

Article

Beyond Profitability: ESG Performance and Financial Resilience of Banks in Romania and Poland

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Abstract

This study examines the relationship between ESG performance and financial performance and resilience in the banking sector, using a sample of systemically important banking institutions in Romania and Poland for the period 2020–2024. The study aims to assess the extent to which ESG performance contributes to improving financial performance and strengthening the financial resilience of banking institutions operating in these two emerging economies in Central and Eastern Europe. The research employs an empirical framework based on correlation analysis, panel regression models (Fixed Effects and Random Effects), selected on the basis of the Hausman test, with robust standard errors, as well as a robustness analysis using ESG variables lagged by one year. Financial performance is assessed using the Return on Assets (ROA) and Return on Equity (ROE) indicators, whilst financial resilience is analysed using the Capital Adequacy Ratio (CAR), Liquidity Coverage Ratio (LCR), Non-Performing Loans (NPLs) and Cost of Risk (CoR). ESG performance is examined both through the aggregate ESG score and through its individual environmental, social and governance components. The results highlight that ESG performance does not show statistically significant associations with traditional indicators of financial performance. Instead, the analysis reveals differentiated associations between the ESG components and indicators of financial resilience, with the social dimension being associated with credit risk indicators (NPL and CoR), whilst the environmental and governance components do not show significant effects in the estimated models. The study’s contribution lies in the simultaneous analysis of financial performance and financial resilience using a panel framework applied to banks in Romania and Poland, as well as in highlighting the heterogeneous nature of the relationship between ESG components and the various dimensions of financial resilience. The results complement the literature on the banking sector in Central and Eastern Europe and offer relevant implications for banking institutions, investors and regulators, without implying causal relationships between the variables analysed.



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1. Introduction

Changes in the global economic environment have led to a rethinking of how performance is perceived and assessed. Beyond traditional economic results, investors and

regulators are increasingly demanding greater transparency regarding the social and environmental impact of financial institutions. In this context, Environmental, Social and Governance (ESG) reporting has become a key tool for assessing sustainability and corporate responsibility, complementing conventional financial analysis. According to Park and Kim (2020), the banking sector plays a vital role in facilitating adaptation to climate change and in strengthening financial resilience in the face of climate risks [1]. Furthermore, banking institutions can actively contribute to mitigating these risks by channelling funding towards industries that are vulnerable from a sustainability and environmental perspective.

Through this research, we aim to explore the relationship between the level of ESG reporting and banking financial resilience in Romania and Poland, using an empirical approach based on data from the period 2020–2024. The sample comprises banking institutions selected on the basis of their relevance within the national banking systems and the availability of financial and ESG data. The panel structure of the data results in a total of 50 observations used in the empirical analysis. Romania and Poland provide a relevant empirical framework for analysing the relationship between ESG performance, financial performance and financial resilience. Both countries operate within the common regulatory framework of the European Union, and this combination allows for the examination of ESG-related relationships within two banking systems in Central and Eastern Europe that are institutionally comparable but economically distinct. Furthermore, although the relationship between ESG and banking performance has attracted increasing attention in the literature, comparative empirical evidence focusing specifically on banking institutions in Romania and Poland remains relatively limited. Consequently, this study contributes to expanding the existing evidence for Central and Eastern Europe and offers further insights into the varied relationships between individual ESG dimensions and various measures of financial performance and financial resilience. The main objective is to investigate the relationship between the financial performance and financial resilience of banking institutions and the extent of banks' engagement in ESG reporting. Financial resilience is measured by indicators such as return on assets (ROA), return on equity (ROE), capital adequacy ratio (CAR), non-performing loan (NPL) ratio, liquidity coverage ratio (LCR) and cost of risk (CoR).

The selection of the financial indicators used was based both on their theoretical relevance and their applicability within the specific context of the banking system. In the specialist literature, NPLs are frequently used to assess asset quality and the risk of default, particularly during periods of economic uncertainty. For example, Almarzoqi et al. (2015) highlight the role of NPL ratios in estimating credit risk [2], whilst Aldousari et al. (2025) emphasise their impact on stability during the COVID-19 pandemic [3].

By combining descriptive analysis with panel econometric models, our research offers an integrated perspective on banking sustainability and performance, making an original contribution to the specialist literature on sustainable governance and business continuity. This article distinguishes itself from other works, on the one hand, by: its exclusive focus on listed banks in Romania and Poland, providing a contextualised analysis of these two emerging markets which have received limited attention in the international literature; the integration of disaggregated ESG scores into the analysis of the multiple dimensions of financial resilience, rather than just traditional financial performance; the use of a unified empirical framework, which includes both traditional performance indicators (ROA, ROE, CAR) and risk indicators (NPL).

Furthermore, the study contributes to the literature on ESG and banking performance in Central and Eastern Europe, providing quantitative evidence from an emerging market with distinctive institutional characteristics. The research findings provide investors interested in sustainable finance with relevant benchmarks for assessing the ESG performance

of banking institutions and its implications for financial performance and resilience. Banks can gain a clearer understanding of which ESG dimensions influence financial performance, thereby supporting strategic decisions regarding reporting and governance. The research provides valuable insights into how sustainability is reflected in the stability of the banking system, which are useful for regulatory and reporting policies. Finally, the study contributes to the public debate on the responsibility of financial institutions and the sustainable transition.

The integration of ESG criteria into banking strategies is no longer seen merely as a reputational advantage, but as an essential prerequisite for financial resilience, business continuity and investor confidence. As such, the banking sector is becoming a key player in aligning the economy with the objectives of the European Green Deal and the requirements of the European Corporate Sustainability Reporting Directive (CSRD) on corporate sustainability reporting.

We note the lack of a unified ESG reporting framework and the need for empirical analyses of the relationship between ESG performance and financial performance. Therefore, through this research, we aim to address these shortcomings by conducting an empirical study of the links between the voluntary adoption of ESG principles and the financial resilience of banks operating in Romania and Poland. The choice of this topic is motivated by the need to understand whether, and to what extent, a focus on sustainability contributes to strengthening financial stability and reducing institutional vulnerabilities to economic, climate or governance risks. In this context, the present research is guided by the question: 'Can ESG reporting be considered a relevant indicator of banks' commitment to sustainability and, at the same time, a factor associated with their financial performance and resilience?

To facilitate a clear and coherent understanding of the scientific approach, this article is structured as follows: Section 2 provides a critical review of the specialist literature, identifying the main theoretical approaches and gaps in previous research. Section 3 describes the methodology used, including the selection of variables, the research design and the analytical techniques applied. Section 4 presents and interprets the results of the empirical analysis, whilst Section 5 discusses their theoretical and practical implications. Finally, Section 6 summarises the main conclusions, the limitations of the study and future research directions.

2. Literature Review

The literature review is conducted in a critical and structured manner, with the aim of highlighting the major lines of research in the field of the relationship between ESG responsibility and the banking sector, as well as their impact on financial resilience. This section has been divided into two distinct subsections: one on the theoretical foundations and the other on relevant empirical studies. This clear division helps to firmly ground the hypotheses in the relevant literature.

2.1. The Evolution of the ESG Concept and the Theoretical Foundations of Its Relationship with Financial Performance and Resilience

The ESG concept did not emerge as a standalone approach but rather represents the result of developments in the literature on corporate social responsibility and sustainable development. Early research focused on the concept of Corporate Social Responsibility (CSR), which emerged in response to social and institutional pressures, initially centring on voluntary actions by companies to meet society's expectations and address the negative impact of economic activities on the environment and communities [4]. However, the literature highlights the limitations of CSR: the selective implementation of initiatives, a

tendency towards greenwashing, a lack of integration of all stakeholders, and difficulties in comparing actions across industries and countries [5]. In many cases, CSR has remained at the level of a philanthropic or reputational strategy, without being systematically integrated into business decisions [6].

Sustainable development has expanded the logic of CSR, adding the dimension of sustainability and involving a holistic approach that combines social responsibility with economic and environmental objectives [7]. The Triple Bottom Line (TBL) model, proposed by Elkington (1997), marked a turning point in the evolution of the concept of corporate sustainability by extending the assessment of organisational performance beyond economic results and integrating social and environmental dimensions into the decision-making process [8]. Based on the People–Planet–Profit principle, the model provided a conceptual framework for the balanced analysis of organisations' economic, social and environmental performance [9]. However, the recent literature highlights that, although the TBL has contributed to the development of the sustainability paradigm, its practical application is often limited by the difficulty of simultaneously quantifying the three dimensions and by the lack of standardised indicators, particularly in the case of small enterprises and emerging economies [10]. These limitations have encouraged the development of more rigorous assessment frameworks, amongst which ESG has emerged as the predominant tool for measuring sustainable performance and non-financial risks.

In this context, the ESG concept has emerged as a natural evolution of previous approaches, responding to the need for standardisation, comparability and the integration of sustainability into financial and management decisions, going beyond the scope of CSR and TBL [7]. ESG provides concrete and transparent indicators for assessing performance across three dimensions: environmental, social and governance [11]. ESG has become particularly prevalent in the financial and banking sectors, as it enables the assessment of non-financial risks and influences companies' cost of capital, reputation and resilience [12].

