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Soumaya Maztoul

D.Sc. in Economics, Researcher of the
Department of Finance, ESCT, Tunisie,
Tunisia;

e-mail: soumaya.maztoul@esct.ima.tn

ORCID: [0009-0003-1044-0093](https://orcid.org/0009-0003-1044-0093)

BANKS' SUSTAINABILITY AND FINANCIAL PERFORMANCE: THE ROLE OF CREDIT RISK

ABSTRACT

Under growing pressure to address sustainability imperatives, banks are progressively aligning their strategies with stakeholders' expectations. Gaining insights into how these initiatives impact banks' credit risk and financial performance is pivotal to ensuring economic stability and growth. In this context, the present article examines the effect of banks' sustainability on financial performance through its role in lessening credit risk. The study is based on a data set of 131 OECD commercial banks for 10 years. Using a recursive model, we test the mediating effect of non-performing loans in the relation between financial and ESG performances. We confirm our results using the Structural Equation Model that highlights the indirect effect. Empirical results show strong evidence that banks' financial performance is negatively related to non-performing loans and that banks with higher ESG scores have lower nonperforming loan ratios. Our study concludes that improving sustainability increases banks' financial performance by reducing credit risk. Integrating sustainability into banking operations enhances risk management which improves financial performance. Further results indicate that Social and Governance levels strongly contribute to this effect whereas the Environmental level has an ambiguous role. These results suggest that there is a need for banks to enhance ESG performance because of its beneficial effect on loan quality and financial performance. Findings have significant implications for bankers to manage their credit risk, for investors to understand the importance of sustainability and for regulators to enhance assessing ESG standards.

Keywords: sustainability, ESG factors, mediator, bank credit risk, financial performance

JEL Classification: G21, Q56 M14, L25

INTRODUCTION

Economic growth is significantly influenced by the banking system; it is argued that sound banks bring substantial benefits to the economy, in contrast, their instability leads to significant harm (Levine 2005; Shen and Lee 2006). This has been recently underscored by successive financial crises and the failures of some big banks, which have reignited theoretical and empirical debates on the vulnerability of the banking system. Since impaired assets play a critical role in financial fragility, credit risk regained importance, and the ascension of impaired loans is a prominent indicator of monetary crises. Therefore, following the global crisis, the attention of government authorities and banking management is predominately focused on non-performing loans, as they are closely associated with the breakdown and crises of the banking system (Ghosh, 2015).

More recently, sustainable finance disclosure has gained a great deal of attention with the emergence of ESG-friendly policies and practices for the banking sector. Incorporating ESG risks into banks' strategies and risk management framework is recommended by regulatory authorities. In this context, research on Environment, Social and Governance has gained considerable attention, among which the effect of ESG disclosure on a bank's financial performance has been the hottest topic. Several studies have concluded that environmental engagement (Nizam et al., 2019), social responsibility (Wu and Shen, 2013), and corporate governance (Aebi et al., 2012) were conducive to the improvement of bank's income statements. It is proved that, in the face of a financial

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crisis, sustainable banks are relatively stable and more resilient than their peers (Cornett et al., 2016). The longstanding discussed issue revolves around whether integrating ESG factors can improve banks' bottom line. Therefore, gaining a more profound comprehension of this relationship holds significant value for managers, regulators and stakeholders. It's also interesting to appreciate how ESG disclosure affects banks' performance; in fact, while there is substantial research on the impact of ESG factors on financial performance, the specific channel or mechanism through which this effect is established remains insufficiently explored. Exploring the underlying mechanisms that explain interconnections between financial performance and corporate sustainability can enhance our understanding of the "black box" associated with the two sides of performance metrics (conte et al., 2024).

The main objective of this study is to investigate the relationship between ESG levels and financial performance within the banking sector by focusing on the mediating effect of non-performing loans. Few prior studies have focused on the relationship between ESG reporting, non-performing loans, and financial performance simultaneously. Thus, this study is designed to contribute to banking performance as well as social responsibility literature in three ways.

First, we explore the relation between ESG disclosure and banks' financial performance. In this relationship, non-performing loans emerge as a significant determinant, providing insights into the explicit channel through which ESG disclosure effectively affects the bottom line of banks. Non-performing loans are incorporated into the examination framework of the impact of ESG factors on listed banks' financial performance as a mediating variable. By constructing a mediating effect model, this paper examines the impact of ESG factors on the bank's financial performance and its transmission mechanism from non-performing loans. Second, our research adds to the ongoing discussion in the literature by enhancing the interplay between each ESG factor, credit risk and financial performance highlighting the specific effect of its implementation into business strategy and risk management frameworks. Practically, this work encourages the implementation of ESG-related strategies that protect the interests of both shareholders and stakeholders by minimizing credit risk. Finally, our research adds to the understanding of banks' sustainability by conducting research on a large sample of banking data from OECD countries, for a considerable period. Examining a substantial sample size mitigates the potential bias inherent to smaller samples, a bias that can vary based on specific geographical areas and sample periods. Unlike other recent studies that have focused on periods of crisis when examining the relationship between ESG and financial performance, our study focuses on a more stable period, thus avoiding excessive and momentary effects (Danisman and Tarazi, 2024), our results confirm that banks' sustainability is not only a safe mean for financial turmoil but it is a secure tool for all periods.

The rest of the paper is structured as follows: in the next section, we discuss prior literature and develop a hypothesis. Section 3 provides a description of the data set and the methodology applied. Section 4 presents the main results and provides findings of several robustness checks. Finally, section 5 summarizes the key findings and the characteristics of future study areas.

