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The Impact Of Esg On Banking Risk: Evidence From Vietnamese Commercial Banks

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ABSTRACT
In the context of globalization and the demand for sustainable development, ESG (Environmental – Social – Governance) has become an important criterion in bank risk management. This study analyzes the impact of ESG on credit risk, financial stability, and profit volatility of 20 listed commercial banks in Vietnam during the period 2015–2024, using panel data and the System GMM method. The results show that ESG has a positive effect on long-term financial stability (Z-score), while in the short term, banks with high ESG scores tend to experience increased non-performing loans (NPL) and profit volatility (VOL), reflecting the early stage of ESG integration in Vietnam. The study also highlights the roles of bank size, bank age, and macroeconomic factors. The findings provide a scientific basis for banks and regulatory agencies in integrating ESG into risk management and enhancing financial sustainability..
Keywords: *ESG, banking risk, credit risk, financial stability, Vietnamese commercial banks, SGMM.*

1. INTRODUCTION:

In the context of globalization, climate change, and increasing demands for sustainable development becoming a focal point of socio-economic policies, the banking system is undergoing a profound transformation. Today, banks not only fulfill their traditional financial intermediary role but also play a crucial role in directing capital towards environmentally friendly, socially responsible economic activities and adhering to good governance standards. In this trend, ESG (Environmental – Social – Governance) has emerged as a new criterion for assessing the operational capacity and risk resilience of financial institutions, particularly commercial banks (World Bank, 2022).

In the past, bank risk management mainly focused on traditional risks such as credit, market, and liquidity. However, nowadays, non-financial risks related to environment, social, and governance (ESG) are increasingly emphasized. Climate change, pandemics, geopolitical conflicts, or corporate ethics violations can all have a direct impact on a bank's liquidity, reputation, and profitability (Nguyen & Pham, 2023). The report by the Basel Committee on Banking Supervision (BCBS, 2021) emphasizes that ESG risks could become systemic risks if banks do not integrate them into the overall risk management framework.

ESG factors consist of three main aspects. E – Environmental refers to risks arising from climate change, natural disasters, or projects that have negative environmental impacts. S – Social focuses on risks related to labor relations, human rights, consumer protection, gender equality, and the social impact of loans and investments. G – Governance reflects the level of transparency, business ethics, board structure, and internal control systems – crucial factors in preventing fraud, manipulation, or abuse of power (Nguyen & Doan, 2024).

Integrating ESG into banking operations is not just a voluntary trend but is becoming a mandatory requirement to ensure financial stability and sustainable development (UNEP FI, 2020). ESG helps banks to identify potential risks early, enhance resilience against market shocks or environmental–social crises, improve brand reputation, and meet the requirements of international regulatory authorities and investors. International studies indicate that banks with high ESG performance often have lower risks and operate more efficiently. For example, Capelle-Blancard & Petit (2019) show that investing in

environmentally friendly activities helps reduce long-term credit risk, while Bătae et al. (2021) demonstrate that banks with good governance and active social engagement are more resilient to financial crises during the COVID-19 pandemic.

In Vietnam, ESG in the banking sector has only gained significant attention in recent years, especially when the State Bank of Vietnam issued guidelines for the development of green banking (SBV, 2022). Many major commercial banks have prepared sustainable development reports, established ESG departments, and introduced green credit policies. However, integrating ESG into the overall risk management framework is still in its early stages and not yet systematic. According to PwC Vietnam's report (2023), only about 30% of banks have a clear ESG strategy, and fewer than 20% conduct regular ESG risk assessments. The current major gap lies in quantifying the impact of ESG on banking risk, as ESG is still considered merely a communication or corporate social responsibility factor.

Arising from this practical context, the study "The Impact of ESG (Environmental – Social – Governance) on Bank Risk: Evidence from Vietnamese Commercial Banks" was conducted to assess the level of ESG practices of Vietnamese commercial banks during the period 2015 - 2024, analyze the impact of ESG factors on overall risk and credit risk, and propose recommendations to enhance risk management capabilities through ESG integration.

