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Article

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ADAPTATION OF BANKS TO SUSTAINABILITY REQUIREMENTS AND IMPACT ON THEIR FINANCIAL PERFORMANCE

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Abstract

At the banking system level, the implementation of sustainability requirements is an important goal in order to ensure long-term financial performance. Transparency of information included in banks' sustainability reports can be assessed through methodologies based on environmental impact criteria, governance, and social aspects (ESG). A high score on the impact criteria can bring benefits to the level of banks, but at the same time, the adoption of sustainability policies can increase operational costs. In this context, the objective of this research is to identify the correlation between a series of indicators that measure the performance of ESG and the financial performance of banks. The research is based on the econometric analysis applied to a sample of 76 banks in Europe for the period 2020-2023. Information was collected from the LSEG Refinitiv Eikon database, using financial indicators and ESG scores reported by banks, thus ensuring a relevant benchmarking analysis. The results obtained indicate a significant relationship between the financial performance of European banks and the factors of ESG, highlighting a negative correlation between the return on assets (ROA) and the governance score (G), as well as a positive influence of the ESG score on the return on equity (ROE). This research highlights how ESG factors influence the financial performance of European banks and their climate risk management strategies. It provides essential information for policymakers, investors, and regulators looking to integrate sustainability into banking practices.

Keywords: performance, banks, sustainability, ESG scores, reporting.

JEL classification: G21, L25, M40.

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Introduction

Over the last decade, non-financial reporting has evolved from voluntary reporting to mandatory reporting. The transition to the obligation to report non-financial information has been carried out and will be carried out gradually depending on the size and category of entities. Banks considered public interest entities were from the beginning in the first tier of companies that were required to prepare these reports.

Given that over time there were a multitude of standards based on which non-financial and sustainability reports could be drawn up, it was found that the reports were difficult to compare from one company to another. To allow comparability of reporting, the International Sustainability Standards Board (ISSB, 2023) and the European Financial Reporting Advisory Group (EFRAG, 2023) have collaborated to align reporting requirements by reducing complexity and avoiding duplication of company efforts. Of all financial markets, European Union (EU) companies have a well-defined reporting framework (European Commission, EC, 2023), being obliged to apply EU regulations.

Also, due to the multitude of indicators reported by companies, it is difficult to measure whether the activities and values reported reflect reality, or only reports are prepared that present the favourable image of companies, known as "greenwashing" reports, and more recently by "ESG washing" (Todaro and Torelli, 2024). From the need to increase investor confidence, companies turn to rating agencies that, based on their methodologies to assess sustainability reports, calculate scores on the transparency of the information published in these reports. These scores are known as ESG scores, respectively, for Environmental (E), Social (S), and Governance (G) activities.

Implementing actions that meet ESG requirements involves high costs for companies, a situation that also influences the financial performance of banks. Banks, as entities with a significant impact on the economy, must choose their strategies for ESG activities both for their own business and for customers, being a model of good practice for them.

Current research on the impact of ESG on financial performance is the focus of many researchers, not only in the business field but also in other fields. Research is very diverse, both in terms of impact on companies in different sectors or in different geographical areas, and as indicators analysed according to different research methodologies. Regarding banks, studies were carried out with samples of banks from the same region, especially from Europe (Buallay, 2019; La Torre, Leo and Panetta, 2023; Czaja-Cieszyńska, Kordela and Garanti, 2024) or samples of banks internationally (Wang et al., 2024; Mijoč, Kuzmić and Vujanić, 2025).

In Europe, ESG regulations are the most stringent, so banks with already accumulated experience have reached a higher level of implementation than banks in other regions, as well as companies in other sectors of activity. Therefore, in order to highlight the most recent situation of the evolution of the impact of ESG regulations in Europe, the chosen sample is represented by the banks in this region, the data over 4 years, respectively, 2020-2023, being analysed. This research investigates the relationship between the indicators expressed by ESG, general, and by each criterion (E, S, G) as independent variables, and the financial performance of banks, expressed by return on assets (ROA), equity (ROE), and earnings before interest, taxes, depreciation, and amortisation (EBITDA) performance as dependent variables. The proposed econometric model consists of random effect regression analyses used to assess the impact of ESG factors on the financial performance of European banks.