LITERATURE REVIEW

Sustainability, credit risk and financial performance

The relationship between financial performance and sustainability has yielded a very extensive empirical literature. Overall, this relation is positive (Friede et al., 2015; Ozili, 2022), suggesting that companies benefit from undertaking sustainable activities. These conclusions are supported by the stakeholders' model which asserts that a firm is accountable not solely to its shareholders but to all stakeholders. This nexus has largely attracted researchers who have focused on non-financial firms, it is only recently that banks have been the subject of such research. In this vein, Cornett et al., (2016) conclude that ESG scores are positively and strongly related to the financial performance of US banks that are rewarded for being socially responsible. Similarly, Wu and Shen (2013) indicate that CSR affect positively the financial performance of an international sample of banks. More recently, Andries and Sprincean (2023) confirm the positive effect of incorporating ESG factors into banks' financial decisions and conclude that sustainable banks are enjoying reduced costs of raising liabilities as well as attracting deposits.

The stakeholders' theory suggests that banks engaging in corporate social responsibility demonstrate a commitment to the interest of all their stakeholders. Consequently, they meticulously screen borrowers and oversee the use of loans to decrease the default risk. By choosing to lend to responsible borrowers, banks can reduce their credit risk since firms with higher ESG awareness are strongly associated with creditworthiness (Brogi et al., 2022). Recently, at the regulatory and prudential level, there has been a notable emergency of ESG standards and metrics that play a crucial role in aiding banks in their strategic planning and decision-making processes, as well as in assessing, managing, mitigating and potentially eliminating ESG-related risk exposures. Supporting that strategic decision-making guides banks in adopting CSR, Wu and Shen (2013) document a negative relation between CSR and non-performing loans. Exploring the impact of ESG on major

risks for banks, Tóth et al., (2021) find that ESG performance significantly reduces credit risk while Di Tommaso and Thornton (2020) find a negative correlation between ESG score and the banks' risk-taking behaviour, empirical results confirm the existence of a negative and significant effect of the ESG scores on non-performing loans for European banks even if their economic impact is quite modest. The same conclusions are held by Liu et al., (2023) for American banks, they argue that non-performing loans are negatively associated with ESG performance. More recently, Hunjra et al., (2024) corroborate that CSR leads to reduce credit risk for Asian banks.

Mediation role of credit risk on ESG pillars

The ESG score is a weighted average of three pillars including heterogeneous activities and purposes. Recent studies examine each score solely to examine its proper effect on financial performance. Concerning banks taking a risk, Chiamonte et al., (2022) attest that each sub-pillar of ESG scores reduces bank fragility and conclude that each sub-pillar has a significant role in banks' stability.

For the environmental side, banks involved in projects that protect the environment or promote ecological products and assets, managing their assets under the equator principle and clean energy are considered environmentally friendly banks. They profit from this commitment in indirect and direct ways. Firstly, banks that integrate environmental preoccupation into their lending policy are inclined to extend loans to businesses actively mitigating carbon emissions, minimizing packaging waste and conserving water, which helps borrowers' cost saving and enhances their capacity to repay the principal and interest on loans as demonstrated by (Liu et al., 2023). Furthermore, banks committed to environmental sustainability should avoid prioritising retaining borrowers with a combination of lower risk and higher profitability as they possess a competitive advantage that is not easily replicable (Elijido-Ten, 2017). This lending policy helps in minimizing non-performing loans (Cui et al., 2018). Secondly, banks engaged in environmental initiatives mitigate controversial risks stemming from the implementation of new regulations or shifts in borrowers' preferences that are able to pay a premium for green products. This lending strategy is designed to minimize risk and improve financial performance.

On the social side, banks demonstrating high social responsibility are dedicated to fostering diversity, equality, employee turnover, and improved working conditions. This commitment fosters connections among individuals, leading to enhanced societal efficiency. This accumulation of social capital contributes to the establishment of valuable goodwill (Stubbs and Cocklin, 2008; Esteban-sanchez et al., 2017). Moreover, such institutions advocate for human rights and business ethics, making them less susceptible to controversies and penalties, thereby reducing expenses. Recently, Boussaada et al., (2023) confirmed the negative effect of social performance on credit risk. The mitigation of credit risk is achieved not only through a robust reputation for community involvement and lending but also through product responsibility, privacy, and, notably, customer satisfaction. It is anticipated that positive social performance positively influences financial performance by diminishing credit risk.

For the governance side, a bank attaining a high governance score is expected to exhibit strong corporate governance, ensuring alignment between shareholder interests and those of the board of directors and management. Banks with high governance scores should produce comprehensive and transparent financial and sustainability reports. Such a bank is inclined to extend loans to companies with similarly robust governance scores which reduce informational asymmetries and reduce credit risk (Zagorchev and Gao, 2015; Liu et al., 2023). In turn, borrowing companies are likely to place greater trust in a bank that issues accurate financial reports. Consequently, these firms are expected to maintain a favourable association with the bank and meet their loan obligations punctually.

AIMS AND OBJECTIVES

The aim of this study is to examine the interdependence between credit risk, banks' sustainability and financial performance. More precisely, having a high NPL rate would reduce banks' financial results due to several reasons such as a reduction in net interest income, additional capital requirement, and increase in impairment costs. Moreover, higher NPL rates systematically affect banks' ratings which increase the cost of funding and require additional management time and services costs to resolve the problem. Given this linkage, the study has four main objectives. First, the impact of banks' ESG on financial performance is analyzed. Second, the effect of banks' ESG on credit risk is analyzed. Third, we examine the effect of banks' ESG on financial performance by reducing credit risk. Finally, we study the mediating effect of credit risk on the effects of each pillar of banks' ESG on financial performance. Our conceptual framework is resumed as follows (Figure 1).