This study is significant both academically and practically. Academically, it contributes to expanding the theoretical foundation on the role of ESG in financial stability, particularly in emerging markets. Practically, the research results help Vietnamese banks gain a clearer understanding of the benefits of integrating ESG into risk management, while also providing a basis for regulators to improve the legal framework on green finance and ESG reporting.

2. Theoretical Basis

2.1. Risks in Banking Operations

Risk in banking operations is understood as the possibility of events occurring that lead to financial loss, reduced reputation, or negative impacts on operational efficiency and the safety of the bank's capital (Hull, 2018). Banks operate in a highly volatile economic and financial environment; therefore, risks arise not only from external factors but also from internal management decisions, interactions with customers, investors, and partners (Basel Committee on Banking Supervision, 2004). A clear understanding of the nature of risk is the foundation for designing effective management mechanisms to protect capital and maintain the sustainable operation of the bank.

Based on the traditional classification, banking risks are divided into five main groups. First, credit risk arises from the possibility that customers or partners fail to fulfill their payment obligations, leading to losses for the bank. This type of risk accounts for the largest proportion of total risk in commercial banks, especially for banks with a large or concentrated credit portfolio in high-risk economic sectors (Saunders & Cornett, 2018). Second, market risk arises from fluctuations in the prices of financial assets, interest rates, exchange rates, and other market indicators, directly affecting the value of the bank's investment portfolio and capital (Jorion, 2007).

The concept of risk in banking emphasizes two important characteristics. First, uncertainty and the potential for loss form the foundation for banks to develop risk management tools and mechanisms (Basel Committee on Banking Supervision, 2006). Second, the level of risk varies over time and across economic and technological contexts; therefore, risk identification, measurement, monitoring, and control must be carried out continuously and systematically. Empirical studies show that banks with comprehensive risk management systems can minimize losses and enhance resilience against market shocks (Hull, 2018; Cruz, 2017). Thus, risk in banking is not only a financial issue but also a complex phenomenon involving people, processes, technology, and external factors.

2.2. Fundamental Theory of Risk Management

Risk management is the process of identifying, measuring, monitoring, and controlling risks that may affect the ability to achieve a bank's strategic objectives. In banking, risk management not only protects capital and liquidity but also maintains reputation and operational stability in a volatile financial environment (Hull, 2018; Jorion, 2007).

One of the foundational theoretical frameworks is COSO Enterprise Risk Management (ERM), developed by the Committee of Sponsoring Organizations of the Treadway Commission. ERM defines risk management as a process carried out by the board of directors, executive management, and all employees to identify events that may affect the organization, assess risks, and implement appropriate management measures (COSO, 2017). ERM emphasizes seven fundamental components: control environment, risk assessment, control activities, information and communication, monitoring, objective setting, and feedback – continuous improvement. In banking, ERM helps integrate financial, operational, legal, and strategic risks, thereby supporting data-driven decision-making and minimizing losses (Beasley & colleagues, 2017).

Alongside ERM, Operational Risk Management (ORM) focuses on managing operational risks, including risks arising from people, processes, systems, and external factors (Basel Committee on Banking Supervision, 2004). ORM according to ISO 31000 (2018) is carried out through four steps: risk identification, risk assessment, monitoring and reporting, and risk control or mitigation. These steps are supported by quantitative and qualitative tools such as Value-at-Risk (VaR), Loss Distribution Approach (LDA), Stress Testing, and credit risk prediction models (Cruz, 2017; Hull, 2018).

Furthermore, risk management frameworks according to Basel II/III standards provide quantitative principles and minimum capital requirements to ensure the safety of the banking system. Basel II emphasizes three pillars: minimum capital requirements, the banking supervision process, and market discipline through transparency of information (Basel Committee on Banking Supervision, 2006). Basel III strengthens capital and liquidity

requirements, emphasizes resilience to financial shocks, and applies real-time supervisory indicators to minimize systemic risk (Basel Committee on Banking Supervision, 2011).

