, highlighting the need for banks to increase attention to this area, especially with reference to the communities with which the intermediaries interact.

The most significant gaps were found in terms of measuring and communicating indirect impacts. In many cases, the non-financial reports published by banks provide information, characterised by a different degree of detail, on the ESG factors related to the internal strategic and managerial choices. However, almost all the most significant banks still seem unprepared to evaluate in a structured way impacts on the environment and society produced indirectly through the financed counterparties.

Given the role played by financial intermediaries within the economic system, this gap is particularly serious as only banks capable of making investment and financing decisions that consider the ESG profiles of borrowers will be able to effectively contribute to the achievement of international environmental and social goals.

An assessment of counterparties that integrates ESG considerations and internal policies that exclude the most controversial sectors from the loan and investment portfolios would contribute not only to the production of positive indirect impacts on the environment and external society, but also to better risk management within banks themselves. Indeed, implementation of a more sustainable approach is not only a strategic, commercial and reputational issue, but can produce a significant impact on the quality of bank assets and their profitability, affecting stability of the bank and its overall risk profile.

Currently, the situation in terms of the overall BESGI score is quite different across the sample. The main determinant seems to be related to the size of the institution: larger institutions perform better, overall, than small ones, probably due to their greater investment capacities, but also in terms of disclosure. The largest banks, often listed, are also those for which legislation requires a higher level of transparency, including on ESG issues.

The characteristics of the financial system in which the bank operates also has a role in determining the level of isomorphism related to sustainability. In particular, the greater the penetration of banks and the territorial capillarity of their distribution channels, the higher the sustainability indicator is, especially with reference to direct impacts.

The current strategic orientation towards reducing the number of branches per inhabitant and a greater use of digital channels should therefore be carefully monitored with respect to potential impacts on the level of overall sustainability. Attention must be paid not only to the environmental effects, potentially favoured by technological developments in business strategies and commercial offer, but also to the social impacts which, more than others, could be penalised by a reduction in local presence.

In this context, an important role can be played by the supervisory authorities, which can continue to incentivise increased disclosure to the public, including the subject of sustainable finance, to make banking customers and investors increasingly aware and more responsible of their financial choices, also with respect to the sustainable orientation of their financial services provider.

Our study indicates that banks operating in countries with a more engaged public opinion have better results in terms of sustainability. It is thus fundamental to increase mandatory disclosure and standardised transparency in terms of ESG behaviours.

The score presented in this paper accounts synthetically the most important factors to communicate, to increase stakeholders' level of perception with regards to a bank's commitments on ESG issues.

This is particularly relevant for the banking industry, for which the research highlighted serious difficulties in finding data relating to some relevant ESG dimensions in the official reports. Indeed, the modest results obtained by some intermediaries within the sample are related to the lack of sufficient transparency regarding their behaviour and related impacts. It is therefore hoped that the model built can constitute a valid support for banks and supervisory authorities to conduct an assessment / self-assessment of bank performance in terms of sustainability, as well as providing a useful guide for understanding the dimensions and indicators to be monitored and published, discouraging ESG-washing and ESG-bleaching behaviours.

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Declaration of Competing Interest

The authors have no relevant financial or non-financial interests to disclose.

Data availability

Data will be made available on request.

Appendix A. Appendix

A.1. List of banks in the sample used for the analysis and their main characteristics (average 2017–2019)