The methodology used allows capturing individual variations between banks, reducing the risk of specification errors, and providing accurate and generalisable estimates. For data control, control variables that reflect the characteristics of banks, represented by total assets, nonperforming loans, and financial leverage were also included.

The article contributes to existing research through the proposed econometric model and the results obtained, which can be useful in both future academic research and in the management of banks, as it shows a recent picture of the main banks in Europe in terms of the relationship between ESG and financial performance.

The paper is structured as follows: in the following section, the literature on the studied topic is reviewed, after which the research methodology is presented, including information about the source of the data used, the selected sample, the variables, and the econometric model tested. The paper continues with the section on results and discussions, finally drawing the main conclusions, limits, and future directions of research.

1. Review of the scientific literature

Climate change can influence banks' financial performance through multiple channels: physical risks (e.g., natural disasters affecting assets and borrowers' repayment capacity), transition risks (e.g., strict decarbonisation policies affecting the loan portfolio), as well as reputational and compliance risks (FSB, 2021; ECB, 2023).

According to the Annual Report 2021 of the Financial Stability Board (FSB), these risks can affect both the assets and liabilities of financial institutions, thus influencing their profitability and solvency. Furthermore, both the FSB and the European Central Bank (ECB) stressed the need for banking institutions to improve their climate risk information reporting practices and adopt globally comparable reporting standards to increase transparency and a more accurate assessment of climate risk exposure.

Banks face significant challenges due to climate change, which affects systemic risk, profitability, and credit supply (Lee and Alam, 2024; Afzal et al., 2024; Wu et al., 2024). Adaptation strategies, including green technology, legislative support, and climate change adaptation policies, are key to mitigating these risks and improving financial performance (Heo, 2024; Afzal et al., 2024).

Organisational adaptation is the key to understanding how banks respond to the increasing risks posed by climate change. As environmental risks become more apparent, organisations must transform to meet new market demands, regulations, and expectations. Thus, organisational transformation theory provides insights into how organisations can evolve in terms of structures, processes, and culture to effectively manage these risks (Howard-Grenville and Lehneman, 2021; Assoratgoon, 2023; Probojakti et al., 2024).

The literature highlights that banking institutions that do not manage these risks may experience increases in impairment adjustments and the rate of non-performing loans, which reduces return on assets (ROA) and equity (ROE) (Battiston et al., 2021; Roncoroni et al., 2021; Martin, 2025; Mijoč, Kuzmić and Vujanić 2025; Socol and Iuga, 2025).

Therefore, based on the specialised literature, hypothesis H1 was established, starting with the finding that poor management of climate risks can negatively affect bank profitability,

and the organisational adaptation of banks to these risks, reflected in the ESG performance, could contribute to improving the return on assets (ROA).

H1: Bank organisational adaptation to climate change risks, as reflected in ESG performance, has a significant impact on return on assets (ROA), suggesting that better climate risk management is associated with higher return on banking assets.

Banks that implement sustainability policies can benefit from better risk management and positive investor perception (Friede Busch and Bassen, 2015). Furthermore, climate reporting and sustainability are enforced through European regulations such as the Corporate Sustainability Reporting Directive (CSRD) and the EU Taxonomy Regulation (European Commission - EC, 2022). In particular, the climate governance (G) component plays a key role by establishing clear climate risk management frameworks and aligning banking strategies with EU required sustainability regulations such as CSRD and EU Taxonomy Regulation (EC, 2020). Banks with a well-defined climate adaptation strategy can adjust the capital structure to maintain a balance between risk exposure and long-term profitability opportunities. Using an optimal level of financial leverage (L) is an important factor in determining ROE, as it influences both funding costs and the ability of banks to absorb financial shocks caused by climate risks (Battiston et al., 2021, Le et al., 2023).

Therefore, in the context of European regulations and increasing climate risk transparency requirements, banks that integrate a robust climate governance (G) framework can avoid penalties, improve investor relations, and gain competitive advantages in accessing sustainable capital (Giese et al., 2021; Fu et al., 2024). Analysing the literature, we found that there is a theoretical and empirical framework that supports the assumption that banks that integrate climate adaptation into their ESG strategy record a higher return on equity (ROE).

