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Corporate Social Responsibility and Bank Stability in Vietnam Novel Insights from a Method of Moments Quantile Regression Approach

Abstract

This study investigates the relationship between corporate social responsibility (CSR) and bank stability in Vietnam from 2016 to 2022 using the method of moments quantile regression (MMQR). The results show a U-shaped relationship between CSR and bank stability at location-based and across quantiles; however, mixed findings are obtained for different CSR components at different quantiles. Specifically, responsibilities to customers and the environment first mitigate but later improve bank stability. However, the findings indicate an inverted U-shaped relationship between product and service responsibility and bank stability, implying that aggressive pursuits of sustainable products may increase bank instability. Our findings still hold when running several robustness checks.

Keywords: CSR; Bank stability; MMQR, GRI, entropy, Vietnam.

JEL code: G20, G21, G32, M14, Q56

1. Introduction

Recent crises reemphasize the critical roles of corporate social responsibility (CSR) and Environmental, Social, and Governance (ESG) in the banking sector (Ben Abdallah, Saïdane & Ben Slama 2020; Yuen et al. 2022). PwC (2022b) also reported that environmental and social-focused institutional investment is significantly rising and will reach approximately US$33.9 trillion in 2026, accounting for 21.5% of assets under management (AUM). AUM in the Asia-Pacific area would triple to achieve US$3.3 trillion in 2026, surpassing a doubling of such investment in the US (PwC 2022b). More importantly, sustainable development (e.g., zero emissions by 2030) calls for banks to further disclose CSR information to reduce environmental emissions and adjust their financing and investment strategies for 'greener' projects (United Nations 2018). The resource-based theory demonstrates that banks may gain outstanding performance if information on their financial and non-financial resources is more often revealed (Azmi et al. 2021). These resources could improve bank competencies and capabilities, thus affecting bank performance, particularly bank stability (Gaur, Vasudevan & Gaur 2011). The unprecedented COVID-19 pandemic, however, has challenged the stability of the global banking system (Boubaker, Le & Ngo 2022; Ho et al. 2023; Nguyen, Le & Ngo 2025), leading to the debate of whether CSR/ESG can improve bank stability and performance in such situations (Yuen et al. 2022).

Studies on the link between CSR and bank stability/performance have shown mixed findings. Several authors found a positive effect of CSR on bank performance (Buallay 2019; Shen et al. 2016) and bank risks (Gangi et al. 2019; Neitzert & Petras 2022). However, others have pointed out the opposite results (Horváthová 2010; Soana 2011). One may argue that the relationship between CSR adoption and bank performance may hold up to certain thresholds (El Khoury, Nasrallah & Alareeni 2021; Yuen et al. 2022).

Such confounding evidence inspires us to revisit the association between CSR adoption and bank stability in emerging markets like Vietnam.

Vietnam is considered the next dragon in Asia since this country boasts one of the fastest-growing economies. Accordingly, its average annual economic growth was 6.09% between 2010 and 2022 (WB 2020), outstandingly maintaining positive expansion even during the unprecedented COVID-19 turmoil (ADB 2020; Le, TD et al. 2024). The sustainable and sound banking system significantly contributes to the significant growth of the Vietnamese economy (BoubakerLe, et al. 2024). While the Vietnamese banking system is generally dominated by state-owned commercial banks (SOCBs) and joint-stock commercial banks (JSCBs), the increasing presence of foreign banks in the market and the commitments of Vietnamese banks to zero emissions have created incentives for Vietnamese banks to focus more on adopting CSR activities as part of their sustainable growth. PwC (2022a) estimated that Vietnam could suffer losses of approximately US$ 523 billion (equivalent to 14.5% of GDP) by 2050 due to the negative impact of climate change. In response to the Vietnamese government's requirement, the State Bank of Vietnam (SBV) has undertaken several measures to promote CSR in the banking system. Notable examples are the introduction of Directive No. 03/CT-NHNN on encouraging green credit growth and environmental–social risk management in credit-granting activities (SBV 2015b) and the Decision No.1552/QD-NHNN on the action plan for green growth by 2020 (SBV 2015a). Accordingly, Tan (2017) reported that Vietnamese banks have gradually engaged in CSR practices following the GRI 2016 standards because they provide more opportunities for banks to improve their performance and stability (Neitzert & Petras 2022). Unfortunately, there is no specific CSR standard guideline for Vietnamese commercial banks; banks would follow different ways of CSR activities (Thu & Khuong 2023) to deal with the substantial costs of CSR (Yuen et al. 2022). Therefore,

this necessitates research on the benefits of CSR, i.e., whether CSR activities could strengthen bank stability in Vietnam.

Our study mainly contributes to the literature in three ways. ***First***, most studies measure CSR by the amount of charitable contributions (Vo et al. 2022) or via CSR indices constructed from three or four ESG pillars (Nguyen & Nguyen 2021) available in the bank's annual reports, and/or from ESG data provided by international organizations such as Bloomberg or LSEG Workspace (Danisman 2022; Yuen et al. 2022). However, the first two measures may not comprehensively capture different dimensions of CSR activities, given that the Global Reporting Initiative (2016) proposed a wider range of dimensions. The last measure, however, may not be available to some emerging markets due to the lack of information that banks disclose. In this sense, our first contribution is constructing a novel CSR index based on eight banking-related dimensions of the GRI 2016 standards. ***Second***, several studies adopted the GRI 2016 standards to measure CSR in different markets without accounting for the country- and industry-specific characteristics. To better reflect the Vietnamese banking system, we relied on the banks' expert opinions in constructing the novel CSR index; the robustness of the index is improved via a Shannon (1948) entropy approach. ***Third***, we empirically examined the relationship between CSR and bank stability in Vietnam using a method of moments quantile regression approach, which can account for differences in the banks' characteristics, such as ownership, size, and listed status at different quantiles (Machado & Santos Silva 2019). Therefore, our study provides novel and significant implications for bank managers and the authorities in strengthening bank stability in Vietnam.