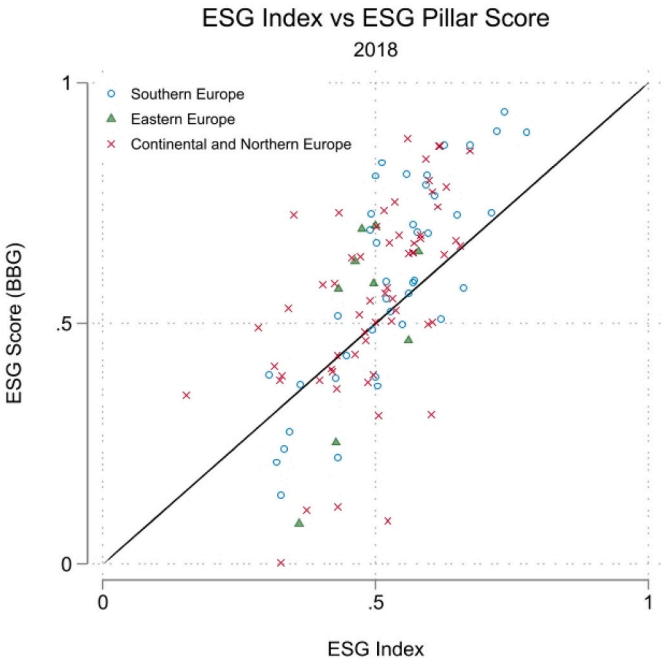
Bank name	Total Assets (million €)	N employees	Tier1_Ratio	ROE investments	Efficiency Ratio	Gross loans / Total assets	RWAs/ Total assets	Equity/ Total assets
3I GROUP	8987.292367	254		23.4				9%
AAREAL BANK AG	41,910.66667	2780	21.3	6.8	41.2	81%	29%	7%
ABC ARBITRAGE	150.7572333	82		12.7				
ABN AMRO BANK	383,173.3333	18,814	19.2	12.0	68.5	72%	28%	5%
ADYEN	1868.864	908		25.1				33%
AERCAP HOLDINGS	37,220.2467	394		12.3				21%
AIB GROUP	93,386.66667	9931	18.2	6.0	54.5	69%	57%	15%
AKTIA BANK PLC	9504.641333	786	16.7	8.7		65%	24%	6%
ALIOR BANK SPOLKA AKCYJNA	17,263.26737	8160	12.8	7.5	47.3	77%	70%	9%
ALLIANCE TRUST	3355.595467	11		10.3				9%
ALM. BRAND A/S	5158.562367	1759		12.5				13%
ALPHA SERVICES AND HOLDINGS	61,757.38233	11,190	17.9	0.7	47.9	99%	83%	15%
ARBUTHNOT BANKING	2523.741533	414	15.9	−1.1	96.5	46%	48%	10%
AVANZA BANK HOLDING	12,891.1524	414	16.8	25.9	53.7	8%	53%	13%
AZIMUT HOLDING	7815.381333	934		39.5	51.5	2%		8%
BANCA CARIGE	23,242.841	4168	11.6	−15.8	96.2	97%	67%	9%
BANCA GENERALI	522,497.3333	875	17.4	29.0	41.9	21%	29%	8%
BANCA IFIS	9820.871667	1596	11.6	10.9	50.6	89%	87%	15%
BANCA MEDIOLANUM	48,026.26167	2323	20.2	18.4	56.5		18%	5%
BANCA POPOLARE DI SONDRIO	41,299.676	3230	13.2	5.1	54.6	73%	50%	7%
BANCO BILBAO VIZCAYA ARGENTARIA	688,161.6667	129,388	16.4	2.2	50.1	58%	52%	6%
BANCO BPM	162,903.2523	22,484	13.3	11.2	79.6	69%	48%	7%
BANCO COMERCIAL PORTUGUES	76,501.969	16,746	12.9	4.6	47.5	69%	58%	8%
BANCO DE SABADELL	222,474.7923	25,792	13.6	5.0	78.0	103%	37%	6%
BANCO SANTANDER	1,475,423.667	200,461	12.9	7.3	51.4	61%	41%	7%
BANK HANDLOWY W WARSZAWIE	11,338.1601	3303	17.3	7.9	57.0	45%	61%	15%
BANK OF CYPRUS HOLDINGS	22,265.52533	4250	13.1	−8.9	50.3	76%	70%	11%
BANK OF GEORGIA GROUP	5152.235333	13,531	12.7	22.7	43.0	19%	71%	13%
BANK OF IRELAND	126,035.3333	10,802	14.8	6.0	48.5	64%	38%	7%
BANK POLSKA KASA OPIEKI	45,579.80333	16,577	15.6	11.0	44.1	71%	66%	11%
BANKINTER	77,188.845	8155	12.2	11.8	50.1	71%	43%	6%
BARCLAYS	1,294,300	81,400	17.3	1.2	79.2	4%	27%	6%
BAWAG GROUP	45,472	4191	14.6	12.7	44.2	68%	45%	8%
BFF BANK	4959.250567	444	12.1	25.9	34.3	67%	45%	7%
BNP PARIBAS	2,051,775.667	197,369	13.2	8.0	72.9	39%	32%	5%
BPER BANCA	73,669.024	12,422	14.2	6.7	83.9	55%	45%	7%
BRAIT SE, SOCIETAS EUROPAEA	2682.2374			−63.6				
BREWIN DOLPHIN HOLDINGS	595.8049333	1701		16.6				
Banca Transilvania / TRANSILVANIA BANK	16,235.3245	8739	18.0	19.1	46.1	50%	57%	10%
CAIXABANK	387,048.721	37,108	13.1	7.2	55.6	60%	39%	6%
CLOSE BROTHERS GROUP	11,152.55073	3234	13.3	12.6	66.1	71%	83%	13%
CMC MARKETS	348.4705333	657		20.8				
COMMERZBANK	459,002.3333	48,733	13.6	1.9	78.6		39%	6%
CREDIT AGRICOLE	1,647,440	73,114	13.2	6.8	67.2	23%	19%	3%
CREDITO EMILIANO	44,127.55667	6171	13.6	7.3	74.6	63%	32%	6%
DANSKE BANK	486,028.8406	20,819	20.2	10.6	66.3	6%	21%	4%
DEA CAPITAL	600.0916667	197		0.9				
DEUTSCHE BANK	1,373,514.333	92,290	15.1	−3.8	111.3	31%	25%	4%
DEUTSCHE BOERSE	144,735.2667	6126		18.3	54.2			4%
DEUTSCHE PFANDBRIEFBANK	57,528.33333	789	18.3	5.9	46.5	75%	27%	5%
DOVALUE	464.9096667	1618	26.1	20.5	62.5		26%	17%
ELECTRA PRIVATE EQUITY	512.1857816	6		−10.8				
ERSTE GROUP BANK	234,381.371	47,461	14.4	11.1	69.7	64%	49%	6%
EUROBANK ERGASIAS	60,929	13,483	16.6	2.8	47.7	77%	63%	10%
FINECOBANK BANK	25,031.95737	1356	21.6	27.7	40.8	13%	11%	4%
FLOW TRADERS	6485.160333	453		28.3				5%
GETIN HOLDING	5980.1983	5976	5.9	−14.7		84%	61%	5%
GETIN NOBLE BANK	12,790.94807	5037	8.9	−15.5	60.3	90%	78%	6%
GRENKE	5912.536	1453		15.6	52.6			15%
GROUPE BRUXELLES LAMBERT	26,411.7	424,467		4.2	56.8			7%
GRUPPO MUTUIONLINE	268.4663333	1693		39.5				
HOIST FINANCE	2814.730567	1489	12.4	13.0	82.2		84%	15%
HSBC HOLDINGS	2,249,800	233,189	17.3	5.7	93.3	44%	33%	6%
ILLIMITY BANK	1778.3588	193	21.4				72%	18%
ING GROEP	874,996.6667	52,776	16.4	9.4		74%	36%	6%
INTERMEDIATE CAPITAL GROUP	7552.726333	285		13.9	109.8			20%
INTERNATIONAL PERSONAL FINANCE	1514.855433	9733		13.5				