CSR is largely voluntary and often reputation-driven, lacking rigorous and comparable assessment criteria, whereas ESG involves standardised reporting and the integration of these criteria into management and financial assessment processes [4]. ESG is seen as a tool for managing risks and opportunities, being directly incorporated into investment, lending and performance evaluation decisions [13]. Whilst CSR can be symbolic or philanthropic, ESG focuses on accountability and transparency, and ESG reporting reduces the risk of greenwashing and increases investor confidence [14].

ESG has become a dominant theme in financial and banking literature because it provides clear tools for assessing non-financial risks, influences the cost of capital and financial performance, and is associated with resilience during economic and geopolitical crises [10]. Studies show that firms with high ESG scores have access to cheaper finance and perform better, and that investors and financial institutions value these criteria in their lending and investment decisions [12,13]. ESG is used to distinguish between actual performance and token reporting, reducing the risk of greenwashing and strengthening corporate governance processes.

The evolution of the ESG concept from a voluntary reporting tool to a criterion used in assessing organisational performance has led to the development of several theoretical perspectives that explain the mechanisms through which ESG practices can influence both financial performance and financial resilience. Among these, stakeholder theory, signalling theory and the theory of resources and capabilities offer complementary explanations of how the integration of ESG criteria can generate long-term value and strengthen organisations' ability to adapt to economic and institutional changes.

Stakeholder theory holds that companies have responsibilities towards all stakeholders, not just shareholders [15]. The implementation of sound environmental, social and

governance (ESG) practices is one way in which banks can meet these multiple expectations, thereby strengthening sustainability and contributing to improved long-term financial performance and resilience.

Signalling theory supports the idea that companies can convey credible information to the market through their behaviour and the policies they adopt. ESG reporting can serve as a signal of transparency and accountability, reducing information asymmetry and strengthening investor confidence—factors which can support both the financial performance and the resilience of banking institutions [16].

The resources and capabilities theory emphasises that intangible resources, such as reputation, social capital or organisational culture, can generate sustainable financial performance [17]. ESG is regarded as an element of strategic capability, enabling banking institutions to improve their operational efficiency, reduce their risks and strengthen their ability to adapt in times of uncertainty, thereby contributing to increased financial resilience [10].

The theoretical foundations analysed justify an investigation into the relationship between ESG performance, financial performance and financial resilience. The focus then shifts to how this relationship is reflected in the literature on the banking sector.

2.1.1. ESG and Financial Resilience

In the specialist literature, studies examining the relationship between ESG performance and financial results have yielded mixed conclusions. Some researchers argue that there is a positive relationship between sustainability engagement and profitability [18,19], contending that ESG practices contribute to increased operational efficiency and reduced reputational risks. Other studies, however, highlight a weak or even negative correlation, citing the high costs associated with implementing ESG policies [20].

Financial resilience is increasingly associated with institutions' ability to integrate and manage ESG risks. Banks that implement sustainable strategies are considered better prepared to cope with external shocks, such as climate, pandemic or economic crises [21]. An emerging body of literature argues that firms with high ESG scores tend to demonstrate a greater capacity to adapt to exogenous shocks and instability, highlighting a potential link between sustainability and financial resilience [22]. These findings were empirically tested during the COVID-19 pandemic, which provided a critical context for assessing companies' ability to cope with systemic risk. Voltelinos et al. (2024) showed that firms with high ESG scores performed better on the stock market during the pandemic, particularly those with strong governance [22].

Recent literature highlights the importance of the social dimension (S) within the ESG framework on banking risk indicators, such as non-performing loans (NPLs) and the cost of risk (CoR), emphasising that social responsibility and sound social practices can directly influence the quality of the loan portfolio and the financial stability of banks [23].

At the same time, analysis of the banking sector indicates an inverse relationship between ESG risk and share price volatility. Banks with lower ESG exposure also exhibit lower volatility in their financial performance, suggesting a risk-mitigating effect attributable to sustainable practices [24]. This association is crucial in a context where investors are attaching increasing importance to non-financial risks. Although studies do not reach an absolute consensus, there is significant evidence to support the hypothesis that ESG can contribute to increasing the financial resilience of institutions.

2.1.2. ESG and the Banking Sector

At European Union level, the reporting of sustainability information is governed by a legislative framework designed to ensure the transparency, comparability and credibil-

ity of ESG information. In this regard, the Corporate Sustainability Reporting Directive (CSRD) has expanded and consolidated the requirements previously introduced by the Non-Financial Reporting Directive (NFRD), mandating the use of the European Sustainability Reporting Standards (ESRS), which were developed to ensure consistent and comparable reporting of sustainability information [25,26]. Furthermore, the reported information is subject to an external assurance process, which helps to increase the credibility and transparency of reporting and to reduce the risk of greenwashing. Through this regulatory framework, the European Union aims to ensure the reporting of reliable and comparable ESG information, thereby facilitating the assessment of sustainability performance and the integration of ESG factors into the operations and supervision of banking institutions [26,27].

Banks are increasingly integrating ESG factors into their strategies, driven not only by regulatory requirements but also by the growing focus among investors on supporting sustainable and environmentally responsible organisations [28]. The growing relevance of ESG in the banking sector has also been driven by changing stakeholder expectations. Investors, customers and society now attach greater importance to how banks address climate risks, diversity and corporate responsibility [29]. ESG has thus become a strategic consideration, not only for compliance but also for maintaining legitimacy and competitiveness in the financial sector [30].

With regard to the banking sector, the specialist literature highlights its dual role: on the one hand, as an organisation exposed to environmental, social and governance risks; and on the other, as a financial intermediary capable of supporting the transition to a sustainable economy [31]. The integration of ESG principles into banking operations is regarded as a key component of risk management and financial resilience, as it enables the early identification of vulnerabilities and strengthens relationships of trust with customers and investors [21].

In the case of Romania, the analysis of ESG reporting in the banking sector is at an early stage, with the specialist literature focusing on descriptive aspects and on the analysis of corporate social responsibility (CSR) as a precursor to ESG reporting. This confirms the need for empirical studies to assess, using quantitative data, the effects of ESG reporting on the financial resilience of Romanian banking institutions.

In the case of Poland, the literature highlights a growing interest among Polish banks in ESG reporting and performance, driven both by European sustainability requirements and by pressure from investors and other stakeholder groups [32]. However, the empirical findings regarding the impact of ESG on financial performance and resilience remain inconclusive, which justifies the need for further investigation in the context of the region's emerging economies.

2.2. Empirical Contributions on ESG and Financial Resilience in the Banking Sector

Numerous recent empirical studies have examined the link between ESG performance and financial resilience in the banking sector, with mixed results depending on the geographical context, the period under review and the indicators used.

Chiaromonte et al. (2022) found that ESG strategies enhance the financial resilience of European banks during times of crisis, particularly by reducing systemic risk and increasing operational efficiency [33]. In contrast, Horobet et al. (2025) provide evidence that ESG scores are positively correlated with return on assets (ROA) and return on equity (ROE) in EU banks, with significant differences across regions [34]. Mirza et al. (2025) show that, within the context of the informal group of emerging economies (BRICS), ESG performance combined with investment in technology has a positive impact on financial resilience, although the effect is more pronounced in countries with weak regulation [35]. Other

studies, such as those by Pyka et al. (2025) and Toth et al. (2021), highlight the importance of a coherent ESG reporting framework and the difficulties in comparing scores across institutions and countries [36,37].

To summarise these contributions, Table 1 presents a summary of the most relevant empirical research in the specialist literature:

Table 1. Summary of relevant empirical research on ESG and financial resilience in the banking sector.

Authors	Region	Sample	Methodology	Key Findings
Chiaramonte et al. (2022) [33]	Europe	European banks	Panel regression	ESG reduces systemic risk
Horobet et al. (2025) [34]	European Union	45. banks across 12 countries	Multiple regression	ESG positively correlated with ROE and ROA
Mirza et al. (2025) [35]	BRICS	50. banks	SEM and regressions	ESG has a positive influence
Pyka et al. (2025) [36]	Poland	Commercial banks	Panel regression	ESG linked to stability and profitability
Toth et al. (2021) [37]	Europe	Panel 2005–2020	Dynamic panel regression	ESG as a key factor for financial stability

Source: authors' projection.

The theoretical foundations presented, in particular stakeholder theory, signalling theory and the theory of resources and capabilities—support the view that the integration of ESG practices can generate economic and organisational benefits for banking institutions. However, the empirical literature highlights divergent findings regarding the relationship between ESG, financial performance and financial resilience, which justifies the formulation of the following research hypotheses.