The rest of the study is organized as follows. Section 2 provides a brief literature review. Section 3 presents the methodology and data. Section 4 discusses empirical findings, while Section 5 concludes.

2. A brief overview of the literature

Corporate social responsibility (CSR) has emerged as a critical and strategic concern for banking businesses' growth and operational effectiveness. Stakeholders' awareness of corporate CSR has grown, particularly in emerging economies (Boubakri et al. 2021). Stakeholders, including but not limited to customers, investors, partners, agencies, associations, and employees, expect that the enterprise assumes societal responsibility in light of current global challenges, including resource scarcity, environmental degradation, discrimination, and unethical conduct (Wanderley et al. 2008). Social perceptions of stakeholders and their expectations of businesses have generated a need for mandatory and voluntary reporting on CSR.

Although many studies have examined the relationship between CSR and bank performance since the 1970s, the evidence is mixed (Zhou et al. (2021). More specifically, several studies in developed markets indicated that CSR could improve bank performance (Cornett, Erhemjamts & Tehranian 2016; Forcadell, Aracil & Úbeda 2020; Orlitzky, Schmidt & Rynes 2003; Simpson & Kohers 2002; Wu 2006). The same findings are found in the case of India (Maqbool & Zameer 2018), Saudi Arabia (Ghardallou & Alessa 2022) and a cross-country sample (Esteban-Sanchez, de la Cuesta-Gonzalez & Paredes-Gazquez 2017). Belasri, Gomes and Pijourlet (2020) suggested that the positive effect of CSR on bank efficiency is only felt in developed markets with strong investor protection and high stakeholder orientation. Nonetheless, these studies support the view of stakeholder theory that the transformation in governance from a shareholder-centered to a stakeholder-centered approach seeks to resolve investment and non-investment concerns effectively (Freeman 1984). This shift has assisted managers in making business decisions and implementing business strategies that minimize potential risks and improve bank stability. It also may reduce bank risk by improving customer loyalty and

reducing compliance costs associated with governance-related deficiencies (Brooks & Oikonomou 2018).

On the other hand, better CSR performance requires a tradeoff, which reduces financial performance (Preston & O'Bannon 1997). The overinvestment hypothesis posits that implementing CSR activities will divert scarce resources from maximizing shareholder wealth. This resource diversion may lead to reduced investment, thus impacting bank performance negatively (Alexander & Buchholz 1978; Barnea & Rubin 2010). Alternatively, adopting CSR standards can be viewed as agency costs due to managers' ability to improve their image through CSR initiatives. This can incur shareholders' costs (Barnea & Rubin 2010). Regarding investors' perspective, banks that experience an increase in fixed costs associated with enhanced CSR activities are considered riskier. In this sense, CSR activities are, in fact, costly (Platonova et al. 2018) and harm corporate financial performance (Maqbool & Zameer 2018).

Furthermore, factors such as globalization, climate change, and the COVID-19 pandemic reemphasized the critical role of CSR on bank performance (European Commission 2018; Latapí Agudelo, Jóhannsdóttir & Davídsdóttir 2019; Yuen et al. 2022). Integrating CSR principles into daily operations is considered one of the risk management forms, thus reducing banks' vulnerability to sustainable development and other financial risks (Chollet & Sandwidi 2018; Nofsinger, Sulaeman & Varma 2019). Cornett, Erhemjamts and Tehranian (2016) demonstrated that by embracing societal contribution and social responsibility and incorporating supplementary obligations on sustainability, environmentally friendly goods and services, and community welfare, the bank can enhance its operational efficiency while mitigating financial and non-financial risks. Such an arrangement confers a competitive edge upon the bank and aids it in surmounting periods of adversity, such as the recent COVID-19 pandemic (Bischof et al. 2021; Yuen et al. 2022). Similarly, others have demonstrated that CSR can reduce default

and portfolio risks (Neitzert & Petras 2022). Because ESG reflects CSR, several studies show the positive effect of ESG on bank performance (Azmi et al. 2021). Others show the U-shaped relationship between ESG practices and bank performance across the globe (Yuen et al. 2022).

When observing CSR components, Andrieș and Sprincean (2023) showed that three dimensions are responsible for the total cost of funds. In contrast, social performance and corporate governance are more valuable regarding the cost of deposits. Their findings also suggested that only large banks in developed countries can benefit from environmentally and socially responsible operations that can reduce capital costs. Furthermore, Di Tommaso and Thornton (2020) argued that the positive association between ESG and bank risk-taking depends entirely on the operator's characteristics. Again, other studies in different fields highlighted the importance of other perspectives. Lima Crisóstomo, de Souza Freire and Cortes de Vasconcellos (2011) revealed that firms with greater employee responsibility experience a decline in financial performance due to increased costs.