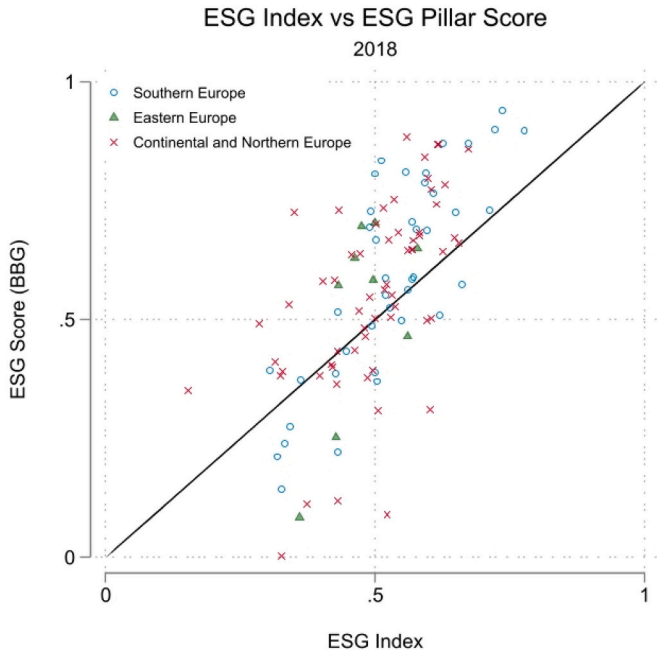
(continued on next page)