H2: Banks integrating climate change risk adaptation strategies through improved ESG performance record a higher return on equity (ROE), and the implementation of a robust climate governance framework (G) and an appropriate level of financial leverage (L) are significant factors in this relationship.

The literature suggests that climate change risks can have a significant impact on financial performance of financial performance, but this impact varies depending on the indicator chosen. Although ROA and ROE are more directly influenced by climate risk management, the impact on indicators such as EBITDA/TA may be less significant, but still relevant for assessing the efficiency of total asset management. Shu et al. (2023) show that banks that implement climate risk adaptation strategies and sustainability policies can optimise the use of their assets. The article examines how the risk associated with carbon policy influences corporate decisions, including asset utilisation adjustments and financial strategies, as well as the relationship of these factors with performance indicators such as EBITDA.

The approach of a well-defined ESG framework can positively influence the efficiency of total assets (EBITDA/TA), given that sustainability measures contribute to reducing operating costs and improving overall performance (Deloitte, 2023). Friede et al. (2015) state that organisations that adopt effective ESG strategies are able to better manage their resources and assets. Therefore, in this context, they can achieve a higher EBITDA relative to total assets. These measures help increase operational efficiency without placing significant pressure on return on assets (ROA) or equity (ROE) (Verriest et al., 2018).

Adopting climate transition strategies helps banks more effectively manage the risks associated with their assets, especially those that may be affected by direct climate change, such as real estate assets or loan portfolios. Good climate risk management can help reduce income volatility, which can indirectly lead to improved EBITDA/TA, as the additional costs generated by climate risks are minimised.

Therefore, hypothesis H3 is supported by research suggesting that climate risks and organisational adaptation positively and indirectly influence EBITDA / TA, through better asset use and implementation of ESG measures.

H3: The risks of climate change and the organisational adaptation of banks positively influence EBITDA/TA, through a more efficient management of total assets and the implementation of effective ESG measures.

This paper proposes a quantitative research approach to test hypotheses using financial data and bank sustainability indicators. Econometric models will be used to assess how climate risks and adaptation strategies affect financial performance, measured by ROA, ROE, and EBITDA/TA.

Based on the literature, we considered that the indicators selected as dependent variables are relevant to banking companies, so the study will assess how the integration of environmental, social, and governance (ESG) principles and climate risk management influence the asset efficiency and profitability of banks.

2. Research methodology

The initially selected sample included 94 banks in Europe, the information being extracted from the LSEG Refinitiv database over a period of 4 years, namely 2020-2023. LSEG Refinitiv has its own methodology for assessing ESG scores according to a high number of criteria that contribute to a lesser or greater extent to the overall score (Guerrero and Viteri, 2025). This database also contains a wealth of financial information, which has contributed to its use in a lot of research (Czaja-Cieszyńska, Kordela and Garanti, 2024).

For a better data distribution, the criteria for selecting the banks consisted of obtaining profit over the analysed period, as well as recording an overall ESG score of at least 25 (a score below this threshold is considered unsatisfactory according to the Refinitiv methodology). Therefore, in the first stage, the data of the banks that recorded a negative return on assets and equity in at least one year of the analysed period were eliminated, resulting in a number of 13 banks that did not meet the selection criterion. In the next stage, banks that did not register an ESG (total) score of at least 25 were eliminated, which led to the elimination of 5 banks. Therefore, the data in the final sample refer to 76 banks.

The variables tested in the proposed econometric model are presented in Table 1. Therefore, the most common indicators reflecting financial performance, namely return on assets (ROA) and return on equity (ROE), as well as the ratio between EBITDA and total assets (Segura et al., 2024) were selected. The three indicators will be tested as dependent variables.

For the independent variables, the indicators representing the overall ESG score were chosen, and the score for each pillar, E, S, and G. The score on each pillar is based on a series of component indicators (Nitescu et al., 2024), so that based on the data available for each pillar, an indicator was selected. From Pillar E, the Climate_CCRO indicator measuring business

risks and opportunities for business change was selected, from Pillar S, the headcount indicator was chosen, and from Pillar G, the indicator reflecting the existence of a sustainability committee within the management.