From the perspective of stakeholder theory and signalling theory, ESG practices enable banking institutions to respond to stakeholders' expectations and reduce information asymmetry through more transparent reporting, which supports the expectation of a favourable effect on financial performance [15,16]. This relationship is also supported by recent empirical literature [25,27]. Consequently, the following hypothesis is formulated:

Hypothesis 1. *The adoption of ESG practices has a positive influence on the financial performance of banking institutions.*

From the perspective of resource and capability theory, ESG practices can represent a strategic resource that helps strengthen banking institutions' ability to manage risks and adapt to changes in the economic environment. In this context, ESG integration is associated with the development of organisational mechanisms that can strengthen financial resilience [10,17]. Consequently, the following hypothesis is formulated:

Hypothesis 2. *The integration of ESG practices has a positive influence on the financial resilience of banking institutions.*

The findings reported in the specialist literature suggest that the effects of environmental, social and governance dimensions are not uniform, with their intensity and direction varying according to the characteristics of the institutions analysed and the economic context [10,12]. Based on these arguments, the following hypothesis is formulated:

Hypothesis 3. *The impact of ESG on financial resilience differs depending on the sustainability dimension analysed.*

The banking literature highlights that the size of an institution is an important factor in explaining financial performance and financial resilience, as larger banks benefit from economies of scale, easier access to funding and additional resources for implementing ESG strategies and strengthening risk management mechanisms [38]. Consequently, the following hypothesis is formulated:

Hypothesis 4. *It is anticipated that bank size will have a positive influence on financial performance and financial resilience.*

3. Methodology

3.1. Conceptual Framework and Research Objectives

Hossain (2023) describes ESG reporting as the process of disclosing data relating to an organisation's environmental, social and governance practices and performance [39].

Financial resilience refers to an institution's ability to maintain business continuity in the face of economic shocks, crises or unforeseen risks. In the case of banks, financial resilience is reflected in capital adequacy, asset quality, liquidity and profitability. Resilient banks are those that can absorb losses, maintain the flow of credit and support the real economy even during periods of high volatility. In recent ESG literature, this concept is addressed from multiple perspectives: through the reduction in idiosyncratic risk [40], the improvement of operational and technical efficiency, as well as the strengthening of internal risk management mechanisms [3,41].

Numerous studies show that strong ESG performance can help to increase financial resilience by reducing reputational and operational risks, improving management and strengthening relationships with investors.

To achieve the aim of this research, we have formulated the following objectives:

Sub-objective 1. To identify the extent to which voluntary reporting of ESG information reflects a genuine commitment by banks to the principles of sustainability and corporate governance during the period 2020–2024.

Sub-objective 2. To determine the nature of the correlation between performance indicators and banking sector financial resilience, and the extent to which banks are involved in ESG reporting.

Sub-objective 3. To determine the extent to which ESG performance contributes to strengthening financial resilience.

3.2. Data Collection and Variables

Using the applied research methodology, we defined the analytical framework, objectives and tools used to assess the relationship between the adoption of ESG principles and the financial resilience of the selected banking institutions operating in Romania and Poland. The methodological approach is empirical and quantitative in nature, based on an analysis of the financial and non-financial data reported by the selected banks over the period 2020–2024.

The research is based on a sample comprising banking institutions, selected on the basis of their significant share of the national banking market and their high level of transparency regarding ESG reporting. The sample includes Banca Transilvania, BRD Groupe Societe Generale, Raiffeisen Bank Romania, ING Bank Romania and UniCredit Bank Romania, as well as PKO Bank Polski, Bank Pekao, ING Bank Slaski, mBank and Santander Bank Polska, analysed for the period 2020–2024. Their selection took into account

the availability of financial information and data for the entire period analysed, ensuring the comparability of the results obtained.

For the period 2020–2024, the analysis is based on financial and non-financial data extracted from annual and quarterly reports, sustainability reports and other official public sources. For each of the 11 variables analysed (7 financial and 4 non-financial), a wide range of quantitative and qualitative information covering the 5-year period was extracted and processed. The process involved over 700 individual operations to identify, verify and organise the data required to calculate the indicators used in the descriptive, correlational and econometric analyses. This detailed approach ensures the consistency and depth of the analysis and reflects the research's commitment to the empirical validity of the relationship between ESG performance and financial resilience in the banking sector under analysis.

We carried out the selection on the basis of clearly defined criteria, so as to allow for an appropriate comparison between entities with similar economic and structural characteristics, all operating in the same sector, thereby maximising the validity of the results obtained. A breakdown of each selection criterion is set out in Table 2 below:

Table 2. Description of the sample selection criteria.

Selection Criterion	Description of the Selection
Systemic and economic relevance	As regards Romania, the selected companies account for a combined share of over 75 per cent of the total assets of the Romanian banking system and are recognised by the National Bank of Romania as systemically important banks. In Poland, the sample includes some of the most representative listed banking institutions, which account for a significant share of the national financial system's activity.
Transparency and availability of information	All the banks included consistently publish annual reports and sustainability information, which enables the uniform collection of data and the comparison of trends over time.
Institutional and governance diversity	The sample includes both domestically owned institutions and subsidiaries of international banking groups.
Relevance to the research objective	The selected entities are among the first to have integrated ESG principles into their business strategies and public reporting processes.
Temporal availability of data	The period analysed coincides with the transition phase towards the implementation of Directive (EU) 2022/2464-CSRD, which allows us to observe how ESG reporting has evolved under the influence of European regulations and compliance pressures.

Source: authors' projection.

We compiled the database used in this research by integrating the financial and non-financial information published by the banks included in the sample, supplemented with data from institutional sources and specialist international platforms. I extracted information on traditional financial indicators from the banks' annual reports and from the LSEG (London Stock Exchange Group) database, which was used to ensure the comparability and consistency of financial and non-financial information. At the same time, we collected data on ESG performance from the sustainability and corporate governance reports published by each institution, as well as from specialised international databases (Refinitiv, now LSEG).

We have chosen the period under review, 2020–2024, both for its temporal relevance, as it corresponds to the transition towards the implementation of the European Corporate Sustainability Reporting Directive (CSRD), and for the opportunity it provides to observe the dynamics of ESG criteria adoption within the post-pandemic economic and legislative context. The sample also includes the years 2020–2021, which were characterised by the context created by the COVID-19 pandemic. Although no special treatment was applied to this period, it is recognised that the exceptional events of these years may have a particular influence on the behaviour of economic, financial and ESG indicators.

In order to achieve the research objectives, we have defined two sets of variables, expressed by the indicators shown in Table 3:

- (i) Financial indicators used to measure financial performance and resilience;
- (ii) Non-financial indicators reflecting the level of engagement in ESG reporting.

Table 3. Variables analysed in the study: econometric model, correlations and descriptive statistics.

No.	Variable Name	Symbol	Variable Description	Data Source	Role in the Analysis
Financial indicators					
1.	Return on assets	ROA	Net profit/Total assets $\times 100$	Annual reports, BVB	Dependent variable
2.	Return on equity	ROE	Net profit/Equity $\times 100$	Annual reports, BVB	Dependent variable
3.	Return on capital adequacy	CAR	Total capital/Risk-weighted assets $\times 100$	Annual reports, NBR	Resilience indicator
4.	Non-performing loan ratio	NPL	Non-performing loans/Total loans $\times 100$	Annual reports, NBR	Resilience/control indicator
5.	Liquidity coverage ratio	LCR	Liquid assets/Net cash outflows over 30 days $\times 100$	Annual reports, NBR	Resilience/control indicator
6.	Total assets	TA	Total assets expressed in billions of euros	Annual reports	Control indicator
7.	Cost of risk	CoR	Cost of risk (%) reported by the bank	Annual reports	Resilience/risk indicator
Non-financial indicators					
8.	Total ESG score	ESG_total	Composite assessment of performance across E, S and G dimensions (0–100)	Refinitiv, Sustainalytics, ESG reports.	Independent variable
9.	E, S and G components	E_Score S_Score G_Score	E, S, G sub-scores (0–100)	Refinitiv, Sustainability Reports.	Independent variable
10.	Existence of ESG reporting	Rap_ESG	Binary variable (1 = report published, 0 = no)	Bank's official website	Descriptive variable
11.	Type of ESG reporting	Report_Type	Categorical: 1 = integrated report; 2 = sustainability report; 3 = CSR section	Annual or sustainability reports	Descriptive variable

Source: authors' projection.

Unlike studies that use only an aggregate ESG score, this research analyses both overall ESG performance and its individual components (E, S and G) in order to capture any differential effects on financial performance and resilience.

According to the specialist literature and the Basel III regulatory framework, the financial resilience of banking institutions cannot be captured by a single indicator but requires a multidimensional approach. In this study, financial resilience is assessed using the capital adequacy ratio (CAR), which reflects banks' ability to absorb unexpected losses; the liquidity coverage ratio (LCR), which highlights their ability to cope with short-term liquidity shocks; the non-performing loan (NPL) ratio, used to assess the quality of the loan portfolio and exposure to credit risk, as well as the cost of risk (CoR), which reflects the level of expected losses associated with credit risk. Together, these indicators provide a comprehensive overview of banking institutions' ability to absorb financial shocks and maintain operational stability. By contrast, return on assets (ROA) and return on equity (ROE) are used exclusively to assess financial performance.

As the dataset has a balanced panel structure, panel regression techniques were used. Both fixed-effects and random-effects models were estimated. The Hausman specification test was applied to identify the appropriate estimator.

4. Research Results

4.1. Descriptive Analysis of the Variables

In order to provide an overview of the performance of the banks analysed over the period 2020–2024, we carried out a descriptive analysis of the main financial and non-financial indicators, including ESG scores. In the table below, Table 4, we have summarised the mean, minimum, maximum and standard deviation values for each variable included in the study.