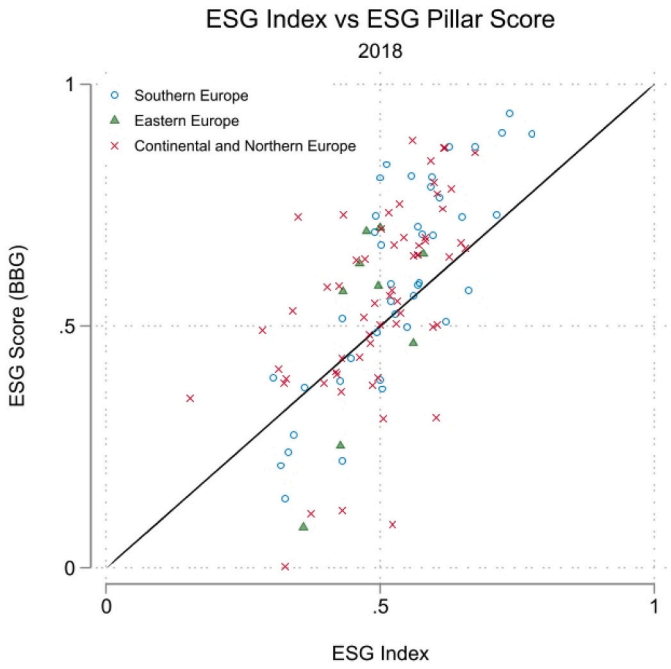
(*continued*)

Bank name	Total Assets (million €)	N employees	Tier1_Ratio	ROE investments	Efficiency Ratio	Gross loans / Total assets	RWAs/ Total assets	Equity/ Total assets
INTESA SANPAOLO	800,251	92,704	14.4	10.3	60.8		37%	7%
INVESTEC	65,067.9219	9357	12.6	16.1	66.6	45%	28%	8%
JANUS HENDERSON GROUP	6290.8489	2219		13.0				7%
JYSKE BANK	82,520.72513	3756	18.5	8.1	63.2	76%	30%	5%
KBC GROEP	288,913.6667	39,231	17.9	14.3	53.2	53%	33%	6%
LIBERBANK	38,878.87067	3879	14.0	−0.4	88.0	65%	46%	7%
LLOYDS BANKING GROUP	928,745.352	65,300	17.0	6.5			25%	6%
MARFIN INVESTMENT GROUP HOLDINGS	2383.021333	9654		−7.1				10%
MEDIOBANCA	73,663.605	4773	14.8	7.9	46.2	62%	62%	13%
METRO BANK	22,589.35907	3355	14.7	−3.0		49%	40%	7%
MLP SE	2463.398667	1730	19.6	8.0		29%	61%	17%
MONETA MONEY BANK	8159.0067	3375	18.1	15.8	47.2	62%	59%	12%
MONTE DEI PASCHI DI SIENA	133,943.735	22,877	14.4	−16.9	65.3	82%	45%	7%
NATIONAL BANK OF GREECE	64,703.66667	12,903	16.4	−4.2	55.0	81%	62%	9%
NATIXIS	504,079	21,035	11.3	8.0	71.3	30%	22%	4%
NATWEST GROUP	818,984.944	67,233	18.3	4.0	73.1		26%	6%
NEXI	5678.615667	1997		7.2		46%		27%
NORDEA BANK	562,622.6667	29,463	19.3	8.0	52.1	5%	26%	6%
OTP BANK	49,557.99887	41,097	14.4	19.0	53.2	52%	67%	12%
PARAGON BANKING GROUP	16,018.08783	1320	13.9	11.2	39.7		45%	8%
PERMANENT TSB GROUP HOLDINGS	21,620.33333	2386	14.7	0.7	74.8	92%	51%	10%
PICCOLO CREDITO VALTELLINESE	25,256.49767	3698	16.4	−5.1	84.9		44%	6%
POWSZECHNA KASA OSZCZEDNOSCI BANK POLSKI	76,147.9293	28,002	16.2	9.4	57.5	72%	65%	12%
PROVIDENT FINANCIAL	3346.683333	4152		15.7	55.7			4%
RAIFFEISEN BANK INTERNATIONAL	142,486.9993	47,884	14.7	11.3	62.5	81%	52%	8%
RATHBONE BROTHERS	3429.0551	1328	21.1	10.1			37%	15%
RESURS HOLDING	3619.359167	759	13.9	17.9	42.8	72%	77%	18%
RIT CAPITAL PARTNERS	3862.6565	55		6.8				9%
SCHRODERS	24,089.54993	4593		15.2				17%
SKANDINAVISKA ENSKILDA BANKEN	261,538.1281	15,174	20.7	13.5	51.3	6%	26%	6%
SOCIETE GENERALE	1,313,683.667	144,122	14.1	5.3	75.7	33%	27%	4%
SPAR NORD BANK	11,448.61563	1535	15.9	11.4	60.2	46%	62%	10%
STANDARD CHARTERED	598,296.9413	85,267	16.4	2.2	74.5	46%	39%	7%
SVENSKA HANDELSBANKEN	288,884.4365	12,246	21.4	11.7	48.1	7%	22%	5%
SWEDBANK	225,094.2286	14,887	21.6	14.9	43.0	7%	25%	6%
SYDBANK	19,065.1185	2064	18.7	10.1	61.1		40%	8%
TBC BANK GROUP	4971.499867	7172	15.9	21.9	44.9	18%	79%	14%
TCS GROUP HOLDING	5645.893867	21,249	18.3	57.3	47.9	4%	80%	14%
TRANSILVANIA BANK	63,509.33333	13,096	13.3	0.0	60.4	96%	85%	11%
UNICAJA BANCO	56,847.90067	6752	15.3	4.1	63.5	72%	43%	7%
UNICREDIT	841,536.2413	98,687	14.6	8.4	56.8	55%	44%	6%
VIRGIN MONEY UK	66,812.13387	7068	15.7	−5.3	18.0	64%	33%	6%
WITAN INVESTMENT TRUST	2618.175608	7		9.3				9%
WUSTENROT & WURTTEMBERGISCHE	73,069.52567	8095		6.1				6%