For data control and to capture specific factors influencing financial performance, are included in the variable control model regarding the size of banks represented by total assets (Abisola, 2022; Gržeta, Žiković and Tomas Žiković, 2023; Bolibok, 2024), as well as financial risks, respectively, the rate of nonperforming loans (Liu, Jin and Nainar, 2023; Ioannidis, Kosmidou and Zopounidis, 2025) and financial leverage.

Given that the sample consists of banks, we have chosen the leverage formula as the ratio of total assets to equity, also known as the equity multiplier (OECD, 2022). This ratio is a measure of how many assets a bank holds relative to its equity, so a value equal to or close to one (1) means that the bank uses its equity to finance its assets, which is generally a healthier, less risky, and more costly leverage than the sources attracted.

Table no. 1. Description of indicators

Indicator	Code	Description	Mode of expression
Return on assets	ROA	Net profit to total assets ratio	Value
Return on Equity	ROE	Net profit to equity ratio	Value
EBITDA to TA	EBITDA/TA	Ratio of EBITDA to Total Assets	Value
Score	ESG / VSG	Overall score based on self-reported information on the environmental, social, and corporate governance pillars.	Value scale – maximum 100
E (Environmental) - Medium Score	E	Relative weighted average score based on environmental information	Value scale – maximum 100
S (Social) Score	S	Relative weighted average score based on social information	Value scale – maximum 100
G (Governance) Score	G	Relative weighted average score based on governance information	Value scale – maximum 100
Climate Change Commercial Risks Opportunities	Climate_ CCRO	Score awarded for the development of new products/ services to overcome the threats of climate change to the existing business model	Value scale – maximum 100
CSR Sustainability Committee	CSRSC	Existence of a CSR Sustainability Committee	1 – existence 0 – non-existence
Employees	Em	Number of employees from CSR reporting	value
Total assets	TA	Total assets from the financial statements	Value
Non-perform. Loans	NPL	Non-performing Loans	Value
Financial leverage	L	Ratio of total assets to equity	Value

Source: own processing of survey data

The econometric model proposed to test the hypothesis is of the form:

$$X_{it} = \alpha_{it} + \beta_1 Y_{it} + \beta_2 C_{it} + \epsilon_{it} \tag{1}$$

where:

X – dependent variables: ROA, ROE, EBITDA/TA

Y – independent variables: ESG Score, E Score, S Score, G Score, Climate_CCRO_Score, CSRSC, Number of employees

C – control variables: Total assets, non-performing loans, Leverage

The proposed econometric model consists of random-effects regression analyses used to assess the impact of ESG factors on the financial performance of European banks. This methodology allows one to capture the heterogeneity of banks and provides a robust assessment of the relationship between sustainability and economic performance.

3. Results and Discussion

In the first stage, a qualitative analysis of the banks included in the sample was carried out after the overall ESG score. The ESG rating scale, by category, of banks is presented in Table No. 2.

Table no. 2 The ESG score rating scale

Ratings scale	Score	Observations	Percentage
Satisfactory	25-50	79	99%
Fine	50-75	134	08
Excellent	75-100	91	93%
Total		304	100.00%

Source: own processing of survey data

From Table no. 2 it is found that of the total number of observations, almost half of them recorded a score that falls into the Good category, a quarter in the Satisfactory category, and more than a quarter in the Excellent category. Therefore, it is not easy for banks to implement practices leading to a high-score assessment. In general, it is quite difficult for companies to achieve performance results, but it is even more difficult to maintain them or achieve superior performance. In order to have an extended image in figure no. 1, a top five of the banks with the highest scores in the analysed period is presented, as well as the average of the scores for the 4 years.