Overall, the correlation between CSR and bank performance or stability remains controversial. The possible explanation is that existing research may overlook the distinction between short-term and long-term CSR effects on performance (Ferrell, Liang & Renneboog 2016; Hillman & Keim 2001). Horváthová (2010) suggested that the confounding results are due to omitted variable bias, inadequate sample size, and inconsistent measurement of crucial variables. These studies offer critical applications for emerging markets like Vietnam, where CSR disclosure is less transparent. Given the importance of the 2016 GRI Guideline, whether these criteria are relevant to the banking sector is still questionable. Additionally, the unweighted method used to construct the CSR index may provide a biased result (Nguyen & Nguyen 2021) as each business can establish distinct strategic importance criteria for each period (e.g., environmental

responsibility, employee responsibility, product liability). We first construct a novel CSR index to overcome these issues by combining expert survey and entropy methods. Because of the non-normality distribution of bank stability, we use the method of moments quantile regression to evaluate the effects of CSR and its components on bank stability in Vietnam. Due to the diverse banking structure in Vietnam, we also examine whether the link may vary among different settings.

3. Methodology and data

3.1 Methodology

Our baseline model is formed as follows.

$$\pi_{i,t} = \alpha + \beta_1 CSR_{i,t} + \beta_2 SQCSR_{i,t} + \beta_3 X_{i,t} + \varepsilon_i \quad (1)$$

Bank risk ($\pi_{i,t}$) can be measured by the share of loan loss reserves to total loans (Le 2018), the ratio of non-performing loans to total loans (Berger, Klapper & Turk-Ariss 2009; Nguyen & Le 2022; Nguyen & Le 2023), the proportion of loan loss provision to gross loans (Williams 2004); expected default frequency (Fiordelisi, Marques-Ibanez & Molyneux 2011) and bank Z-score (Hafeez et al. 2022). However, it is argued that the first three measures only capture credit risk and are associated with managerial discretion (Le 2021a). The expected default frequency measure is more appropriate to publicly traded banks, whereas not many Vietnamese banks are listed in the market. Subsequently, the Z-score is adopted in our study as it is an inverse measure of overall bank risk. In other words, a greater value of the Z-score means less overall bank risk and higher bank stability. Following prior studies (Le & Nguyen 2021; Lepetit & Strobel 2015; Nguyen & Le 2022; Nguyen & Le 2023), $ZSCORE$ is calculated as:

$$ZSCORE_{i,t} = \frac{ROA_{i,t} + CAP_{i,t}}{\sigma_{ROA_i}} \quad (2)$$

where $ROA_{i,t}$ and $CAP_{i,t}$ are return on assets and the ratio of total equity to total assets in year t, respectively; σ_{ROA} is the standard deviation of ROA over the examined period.

The literature in Vietnamese studies shows that bank CSR can be measured by the ratio of a charitable contribution to bank profits (Vo et al. 2022) or CSR index without considering the weights of its components, based on four categories, including community, environment, employees, and social products and service quality (Nguyen & Nguyen 2021). However, the former approach reflects CSR activities solely from the community perspective, while the latter fails to capture the broader and multidimensional nature of CSR. To overcome these issues, this study first uses an expert survey method to determine the most relevent components of CSR in the Vietnamese banking system, from the GRI (2016) framwork outlining 33 indicators of organizational CSR practices. Then, the entropy method is applied to identify their weights. The mixed-method approach and entropy weighting used in this study are innovative. First, several methodological safeguards were applied to mitigate survey bias and subjectivity. More specifically, the Likert scale helps reduce extreme response tendencies, while Cronbach's Alpha eliminates unreliable items. Also, exploratory factor analysis (EFA) and the Kaiser–Meyer–Olkin (KMO) coefficient are reported to ensure construct validity (Kaiser 1974). In addition, content analysis of publicly disclosed CSR reports was incorporated to supplement subjective expert evaluations with objective data (Nguyen & Nguyen 2021; Rouf & Hossan 2021). Second, entropy is superior to alternative weighting approaches such as principal component analysis or the equal weighting method for three main reasons. Firstly, entropy emphasizes information divergence across indicators, allowing the importance of each dimension to be determined by actual data dispersion rather than uniform assumptions (Karagiannis & Karagiannis 2020). Secondly, unlike PCA, entropy does not require normality assumptions and is better suited for CSR data in Vietnam, which is often heterogeneous and incomplete, thereby directly capturing informational

uncertainty (BoubakerNgo, et al. 2024). Thirdly, equal weighting often leads to biased results by assuming all CSR dimensions are equally important, whereas entropy produces weights that reflect the actual informational contribution of each dimension, thereby enhancing the reliability and generalizability of the composite CSR index.

Table 1 The results of constructing the CSR index.

CSR components	Weight	Score by Likert	Cronbach's Alpha	KMO	Extracted variance	Eigenvalues
SHR	4.8%	858	0.742	0.754	50%	2.487
PN	7.8%	838	0.826	0.821	56%	3.354
CUS	1.9%	855	0.851	0.842	66%	2.487
COM	30.4%	809	0.896	0.901	52%	5.231
ENV	43.9%	821	0.899	0.887	63%	4.382
PRD	4.3%	882	0.781	0.806	50%	3.017
EMP	2.4%	879	0.777	0.792	50%	1.929
MAN	4.5%	898	0.735	0.741	52%	2.616

Notes: SHR, a bank's responsibility to its shareholders index; PN, a bank's responsibility to its partner's index; CUS, a bank's responsibility to its customers index; PRD, a bank's responsibility to its product and services index; EMP, a bank's responsibility to its employees index; COM, a bank's responsibility to its social and community index; ENV, a bank's responsibility to its environment index; MAN, a bank's responsibility to its manager's index.