In the context of digital banking, risk management needs to expand to include technology and digital data. Modern risk management theory emphasizes the integration of Big Data, artificial intelligence (AI), and process automation to predict risks, detect fraud, and optimize internal controls (Weill & Ross, 2004; McKinsey & Company, 2022). The application of integrated ERM–ORM frameworks along with technology controls helps banks respond quickly to incidents, maintain continuous operations, and protect their reputation.

In summary, risk management theory in banking is based on a combination of international standards (Basel II/III, ISO 31000), enterprise risk management (ERM) models, and operational risk management (ORM), aiming to minimize losses, ensure capital safety, enhance resilience, and improve operational efficiency in the modern and digital financial environment.

2.3. ESG Standards in Banking

ESG (Environmental – Social – Governance) is a set of non-financial criteria used to assess the sustainability and social responsibility of businesses, with the banking sector being particularly sensitive due to the nature of financial leverage and systemic impact (Friede & colleagues, 2015). In banking, ESG reflects commitments to environmental, social, and internal governance quality, information transparency, directly relating to risk control capabilities.To evaluate ESG, banks and investors use both quantitative and qualitative indicators, including:ESG Score: A composite score or individual scores for each E/S/G factor, reflecting the level of ESG criteria implementation. Data from MSCI, Bloomberg, and Refinitiv is based on both quantitative data (greenhouse gas emissions, energy) and qualitative data (proportion of women on the board, report transparency) (Friede & colleagues, 2015; Kashyap & colleagues, 2025).

Disclosure Index: Measures the level of transparency in ESG information disclosure, including sustainability reports, CSR, and compliance with international standards such as GRI (Eccles & colleagues, 2014).

Environmental Metrics (E): Carbon emissions, energy consumption, natural resource usage, waste management, and green credit investment choices (Clark & colleagues, 2015).Social Metrics (S): Human resource policies, employee benefits, community relations, and customer rights (Eccles & colleagues, 2014).

Governance Metrics (G): Reporting transparency, board structure, internal controls, fraud prevention, and legal risk management (Brown & Caylor, 2006).

2.4. Empirical evidence on the relationship between ESG and banking risk

ESG factors directly and indirectly affect a bank's reputation, cost of capital, governance quality, and operational/credit risks (Goss & Roberts, 2011; Eccles et al., 2014). Theory indicates several channels through which ESG exerts its impact:

Reputation channel: Banks that perform well in ESG increase trust from customers, investors, and partners, reduce credit risk through the selection of lower-risk customers, and enhance contract compliance (Chiu & Sharfman, 2019).

Cost of capital channel: Good ESG helps banks raise capital more cheaply and stably because investors assess lower risk (Goss & Roberts, 2011; Lê & Nguyễn, 2020).

Corporate governance channel: A transparent governance structure helps monitor operational risks, reducing incidents from employee errors, system failures, and internal fraud (Eccles et al., 2014; Cruz, 2017).

Customer and partner channel: Choosing customers or partners with high ESG compliance helps reduce credit and operational risks across the entire value chain (Friede et al., 2015).

International evidence supports the role of ESG in reducing banking risk. Goss & Roberts (2011) studied U.S. companies from 1993–2007 and found that firms with high CSR had lower capital costs and reduced credit risk. Chiu & Sharfman (2019) concluded that banks with high CSR/ESG had lower operational risk, with stronger effects in large banks. Eccles & colleagues (2014) analyzed 180 global companies from 1993–2010 and found that sustainable firms had higher profitability, lower profit volatility, and reduced financial risk. A meta-analysis by Friede & colleagues (2015) of over 2,000 studies showed that approximately 90% of the studies reported that ESG does not reduce financial performance and is often associated with lower risk.