Table 4. Descriptive analysis of variables.

	Mean	Median	Std. Dev.	Min	Max
ROA	1.2816	1.35	0.745138	−0.71	2.6
ROE	12.1132	11.69	8.318656	−7.76	34.06
CAR	19.3362	18.89	3.000043	14.5	25.3
NPL	3.1498	3.305	0.908692	1.5	5.45
LCR	232.0928	234.5	97.94493	126	767.3
TA	56.77348	41.57553	64.64831	10.02012	245.95
CoR	0.5832	0.595	0.30178	0.06	1.27
ESG_total	71.8912	74.65	9.433544	43.51	85.49
E_Score	75.0704	77.605	13.13918	47.35	94.05
S_Score	74.0052	73.77	6.849285	58.47	89.39
G_Score	74.7962	78.405	13.6237	43.9	94.25

Source: authors' projection using Excel. Note: TA represents total assets expressed in billions of euros (N = 50 observations).

The descriptive analysis highlights the general characteristics of the sample of banks analysed over the period 2020–2024, providing key insights into both financial performance and stated commitments to sustainability.

The results highlight the sound financial position of the banks included in the sample. Return on assets (ROA) stands at an average of 1.28 per cent, whilst return on equity (ROE) stands at an average of 12.11 per cent, indicating a satisfactory level of financial performance over the period analysed. The negative minimum values of these two indicators (−0.71% for ROA and −7.76% for ROE) suggest the existence of isolated episodes of poor performance, likely associated with the effects of the COVID-19 pandemic and subsequent economic uncertainties. Nevertheless, the positive median values confirm that the majority of banks have maintained adequate levels of profitability.

From the perspective of financial resilience, the institutions analysed demonstrate a high level of capitalisation and a comfortable liquidity position. The capital adequacy ratio (CAR) stands at an average of 19.34 per cent, significantly above the minimum requirements set by the Basel III regulations, indicating a high capacity to absorb financial shocks. Similarly, the liquidity coverage ratio (LCR) stands at an average of 232.09 per cent, well above the regulatory minimum threshold of 100 per cent, highlighting the existence of substantial liquidity reserves within the banking sector under review.

The quality of the loan portfolio is reflected in an average non-performing loan (NPL) ratio of 3.15 per cent, a figure that can be considered moderate within the context of the European banking sector. Furthermore, the cost of risk (CoR) stands at an average of 0.58 per cent, suggesting a relatively low level of loan impairment losses and provisioning requirements. At the same time, the variation observed in the NPL and CoR indicators

highlights differences between the banks analysed in terms of their risk profiles and the structure of their loan portfolios.

As regards the size of credit institutions, total assets (TA) amount to an average of 56.77 billion euros. The considerable difference between the minimum and maximum values highlights the heterogeneous nature of the sample, which includes both systemically important banking institutions and small banks. This aspect justifies the inclusion of bank size as a control variable in the econometric models developed previously.

An analysis of the ESG scores indicates a high level of integration of sustainability principles into the operations of the banks analysed. The total ESG score stands at an average of 71.89 points, whilst the environmental (E_Score), social (S_Score) and governance (G_Score) components have average scores of 75.07, 74.01 and 74.80 points respectively. These results suggest that banks in Romania and Poland have made significant progress in implementing ESG practices and in strengthening corporate governance and sustainability reporting mechanisms.

Overall, the descriptive statistics highlight the existence of a banking sector characterised by high levels of capitalisation, liquidity and ESG performance, alongside a moderate level of credit risk. These preliminary findings provide a favourable basis for investigating the relationship between ESG performance, financial performance and the resilience of banking institutions, an aspect analysed in the following sections of the study.

4.2. Correlations and Analysis of Statistical Relationships

In this section, we applied Pearson's correlation analysis to identify linear relationships between the variables analysed, both financial and non-financial. The results are illustrated in Table 5 below:

Table 5. Pearson correlation coefficients with statistical significance.

	ROA	ROE	CAR	NPL	LCR	TA	CoR	ESG_Total	E_Score	S_Score	G_Score
ROA	1.000 ***	0.819 ***	0.121	−0.501 ***	0.170	−0.579 ***	−0.425 ***	−0.044	0.123	0.008	0.097
ROE	0.819 ***	1.000 ***	0.112	−0.392 ***	0.378 ***	−0.355 **	−0.284 **	0.020	0.101	−0.061	0.051
CAR	0.121	0.112	1.000 ***	0.173	0.435 ***	−0.414 ***	0.267 *	−0.397 ***	−0.499 ***	0.159	−0.239 *
NPL	−0.501 ***	−0.392 ***	0.173	1.000 ***	−0.083	0.264 *	0.235	0.101	−0.221	0.412 ***	−0.016
LCR	0.170	0.378 ***	0.435 ***	−0.083	1.000 ***	−0.098	0.207	−0.132	−0.220	−0.048	−0.066
TA	−0.579 ***	−0.355 **	−0.414 ***	0.264 *	−0.098	1.000 ***	0.161	0.220	0.191	−0.195	0.175
CoR	−0.425 ***	−0.284 **	0.267 *	0.235	0.207	0.161	1.000 ***	0.031	0.016	0.006	−0.048
ESG_total	−0.044	0.020	−0.397 ***	0.101	−0.132	0.220	0.031	1.000 ***	0.566 ***	0.201	0.588 ***
E_Score	0.123	0.101	−0.499 ***	−0.221	−0.220	0.191	0.016	0.566 ***	1.000 ***	−0.201	0.536 ***
S_Score	0.008	−0.061	0.159	0.412 ***	−0.048	−0.195	0.006	0.201	−0.201	1.000 ***	−0.000
G_Score	0.097	0.051	−0.239 *	−0.016	−0.066	0.175	−0.048	0.588 ***	0.536 ***	−0.000	1.000 ***

Source: authors' projection. Notes: * $p > 0.10$, ** $p < 0.05$, *** $p < 0.01$.

To assess the preliminary relationships between financial performance, financial resilience and ESG performance, a matrix of Pearson correlation coefficients was calculated. This analysis allows the direction and strength of the associations between variables to be identified prior to estimating regression models and provides guidance on potential multicollinearity issues.

The results highlight the existence of a strong positive correlation between return on assets (ROA) and return on equity (ROE) ($r = 0.819$; $p < 0.01$), which confirms that banking institutions that make efficient use of their available assets also tend to generate higher levels of returns for shareholders. This result is consistent with the theoretical relationship between the two indicators and confirms the reliability of the database used.

With regard to the dimension of financial resilience, a negative relationship is observed between the non-performing loan (NPL) ratio and return on assets (ROA) ($r = -0.501$; $p < 0.01$), and between NPL and return on equity (ROE) ($r = -0.392$; $p < 0.01$). These results suggest that a deterioration in the quality of the loan portfolio affects banks' ability to

generate profit. Similarly, the cost of risk (CoR) shows negative correlations with both ROA ($r = -0.425$; $p < 0.01$) and ROE ($r = -0.284$; $p < 0.05$), confirming that most expenses associated with credit risk reduce banks' financial performance.

The analysis also reveals a positive relationship between liquidity and profitability. The liquidity coverage ratio (LCR) is positively correlated with ROE ($r = 0.378$; $p < 0.01$), indicating that institutions maintaining adequate liquidity reserves enjoy a more stable financial position and an enhanced ability to generate value for shareholders. At the same time, the LCR is positively correlated with the capital adequacy ratio ($r = 0.435$; $p < 0.01$), suggesting the existence of common mechanisms for strengthening financial resilience.

An interesting finding is the negative relationship between bank size, measured by total assets, and profitability indicators. Total assets show negative correlations with both ROA ($r = -0.579$; $p < 0.01$) and ROE ($r = -0.355$; $p < 0.05$). This result suggests that, within the sample analysed, larger banks do not necessarily achieve superior financial performance, a finding which can be explained by their higher operational complexity and the pressures associated with regulatory and compliance requirements.

With regard to ESG performance, the correlation analysis yields nuanced results. The total ESG score shows no statistically significant relationship with either ROA ($r = -0.044$; $p < 0.10$) or ROE ($r = 0.020$; $p < 0.10$). This result suggests that, at the bivariate level, ESG performance is not directly associated with the profitability of banking institutions. However, the absence of a simple correlation does not rule out the existence of indirect or conditional effects, which may become apparent in subsequent multivariate analyses.

Furthermore, the total ESG score shows a negative correlation with the capital adequacy ratio (CAR) ($r = -0.397$; $p < 0.01$). Although this result may seem counterintuitive at first glance, it may reflect structural differences between the banks analysed, namely that banks with more advanced ESG strategies are not necessarily those that maintain the highest levels of capitalisation. This aspect requires further investigation using regression models.

The analysis of the ESG components highlights relationships between the total ESG score and its individual components. The overall ESG score is positively correlated with both the environmental component, E_Score, ($r = 0.566$; $p < 0.01$) and the governance component, G_Score, ($r = 0.588$; $p < 0.01$), confirming the significant contribution of these dimensions to the overall assessment of ESG performance. The social component (S_Score) shows a positive, but statistically insignificant, association with the total ESG score ($r = 0.201$; $p < 0.10$). This result should not be interpreted as indicating a limited contribution of the social dimension to ESG performance, as the aggregate ESG score is constructed using a complex weighting methodology. The observed correlation reflects solely the degree of common variation between the two variables within the sample analysed.