The results of using Cronbach's Alpha, EFA, KMO and entropy methods are presented in Table 1. The procedure is comprehensively discussed in Appendix 1. $SQCSR$ is the squared term of CSR that captures the non-linear relationship between CSR and $ZSCORE$. Table 1 indicates that the values of Cronbach's Alpha and the Kaiser–Meyer–Olkin (KMO) coefficients are greater than 0.6 and 0.7, respectively, implying the accuracy and reliability of the scale. Also, social and community(COM) and environment (ENV) components accounted for the greatest responsibilities, while the least responsibilities are customer (CUS) and employees (EMP). These findings demonstrate that bank managers in Vietnam prioritize compliance with social and community and environment matters because these activities help them protect their interests and earn positive effects for the community and the earth, thus maintaining a sustainable corporate environment.

Furthermore, banks in Vietnam are a primary channel for transforming funds from savers to borrowers. This prevailing perception may reduce bank managers' accountability to their employees and credit consumers. Nonetheless, these weights of CSR among different stakeholders are pragmatic and compelling.

It is essential to highlight that control variables ($X_{i,t}$) used in the model are similar but not identical to those in prior studies in the literature, thus allowing for a more accurate representation of the conditions and characteristics inherent to the Vietnamese banking sector. This study accounts for the roles of CEO gender (CEO), Basel framework adoption ($BASELII$), credit risk (LLP), audited financial reporting ($BIG4$), bank efficiency (CIR), bank size ($LNTA$), and economic conditions (GDP) (Alzoubi & Salem 2022; Ho et al. 2024; Le, Tu et al. 2024; Manlagnit 2015). CEO is a dummy variable that takes a value of 1 if a chief executive officer is a male, and 0 otherwise. BASELII is a dummy variable that takes a value of 1 if a bank comprehensively adopts the Basel II framework, and 0 otherwise. LLP is the ratio of loan loss provision to total loans. BIG4 is a dummy variable that takes a value of 1 for a bank's financial statement that is audited by one of the four largest public accounting firms, and 0 otherwise. CIR is measured by the ratio of operating expenses to total revenue. $LNTA$ is the natural logarithm of total assets. GDP is the national annual economic growth rate. It is worth noting that this study did not account for other variables (e.g., loan growth, liquidity ratio, and others) because they are highly correlated with our variables (Vithessonthi 2023).

The conventional mean-based panel data estimation approaches do not consider the heterogeneous effects of independent variables on dependent variables over various conditional quantiles of the dependent one. Additionally, the panel quantile regression approach does not consider heterogeneity and cross-sectional dependency in the distribution of the panel data. However, it allows for estimating the conditional median

behaviour of the explained variable that responds to regressors' specific values. This study, thus, utilizes a method of moments quantile regression (MMQR) proposed by Machado and Santos Silva (2019). Several critical advantages of MMQR, as comprehensively discussed by Alvarado et al. (2021) and Khalfaoui et al. (2023), among others, include (i) the ability to calculate marginal effects of each explanatory variable on explained variable across all quantile distributions, (ii) the ability to consider heterogeneity within the studied units when calculating the coefficients, (iii) can account for non-normality and heterogeneity issues, and (iv) can provide consistent and efficient estimates in terms of endogenous covariates and fixed effects. As reported later in section 3.2, the outcome variable's distribution is non-normal. Furthermore, we check for heteroscedasticity issues using two steps of pool OLS (with robust standard errors for CSR and its components) (Le, Tu et al. 2024; Le, Nguyen & Ngo 2024) and Breusch and Pagan/Cook-Weisberg diagnosis (to test for the null hypothesis of homoscedasticity). Note that we only report the Chi-squares and their p-values for ease of exposition. In Table 2, the p-values in all models are less than 0.01, meaning that the null hypotheses are rejected. Alternatively, the model suffers from high heteroscedasticity. Consequently, using MMQR is more appropriate.

Table 2 The results of the Breusch-Pagan test

ZSCORE	χ^2	p-value
CSR	38.12	0.000
SHR	48.21	0.000
PN	24.89	0.000
CUS	45.76	0.000
COM	39.13	0.000
ENV	40.65	0.000
PRD	69.66	0.000
EMP	56.41	0.000
MAN	47.79	0.000

Notes: $ZSCORE$, the value of bank Z-score; CSR, the bank's corporate social responsibility index, SHR, a bank's responsibility to its shareholders index; PN, a bank's responsibility to its partners index; CUS, a

bank's responsibility to its customers index, PRD, a bank's responsibility to its product and services index; EMP, a bank's responsibility to its employees index; COM, a bank's responsibility to its social and community index; ENV, a bank's responsibility to its environment index; MAN, a bank's responsibility to its managers index