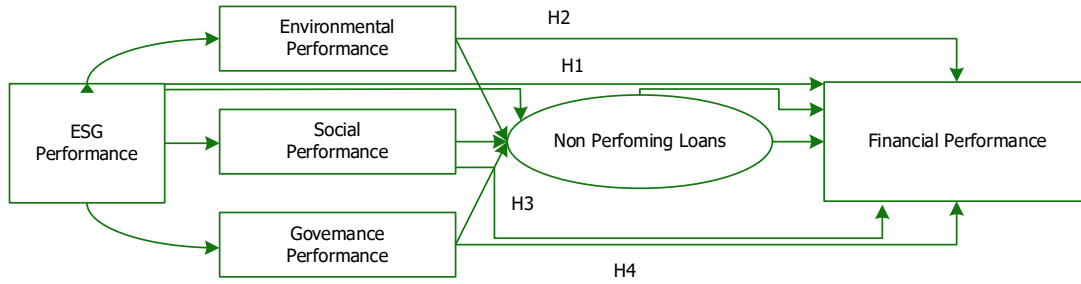


Figure 1. Conceptual framework.

METHODS

Data and variables measurement

The research uses a balanced panel dataset of commercial banks in 21 countries from 2010 to 2019. We selected all OECD countries affiliated with the organization before 2010. First, we limit our period to 2019 year because of the occurrence of the COVID-19 crisis that largely affected non-performing loans. Including this specific period may skew findings. Second, we eliminated five countries (PIIGS: Portugal, Ireland, Italy, Greece and Spain) severely affected by the sovereign debt crisis of 2010. The sample covers all 131 cited banks that have ESG scores for the studied period (Table 1). The data for bank-specific variables is sourced from Eikon Refinitiv, whereas the data on macroeconomic variables is extracted from the World Bank database.

Table 1. Sample Description.

Country	No. of banks	%	Country	No. of banks	%
Australia	6	4,58	Mexico	4	3,05
Austria	2	1,53	Norway	1	0,76
Belgium	1	0,76	Poland	8	6,11
Canada	8	6,11	Republic of Korea	6	4,58
Chili	3	2,29	Sweden	3	2,29
Czech Republic	1	0,76	Switzerland	3	2,29
Denmark	3	2,29	The Netherlands	1	0,76
France	3	2,29	Turkey	7	5,34
Germany	3	2,29	United Kingdom	7	5,34
Hungary	1	0,76	U.S. of America	33	25,19
Japan	22	16,79	Total	131	100%

The main dependent variables are Return on Assets (ROA) and Return on Equity (ROE) respectively calculated by dividing the bank's net income by the average of total assets and Total Equity. These measures are commonly used as the key ratio for evaluating bank performance. The main independent variable is banks' sustainability, which is approximated by the ESG score of banks that serves as a reflection of a bank's environmental performance, social commitment and governance effectiveness, derived from publicly reported information. A higher score means better social responsibility. We, therefore, take into consideration the three pillars of the ESG score independently which allows us to better assess the relation banks between each factor. First, the Environmental score measures resource use, emission and environmental innovation. Second, the Social score takes into account workforce, human rights, community and product responsibility. Finally, the Governance score evaluates management corporate boards, shareholders rights and CSR Strategy. The proposed mediating variable is the quality of banks' loans largely assessed through the non-performing loans in which repayments are overdue or are unlikely to be fulfilled by the borrower. As the rate of non-performing loans increases, lending quality decreases. The ratio of impaired loans to loans serves as the metric for credit quality.

The study controls several variables that might confound the relationship between social responsibility, credit quality, and financial performance. Control variables used in this study are as follows:

1. SIZE is measured by the natural logarithm of total assets. Studies document a positive nexus between size and credit risk as measured by NPL. Bank size affects its financial performance through diversification opportunities and larger resources (Salas and Saurina, 2002).
2. LTD reflects the risk attitude as measured by the Loan Deposits ratio. As outlined by Anastasiou et al., (2019), a higher ratio of loans with respect to deposits signifies a more lenient approach to loan approval reflecting a risk-prone attitude and consequently, a higher probability of NPLs.
3. CAR reflects banks' stability as measured by the capital adequacy ratio; following Salas and Saurina (2002), a higher level of equity reflects the safety of the bank that is associated with lower NPLs. Similarly, according to Saona (2016), capital ratio is negatively related to profitability since an excessively high capitalization is associated with a decrease in the risk of equity.
4. GDP reflects the economic growth as measured by the GDP growth rate. Several studies find a positive relationship between GDP growth and bank performance (Bikker and Hu, 2002).
5. INF reflects the economic cycles as measured by the annual average inflation rate based on consumers' prices. The performance of banks can be negatively affected by high inflation (Boyd and Smith, 1998). Inflation affects borrowers' ability to pay their loans which increases credit risk (Anita et al., 2022).

Empirical model

To assess the mediating effect of the credit risk between ESG performance and financial performance, we used the recursive model proposed by Baron and Kenny (1986) and Wen and Ye (2014). The objective is to ascertain whether the banks' ESG performance enhances financial performance through the reduction of credit risk.

$$FP_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta C_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$NPL_{i,t} = \alpha_0 + \alpha_1 NPL_{i,t-1} + \alpha_2 ESG_{i,t} + \alpha C_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$FP_{i,t} = \gamma_0 + \gamma_1 ESG_{i,t} + \gamma_2 PNL_{i,t} + \gamma C_{i,t} + \varepsilon_{i,t} \quad (3)$$

We note that FP denotes Financial Performance measured by two variables namely ROA and ROE. α_0 , β_0 and γ_0 are the intercept terms, β_1 , α_1 , α_2 , γ_1 and γ_2 are the coefficient vectors, α , β , and γ are the control variable coefficient vectors, C is the control variable matrix, and ε is the random disturbance term.