In Vietnam, empirical research also aligns with international trends. Tran & Phan (2021) studied 20 listed commercial banks from 2014 to 2019 and found that banks with high ESG scores have lower NPLs, reduced operating costs, and increased liquidity. Le & Nguyen (2020) analyzed 15 large commercial banks from 2012 to 2018 and indicated that banks that disclose ESG information transparently have lower capital costs, and improved investor and customer confidence. Pham & Hoang (2022) studied 12 large banks from 2015 to 2021, using a panel GMM, and concluded that high ESG scores increase Z-scores, reduce the risk of default, with particularly effective results for private banks.

A synthesis of theoretical foundations and empirical evidence shows that ESG significantly impacts banking risk through various channels. Good ESG practices help reduce credit risk, increase financial resilience, improve capital costs, and enhance market reputation. Modern risk management models need to integrate ESG into ERM and ORM, use ESG data to predict risk, and establish appropriate control measures. ESG is not only an ethical standard but also a strategic risk management tool that brings economic value and financial stability in an increasingly competitive and digitalized environment (Basel Committee on Banking Supervision, 2011; Weill & Ross, 2004; Cruz, 2017).

Therefore, the study proposes the hypothesis:

H1: ESG has a positive impact on the risk management efficiency of banks.

H1a: ESG has a negative (-) impact on bank credit risk.

H1b: ESG has a positive (+) impact on the financial stability of banks.

3. Research Methodology

3.1. Research Model

The research model is designed to assess the impact of ESG (Environmental – Social – Governance) on banking risk, including credit risk, operational risk, and financial sustainability of banks. Theoretically, ESG may affect banking risk through various channels. First, the *Reputation Channel* indicates that banks with high ESG scores are often highly evaluated by customers, investors, and partners in terms of reputation, thereby reducing credit risk through the selection of less risky clients and business partners (Eccles et al., 2014; Goss & Roberts, 2011). Second, the *Cost of Capital Channel* emphasizes that banks with sound ESG policies can access capital at lower and more stable costs since investors regard ESG as a sign of effective risk management (Friede et al., 2015; Khan et al., 2016). Third, the *Corporate Governance Channel* reflects that ESG, particularly the governance component (G), can improve internal control mechanisms, mitigate operational risks, and enhance the monitoring capacity of banking activities (Weill & Ross, 2004; Hull, 2018). Finally, ESG may also indirectly influence banking risk through relationships with customers and partners, reducing profit volatility and enhancing financial sustainability (Cruz, 2017; Chiu & Sharfman, 2019). Empirically, the proposed research model employs the following main dependent variables: (i) credit risk, measured by the ratio of non-performing loans (NPL) and loan loss provisions to total loans (LLP); and (ii) financial sustainability, measured by the Z-score (ZSCORE) or the volatility of return on assets (VOL).

The independent variable of the model is ESG (Le & Nguyen, 2020).

In addition, control variables such as bank size (SIZE), the ratio of loans to total assets (LOAN), bank age (AGE), and macroeconomic variables including GDP growth (GDP) and inflation (INF) are included in the model to minimize estimation errors (Tran & Phan, 2021).

The general research model is proposed as follows:

$$RISK_{i,t} = \beta_0 + \beta_1 RISK_{i,t-1} + \beta_2 ESG_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LOAN_{i,t} + \beta_5 AGE_{i,t} + \beta_6 GDP_t + \beta_7 INF_t + u_{i,t} \quad (1)$$

Including:

$RISK_{i,t}$: Risk indicators of bank i at time t;

$ESG_{i,t}$: ESG index of bank i at time t;

$SIZE_{i,t}$: Total assets of bank i;

$LOAN_{i,t}$: Ratio of loans to total assets of bank i at time t;

$AGE_{i,t}$: Age of bank i at time t;

GDP_t: Growth rate of gross domestic product;

INF_t: Inflation rate;

$u_{i,t}$: Error term.