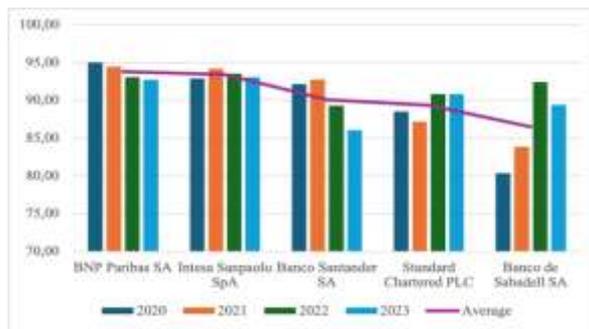


Figure no. 1. Top 5 banks by ESG score and average

Figure no. 1 shows that 4 of the 5 banks are based in the European Union. The bank with the highest annual and average scores is BNP Paribas SA (France), followed by Intesa Sanpaolo SpA (Italy) and Banco Santander SA (Spain). From the analysis of the data of the three banks, it can be noticed that they are making efforts to maintain their top status because in the last two years of the interval, they were evaluated with slightly lower scores than in the first two years. Surprisingly, the banks ranked 4th and 5th (based on average ESG scores), respectively, Standard Chartered PLC (UK) and Banco de Sabadell SA (Spain) have improved their scores in the last two years, surpassing the bank on 3rd place in the ESG score. Therefore, it can be considered that ESG performance is an indicator that changes from period to period, the possible factors being both internal, related to the transparency of the reported information and the status of the implementation of the mandatory reporting requirements, but also external, related to the legislative changes related to the reporting, but also to those related to the environment and governance.

The descriptive statistics of the indicators tested are shown in Table no. 3.

Table no. 3. Descriptive statistics

Indicators	No. Obs.	Mean	Standard deviation	Min	Max
ROA	304	1.1437	0.9169	0.0726	6.1436
ROE	304	15.9570	7.3053	0.3674	46.1056
EBITDA/TA	304	2.1244	1.4083	0.4130	9.7658
ESG	304	63.8626	17.4275	25.0000	95.0080
E	304	78.0391	15.8776	25.0653	98.3090
S	304	64.9520	18.5419	15.0508	96.2195
G	304	61.4438	22.4823	16.1300	95.6363
Climate_CCRO	304	60.9970	26.1337	0.0000	84.9574
CSRSC	304	0.8224	0.3828	0	1
Em	304	32082	55636	195	288000
TA	304	338471038	597914951	1.303.142	2914166663
NPL	304	3.948.095	6848400	56	34250000
L	304	17.0697	6.6606	5.0545	41.1392

Source: Own processing

From table no. 3 It is observed that ROA had a mean value of 1.14% from a minimum of 0.07% to a maximum of 6.14% with a standard deviation of 0.92. The performance of banks' assets is found to have significantly different values from one bank to another. The return on equity averaged 15.96% from a low of 0.37% to 46.11%, which means that the return is very good. The EBITDA/TA ratio averaged 2.12%, from a low of 0.41% to a high of 9.76%.

The overall ESG score recorded an average value of 63.86 from the minimum of 25 (set according to the methodology) to the maximum of 95 (as shown in Figure no. 1). The value of the average score is justified by the fact that almost half of the companies were classified in the Good category (Table no. 3), of the three components. The environmental score (E) has the highest average value of 78.04, also having the highest minimum and maximum values compared to the other two components. The social score (S) was averaged 64.95, close

to the overall average score. The governance score (G) was also low at 61.44, showing that this component, along with the S, has the greatest influence on the overall ESG score.

The independent variable Climate CCRO within Pillar E recorded an average value of approximately 61, from a minimum of 0, which shows that the sample included banks that did not develop any products to overcome the threats of climate change, but also banks that developed this type of products, being evaluated with a maximum score of 84.96. The CSRSC variable shows that on average 82% of banks had a CSR sustainability committee, a situation that contributes to improving governance. The average number of employees was more than 32082, with small banks with 195 employees up to a maximum of 288000. This situation may also significantly influence the average score for the S-pile.

The TA and NPL control variables expressed in absolute values (thousands of euros) were in a very wide range of values, so that logarithms will be used to standardise their values. Banks of different sizes are included in the sample, from small banks to very large banks. Financial leverage averages over 17, from a minimum of 5 to a maximum of 41 which means that the equity multiplier is high.

The correlation between the indicators is shown in Figure 2.