Initially, the regression analysis of (1) is conducted to assess the effect of ESG scores on banks' financial performance. The significance of the coefficient between banks' sustainability and financial performance (FP) is important, if the value of β_1 is significant, it suggests that ESG performance has a noteworthy impact on banks' financial performance, leading to the next step; otherwise, the test is concluded. The second step involves regression of (2) to evaluate the effect of ESG on credit risk as measured by the NPL ratio. Anticipating some persistence of the credit risk, we include the lagged NPL ratio as an explanatory variable in the model, so that (2) is a dynamic panel. Following recent empirical investigations (Bayar 2019; Di Tommaso and Thronton 2020; Boussaada et al., 2023), we implement the system generalized methods of moment panel regression method by using lagged variables as instruments for the level equation. The significance of the coefficient α_2 implies a notable influence of ESG on credit risk. The third step comprises regression of the third equation (3) that incorporates both ESG and NPL ratios as explanatory variables of the financial performance. The significance of both γ_1 and γ_2 indicates that there are partial mediating effects for the mediator whereas the significance of γ_2 only indicates that the mediator plays a complete mediating role for the mediator.

Subsequently, to test the possible mediating effect between each pillar of ESG and the financial performance, we replace the ESG in (1), (2) and (3), with ENV, SOC and GOV to obtain the role of each component separately.

RESULTS

Descriptive statistics

Descriptive statistics of all variables are presented in Table 2, while Pearson's correlation matrix is shown in Table 3. The mean value of ROA (ROE) is % 1.19% (9.53%) and the mean value of non-performing loans is 2.91%. Moreover, our sample has relatively good ESG performance and above average degree of transparency in reporting ESG data publicly

(0.5225), ranging from 0.025 to 0.9427. We remark on a high governance score among the three pillars which is related to the specificity of on banking sector.

Table 2. Descriptive Statistics.

		No of Obs	Mean	St Dev.	Min	Max
Financial performance	ROA	1310	1.1958	1.1211	-0.27	8.06
	ROE	1310	9.5343	5.8877	-9.39	25.75
Interest variables	ESG	1310	0.5225	0.2323	0.0250	0.9427
	ENV	1310	0.5160	0.3117	0	0.9752
	SOC	1310	0.5121	0.2585	0.0093	0.9766
	GOV	1310	0.5644	0.2388	0	0.9934
	NPL	1310	0.0291	0.0303	0	0.2863
Specific control variables	SIZE	1310	20.2173	2.6229	15.6208	27.0371
	CAR	1310	0.1595	0.0527	0.0396	0.541
	LTD	1310	0.9663	0.3855	0.3805	2.3280
Macroeconomic control variables	GDP	1310	1.7062	1.5072	-3.0224	9.5099
	INF	1310	1.9224	2.1974	-1.1439	16.3324

Pearson correlation shows a high correlation between ESG scores and its peers as mentioned by previous studies. Unless, the absolute values of correlation coefficients among independent variables, are less than 0.75 and the Variance Inflation Factor (VIF) value is 1.11 which confirms that multicollinearity doesn't appear to be a serious problem in our models.

Table 3. Correlation Matrix. Note: * p<.05.

	ROA	ROE	ESG	ENV	SOC	GOV	NPL	SIZE	CAP	LTD	GDP	INF
ROA	1											
ROE	0.6144*	1										
ESG	0.1032*	-0.0017	1									
ENV	0.0504	-0.0670*	0.8125*	1								
SOC	0.1209*	0.0398	0.9220*	0.7734*	1							
GOV	0.1253*	0.0171	0.7579*	0.5027*	0.5489*	1						
NPL	-0.1485*	0.0177	0.0310	0.0433	0.0311	-0.0756*	1					
SIZE	-0.0917*	-0.1887*	0.1658*	0.3003*	0.0777*	0.1790*	0.0044	1				
CAR	0.0455	0.2466*	-0.0426	-0.0497	-0.0180	-0.0769*	-0.0721*	-0.1578*	1			
LTD	0.1185*	0.1647*	0.3067*	0.3008*	0.3080*	0.1056*	0.0960*	-0.0308	0.1027*	1		
GDP	0.1936*	0.2297*	-0.0587*	-0.0611*	-0.0290	-0.0356	0.1072*	-0.0148	-0.0268	0.0520	1	
INF	0.2781*	0.2297*	0.1100*	0.0696*	0.2019*	-0.0440	0.1473*	-0.1447*	0.0212	0.2091*	0.1779*	1

ESG performance, credit risk and financial performance

Before estimating the effect of banks' sustainability on financial performance, a battery of tests is undertaken to detect eventual problems of serial correlation and heteroskedasticity. We conducted various tests including Breusch-Pagan and Modified Wald for heteroskedasticity and Inoue–Solon test, LM-test Bias-corrected for autocorrelation. Table 4 shows the presence of serial correlation and heteroskedasticity issues for (1) and (3) for the two dependent variables (ROA and ROE). As expected, problems of serial correlation and heteroskedasticity persist for this model. For these reasons, we run an estimation of these equations using the Feasible Generalized Least Square (FGLS) method in order to correct these issues for panel data (Bai et al., 2021).

Table 4. Preliminary tests.