A.2. Comparison with Bloomberg's ESG score, arithmetic and geometric mean


ESG Index vs ESG Pillar Score
2018
Southern Europe
Eastern Europe
Continental and Northern Europe
ESG Score (BBG)
0
.5
1
ESG Index


ESG Index vs ESG Pillar Score
2018
Southern Europe
Eastern Europe
Continental and Northern Europe
ESG Score (BBG)
0
.5
1
ESG Index



A.3. Regression results - Linear regression

	(1)	(2)	(3)
Variables	ESG Index	Direct impacts	Indirect impacts
Total assets (ln)	0.033***	0.018***	0.063***
	(0.003)	(0.003)	(0.007)
Equity/Total assets	0.488**	0.508**	0.405
	(0.203)	(0.210)	(0.470)
RWAs/Total assets	−0.101**	−0.144***	−0.036
	(0.045)	(0.048)	(0.114)
Voice and accountability	0.140**	0.125*	0.134*
	(0.049)	(0.069)	(0.065)
F.I. Depth	−0.017	0.035	−0.142
	(0.045)	(0.034)	(0.088)
F.I. Access	0.086***	0.060**	0.118
	(0.020)	(0.027)	(0.076)
F.I. Efficiency	0.120	0.028	0.268
	(0.071)	(0.098)	(0.202)
Renewables (% sub energy)	−0.001	−0.001***	0.002
	(0.000)	(0.000)	(0.001)
Share of recycling (% total waste)	−0.003***	−0.004***	−0.001
	(0.001)	(0.001)	(0.002)
Quantile of loans/assets = 2	−0.008	0.004	−0.043
	(0.014)	(0.015)	(0.033)
Quantile of loans/assets = 3	−0.022	−0.008	−0.050
	(0.014)	(0.011)	(0.029)
region = 2, Eastern Europe	0.019	0.026	−0.011
	(0.013)	(0.020)	(0.044)
region = 3, Continental and Northern Europe	−0.035*	−0.053**	0.010
	(0.020)	(0.020)	(0.052)
Fiscal year = 2018	0.023***	0.017***	0.030***
	(0.005)	(0.006)	(0.010)
Fiscal year = 2019	0.055***	0.050***	0.061***
	(0.011)	(0.011)	(0.013)
Constant	−0.477***	0.112	−1.552***
	(0.082)	(0.085)	(0.230)
Observations	184	184	184
R-squared	0.766	0.587	0.703

Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Appendix B. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.eiar.2023.107216.

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