Our general MMQR is constructed as follows:

$$Q_{ZSCORE}(\tau|X_{i,t}) = (\alpha_i + \gamma_i q(\tau)) + \delta X_{i,t} + \rho Z'_{i,t} q(\tau) \quad (3)$$

where $Q_{ZSCORE}(\tau|X_{i,t})$ represents the τ^{th} conditional quantile of $ZSCORE$ given a vector of independent variable $X_{i,t}$(e.g., CSR, $SQCSR$, and other control variables); $-\alpha_i(\tau) \equiv \alpha_i + \gamma_i q(\tau)$ is a scalar coefficient representing the consistent influence of τ quantiles on i; Z is a vector of the characteristic elements of $X_{i,t}$; and $q(\tau)$ refers the τ^{th} quantile condition (e.g., 10th, 15th, …, and 90th) derived from the following optimization function:

$$min_{q \sum_i \sum_t \theta_\tau}(X_{i,t} - (\gamma_i + \rho Z'_{i,t})q) \quad (4)$$

given that $\theta_\tau(A) = (\tau - 1)AI\{A \leq 0\} + TAI\{A > 0\}$ is the check function.

3.2 Data

It is noted that financial information on bank-level data was primarily gathered from a novel Vietnamese banking database (LeHoNgo, et al. 2022) which has been popularly used recently (BoubakerLe, et al. 2024; BoubakerNgo, et al. 2024; Le, Tu et al. 2024; Nguyen, Tripe & Ngo 2018; Nguyen 2023). Using content analysis (Lin et al. 2018), CSR information was extracted from banks' annual reports and other relevant information published on their websites. The information on macroeconomic conditions was collected from the World Development Indicators (WB 2020). After excluding those for which no CSR information was available from any source, a sample of 30 commercial banks from 2016 to 2022 was obtained, yielding a total of 210 balanced panel-data observations. They comprised four state-owned and 26 privately owned commercial

banks, accounting for 97 % of the banking industry's total assets. Table 3 shows descriptive statistics of the variables used in our study.

Table 3 Descriptive statistics of variables

Variables	Mean	Std.Dev	Min	Max
ZSCORE	17.897	10.170	2.603	51.262
CSR	67.292	22.839	18.999	98.882
CEO	0.880	0.325	0	1
BASELII	0.253	0.436	0	1
LLP	1.298	0.390	0.755	2.703
BIG4	0.623	0.485	0	1
CIR	28.034	9.099	9.849	77.253
LNTA	19.083	1.113	16.767	21.455
GDP	6.005	2.102	2.561	8.020

Notes: $ZSCORE$, the value of bank Z-score; CSR, the bank's corporate social responsibility index; CEO, a dummy variable that takes a value of 1 if a chief executive officer is a male and 0 otherwise; BASELII, a dummy variable that takes a value of 1 if a bank comprehensively adopts the Basel II framework and 0 otherwise; LLP, the ratio of loan loss provision to total loans; BIG4, *is* a dummy variable that takes a value of 1 for a bank's financial statement that is audited by one of the four largest public accounting firms, and 0 otherwise; CIR, the ratio of operating expenses to total revenue; $LNTA$, the natural logarithm of total assets; GDP, the annual economic growth rate.

Importantly, Table 3 reports that $ZSCORE$ has a high standard deviation (compared to its mean) and also a wide range between the maximum and minimum values. We further illustrate in Figure 1 that the distribution of $ZSCORE$ is highly skewed and heavy-tailed. We then performed the Shapiro and Wilk (1965)'s W test to determine the normality of this variable. The result indicates that the null hypothesis of a normal distribution of $ZSCORE$ is rejected at the 1% significance level; it enforces the need for an MMQR approach.

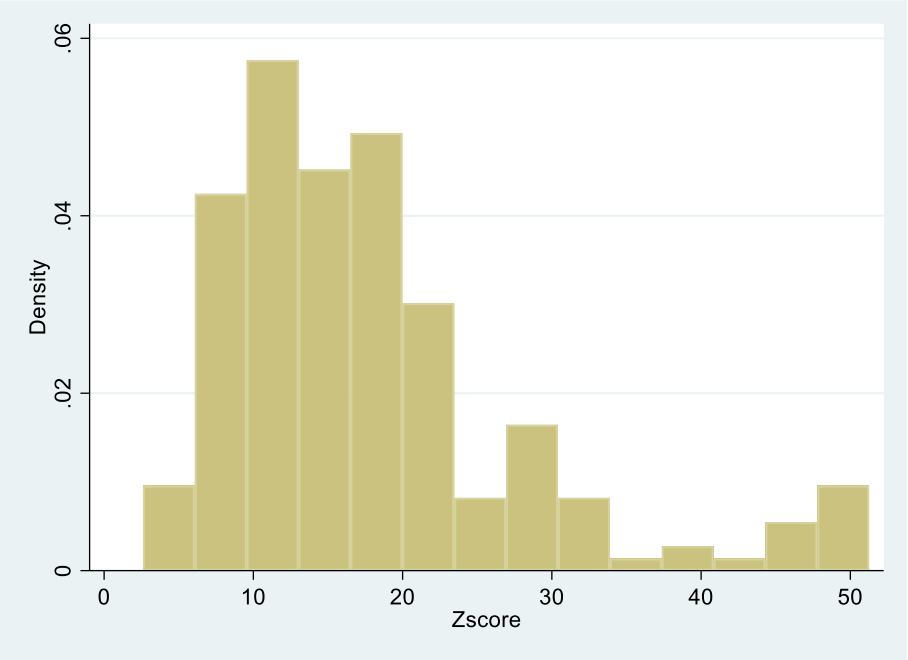

Figure 1 Histogram for Zscore

4. Empirical results

4.1. The results of our baseline model

Note that there is no high correlation among regressors in our analysis, implying no multicollinearity problem, as shown in Table 4, so we can use the MMQR estimation.