	Empirical tests	ROA	ROE
Heteroskedasticity	Breusch–Pagan (P-values)	1323.53 (0.000)	3.86 (0.0495)
	Modified Wald (P-values)	5.7e+05 (0.000)	86868.73 (0.000)
Serial correlation	LM(k)-stat (P-values)	2.80 (0.005)	5.95 (0.000)
	IS-stat (P-values)	48.02 (0.000)	37.91 (0.000)

Table 5 (1) and (2) report empirical results from the estimation of the first equation. Findings robustly confirm the view that a high ESG score is associated with enhanced financial performance. ESG performance positively affects the ROA and ROE of banks, coefficients are positive for the two dependent variables in accordance with several studies (Wu and Shein 2022). We note that results show that control variables have significant effects on financial performance. Therefore, the improvement of ESG performance is beneficial to banks' performance supporting stakeholder theory.

Table 5. The mediating effect of NPL in ESG -FP. Note: Standard errors are in parentheses; *** p<.01, **p<.05, *<.1.

Variable	ROA	ROE	NPL	ROA	ROE
	(1)	(2)	(3)	(4)	(5)
ESG	0.0905*	2.3716***	-0.0073***	0.0949*	1.8595***
	(0.0489)	(0.4988)	(0.0034)	(0.0488)	(0.51127)
L1.NPL			0.9509***		
			(0.0244)		
NPL				-2.5552***	-26.9021***
				(0.4865)	(3.8232)
SIZE	-0.0528***	-0.2163***		-0.0523***	-0.2998***
	(0.0035)	(0.0398)		(0.0036)	(0.0411)
CAR	3.1392***	0.8796	-0.0168	3.0423***	1.4789
	(0.2823)	(2.6086)	(0.0160)	(0.2802)	(2.4944)
LTD	0.1341***	1.4769***	0.0040***	0.2077***	1.3843***
	(0.0313)	(0.3251)	(0.0011)	(0.0467)	(0.3329)
GDP	0.0883***	0.2391***	-0.0015***	0.0899***	0.2651***
	(0.0084)	(0.0383)	(0.0004)	(0.0086)	(0.0394)
INF	0.1505***	0.3945***	0.0009***	0.1521***	0.4638***
	(0.0087)	(0.0403)	(0.0002)	(0.0087)	(0.0376)
Intercept	1.0318***	9.3753***	0.0035	1.0737***	11.9225***
	(0.0901)	(0.9997)	(0.0032)	(0.0911)	(0.9535)
Wald (Khi2)	1097.18	312.08	17830.52	1116.71	446.76
N	1310	1310	1179	1310	1310

As planned in the second step, we run the second equation to illustrate the effect of ESG performance on the banks' credit risk measured by the NPL ratio. This step is crucial for detecting the mediating effect of credit risk. Table 5 (3) reports the results of the two-step system GMM with the estimated coefficients with lagged variables as instrument variables. Findings consistently demonstrate that the model is well-specified, Arellano-Bond tests confirm the absence of autocorrelation at the second order (p=0.987), Sagan and Hansen's tests confirm that the regression is not affected by the overidentification problem which collectively indicates the validity of instruments (p=0.103 and p=0.258). This cautious approach contributes to the robustness of the results and underscores the reliability of the instrument set used in the analysis. Results demonstrate that the coefficient of ESG is negative and significant at the level of 1% indicating that ESG performance enhances loan quality, which is consistent with previous studies (Liu et al., 2023). The coefficients on specific and macroeconomic

variables are mostly statistically significant and in line with the literature on banking risk. Finally, we estimate the third equation which takes into account both ESG scores and loan quality. Results obtained are presented in Table 5 (4) and (5), they reveal a positive and significant effect of ESG score and a negative and significant coefficient of NPL ratio.

Taken together, the results of the estimation of the three equations confirm the existence of the mediating effect of ESG on financial performance through the NPL ratio. Additionally, the significance of both coefficients of ESG and NPL affirms the partial mediator effect of credit risk in the connection between financial performance and ESG scores.

Environmental, Social, Governance, credit risk and financial performance

This sub-section explores the interdimensional effects of each of the ESG pillars on banks' financial performance. To study the mediating effect of NPL on the relation between each pillar, we re-estimate our three equations adopting separately each score as the independent variable. We initiate our analysis by examining the relation between Environmental score and financial performance. Suspecting the same problems of autocorrelation and heteroscedasticity, we perform a battery of tests that confirm our suspicions and we adopt the same method of estimation for the ENV.

Empirical findings (Table 6) indicate that Environmental performance positively affects ROE which is in accordance with Nizam et al., (2019) and Hassan et al., (2019), Xi, et al., (2022) but negatively affects ROA which indicates that green banking is negatively related to profitability (Finger et al., 2018). It seems that the effect of environmentally friendly banks on financial performance is ambiguous. More interestingly, the second step demonstrates that ENV doesn't affect the credit risk of banks. Environmentally friendly banks have the same level of NPL as non-environmentally friendly ones. In contrast to the comprehensive ESG outcomes, the environmental score exhibits a controversial impact on financial performance and no significant impact on credit risk. We conclude that the mediator effect is absent for the environmental factor. Running the third equation, we affirm the ambiguous effect of environmental performance on banks' profitability.

Table 6. The mediating effect of credit risk in Environment – Financial Performance relation. Note: Standard errors are in parentheses; *** p<.01, **p<.05, *<.1.