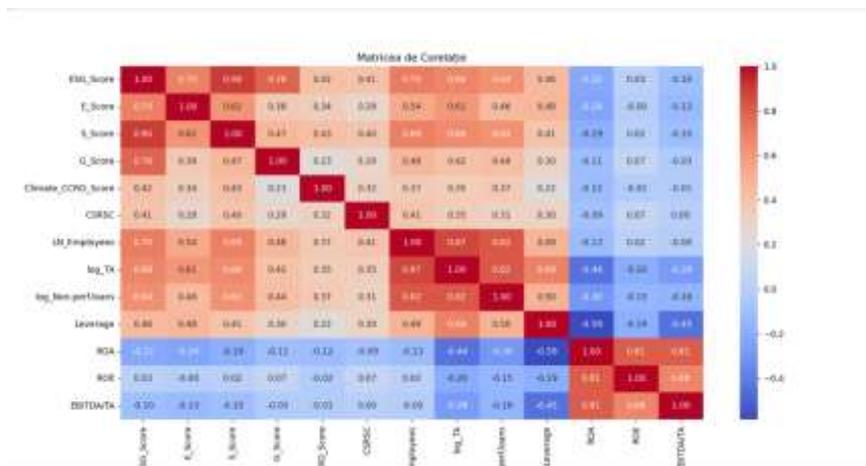


Figure no. 2. Correlation matrix
 Source: Own processing using Python software

Figure 2 results in modest correlations between the dependent and independent variables. The ROA dependent variable is inversely related to all 7 independent variables. The most significant is the correlation with E (-0.24), followed by ESG (-0.22) and S (-0.19). The same type of correlation is recorded by EBITDA/TA with 5 of the independent variables, but the coefficients are significantly reduced. The dependent variable ROE has a direct correlation with the independent variables, except for the Climate CCRO score, but the coefficients are low, from 0.07 to 0.02. Higher negative correlations were recorded between the dependent variables and the control variables than between the independent variables.

There are significant direct correlations between the independent variables, which is natural because some are components of the overall score. These types of correlations are also recorded with the control variables.

The econometric analysis of the longitudinal panel data started with an OLS multifactorial regression (using the least ordinary squares method), obtaining a significant value of the R-square coefficient. The multicollinearity test. VIF, generated a maximum result of 1.00614 (corresponding to the ROA dependent variable). which is below the critical threshold of 7, thus validating the econometric model.

When applying the Breusch-Pagan/Cook-Weisberg test, used to verify the existence of heteroscedasticity in the analysed data, significant values were obtained. respectively, chi2 (1) (4.42626) with a p-value of 0.4808 for ROA, chi2 (1) (8.87955) with a p-value of 0.1139 for ROE, and chi2 (1) (6.89790) with a p-value of 0.22834 for EBITDA/TA. exceeding the significance threshold of 0.05, which indicates that there is not enough evidence to reject the null hypothesis of homoscedasticity. Therefore. No significant heteroskedasticity problems are identified in the analysed model.

Determine the appropriate type of regression (with fixed or random effects); the Hausman test was performed. The test results for each model showed the following notable values: for the model with ROA as a dependent variable, a chi2 (2) value of 0.21886 with a p value of 0.9997, for the model with ROE as a dependent variable, chi2 (2) was 3.978201 and a p value = 0.679626, for the model with EBITDA/TA as dependent variable, chi2 (2) was 3.978201 and a p value = 0.679626. Therefore, we accepted the null hypothesis and, consequently, random-effects regression was used.

Durbin-Watson statistics in all 3 models ROA: 1.811, ROE: 1.6912, EBITDA/TA: 1.713, used to test the self-correlation of regression model residues. In particular, to detect first-order self-correlation (self-correlation between successive residues), is close to 2, suggesting that there are no significant problems with self-correlation of errors.

The likelihood ratio statistics in all three cases (p-value is much lower than 0.05), the added variable (ROA, ROE, respectively, EBITDA/TA) significantly improves the model, suggesting that each variable included in the models contributes significantly to the explanation of the variation in the dependent variable.

The tests, the regression results, the correlation coefficients, together with the standard errors and the t-values from Student's t-test, the significance levels, can be found in Table 4.

Table no. 4. Regression results

Variables	Obs	DV: ROA	DV: ROE	DV: EBITDA/TA
R-squared		0.1844	0.1530	0.1885
F-statistic		4.9275***	3.9364***	6.8062***
ESG	304	2.2746*	2.5265**	0.3552
E	304	0.1581	0.0135	1.4686
S	304	-1.7439*	-2.2315**	-0.5951
G	304	-2.8960***	-2.9577***	-0.4209
Climate_CCRO	304	-1.8902*	-1.5373	-0.4672
CSRSC	304	0.5532	0.7866	1.4941
Em	304	-0.2536	-0.7003	3.3746***
Log TA	304	1.9435*	3.0383***	-2.7444***
Log NPL	304	-1.3694	-1.7464*	-1.4228
L	304	-4.9212***	-2.2214**	-3.7617***
Mean VIF		1.00614	1.00578	1.00549

Significant t values are represented by *, ** and *** meaning the significance level of 10%, 5% and 1%.