Overall, the results of the correlation analysis indicate the existence of robust relationships between traditional indicators of financial performance and resilience, whilst the links between ESG performance and financial performance are less evident at the bivariate level.

These findings justify the use of panel regression models in the next stage of the research, as the effects of ESG on financial performance and resilience may only become apparent after controlling for the specific characteristics of banking institutions and the risk factors included in the analysis.

4.3. Panel Regression Analysis: Estimating the Impact of ESG Scores on Financial Performance

To achieve the subsequent objective O2—establishing the type of correlation between banking financial performance indicators and the level of banks' engagement in ESG reporting—we constructed a panel regression model. The financial indicators ROE and

ROA were considered as dependent variables, and the individual ESG components as independent variables, namely the size of the institution (TA) and the cost of risk (CoR), which are regarded as determinants of financial performance. The econometric model estimated for the analysis of return on equity is as follows:

$$ROE_{i,t} = \alpha + \beta_1 E_Score_{i,t} + \beta_2 S_Score_{i,t} + \beta_3 G_Score_{i,t} + \beta_4 TA_{i,t} + \beta_5 CoR_{i,t} + \varepsilon_{i,t} \quad (1)$$

where

- $ROE_{i,t}$ = return on equity;
- $E_Score_{i,t}$, $S_Score_{i,t}$, $G_Score_{i,t}$ = ESG components;
- $TA_{i,t}$ = total assets;
- $CoR_{i,t}$ = cost of risk;
- $\varepsilon_{i,t}$ = error term.

The estimated results for the ROE model are presented in the following Table 6:

Table 6. Fixed-effects panel regression results for the impact of ESG dimensions on return on equity (ROE).

Variable	Coefficient (β)	Std. Error	p-Value
E_Score	0.139	0.126	0.279
S_Score	−0.241	0.221	0.284
G_Score	0.177	0.117	0.141
TA	−0.054	0.035	0.140
CoR	−13.323 ***	3.294	0.000
Model statistics			
Statistic			Value
Within R ²			0.397
F-statistic			4.604
Prob (F-statistic)			0.002
Hausman p-value			0.028
Selected model			Fixed Effects
Observations			50.

Source: Authors' own calculations based on the study dataset using Python software (3.13). Note: Robust standard errors are reported. *** $p < 0.01$.

The choice of the fixed-effects model was based on the Hausman test ($p = 0.028$), which indicates that the individual effects specific to banking institutions are correlated with the explanatory variables and must be controlled for in the estimation process. Consequently, the fixed-effects model provides more consistent estimates for analysing the relationship between ESG performance and financial performance.

The results show that none of the three ESG components exhibits a statistically significant association with return on equity. Thus, the environmental score (E_Score ; $\beta = 0.139$; $p = 0.279$), the social score (S_Score ; $\beta = -0.241$; $p = 0.284$) and the governance score (G_Score ; $\beta = 0.177$; $p = 0.141$) are not significantly associated with ROE levels within the sample analysed. These results suggest that, during the period 2020–2024, improvements in ESG performance are not directly reflected in an increase in the return on equity of banking institutions in Romania and Poland.

The interpretation of these findings is consistent with the theoretical framework of the research, according to which ESG performance is one of the factors that can support organisational performance, but its effects do not manifest uniformly across all financial indicators.

With regard to the control variables, total assets (TA; $\beta = -0.054$; $p = 0.140$) do not show a statistically significant association with return on equity within the estimated

model. By contrast, the cost of risk (CoR; $\beta = -13.323$; $p > 0.001$) is negatively and significantly associated with ROE, indicating that a higher level of provisions for expected credit losses is accompanied by a decline in return on equity. This result is consistent with the specific mechanisms of banking, as an increase in the cost of risk reduces net profit and, consequently, the return to shareholders.

The model explains approximately 39.7% of the variation in return on equity at the level of each banking institution (Within $R^2 = 0.397$), and the F-test confirms the overall statistical significance of the model ($p = 0.002$). These results highlight the fact that, during the period analysed, financial performance as measured by ROE is influenced to a greater extent by factors specific to risk management than by the level of ESG performance.

The econometric model estimated for the analysis of return on assets is as follows:

$$ROA_{i,t} = \alpha + \beta_1 E_Score_{i,t} + \beta_2 S_Score_{i,t} + \beta_3 G_Score_{i,t} + \beta_4 TA_{i,t} + \beta_5 CoR_{i,t} + \varepsilon_{i,t} \quad (2)$$

where

- $ROA_{i,t}$ = return on assets;
- $E_Score_{i,t}$, $S_Score_{i,t}$, $G_Score_{i,t}$ = ESG components;
- $TA_{i,t}$ = total assets;
- $CoR_{i,t}$ = cost of risk;
- $\varepsilon_{i,t}$ = error term.

The estimated results for the ROA model are presented in the following Table 7:

Table 7. Fixed-effects panel regression results for the impact of ESG dimensions on return on assets (ROA).

Variable	Coefficient (β)	Std. Error	p-Value
E_Score	0.014	0.012	0.268
S_Score	−0.031	0.019	0.116
G_Score	0.019	0.009	0.063
TA	−0.000	0.002	0.773
CoR	−1.076 *	0.251	0.000
Model statistics			
Statistic			Value
Within R^2			0.390
F-statistic			4.475
Prob(F-statistic)			0.003
Hausman p-value			0.000
Selected model			Fixed Effects
Observations			50.

Source: Authors' own calculations based on the study dataset using Python software. Note: Robust standard errors are reported. * $p < 0.10$.

The choice of the fixed-effects model is supported by the results of the Hausman test ($p > 0.001$), which indicates that the estimation must control for the individual effects specific to each banking institution.

The results show that the environmental score (E_Score; $\beta = 0.014$; $p = 0.268$) and the social score (S_Score; $\beta = -0.031$; $p = 0.116$) are not significantly associated with return on assets. By contrast, the governance score (G_Score; $\beta = 0.019$; $p = 0.063$) suggests a tendency towards a positive association between the quality of corporate governance and return on assets.

With regard to the control variables, total assets (TA; $\beta = -0.001$; $p = 0.773$) do not show a statistically significant association with return on assets. By contrast, the cost of risk (CoR; $\beta = -1.076$; $p < 0.001$) is negatively and significantly associated with ROA,

indicating that an increase in costs arising from credit risk is accompanied by a reduction in the efficiency of asset utilisation. This result confirms the essential role of credit risk management in determining the financial performance of banking institutions.

The model explains 39 percent of the variation in return on assets at the level of each banking institution (Within $R^2 = 0.390$), and the overall statistical significance is confirmed by the F-test ($p = 0.003$), indicating that the estimated model has satisfactory explanatory power.

Consequently, the hypothesis regarding the positive influence of ESG performance on financial performance is only partially supported in the case of return on assets. Although the environmental and social components do not show statistically significant associations, the governance dimension indicates the existence of a positive trend, suggesting that the various ESG components may make distinct contributions to the financial performance of banking institutions.

4.4. Analysis of the Relationship Between ESG Reporting and Financial Resilience

To assess the extent to which ESG performance contributes to strengthening the financial resilience of the banking institutions analysed (sub-objective 3), four econometric models were estimated, with dependent variables comprising representative indicators of the main dimensions of financial resilience: capital adequacy (CAR), short-term liquidity (LCR), loan portfolio quality (NPL) and the cost of risk (CoR). This approach allows us to investigate how ESG components influence banks' ability to absorb shocks, maintain an adequate level of capital and effectively manage the risks associated with lending activities.

The estimated models are presented in Equations (3)–(6), as set out below:

$$CAR_{i,t} = \alpha + \beta_1 E_Score_{i,t} + \beta_2 S_Score_{i,t} + \beta_3 G_Score_{i,t} + \beta_4 TA_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$LCR_{i,t} = \alpha + \beta_1 E_Score_{i,t} + \beta_2 S_Score_{i,t} + \beta_3 G_Score_{i,t} + \beta_4 TA_{i,t} + \varepsilon_{i,t} \quad (4)$$

$$NPL_{i,t} = \alpha + \beta_1 E_Score_{i,t} + \beta_2 S_Score_{i,t} + \beta_3 G_Score_{i,t} + \beta_4 TA_{i,t} + \varepsilon_{i,t} \quad (5)$$

$$CoR_{i,t} = \alpha + \beta_1 E_Score_{i,t} + \beta_2 S_Score_{i,t} + \beta_3 G_Score_{i,t} + \beta_4 TA_{i,t} + \varepsilon_{i,t} \quad (6)$$

To assess the relationship between ESG performance and the various dimensions of financial resilience, four regression models were estimated, with the CAR, LCR, NPL and CoR indicators as dependent variables. The results of the estimations are summarised in Table 8, which presents the estimated coefficients, their associated statistics, and the main model validation indicators.

A comparative analysis of the four models allows us to identify the dimensions of financial resilience associated with ESG performance and to highlight any differences between the environmental, social and governance components. Furthermore, the inclusion of total assets (TA) as a control variable allows us to isolate the effect of the bank's size on the resilience indicators analysed.