Variable	ROA	ROE	NPL	ROA	ROE
	(1)	(2)	(3)	(4)	(5)
ENV	-0.0996*** (0.0351)	1.6430*** (0.3637)	0.0034 (0.0039)	-0.0808** (0.0356)	1.4793*** (0.3658)
L1.NPL			0.9261*** (0.0253)		
NPL				-2.3057*** (0.4543)	-28.2264*** (3.8163)
SIZE	-0.0528*** (0.0038)	-0.2108*** (0.0395)		-0.0555*** (0.0039)	-0.2925*** (0.0407)
CAR	1.9878*** (0.3372)	0.9564 (2.5886)	-0.0184 (0.0163)	1.9344*** (0.3357)	1.8911 (2.4886)
LTD	0.3150*** (0.0369)	1.4122*** (0.3273)	0.0037*** (0.0011)	0.3201*** (0.0382)	1.2724*** (0.3354)
GDP	0.0273*** (0.0051)	0.2413*** (0.0379)	-0.0015*** (0.0004)	0.0266*** (0.0052)	0.2642*** (0.0386)
INF	0.0689*** (0.0063)	0.4197*** (0.0402)	0.0008*** (0.0002)	0.0689*** (0.0064)	0.4749*** (0.0377)
Intercept	1.3565*** (0.1012)	9.6357*** (0.9819)	-0.0005 (0.0040)	1.4573*** (0.1035)	11.9933*** (0.9319)
Wald (Khi2)	770.25	268.61	21669.33	798.30	366.82
N	1310	1310	1179	1310	1310

Despite the apparent contradiction with ESG empirical results, this phenomenon can be ascribed to the minimal weight assigned by Refinitiv data to the environmental score for banks, which stands at 12%. Furthermore, considering the whole score of environmental performance may affect results, since previous studies confirming this relationship choose more specific dimensions (Bătae et al., 2021). For our study, globally we don't confirm the second hypothesis (H2).

Focusing on the social performance of banks, we re-run the same equations with the same methodology. Contrarily to the environmental score, the impact of social one is positive and statistically significant for each measure of bank financial performance after controlling for specific macroeconomic variables (Table 7). Fulfilling social responsibility enhances the bank's internal cohesion, and employees' productivity, thereby bolstering its competitive advantage and increasing financial performance. The second step confirms the significant effect of social performance on reducing credit risk. The coefficient of the social score is significantly negative. Actively assuming social responsibility toward stakeholders essentially depositors and borrowers improves loyalty, and satisfaction and overall integrating social activities leads to reduced credit risk. The third step corroborates the indirect effect of credit risk on the relation between social and financial performance of banks, the mediating effect is still partial since the two coefficients are significant, and H3 is thus validated.

Table 7. The mediating effect of credit risk in Social – Financial Performance relation. Note: Standard errors are in parentheses; *** p<.01, **p<.05, *<.1.

Variable	ROA	ROE	NPL	ROE	ROA
	(1)	(2)	(3)	(4)	(5)
SOC	0.2175*** (0.0628)	2.2164*** (0.4890)	-0.0068** (0.0029)	1.5006*** (0.4922)	0.2087*** (0.0634)
L1.NPL			0.9493*** (0.0237)		
NPL				-27.4866*** (3.8269)	-2.2309*** (0.6126)
SIZE	-0.0613*** (0.0055)	-0.1948*** (0.0388)		-0.2717*** (0.0407)	-0.0604*** (0.0055)
CAR	1.3508*** (0.4106)	0.4526 (2.5925)	-0.0070 (0.0169)	1.0825 (2.4832)	1.3323*** (0.4082)
LTD	0.1895*** (0.0461)	1.4906*** (0.3300)	0.0037*** (0.0011)	1.4574*** (0.3380)	0.2048*** (0.0470)
GDP	0.0382*** (0.0071)	0.2274*** (0.0379)	-0.0014*** (0.0004)	0.2562*** (0.0391)	0.0389*** (0.0073)
INF	0.0948*** (0.0083)	0.3832*** (0.0408)	0.0011*** (0.0002)	0.4749*** (0.0377)	0.4561*** (0.0381)
Intercept	1.5251*** (0.1390)	9.1019*** (0.9720)	0.0016 (0.0029)	11.9933*** (0.9319)	11.5521*** (0.9400)
Wald (Khi2)	441.87	274.90	18897.72	364.40	442.64
N	1310	1310	1179	1310	1310

Concentrating on the governance performance of banks, we adopt the same method of estimation. Overall results are similar to the social score (Table 8). As expected, governance score has a positive and significant effect on financial performance. Meeting responsibilities to shareholders builds trust, enhances shareholder interests, and attracts new investors, contributing to the bank's financial performance (Ferrell et al., 2016). The second step confirms the significant effect of governance performance on reducing credit risk. The coefficient of governance score is significantly negative. Better governance of banks enhances monitoring which reduces credit risk. Finally, the third step confirms the indirect effect of credit risk on the relation between governance and financial performance of banks, the mediating effect is still partial since the two coefficients are significant that confirm H4.

Table 8. The mediating effect of credit risk in Governance – Financial Performance relation. Note: Standard errors are in parentheses; *** p<.01, **p<.05, *<.1.