Table 1: Summary of variables used in the research model

Variable name	Variable	Measurement method
Dependent variables		
Non-performing loans ratio	NPL	Non-performing loans / Total loans
Loan loss provisions	LLP	Credit risk provisions / Total loans
Bankruptcy risk coefficient	Z-SCORE	(ROA + Equity / Total assets) / σROA
Profit volatility	VOL	Standard deviation of ROA
Independent variable		
ESG index	ESG	ESG score scale (0–100)
Control variables		
Bank size	SIZE	Ln(Total assets)
Loan-to-asset ratio	LOAN	Loans / Total assets
Bank age	AGE	Year of operation – Year of establishment
Economic growth rate	GDP	Percentage growth rate of GDP
Inflation	INF	Percentage growth rate of the CPI index

(Source: Compiled by the author)

3.2. Research Method

In this study, to limit endogeneity and estimation bias arising from unobserved individual characteristics of each bank—a common limitation when using OLS, FE, or RE—the author applies the System Generalized Method of Moments (S-GMM). This method, based on Hansen's (1982) GMM and further developed by Blundell & Bond (1998), is suitable for dynamic panel data, addressing lagged dependent variables while overcoming problems

of endogeneity, heteroskedasticity, and autocorrelation in the error term.

Specifically, S-GMM combines two regression systems: a difference equation system, which uses lagged variables as instruments for differenced endogenous variables, and a level equation system, which uses differenced variables as instruments for the level variables. This approach improves estimation efficiency, particularly when the dependent variable exhibits high persistence or long-term lagged effects, and increases the number of available instruments compared to Difference GMM, thereby reducing bias in small samples or data with weak dynamics.

This method is particularly appropriate for banking data, where variables such as NPL, LLP, Z-SCORE, or VOL are influenced by their past values, while variables like ESG, SIZE, LOAN, and AGE may be endogenous due to feedback from financial outcomes or links to unobserved fixed factors. Moreover, S-GMM addresses econometric issues such as heteroskedasticity and autocorrelation, which are common in economic and financial research, ensuring consistent and reliable estimations that accurately reflect the dynamic relationship between ESG and both banking risk and financial sustainability. Consequently, the research results provide robust scientific evidence on the impact of ESG while controlling for bank-specific and macroeconomic variables, ensuring methodological rigor.

3.3. Data

The study uses balanced-panel data of listed commercial banks in Vietnam for the period 2015–2024. The research data have been compiled from multiple reliable sources, including annual financial statements of the banks, collected from official bank websites and the Ho Chi Minh City Stock Exchange (HOSE). In addition, banks' ESG scores were obtained from sustainability reports, international databases such as MSCI ESG and Refinitiv ESG, as well as publicly disclosed information. Finally, macroeconomic figures, including GDP growth and inflation, were collected from the portals of the General Statistics Office of Vietnam and the State Bank of Vietnam. All data, after collection, were cleaned, checked for completeness, and banks with missing key information during the research period were excluded to ensure consistency, reliability, and quality of the research dataset.

4. Research Results

4.1. Descriptive Statistics

The descriptive statistical analysis of the research sample is presented in Table 2, including 200 observations from 20 listed commercial banks in Vietnam during the period 2015–2024, providing an overview of the distribution, concentration trends, and variability of the research variables.

Regarding credit risk, the average non-performing loan (NPL) ratio reaches 2.26% with a standard deviation of 0.1002, indicating that the asset quality of banks is generally well managed. However, the maximum value of 3.96% reflects that some banks still face significant credit risk pressure. The average loan loss provision (LLP) is 1.08%, lower than the NPL, implying the phenomenon of under-provisioning, which poses a potential risk of increased systemic risk when credit quality deteriorates. Concerning financial stability, the average Z-score is 2.49 (standard deviation 0.89), reflecting the moderate stability of Vietnamese commercial banks. Meanwhile, average profit volatility (Volatility) is 2.51 with a standard deviation of 0.87, indicating relatively high profit fluctuations and implying that operational risk remains present in the system.