Source: Own processing using Python software.

From table no. 4 shows the results that all 3 models were validated, with the value of F being statistically significant. For the dependent variables ROA and EBITDA/TA. coefficients R^2 of 0.18 were obtained. indicating that 18% of the variation of ROA or EBITDA/TA can be explained by changes in the independent and control variables. and in the other model the coefficient is lower, respectively 15% there is a lower effect.

Thus, regarding hypothesis H1: Organisational adaptation of banks to climate change, reflected by ESG performance, has a significant impact on return on assets (ROA). It is found that there is an inverse correlation and that a high return on assets is correlated with a lower score for governance. The correlation with the overall score is direct, being significant at a confidence level of 90%. The other two independent variables validated in the model, namely the S and Climate CCRO score, are significant at a 90% confidence level, the correlations being inverse with the return on assets, as is the G variable.

Indeed, the results obtained in previous research have shown mixed correlations between variables tested in the research (Agnese et al., 2024; Nitescu and Cristea, 2020). The correlation of the dependent variable ROA with the variables Social (S), Governance (G), and Leverage (L) has significant coefficients indicating a notable influence on ROA. The result is justified because investments in sustainability generate additional costs that influence the return on assets and equity.

Regarding the test of the H2 hypothesis: *Banks that integrate climate change risk adaptation strategies, through an improved ESG performance, record a higher return on equity (ROE),* it turns out that there is a positive direct correlation between the ROE dependent variable and the ESG score, as in the previous model with dependent variable ROA, but which have a higher level of significance at 5%. The ROE records negative correlations with coefficients of values relatively close to more than 2, at a significance level of 1% for the G-score and a significance level of 5% for the S-score.

Regarding the testing of the third hypothesis H3: *The risks of climate change and the organisational adaptation of banks positively influence EBITDA/TA, through a more efficient management of total assets and the implementation of effective ESG measures,* the model was validated only with an independent variable, namely the number of employees. The correlation being positive and significant at a level of 1%.

The correlations of the three dependent variables with the control variables were significant. except for the non-performing loan (NPL) variable, which was validated only in relation to the ROE. The correlation was positive between ROA and ROE. respectively. and negative for all 3 financial leverage dependent variables.

Previous studies suggest that ESG reporting has a significant impact on financial performance, particularly in terms of return on assets (ROA) and return on equity (ROE). Carnini Pulino et al. (2022) demonstrated that ESG scores significantly influence the financial performance of firms, highlighting that ESG variables, in particular Governance (G). can have an inverse impact on financial performance. Zaman and Ellili (2022) analysed the effect of ESG reporting on the financial performance of UAE banks and concluded that the ESG score has a positive impact on financial performance, especially in terms of return on assets. In a study of banks in Vietnam, the authors Loan, Anh and Hoan (2024) showed that ESG transparency can improve financial performance, especially in the context of commercial banks. It suggests that better governance and responsible resource management can positively influence financial results.

Governance (G), through a lower score, negatively affects return on assets (ROA), but at the same time can contribute to better equity performance (ROE), suggesting that in some cases poor governance could allow for better use of assets to make profits.

Financial leverage (L) shows a negative correlation with dependent variables, suggesting that a broader use of debt may decrease the return on assets and equity, which is consistent with the existing literature (Intezar et al. 2024; Senan et al., 2021). Empirical studies confirm this relationship, indicating that a higher level of financial leverage is associated with a lower return on assets and equity. For example, in December 2024, in the Financial Stability Report, the National Bank of Romania points out that the return on assets and equity has been affected by the increase in over-indebtedness costs and risks.

The results of the analysis indicate a direct positive association between the dependent variables ROA (Return on Assets) and ROE (Return on Equity) and the independent variable ESG (Environment, Social and Governance), aligning with the results of previous research (Horobet et al., 2024; Menicucci and Paolucci, 2023; Gutiérrez et al., 2023; Bătae et al., 2020). This association implies that the improvement in ESG performance is related to increased asset and equity profitability (Duque-Grisales and Aguilera-Caracuel, 2021; Buallay, 2019; Velte, 2017; Friede et al., 2015; Eccles et al., 2014).