In order to select the appropriate estimator, both fixed-effects and random-effects specifications were estimated for each model, with the final choice being made on the basis of the Hausman test. Consequently, the models relating to the CAR and LCR indicators were estimated using the fixed-effects estimator, whilst the random-effects estimator was selected for the NPL and CoR models.

The results highlight that the relationship between ESG performance and financial resilience varies depending on the indicator analysed. For the capital adequacy ratio (CAR) and liquidity coverage ratio (LCR), none of the ESG components show statistically significant associations. This result suggests that these indicators are influenced to a

greater extent by prudential requirements and the banking regulatory framework than by variations in ESG performance.

Table 8. The impact of ESG components on the financial resilience of banking institutions.

Variable	CAR	LCR	NPL	CoR
E_Score	−0.028 (0.021)	−1.724 (1.250)	−0.002 (0.009)	0.001 (0.004)
S_Score	−0.029 (0.042)	−2.253 (1.774)	0.053 *** (0.013)	0.008 *** (0.003)
G_Score	0.007 (0.026)	3.178 (2.038)	−0.010 (0.012)	−0.002 (0.005)
TA	0.001 (0.010)	−0.082 (0.361)	0.002 (0.002)	0.000 (0.001)
Selected estimator	Fixed Effects	Fixed Effects	Random Effects	Random Effects
R ²	0.085	0.094	0.823	0.596
F-statistic	0.841	0.929	53.419	16.939
Prob(F)	0.508	0.458	0.000	0.000
Hausmann <i>p</i> -value	0.000	0.005	0.336	0.525
N	50.	50.	50.	50.

Source: authors' projection based on data obtained using the PyCharm programme (3.13). Notes: Standard errors are shown in brackets. *** $p < 0.01$.

By contrast, for credit risk indicators, the social dimension of ESG is positively associated with both the non-performing loan (NPL) ratio ($\beta = 0.053$; $p < 0.01$) and the cost of risk (CoR; $\beta = 0.008$; $p < 0.05$). These results indicate the existence of a statistical relationship between social performance and credit risk indicators, without, however, implying a causal relationship.

Overall, the results obtained highlight a number of relevant relationships between the ESG dimensions and the indicators analysed, providing a basis for interpreting their implications. These findings are then analysed in relation to the specialist literature and the hypotheses formulated, with a view to highlighting the contributions and distinctive features of this study.

4.5. Robustness Diagnostics

4.5.1. Checking for Multicollinearity (Using the Variance Inflation Factor, VIF)

The Variance Inflation Factor (VIF) was used to assess the degree of multicollinearity; this is one of the most commonly used diagnostic methods in regression analysis. VIF values close to one indicate a low level of linear dependence between the explanatory variables, whilst values exceeding the threshold of 5 may signal the presence of multicollinearity issues. Similarly, Wooldridge (2019) emphasises that the presence of multicollinearity can lead to an increase in standard errors and a reduction in the precision of coefficient estimates, thereby affecting the interpretation of the relationships between variables [42]. Consequently, VIF analysis represents an essential step in assessing the robustness of the econometric models estimated in this study.

The results obtained are presented in the following Table 9:

Table 9. Results of the Variance Inflation Factor (VIF) test.

Variable	VIF
E_Score	1.495
S_Score	1.094
G_Score	1.445
TA	1.079

Source: own analysis using Python software.

The values calculated for all explanatory variables fall within a range of 1.079 to 1.495, which are considerably lower than the critical thresholds used in the specialist literature. These results indicate that the variables included in the econometric models provide distinct information and do not exhibit relationships of dependence strong enough to affect the stability of the estimates.

Consequently, the results suggest the absence of multicollinearity issues within the estimated models, which lends an additional degree of confidence to the interpretation of the regression coefficients presented in the previous sections. Furthermore, the low values of the VIF indicator confirm that the effects identified for the ESG components on certain dimensions of financial resilience are not generated by informational overlaps between the explanatory variables, but reflect specific relationships associated with each component analysed.

4.5.2. Testing for Heteroscedasticity in the Model

The following table summarises the results of the Breusch–Pagan test applied to check for the presence of heteroscedasticity within the estimated models. This test is a commonly used post-estimation tool for testing the hypothesis of homoscedasticity of the error terms [42]. The results are presented in Table 10 below:

Table 10. Results of the Breusch–Pagan test.

Diagnostic	Value	Reference Threshold	Result
CAR	$p = 0.091$	$p\text{-value} > 0.05$	No evidence of heteroscedasticity
LCR	$p = 0.635$	$p\text{-value} > 0.05$	No evidence of heteroscedasticity
NPL	$p = 0.592$	$p\text{-value} > 0.05$	No evidence of heteroscedasticity
CoR	$p = 0.526$	$p\text{-value} > 0.05$	No evidence of heteroscedasticity

Source: authors' projection using Python software.

The p -values associated with the Breusch–Pagan test are above the 5% threshold for all estimated models. Consequently, the null hypothesis regarding the homoscedasticity of errors cannot be rejected, indicating the absence of heteroscedasticity issues within the analysed models. These results support the robustness of the estimates and provide an additional level of confidence in the interpretation of the relationships identified between ESG performance, financial performance and financial resilience.

4.5.3. Robustness Analysis Using One-Year Lagged ESG Variables

To assess the robustness of the empirical results and mitigate potential concerns regarding the simultaneity between ESG performance and financial indicators, the panel models were re-estimated using ESG scores lagged by one year ($t - 1$). This approach allows for a temporal separation between the explanatory and dependent variables, helping to mitigate the risk of reverse causality and to verify the stability of the results obtained in the main analysis.

The results of the robustness analysis indicate that the main conclusions of the study hold even after the introduction of lagged ESG variables. In particular, the positive asso-

ciation between the social component and credit risk indicators (NPL and CoR) remains statistically significant, whilst no significant relationships are identified for the capital adequacy ratio (CAR). These results reinforce the robustness of the findings and suggest that the relationships identified are not determined solely by the use of ESG variables measured over the same period as the financial indicators. However, the use of ESG variables lagged by one period does not completely rule out the possibility of endogeneity; for this reason, the results should be interpreted as associations rather than as evidence of a causal relationship.

5. Discussion and Implications

This study set out to investigate the relationship between ESG performance, financial performance and financial resilience of banking institutions in Romania and Poland, using an approach based on panel regression models. Unlike studies that analyse only financial performance or aggregate ESG indicators, this study highlights the fact that the effects of ESG components differ depending on both the dimension of sustainability analysed and the financial indicator used to assess banking performance and resilience. Thus, the results confirm that the relationship between ESG performance and organisational performance is more complex than traditional approaches suggest, highlighting the existence of distinct mechanisms through which each ESG component can influence the various dimensions of banking activity.

5.1. ESG Adoption and Financial Performance

The results obtained for the profitability indicators (ROA and ROE) do not support the existence of a direct and statistically significant relationship between the ESG components and the financial performance of the banks analysed. Consequently, hypothesis H1 is not confirmed, suggesting that the integration of ESG criteria does not automatically lead to an improvement in return on assets or return on equity.

These findings are consistent with the conclusions drawn by Christensen et al. (2021) and Hummel and Jobst (2024), who highlight that the relationship between ESG performance and financial performance is not uniform, but depends on institutional characteristics, the period analysed and the econometric methodology used [25,26]. From this perspective, the results of this study confirm that the effects of ESG practices on banking profitability cannot be considered universal but must be analysed in light of the institutional context and the specific characteristics of the sample under investigation.

At the same time, the conclusions differ from those reported by Buallay (2019), who identifies a positive association between ESG performance and the profitability of banking institutions [38]. This difference does not necessarily represent a contradiction between the studies but reflects the heterogeneity of the results reported in the literature, driven by differences in the period analysed, the structure of the samples, the indicators used to measure ESG performance, and the econometric methods applied. Consequently, the results obtained reinforce the view that the relationship between ESG performance and financial performance remains complex, and that the conclusions reported in the specialist literature are not always consistent.

5.2. ESG Adoption and Financial Resilience

With regard to financial resilience, the results obtained partially support hypothesis H2, according to which the adoption of ESG practices contributes to strengthening the financial resilience of banking institutions. The panel analysis highlights that the influence of ESG practices is not uniform across all dimensions of financial resilience, sug-

gesting the existence of different mechanisms through which sustainability can influence financial stability.

This finding is consistent with the literature, which highlights that the relationship between ESG practices and financial resilience depends both on the characteristics of the institutions analysed and on the economic and institutional context in which they operate [10]. From this perspective, the results of this study confirm that ESG effects cannot be generalised across all indicators used to assess financial resilience. The analysis is then deepened by evaluating the individual effects of environmental, social and governance components on financial resilience indicators.

5.3. Heterogeneous Effects of ESG Dimensions on Financial Resilience

The results obtained only partially support Hypothesis H3, highlighting that the influence of ESG components on financial resilience varies depending on the sustainability dimension analysed and the financial indicator used. Of the three ESG components, only the social dimension shows statistically significant associations with credit risk indicators, whilst the environmental and governance dimensions do not show significant effects in the estimated models.