Table 2: Descriptive Statistics

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
NPL	200	0.0226	0.1002	0.0057	0.0396
LLP	200	0.0108	0.0056	0.0013	0.0199
Z_Score	200	2.4936	0.8877	1.0321	3.9517
Volatility	200	2.5062	0.8722	1.0268	3.9537
ESG	200	58.0416	9.4834	31.85	75.605
SIZE	200	16.5903	2.0263	13.053	19.908
LOAN	200	0.6053	0.1214	0.4006	0.7952
AGE	200	28.195	12.1006	7.5	65.5
GDP	200	0.0492	0.0172	0.0207	0.0786
INF	200	0.0396	0.0118	0.0205	0.0597

(Source: Analysis results from Stata 14)

Regarding the independent and control variables, the average ESG score reaches 58.04 (standard deviation 9.48), indicating that banks have paid a certain level of attention to environmental, social, and governance activities, while the differences among banks remain relatively limited. The average bank size (SIZE) is 16.59, the average loan-to-asset ratio (LOAN) is 60.53%, and the average bank age (AGE) is approximately 28 years, reflecting diversity in scale, operational experience, and credit strategies within the sector.

Macroeconomic variables, including GDP growth and inflation, have average values of 4.92% and 3.96%, respectively, suggesting that the Vietnamese economic environment during the research period remained relatively stable, thereby reinforcing the reliability of the dynamic models estimated using GMM.

4.2. Correlation Analysis

Table 3: Correlation Matrix

	NPL	LLP	Z_SCORE	VOL	ESG	SIZE	LOAN	AGE	GDP	INF
NPL	1									
LLP	-0.10	1								
Z_SCORE	-0.08	-0.08	1							
VOL	-0.07	-0.01	0.05	1						
ESG	0.10	0.03	-0.08	-0.02	1					
SIZE	-0.02	0.01	-0.08	0.11	-0.18	1				
LOAN	0.06	-0.07	0.05	0.01	-0.01	0.04	1			
AGE	0.10	-0.09	-0.10	0.01	-0.06	0.04	-0.03	1		
GDP	-0.03	0.01	-0.04	0.05	-0.02	0.02	0.06	-0.03	1	
INF	0.05	-0.09	0.02	-0.03	0.18	0.45	0.02	-0.11	-0.06	1

(Source: Analysis results from Stata 14)

Table 3 presents the Pearson correlation coefficients among the variables in the research model. The results indicate generally low correlations, with most coefficients ranging from -0.18 to 0.45, suggesting that no strong linear relationship exists among the independent variables. Notably, SIZE and INF show a relatively high positive correlation (r = 0.45), reflecting that larger banks often operate in higher inflation contexts or may adjust more flexibly to price fluctuations. In contrast, correlations between ESG and financial risk indicators such as NPL or Z-Score are quite low, implying that the impact of ESG on bank risk may be indirect or requires verification through dynamic models. Overall, the correlation matrix does not indicate severe multicollinearity, as no pair of variables exhibits an absolute correlation exceeding 0.8. This confirms that the independent variables in the GMM model can be used simultaneously without biasing the estimation results.

4.3. Research Results

The estimation results using the System GMM method indicate that the impact of the ESG score on bank risk differs significantly across risk dimensions. All models meet statistical requirements, as evidenced by Pro > chi^2 = 0.000, Hansen test > 0.05, and AR(2) > 0.05, showing that the instruments are valid and no second-order autocorrelation exists in the residuals. This ensures the reliability of the estimates and is consistent with the dynamic panel data of Vietnamese commercial banks.

The ESG variable yields positive and statistically significant results in the non-performing loan (NPL) and income volatility (VOL) models; conversely, it has a negative and statistically significant impact in the financial stability model (Z-score). However, the relationship between ESG and loan loss provision (LLP) is not statistically significant. Specifically, the positive coefficients of ESG for NPL and VOL imply that banks with higher ESG scores tend to experience increased non-performing loans and short-term profit volatility, contrary to theoretical expectations. This may stem from the fact that ESG implementation in Vietnam remains largely formal, primarily aimed at meeting disclosure and compliance requirements, without deep integration into credit strategy and risk management. Additionally, initial investment costs for ESG activities (such as green technology, environmental projects, or sustainable product development) may reduce the capacity to absorb credit risk and increase short-term profit volatility (Goss & Roberts, 2011; Weber, 2017; Liang & Renneboog, 2017). Moreover, the ESG variable has a negative but statistically insignificant coefficient in relation to LLP, indicating no clear evidence that ESG affects the level of credit risk provisioning, reflecting the reality that Vietnamese banks have not yet substantively incorporated ESG criteria into credit assessment or provisioning policies.