Variable	ROA	ROE	NPL	ROA	ROE
	(1)	(2)	(3)	(4)	(5)
GOV	0.2919*** (0.0564)	0.0227*** (0.0045)	-0.0105 ** (0.0051)	0.2818 (0.0567)	0.0231*** (0.0045)
L1.NPL			0.8052*** (0.0566)		
NPL				-2.2580 (0.6187)	-14.1796*** (3.7430)
SIZE	-00615*** (0.0054)	-0.2710*** (0.0456)		-0.6107 (0.0054)	-0.2636*** (0.0456)
CAR	1.5465*** (0.4038)	0.0166 (0.0274)	-0.0216 (0.0159)	1.5232 (0.4019)	0.0196 (0.0269)
LTD	0.2311*** (0.0422)	1.5540*** (0.3520)	0.0055* (0.0033)	0.2421 (0.0428)	1.6466*** (0.3418)
GDP	0.0392*** (0.0071)	0.2479*** (0.0467)	-0.0011 *** (0.0004)	0.0402 (0.0073)	0.2478*** (0.0494)
INF	0.0999*** (0.0083)	.4501427*** .0513138	9.21e-06 (0.0002)	0.1015 (0.0085)	0.4725*** (0.0536)
Intercept	1.3962*** (0.1385)	10.55684*** 1.132075	0.0096** (0.0039)	1.4348 (0.1385)	10.5951*** (1.1090)
Wald (Khi2)	490.21	230.96	4097.75	493.25	239.68
N	1310	1310	1179	1310	1310

DISCUSSION

Therefore, to ensure the reliability of earlier findings, we conduct additional analysis in three ways. First, we employ a different statistical method based on the Structural Modelling Equation (SEM) in order to highlight the indirect effect. In fact, the commonly employed three-step approach encounters certain issues notably the absence of a straight test for the significance of indirect effect. A confirmatory method is to estimate the relation with the Structural Equation Model which allows us to carry out a pathway analysis by decomposing the total effect into direct and indirect effects. Second, based on the findings of Bruno et al., (2024) which prove that, unlike American banks, European banks with higher ESG scores have higher levels of NPL, we suspect that the predominance of US banks could skew our results. We exclude American banks that could bias our previous findings since they predominate the sample with 25.19%. Finally, we test the effect of banking sustainability on financial performance by taking into consideration the existence of a CSR sustainability committee which is a board or senior management committee responsible for decision-making on CSR strategy. Banks that implement CSR committees are more involved in CSR activities and strategically adopt this approach.

Firstly, findings presented in Table 9 reveal that, after accounting for control variables, ESG performance exhibits a negative and significant impact on non-performing loans. The indirect effect induced by PNL is evaluated at 11.29%, significance testing of the indirect effect coefficient, through the Sobel test, demonstrates a p-value below 5%. The mediation effect is partial, about 6% of the effect of ESG score on ROE is mediated by the NPL ratio. The indirect effect to the direct effect is 0.064, which is about 10% as large as the direct effect of ESG on ROE. Moreover, Using SEM, Table 9 presents the results of the indirect effect mediated by the NPL ratio of respectively ENV, SOC and GOV on ROE. We conclude the same results where only social and governance effects have been partially mediated by credit risk. Social and governance performance reduces credit risk which enhances the bottom line of banks' statements. Moreover, findings suggest that about 7% of the effect of the social pillar on ROE is mediated by NPL ratio where this relation is about 4% for governance. These findings confirm our previous conclusions.

Table 9. ESG effect decomposition. Note: Standard errors are in parentheses; *** p<.01, **p<.05, *<.1.

Variable	Direct Effect		Indirect effect			
	NPL ratio	ROE	ROE			
	(1)	(2)	(3)	(4)	(5)	(6)
ESG	-0.0028** (0.0013)	1.7639*** (0.6458)	0.1129* (0.0581)			
ENV				0.0353 (0.0450)		
SOC					0.0918* (0.0521)	
GOV						0.1476** (0.0656)
L1.NPL	0.8852*** (0.0427)					
NPL		-39.6694*** (4.6232)	-35.1189*** (3.9447)	-35.2098*** (3.9639)	35.0398*** (4.0114)	-32.6816*** (3.9534)
SIZE		0.1491*** (0.0502)				
CAR	-0.0210*** (0.0062)	3.1859 (2.6113)	0.8357*** (0.2747)	0.8166*** (0.2724)	0.8211*** (0.2726)	0.8227*** (0.2633)
LTD	0.0023*** (0.0007)	0.8393** (0.3509)	-0.0918*** (0.0326)	-0.0807** (0.0319)	-0.0888*** (0.0320)	-0.0796*** (0.0295)
GDP	-0.0010** (0.0004)	0.7053*** (0.0990)	0.0426** (0.0180)	0.0427** (0.0178)	0.0417** (0.0180)	0.0394** (0.0168)
INF	0.0009* (0.0005)	0.6226*** (0.0574)	-0.0370* (0.0211)	-0.0368* (0.0210)	-0.0373* (0.0210)	-0.0329* (0.0195)

Secondly, we run the same estimations after excluding American banks. Results indicate the same findings; credit risk partially mediates the effect of ESG on the financial performance of banks (Table 10, (1); (2) and (3)). Additionally, the structural equation model for non-US samples also confirms earlier findings and proves that the indirect effect is significant and also stronger. In fact, about 14% of the effect of ESG score on ROE is mediated by NPL ratio and the mediated effect is about 0.2 times as large as the direct effect of ESG on ROE.

Table 10. The mediating effect of credit risk- Robustness checks. Note: Standard errors are in parentheses; *** p<.01, **p<.05, *<.1.