Table 4 Correlation matrix among variables

ZSCORE								
0.375***	CSR							
0.009	-0.106	CEO						
-0.182***	-0.182***	0.090	BASELII					
0.100	0.296***	-0.048	0.120*	LLP				
0.074	0.149**	0.272***	0.167**	0.081	BIG4			
-0.227***	0.029	0.264***	0.434***	0.042	0.248***	CIR		
0.183***	0.531***	0.075	0.178***	0.543***	0.488***	0.054	LNTA	
-0.030	-0.052	0.042	0.012	-0.089	0.015	-0.006	-0.072	GDP

Notes: $ZSCORE$, the value of bank Z-score; CSR, bank corporate socia responsibility index; CEO, a dummy variable that takes a value of 1 if a chief executive officer is a male, and 0 otherwise; BASELII, a dummy variable that takes a value of 1 if a bank comprehensively adopts the Basel II framework, and 0 otherwise; LLP, the ratio of loan loss provision to total loans; BIG4, *is* a dummy variable that takes a value of 1 for a

bank's financial statement that is audited by one of the four largest public accounting firms, and 0 otherwise; CIR, the ratio of operating expenses to total revenue; $LNTA$, the natural logarithm of total assets; GDP, the annual economic growth rate.

Our MMQR results on the factors affecting $ZSCORE$ are reported in Table 5. The coefficients and their 95% confidence intervals are further explained in Figure 2 for easier understanding of their contribution toward $ZSCORE$.

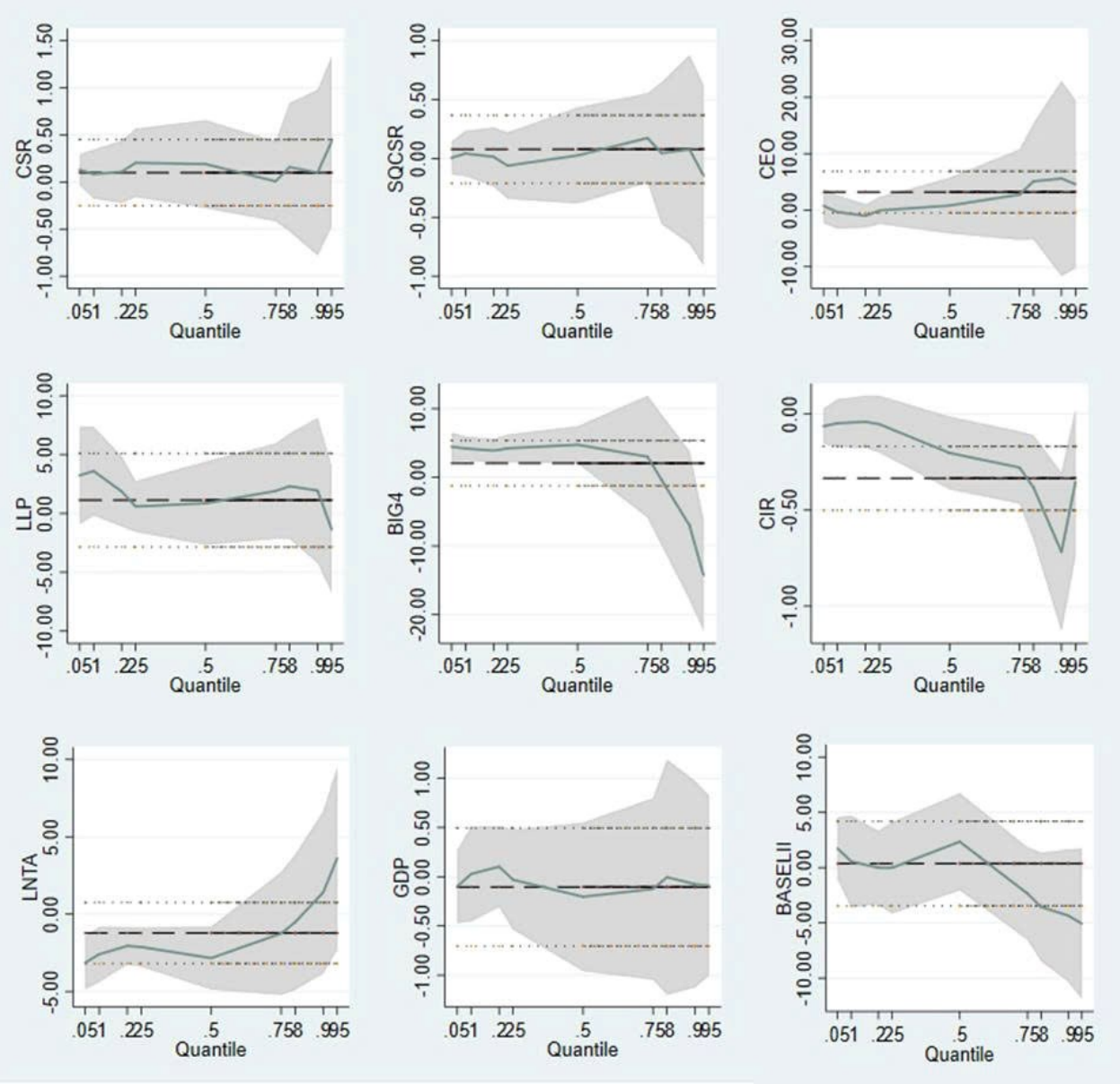

Figure 2. The MMQR coefficients across quantiles (95% confidence intervals)