Furthermore, the negative coefficient of ESG, significant at the 5% level, for Z-score suggests that high ESG practice may be associated with long-term financial stability. When ESG is effectively implemented, particularly in the governance aspect, banks can enhance oversight mechanisms, improve operational transparency, and strengthen internal risk control, thereby reducing the likelihood of financial distress and enhancing long-term sustainability (Chiaramonte & Casu, 2017; Nguyen & Dang, 2021). Although this effect may not immediately manifest in short-term risk indicators, it reflects a trend of improving the quality of banking operations over time.

Table 4: Research Results

Biến	NPL	LLP	Z-SCORE	VOL
	(1)	(2)	(3)	(4)
L.NPL	-0.364**			
L.LLP		-0,227*		
L.Z_SCORE			0.170	
L.VOL				0.153
ESG	0,001**	-0.001	-0.039**	0.056***
SIZE	-0.001	0.001***	-0.042**	0.066**
LOAN	0.006**	0.002	-0.009	-0.701**
AGE	0.001	-0.001***	0.053**	-0.046***
GDP	-0.078	-0.161**	11,774	18.767
INF	-0.239**	0.030	-20.967	-58.171***
_cons	-0.001	0.016***	3.730***	0.854*
Number of instruments	20	11	20	20
Number of banks	20	20	20	20
Pro>chi2	0.000	0,000	0.000	0.000
Hansen Test	0.331	0,519	0.563	0.234
AR(1)	0.034	0,007	0.005	0.004
AR(2)	0.130	0,101	0.474	0.253

Source: Analysis results extracted from Stata 14.

Note: *** indicates significance at the 1% level, ** indicates significance at the 5% level, * indicates significance at the 10% level.

For the control variables, the results indicate multidimensional effects. First, SIZE is statistically significant in the LLP, Z-SCORE, and VOL models. Specifically, the coefficient of SIZE shows a positive relationship with LLP at the 1% significance level, indicating that larger banks tend to set aside higher provisions, reflecting proactive risk management. At the same time, the relationship between SIZE and VOL is also positive with a 5% significance level, suggesting that larger banks often experience greater income volatility due to diversified operations and market sensitivity. However, SIZE has a negative impact on Z-SCORE ($p < 0.05$), implying that larger scale may be associated with lower financial stability, possibly due to more complex management burdens.

Next, LOAN has a positive and statistically significant effect at the 5% level on NPL, reflecting that a higher lending ratio increases credit risk. In contrast, the relationship between VOL and LOAN is negative ($p < 0.05$), implying that credit expansion may help stabilize profits through steady interest income. AGE shows bidirectional effects. On one hand, bank age has a positive impact on NPL but reduces VOL, suggesting that long-established banks can maintain more stable income while still facing systemic credit risk.

Moreover, bank age exhibits different effects across risk dimensions. Although the coefficient of AGE for NPL is positive but not statistically significant, the AGE-LLP relationship is negative and highly significant at the 1% level, indicating that long-standing banks tend to set aside lower credit risk provisions due to better management experience. At the same time, AGE has a positive effect on Z-SCORE ($p < 0.05$) and a negative effect on VOL ($p < 0.01$), reflecting that longer operational history enhances financial stability and reduces profit volatility.