The literature supports the claim that there is a positive association between ESG performance and financial indicators such as ROA and ROE, suggesting that improved ESG practices lead to better financial results by increasing stability, reducing risks and improving operational efficiency.

In addition, the analysis revealed a negative relationship between the dependent variables ROA and ROE and two of the control variables included in the study. This phenomenon can be attributed to the fact that these variables reflect economic or structural factors that can negatively affect the financial performance of companies.

Conclusions

This research highlights the key role of integrating ESG principles and organisational adaptation to climate risks in the banking sector, demonstrating that these transformations not only support risk management, but have a significant impact on long-term financial performance. The paper analysed the impact of climate risks on the financial performance of banks, through a random-effects approach, correlating variables such as ROE, ROA and EBITDA/TA with ESG factors, including components Climate_CCRO, CSRSC, Em, Log TA and Log NPL. The results suggest that integrating ESG principles into banks' financial strategies can help improve financial performance by reducing climate-related risks and strengthening long-term financial stability.

The significant result of the research consisting of the positive correlation between the components of the ESG and financial indicators such as ROA (Return on Assets) and ROE (Return on Equity) highlights that banks that adopt effective ESG policies perform better in terms of return on assets and equity. This is confirmed by previous research, which shows that better climate risk management, in parallel with the implementation of sustainable policies, allows banks to achieve greater operational efficiency and preferential access to capital (Eccles, Ioannou and Serafeim, 2014; Velte, 2017). It is also important to note that while the impact of ESG on EBITDA/TA may be less obvious in the short term.

Sustainability strategies can still help reduce operational costs and make more efficient use of assets. Another key aspect of the research was the identification of significant variables, such as headcount, bank size, and financial leverage, that can influence how banks manage their resources in the face of climate risks and affect financial performance. Financial leverage has a significant negative relationship with all three performance measures (ROA, ROE, and EBITDA/TA), signalling that higher leverage may reduce banks' financial performance. Therefore, banks with a higher number of employees may have a stronger structure to implement organisational changes, while large banks may be more exposed to systemic climate risks, which may affect their profitability. In this context, studies by Duque-Grisales and Aguilera-Caracuel (2021) show that banks focus their funding on low-carbon sectors and develop sustainable financial products, such as green bonds and sustainability-related loans, not only contribute to the transition to a green economy, but also benefit from an increase in investor and customer confidence, which improves long-term financial performance.

These results align with research by Friede, Busch and Bassen (2015), which showed that companies' financial performance is improved when they implement sound ESG strategies, thus demonstrating their positive impact on financial performance within the banking sector. Furthermore, the studies conducted by Buallay (2019) are in line with the results of this research, highlighting that sustainability reporting, including the application of ESG criteria, is associated with financial performance in the European banking sector, indicating a positive correlation between these two dimensions.

Regarding the limits of the investigation, we mention that the analysis focused on a sample of active banks on a single continent, which may limit the degree of generalisation of the results. Furthermore, the analysis period may not fully reflect the evolution of the relationship between the ESG score and financial performance, and the selected variables cover only some of the factors that influence performance. Thus, future research directions aim to address these limitations, initiating the proposal to explore advanced methods such as machine learning and artificial intelligence to analyse the relationship between ESG and financial performance in more depth.

In conclusion, banks that embrace transformational changes in the face of climate risks and integrate ESG principles into their organisational strategy protect their financial stability and contribute to the transition to a sustainable economy. Climate risk reporting and management regulations should not only be perceived as compliance obligations, but as strategic opportunities for growth, innovation and competitiveness in an ever-changing global marketplace.

Continuous and constructive dialogue between the parties involved is essential for the development and implementation of common and applicable evaluation practices and criteria regarding ESG performance in the banking sector. Practical and theoretical implications highlight the need for close collaboration between policymakers and financial institutions. Such cooperation is essential for implementing effective measures to increase resilience to climate risks, facilitate a successful transition to a sustainable economy, address the challenges posed by climate change, and promote long-term stability of the financial sector.

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