The literature reports a negative relationship between social performance and credit risk, arguing that the development of social practices contributes to improving the quality of the loan portfolio and reducing the level of non-performing loans [23,43]. In contrast, the results of this study indicate a positive association between the social dimension and the NPL and CoR indicators. This discrepancy suggests that the effects of social performance on banking risk depend on the institutional context, the characteristics of the sample and the specification of the econometric model, a point also highlighted by Lamanda et al. (2025) [32]. Overall, the results support the view that the impact of ESG on financial resilience must be analysed separately for each dimension of sustainability and for each category of banking risk.

5.4. The Role of Bank Size in Explaining Financial Performance and Resilience

The results do not confirm hypothesis H4, according to which the size of a banking institution has a positive influence on financial performance and financial resilience. Total assets, used as a measure of bank size, do not show any statistically significant associations with the indicators analysed, suggesting that size, in itself, is not a determining factor of performance or resilience in the sample under investigation.

These findings differ from those reported by Buallay (2019), who highlights a positive impact of a bank's size on financial performance and the implementation of ESG practices [38]. The differences can be explained by the characteristics of the sample analysed, the observation period and the econometric approach used, as well as by the fact that the institutions included in the study operate within a relatively homogeneous regulatory framework, which may reduce the influence of size on financial indicators.

Consequently, in the case of the banking institutions analysed, a bank's size does not constitute a sufficient competitive advantage to independently generate a higher level of financial performance or financial resilience. This finding highlights the fact that a mere increase in asset size does not guarantee improved performance.

5.5. Practical Implications

The results of this study highlight that the integration of ESG criteria should not be assessed solely through the lens of traditional profitability indicators, such as ROA and ROE, but also through their ability to influence various dimensions of financial resilience. From this perspective, bank managers should adopt a differentiated approach to ESG

strategies, given that the effects of environmental, social and governance components do not manifest uniformly across all financial indicators.

For regulators and supervisory bodies, the results suggest that the assessment of financial resilience in the context of the transition to sustainability should go beyond the analysis of traditional performance indicators and include specific dimensions of credit risk and ESG practices. At the same time, the results highlight the importance of analysing ESG components separately, as the use of an aggregate score may mask the different effects of environmental, social and governance dimensions on financial stability.

5.6. Theoretical Implications

Compared with existing studies on the banking sector in Central and Eastern Europe, which focus exclusively on profitability or on a single indicator of financial stability, this study integrates several complementary dimensions of financial resilience, offering a more comprehensive perspective on how ESG practices are associated with the stability of banking institutions.

Furthermore, the contribution of this study lies not only in analysing the relationship between ESG and financial performance, but also in highlighting the heterogeneous nature of the effects of ESG components on the various dimensions of financial resilience. The results show that the influence of ESG cannot be interpreted through a single, uniform relationship but varies depending on the component analysed and the financial indicator used, supporting the need for a distinct assessment of environmental, social and governance dimensions.

Furthermore, the study expands the empirical literature on the banking sector in Central and Eastern Europe by using banking institutions in Romania and Poland and by applying panel regression models supplemented with robustness analyses based on time-lagged ESG variables. This approach strengthens the robustness of the results and provides further evidence of the stability of the relationships identified between ESG performance and the financial indicators analysed.

6. Conclusions

The research aimed to investigate the relationship between ESG performance, financial performance and the financial resilience of banking institutions, against a backdrop of growing concerns regarding sustainability and the increasing role of the financial sector in supporting the transition to a responsible economy. By simultaneously integrating financial performance indicators and financial resilience indicators into a unified analytical framework, the study provided a comprehensive perspective on how ESG performance is associated with the operations of banking institutions.

The results highlight that the relationship between ESG performance and the financial results of banking institutions cannot be interpreted in a linear or uniform manner. The research suggests that the associations between sustainability and traditional financial performance manifest differently depending on the ESG dimension analysed and the financial indicator used. This finding confirms the complexity of the mechanisms through which sustainability can be linked to banking activity and highlights the need for analytical approaches that go beyond the exclusive use of aggregate ESG scores.

The main contribution of the study lies in highlighting the nuanced nature of the relationship between ESG performance and financial resilience. The results suggest that the environmental, social and governance dimensions do not exhibit identical associations with financial resilience, which supports the need to analyse ESG components individually in future research. From this perspective, the study complements the existing literature by highlighting that sustainability is not a homogeneous construct, and its associations

with the banking sector must be assessed according to the specific mechanisms of each dimension analysed.

At the same time, the research contributes to the development of the literature on financial resilience by integrating this dimension into the analysis of ESG performance. In the current context, characterised by economic uncertainty, regulatory pressures and the acceleration of sustainable transformation processes, financial resilience is becoming an essential element in assessing banking institutions' ability to respond to future challenges. In this regard, the study's findings support the view that the links between sustainability and banking should be assessed not only in terms of financial performance but also in terms of their contribution to strengthening the stability and adaptability of the banking system.

Given the observational nature of the research, the results should be interpreted as correlations between ESG performance and the financial indicators analysed, rather than as evidence of causal relationships.

From a practical perspective, the study's conclusions provide useful guidance for banking institutions, investors and regulators, highlighting the importance of integrating ESG in a manner that goes beyond reporting and compliance obligations. In a constantly changing economic environment, sustainability can serve as a strategic element linked to strengthening stakeholder trust, managing risks and enhancing financial institutions' ability to respond to economic, social and environmental changes.

6.1. Limitations of the Research

Despite its contributions, this study has a number of limitations. Firstly, the analysis is based on a relatively small sample of banks in Central and Eastern Europe, which may limit the generalisability of the conclusions to other banking systems. Secondly, the study relies on a single ESG data provider (Refinitiv), whilst ESG ratings may vary from one provider to another due to differences in assessment methodologies. Finally, although an additional robustness analysis was carried out using one-year lagged ESG variables, the observational nature of the research does not allow the identified relationships to be interpreted as causal.

6.2. Future Research Directions

In conclusion, we present a number of aspects that may serve as starting points for further research. Firstly, the analysis was conducted for the period 2020–2024, providing a relevant perspective on the relationship between ESG performance and financial resilience in an economic context undergoing transformation. Extending the analysis period and including additional banking systems could help to capture longer-term trends. Secondly, the research focused on a set of financial and financial resilience indicators frequently used in the specialist literature. Investigating additional dimensions of banking performance, such as market indicators, systemic risk or advanced measures of financial resilience, could complement the perspective offered by this study. These avenues do not diminish the relevance of the conclusions reached but rather highlight opportunities to expand research in a field that is constantly evolving and of growing importance for the stability and sustainable development of the financial sector.

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Abbreviations

The following abbreviations are used in this manuscript:

ESG	Environmental, Social and Governance
MSCI	Morgan Stanley Capital International
BVB	Bucharest Stock Exchange
CSRD	Corporate Sustainability Reporting Directive
ROE	Return on Equity
ROA	Return on Assets
TA	Total Assets
CAR	Capital Adequacy Ratio
NPL	Non-performing Loans
LCR	Liquidity Coverage Ratio
BNR	National Bank of Romania
MC	Market Capitalisation
CoR	Cost of Risk
LSEG	London Stock Exchange Group

References

1. Park, H.; Kim, J.D. Transition towards green banking: Role of financial regulators and financial institutions. *Asian J. Sustain. Soc. Responsib.* **2020**, *5*, 5. [CrossRef]
2. Almarzoqi, R.; Ben Naceur, S.; Scopelliti, A.D. *How Does Bank Competition Affect Solvency, Liquidity and Credit Risk? Evidence from the MENA Countries*; IMF Working Paper No. 15/210; International Monetary Fund: Washington, DC, USA, 2015. [CrossRef]
3. Aldousari, A.; Alsabah, M. ESG Integration and Technical Efficiency: A Comparative Frontier Analysis in the Kuwaiti Financial Sector. *Sustainability* **2025**, *17*, 10231. [CrossRef]
4. Sheehy, B.; Farneti, F. Corporate Social Responsibility, Sustainability, Sustainable Development and Corporate Sustainability: What Is the Difference, and Does It Matter? *Sustainability* **2021**, *13*, 5965. [CrossRef]
5. Halme, M.; Rintamaki, J.; Kuisma, M. When Is There a Sustainability Case for CSR? Pathways to Environmental and Social Performance Improvements. *Bus. Soc.* **2020**, *59*, 1181–1227. [CrossRef]
6. Plavcan, P.; Trost, M.; Bakova, V. Social Management and Sustainability in Slovakia: Comparing Approaches in Companies and Non-profit Organisations in an International Context. *Risus-J. Innov. Sustain.* **2026**, *17*, 41–54. [CrossRef]
7. Cantele, S.; Landi, S.; Vernizzi, S. Measuring corporate sustainability in its multidimensionality: A formative approach to integrate ESG and triple bottom line approaches. *Bus. Strategy Environ.* **2024**, *33*, 7383–7408. [CrossRef]
8. Elkington, J. *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*; Capstone Publishing: North Mankato, MN, USA, 1997. Available online: <https://dn721609.ca.archive.org/0/items/BusinessMoneyBooksarchive/Cannibals%20With%20Forks%20-%20The%20Triple%20Bottom%20Line%20of%2021st%20Century%20Business.pdf> (accessed on 20 February 2026).
9. Varyash, I.; Mikhaylov, A.; Aleshin, K. Triple Bottom Line and Corporate Social Responsibility Performance Indicators for Russian Companies. *Entrep. Sustain. Issue* **2020**, *8*, 313–329. [CrossRef] [PubMed]
10. Lu, J.; Rodenburg, K.; Pegoraro, A. Are firms with better sustainability performance more resilient during crises? *Bus. Strategy Environ.* **2022**, *31*, 3354–3370. [CrossRef]
11. Chapagain, R.; Khanal, G.; Maraseni, T. Sustainable finance and institutional performance: A bibliometric analysis and systematic review. *Next Sustain.* **2025**, *6*, 100198. [CrossRef]
12. Habib, A.; Olah, J.; Khan, M.H.; Smutka, L. Does integration of ESG disclosure and green financing improve firm performance: Practical applications of stakeholders theory. *Heliyon* **2025**, *11*, e41996. [CrossRef] [PubMed]