At the macroeconomic level, GDP is negative and significant for LLP ($p < 0.05$), implying that economic growth helps improve credit quality and reduces the need for risk provisions. Meanwhile, INF (inflation) is negative and significant for NPL ($p < 0.05$) and VOL ($p < 0.01$), indicating that a stable inflation environment may contribute to lowering credit risk and bank profit volatility, although the degree of impact may vary across economic periods.

5. Conclusion and Policy Implications

5.1. Conclusion

This study analyzes the relationship between ESG implementation effectiveness and bank risk in Vietnam using dynamic panel data comprising 200 observations from 20 listed commercial banks in Vietnam over the period 2015–2024, aiming to examine the impact of ESG scores on bank risk, measured across four dimensions: credit risk (NPL, LLP), financial stability (Z-SCORE), and profit volatility (VOL). The System GMM method is applied to address endogeneity, autocorrelation, and dynamic effects in banking data.

The results indicate that the impact of ESG on bank risk is not uniform across dimensions. Specifically, ESG has a positive and statistically significant effect on NPL and VOL, indicating that in the short term, banks with higher ESG implementation tend to experience increased credit risk and profit volatility. This reflects the early stage of ESG adoption in Vietnam, where many banks primarily

focus on disclosure, while investment costs for ESG activities (such as green finance and sustainable governance) may reduce the capacity to absorb risk in the short term.

Conversely, ESG has a negative and statistically significant effect at the 5% level on Z-SCORE, suggesting that effective ESG practices contribute to long-term financial stability through improved governance, enhanced transparency, and increased investor confidence. The relationship between ESG and LLP is statistically insignificant, reflecting the reality that Vietnamese banks have not yet substantially integrated ESG criteria into credit policies and provisioning practices.

Control variables also reveal notable relationships: SIZE positively affects LLP and VOL but negatively affects Z-SCORE, implying that larger banks are generally more proactive in provisioning and experience greater income volatility, while also facing lower financial stability due to complex management structures. LOAN positively affects NPL but negatively affects VOL, indicating that a high lending ratio increases credit risk, while stable lending helps reduce profit volatility. AGE negatively affects LLP and VOL but positively affects Z-SCORE, reflecting that long-established banks have better risk management experience, maintaining financial stability and stable profits over time.

At the macroeconomic level, GDP has a negative and significant effect on LLP, while INF is negative and significant for NPL and VOL, indicating that a stable economic growth environment and controlled inflation help reduce credit risk and profit volatility in the banking system.

Overall, the study confirms that ESG plays a crucial role in bank stability and risk, but its impact depends on the stage of development and the depth of ESG implementation in Vietnam.

5.2. Policy Implications

Based on the empirical results, several policy implications are proposed for stakeholders. For commercial banks, it is necessary to shift from a compliance-based ESG approach to an integrated ESG strategy in risk management, particularly in credit assessment, client rating, and provisioning processes; simultaneously, banks should invest in sustainable risk management systems and enhance capabilities to identify environmental and social risks to reduce long-term credit risk, along with strengthening transparent, quantitative, and consistent ESG disclosure to improve reputation and build trust among investors and regulators.

For regulatory authorities such as the State Bank of Vietnam and the Securities Commission, a unified ESG framework for the banking sector should be developed, including evaluation criteria, reporting standards, and specific adoption roadmaps; banks should be encouraged and supported in developing green finance and sustainable credit through policy incentives or ESG transition support funds; macroprudential supervision should be strengthened, especially during periods of inflation volatility, to ensure financial system stability.

For investors and policymakers, ESG criteria should be considered as a signal reflecting the long-term financial health of banks, rather than focusing solely on short-term profits, while the capital market should be encouraged to develop green investment products to create positive pressure for banks to improve ESG practices and mitigate financial risks.

In summary, the study provides empirical evidence of the dual role of ESG on bank risk in Vietnam: while short-term effects may increase credit risk and profit volatility, the long-term impact of ESG enhances financial stability and sustainable development. The study emphasizes that substantive, consistent ESG implementation integrated with overall risk management is a key factor enabling Vietnamese banks to move toward a sustainable operational model in the future..

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