The result shows that corporate social responsibility adoption (CSR) impacts $ZSCORE$ negatively at location-based and most quantiles except for the 10th quantiles (see Figure 2), supporting the overinvestment hypothesis. In other words, the adoption of comprehensive CSR standards may require Vietnamese commercial banks to allocate additional resources to meet social and environmental objectives, such as increasing employee salaries and bonuses, engaging in more community initiatives (e.g., donations and sponsorships), and especially lifting the proportion of green credit. These activities incur higher costs and lower profitability, thus threatening bank stability. Nonetheless, this finding aligns with prior studies demonstrating that CSR activities elevate greater credit and liquidity risk exposure (Li, Trinh & Elnahass 2023) or ESG activities reduce bank value (Di Tommaso & Thornton 2020). Galant and Cadez (2017) also argue that adopting CSR standards induces higher bank costs to accomplish social and environmental goals.

However, the coefficients on $SQCSR$ become positive at location-based, and most quantiles except for the 10th quantile, implying that a U-shaped relationship between CSR adoption and bank stability may exist. Alternatively, CSR activities may reduce bank stability in the early phase since the costs may outweigh the benefits, but this effect becomes favourable later. In fact, embracing comprehensive CSR standards may allow Vietnamese banks to increase their image to gain customer loyalty and reduce compliance costs caused by Decision No. 1658/QĐ-TTg on the national strategy for green growth for the 2021-2030 period with a vision for 2050. Our result supports the earlier suggestions of Zhou et al. (2021) in China that a negative of CSR on bank profitability is temporary and eliminated in the long run, or more accurately, the next year.

Table 5 The result of our baseline model

Variables	Location	Scale	Q10	Q20	Q25	Q50	Q75	Q80	Q90
CSR	-0.180**	-0.021	-0.146	-0.156*	-0.160*	-0.180**	-0.198**	-0.203**	-0.215*
	(-2.26)	(-0.46)	(-1.47)	(-1.76)	(-1.88)	(-2.26)	(-2.12)	(-2.04)	(-1.83)
SQCSR	0.172**	0.024	0.133	0.143*	0.148*	0.172**	0.192**	0.198**	0.212**
	(2.37)	(0.59)	(1.46)	(1.78)	(1.91)	(2.36)	(2.26)	(2.18)	(1.98)
CEO	-1.518**	-0.678*	-0.429	-0.733	-0.857	-1.517**	-2.085**	-2.247**	-2.638**
	(-2.11)	(-1.65)	(-0.48)	(-0.91)	(-1.11)	(-2.09)	(-2.47)	(-2.49)	(-2.48)
BASELII	2.982***	0.160	2.724**	2.796**	2.825**	2.982***	3.117**	3.155**	3.248*
	(2.57)	(0.24)	(1.88)	(2.17)	(2.28)	(2.57)	(2.30)	(2.18)	(1.90)
LLP	2.129***	-0.077	2.253***	2.219***	2.220***	2.129***	2.064***	2.045**	2.001**
	(3.22)	(-0.21)	(2.73)	(3.02)	(3.12)	(3.22)	(2.67)	(2.48)	(2.06)
BIG4	3.965***	0.319	3.452***	3.595***	3.653***	3.964***	4.232***	4.308***	4.492***
	(3.95)	(0.56)	(2.75)	(3.21)	(3.40)	(3.94)	(3.60)	(3.43)	(3.03)
CIR	-0.014	0.018	-0.031	-0.023	-0.019	-0.001	0.014	0.018	0.029
	(-0.04)	(0.96)	(-0.74)	(-0.61)	(-0.54)	(-0.04)	(0.35)	(0.44)	(0.58)
LNTA	0.577	-0.364	1.163	1.000	0.933	0.578	0.272	0.185	-0.024
	(0.65)	(-0.71)	(1.04)	(1.00)	(0.97)	(0.65)	(0.26)	(0.17)	(-0.02)
GDP	-0.074	0.073	-0.184	-0.154	-0.141	-0.074	-0.016	-7.010	0.039
	(-0.79)	(1.33)	(-1.57)	(-1.47)	(-1.41)	(-0.79)	(-0.15)	(-0.00)	(0.29)
Const	6.287	13.567	-7.339	-3.544	-1.991	6.275	13.384	15.407	20.296
	(0.37	(1.36)	(-0.35)	(-0.19)	(-0.11)	(0.37)	(0.67)	(0.73)	(0.81)

Notes: $ZSCORE$, the value of bank Z-score; CSR, bank corporate social responsibility index; $SQCSR$, the squared term of CSR; CEO, a dummy variable that takes a value of 1 if a chief executive officer is a male, and 0 otherwise; BASELII, a dummy variable that takes a value of 1 if a bank comprehensively adopts the Basel II framework, and 0 otherwise; LLP, the ratio of loan loss provision to total loans; BIG4, *is* a dummy variable that takes a value of 1 for a bank's financial statement that is audited by one of the four largest public accounting firms, and 0 otherwise; CIR, the ratio of operating expenses to total revenue; $LNTA$, the natural logarithm of total assets; GDP, the annual economic growth rate. *, **, *** Significant at 10, 5, and 1 per cent levels, respectively. Robust standard errors are in parentheses.