13. Eliwa, Y.; Aboud, A.; Saleh, A. ESG practices and the cost of debt: Evidence from EU countries. *Crit. Perspect. Account.* **2021**, *79*, 102097. [CrossRef]
14. Cahyono, S.; Ardianto, A.; Djajadikerta, H.G. From Triple Bottom Line to Triple Checks: The Interplay Between ESG, Conservatism, and Investor Trust. *Bus. Strategy Dev.* **2026**, *9*, e70323. [CrossRef]
15. Freeman, R.E. *Strategic Management: A Stakeholder Approach*; Pitman: London, UK, 1984. Available online: [https://books.google.ro/books?hl=ro&lr=&id=NpmA_qEiOpkC&oi=fnd&pg=PR5&dq=22.+Freeman,+R.+E.+\(1984\).+Strategic+management:+A+stakeholder+approach.+Pitman%3B&ots=62jjE7RaQJ&sig=fDsLQcjp01MhNjWF8J5uvFpA7NM&redir_esc=y#v=onepage&q&f=false](https://books.google.ro/books?hl=ro&lr=&id=NpmA_qEiOpkC&oi=fnd&pg=PR5&dq=22.+Freeman,+R.+E.+(1984).+Strategic+management:+A+stakeholder+approach.+Pitman%3B&ots=62jjE7RaQJ&sig=fDsLQcjp01MhNjWF8J5uvFpA7NM&redir_esc=y#v=onepage&q&f=false) (accessed on 20 March 2026).
16. Spence, M. Job market signalling. *Q. J. Econ.* **1973**, *87*, 355–374. [CrossRef]
17. Barney, J. Firm resources and sustained competitive advantage. *J. Manag.* **1991**, *17*, 99–120. [CrossRef]
18. Gerged, A.M. Factors affecting corporate environmental disclosure in emerging markets: The role of corporate governance structures. *Bus. Strategy Environ.* **2021**, *30*, 609–629. [CrossRef]
19. Khan, M.; Serafeim, G.; Yoon, A. Corporate sustainability: First evidence on materiality. *Account. Rev.* **2016**, *91*, 1697–1724. [CrossRef]
20. Ferriani, F.; Natoli, F. ESG risks in times of COVID-19. *Appl. Econ. Lett.* **2021**, *28*, 1537–1541. [CrossRef]
21. Cornett, M.M.; Erhemjamts, O.; Tehranian, H. Greed or good deeds: An examination of the relationship between corporate social responsibility and the financial performance of US commercial banks around the time of the financial crisis. *J. Bank. Financ.* **2016**, *70*, 137–159. [CrossRef]
22. Voltelinos, D.; Passas, I.; Floros, C.; Garefalakis, A. Corporate Social Responsibility and Country Governance: An International Comparative Study Amid the COVID-19 Pandemic. *Int. J. Financ. Stud.* **2024**, *12*, 110. [CrossRef]
23. Boussaada, R.; Hakimi, A.; Karmani, M. Non-performing loans and bank performance: What role does corporate social responsibility play? A system GMM analysis for European banks. *J. Appl. Account. Res.* **2023**, *24*, 859–888. [CrossRef]
24. Sorathiya, A.; Saval, P.; Sorathiya, M. Data-Driven Sustainable Investment Strategies: Integrating ESG, Financial Data Science, and Time Series Analysis for Alpha Generation. *Int. J. Financ. Stud.* **2024**, *12*, 36. [CrossRef]
25. Christensen, H.B.; Hail, L.; Leuz, C. Mandatory CSR and sustainability reporting: Economic analysis and literature review. *Rev. Account. Stud.* **2021**, *26*, 1176–1248. [CrossRef]
26. Hummel, K.; Jobst, D. An Overview of Corporate Sustainability Reporting Legislation in the European Union. *Account. Eur.* **2024**, *21*, 320–355. [CrossRef]
27. Fiechter, P.; Hitz, J.M.; Lehmann, N. Real Effects of a Widespread CSR Reporting Mandate: Evidence from the European Union's CSR Directive. *J. Account. Res.* **2022**, *60*, 1499–1549. [CrossRef]
28. Eceiza, J.; Harreis, H.; Härtl, D.; Viscardi, S. *Banking Imperatives for Managing Climate Risk*; McKinsey & Company: Tokyo, Japan, 2020. Available online: <https://netzerohub.id/wp-content/uploads/2022/02/banking-imperatives-for-managing-climate-risk.pdf> (accessed on 13 February 2026).
29. Cavallaro, E.; Sessa, M.R.; Malandrino, O. Sustainable finance disclosure regulations as a tool for changing the urban environment. In *Computational Science and Its Applications, ICSSA 2024 Workshops*; Lecture Notes in Computer Science; Springer: Berlin/Heidelberg, Germany, 2024; Volume 14824, pp. 153–169. [CrossRef]
30. Komarnicka, A.; Komarnicki, M. Challenges in the EU banking sector, as exemplified by Poland, in light of legislative changes relating to the prevention of the climate crisis. *Energies* **2022**, *15*, 699. [CrossRef]
31. Weber, O. Corporate sustainability and financial performance of Chinese banks. *Sustain. Account. Manag. Policy J.* **2017**, *8*, 358–385. [CrossRef]
32. Lamanda, G.; Tamasne, Z.V. Is banks' ESG disclosure associated with financial depth and economic growth? Evidence from the Visegrad Four countries. *Environ. Dev.* **2025**, *55*, 101233. [CrossRef]
33. Chiaramonte, L.; Dreassi, A.; Girardone, C.; Piserà, S. Do ESG strategies enhance bank stability during financial turmoil? Evidence from Europe. *Eur. J. Financ.* **2022**, *28*, 1173–1211. [CrossRef]
34. Horobet, A.; Rahat, B.; Floarea, A.M.; Belascu, L. Green banks, golden returns? Unravelling the ESG–financial performance nexus in European banking. *Rev. Account. Financ.* **2025**, *24*, 259–285. [CrossRef]
35. Mirza, N.; Umar, M.; Lobont, O.R.; Safi, A. ESG lending, technology investment and banking performance in BRICS: Navigating sustainability and financial stability. *China Financ. Rev. Int.* **2025**, *15*, 324–336. [CrossRef]
36. Pyka, I.; Karkowska, R.; Nocoń, A. ESG activities and their influence on commercial banks' profitability and financial stability. *J. Entrep. Manag. Innov.* **2025**, *21*, 54–75. [CrossRef]
37. Tóth, B.; Lippai-Makra, E.; Szládek, D.; Kiss, G.D. The contribution of ESG information to the financial stability of European banks. *Penzugyi Szle./Public Financ. Q.* **2021**, *66*, 429–450. [CrossRef]
38. Buallay, A. Is sustainability reporting (ESG) associated with performance? Evidence from the European banking sector. *Manag. Environ. Qual.* **2019**, *30*, 98–115. [CrossRef]
39. Hossain, D.M. Environmental, Social and Governance (ESG) reporting: An overview. *ResearchGate* **2023**. [CrossRef]

40. Takahashi, H.; Yamada, K. When the Japanese stock market meets COVID-19: Impact of ownership, China and US exposure, and ESG channels. *Int. Rev. Financ. Anal.* **2021**, *74*, 101670. [[CrossRef](#)]
41. Algeri, C.; Brighi, P.; Venturelli, V. Integrating ESG factors into the cost-efficiency frontier: Evidence from European listed banks. *Bus. Strategy Environ.* **2025**, *34*, 3242–3270. [[CrossRef](#)]
42. Wooldridge, J.M. *Introductory Econometrics: A Modern Approach*, 7th ed.; Cengage Learning: Noida, India, 2019. Available online: https://www.kufunda.net/publicdocs/Wooldridge-Introductory-Econometrics_-A-Modern-Approach-6th-Edition-c2016.pdf (accessed on 15 March 2026).
43. Conca, L.; Toma, P.; Colamartino, C.; Campobasso, F. Assessing resilience in banking: The influence of ESG on credit risk during economic crises. *Meas. Bus. Excell.* **2026**, *30*, 128–143. [[CrossRef](#)]

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