Variable	ROE	NPL	ROE	ROE	NPL	ROE
	(1)	(2)	(3)	(4)	(5)	(6)
ESG	1.7457*** (0.5624)	-0.0081** 0.0036	1.1098* (0.5790)			
CSR Committee				0.3376** (0.1474)	-0.0053*** (0.0017)	0.3002** (0.1449)
L1.NPL		0.9707*** (0.0261)			0.8856*** (0.0245)	
NPL			-22.5294*** (3.9435)			-27.3637*** (3.7524)
SIZE	0.2210*** (0.0514)		-0.3169*** (0.0423)	-0.1571*** (0.0384)		-(0.2313)*** (0.0396)
LTD	1.63504*** (0.34279)	0.004578*** (0.0009)	1.3428*** (0.3423)	1.6106 (2.5655)	-0.0627*** (0.0194)	2.2234 (2.4835)
GDP	0.3848*** (0.0441)	-0.0022*** (0.0003)	0.4473*** (0.0403)	1.6187*** (0.3214)	0.0008 (0.0016)	1.4791*** (0.3223)
CAR	8.88531*** (2.92795)	-0.02675* (0.01475)	9.7281*** (2.8656)	0.2286*** (0.0381)	-0.0020*** (0.0007)	0.2532*** (0.0390)
INF	0.2164*** (0.0394)	0.0012*** (0.0002)	0.2441*** (0.0403)	0.4009*** (0.0405)	0.0009*** (0.0002)	0.4626*** (0.0380)
Constant	8.5680*** (1.3063)	0.0052*** (0.00301)	11.5874** (0.9855)	8.9903*** (0.9741)	0.0159*** (0.0037)	11.14649*** (0.9302)
Wald (Khi2)	300.09	18270.87	356.12	300.09	18270.87	366.82
N	980	882	980	1310	1179	1310

Previous studies argue that the presence of these committees positively affects financial performance (Khan et al., 2023; Cosma et al., 2022), although, no study examines its effect on credit risk. We remark that the same results are obtained (Table 10), the presence of a CSR committee reduces credit risk and enhances financial performance ((4); (5) and (6)) which is in accordance with our main conclusions.

CONCLUSIONS

Our research investigates the association between the Financial performance of OECD banks and their ESG levels through the mediating effect of non-performing loans. Previous studies have mainly focused on the direct relation between sustainability reporting and financial performance. Recent studies demonstrate that responsible banking practices, characterized by thorough borrower scrutiny, loan monitoring, and a commitment to social responsibility, are expected to mitigate the incidence of bad loans. In this paper, we conjecture that ESG performance has an indirect effect on Financial performance. Our hypothesis asserts that ESG performance reduces non-performing loans which translates into higher financial performance and our findings align with our expectations.

To discern the driving forces behind the envisaged indirect effect, we extend our analysis to individual pillars of ESG. Empirical findings reveal that only social and governance performance contributes to this mediating effect of non-performing loans, Environmental performance has an ambiguous effect on financial performance and doesn't affect credit risk. Our results withstand robustness tests employing alternative estimation methods, sustainability measures and sub-sample analyses.

The findings of our study hold several implications for managers, regulators, stakeholders and academics. Firstly, given the positive effect of ESG on financial performance and its role in reducing credit risk which is a substantial risk in the banking industry, banks' managers have to implement strategic sustainability initiatives encompassing both environmental social and governance factors. Enhancing sustainable activities reduces credit risk and enhances financial performance, this confirms undertaken legislative action that would implement ESG risks in management risk strategy for banks. Moreover, more sustainable banks are less risky, which encourages depositors and lenders to entertain trusty relationships. Finally, this study contributes to the ESG literature within the banking sector by focusing on the direct and indirect effects on financial performance by concentrating on the effect of non-performing loans. Through archival evidence, we provide insights for ESG research in the banking industry and highlight avenues for future exploration, including taking into account more specified measures of sustainability and especially the environment dimension by explicitly analyzing this dimension with more precaution and more accurate data. As ESG gains importance for banks around the world, the re-estimation of the indirect effect for other countries, particularly in the context of emerging economies, holds the potential to enhance comprehension regarding the multiple effects of sustainability.

ADDITIONAL INFORMATION

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CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

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Мазтул С.

СТІЙКІСТЬ І ФІНАНСОВІ РЕЗУЛЬТАТИ БАНКІВ: РОЛЬ КРЕДИТНОГО РИЗИКУ

В умовах зростаючого тиску щодо вирішення імперативів сталого розвитку банки поступово узгоджують свої стратегії з очікуваннями зацікавлених сторін. Отримання інформації про те, як ці ініціативи впливають на кредитні ризики й фінансові показники банків, має ключове значення для забезпечення економічної стабільності та зростання. У цьому контексті в роботі досліджено вплив стійкості банків на фінансові результати через її роль у зниженні кредитного ризику. Дослідження ґрунтується на наборі даних 131 комерційного банку ОЕСР за 10 років. За допомогою рекурсивної моделі ми перевіряємо опосередкований ефект непрацюючих кредитів у співвідношенні між фінансовими та ESG-показниками. Отримані результати підтверджено за допомогою моделі структурних рівнянь, яка виділяє непрямий ефект. Емпіричні результати свідчать про те, що фінансові результати банків негативно пов'язані з проблемними кредитами, а банки з вищими показниками ESG мають нижчі коефіцієнти непрацюючих кредитів. У нашому дослідженні зроблено висновок, що зростання сталості підвищує фінансові показники банків за рахунок зниження кредитного ризику. Інтеграція сталого розвитку в банківські операції покращує управління ризиками, що покращує фінансові показники. Подальші результати вказують на те, що соціальний та управлінський рівні значною мірою сприяють цьому ефектові, водночас екологічний рівень відіграє неоднозначну роль. Ці результати свідчать про те, що банкам необхідно посилювати свої показники ESG, оскільки це сприятливо впливає на якість кредитів і фінансові показники. Отримані результати мають значні наслідки для того, щоб банкіри могли управляти своїм кредитним ризиком, інвестори – розуміти важливість сталого розвитку, а регулятори – вдосконалювати стандарти оцінки ESG.

Ключові слова: стійкість, фактори ESG, медіатор, кредитний ризик банку, фінансові показники

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