For control variables, CEO inhibits $ZSCORE$ at higher quantiles (e.g., 50th, 75th, 80th, and 90th) and location-and-scale base, implying that male CEOs tend to reduce bank stability. This is comparable with the finding of Ahmed, Sihvonen and Vähämaa (2019), who suggested that male CEOs are related to higher idiosyncratic risk. Skała and Weill (2018) also found that banks led by female CEOs are less risky. Furthermore, the positive effect of $BASELII$ across quantiles reemphasizes the critical role of adopting the Basel framework in fostering bank stability (Le & Pham 2022; Swamy 2018). The positive sign of LLP across quantiles suggests that increasing loan loss provisions may secure bank

stability. This enforces the early suggestions that Vietnamese banks, according to Vietnamese Accounting Standards, are relatively behind those in the region. Bank stability is also positively affected by $BIG4$. Big4 auditors offer additional supervision and scrutiny of banks' financial accounting and reporting practices, mitigating the asymmetric information between bank managers and shareholders (Che, Hope & Langli 2020). This would enhance bank stability. DeBoskey and Jiang (2012) found that Big 4 auditing services tend to reduce income smoothing in the US. The results also demonstrate that CIR, $LNTA$, and GDP hardly affect bank stability.

The findings are mixed when observing CSR components, as shown in Table 6. Their coefficients and their 95% confidence intervals are not reported here for space-saving purposes but are available upon request. More specifically, the bank's responsibility to customers (CUS) first reduces and then enhances bank stability at most quantiles and location-based. The reason is that satisfying customer needs requires substantial costs, including increasing expenditures on in-branch factors (e.g., branch locations and hiring employees) (Alhemoud 2010) and investments in automation and new technologies (e.g., e-banking services, cybersecurity to protect customers' accounts and personal information) (Li et al. 2021). Fader (2020) demonstrated that customer orientation implies understanding customer value and fostering market promotion on the existing consumer segment with higher additional costs, thus reducing bank profitability in the short term. The U-shaped association between them suggests the long-term benefits of being responsible to customers. It partially supports the early suggestion that customer-centric CSR would enhance customer retention and loyalty (McDonald & Hung Lai 2011), thus helping maintain their comparative advantage (Alhemoud 2010). Therefore, they may influence bank performance.

Additionally, the results show that the U-shaped relationship between environmental responsibility (ENV) and bank stability only holds at lower quantiles (e.g.,

10th, 20th, 25th, and 50th) and the location-based. Nonetheless, early studies have suggested that the adoption of environmental responsibility (internal and external) induces additional expenditure for banks to accomplish environmental goals such as financing less emission projects and reducing pollution programs, thus hampering bank profitability (Galant & Cadez 2017; Yuen et al. 2022). However, the positive effect of environmental responsibility on bank stability in the long term supports the stakeholder theory that this could enhance banks' reputation, brand image, and prestige. This ultimately provides an opportunity to gain customer trust and loyalty from depositors and investors, thus lowering deposit rates and increasing bank margins. Environmental responsibility also improves banks' competitive advantage and corporate value (Gangi et al. 2019). In contrast, product and service responsibility (PRD) may improve bank stability at the location-based and most quantiles. This is because disclosing information on their safe, ethical, and sustainable products allows them to widen their potential customers and investors. However, the negative coefficients on $SQPRD$ argue that the extensive pursuit of this strategy may inhibit bank stability. To mitigate adverse impacts on the environment and society while meeting the needs of customers and society, banks tend to provide high-tech products and services (e.g., the implementation of online lending, virtual cards, cashless withdrawal services, QR code payment, and so on). Given the substantial investment, the technology may be outdated, while they have not yet depreciated. Moreover, these advanced products and services may induce higher fraud risks and greater additional efforts to address associated operating risks, thus affecting bank risk and profitability. Nonetheless, this requires ongoing research and development costs as well as updating and maintaining the appropriate systems.

Table 6 The results of using CSR components.

Variables	Location	Scale	Q10	Q20	Q25	Q50	Q75	Q80	Q90
SHR	0.018	0.035	-0.034	-0.022	-0.017	0.014	0.046	0.058	0.077
	(0.36)	(1.24)	(-0.61)	(-0.43)	(-0.34)	(0.30)	(0.77)	(0.88)	(0.99)
SQSHR	0.012	-0.029	0.055	0.045	0.041	0.015	-0.010	-0.020	-0.035
	(0.31)	(-1.26)	1.23	1.09	1.02	0.38	(-0.22)	(-0.39)	(-0.57)
PN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SQPN	-0.035	-0.007	-0.023	-0.026	-0.027	-0.034	-0.041	-0.043	-0.046
	(-0.16)	(-0.06)	(-0.09)	(-0.11)	(-0.12)	(-0.16)	(-0.16)	(-0.16)	(-0.15)
CUS	-0.902**	-0.058	-0.816*	-0.839**	-0.844**	-0.895**	-0.954**	-0.964*	-0.994*
	(-2.30)	(-0.26)	(-1.80)	(-2.02)	(-2.07)	(-2.31)	(-2.01)	(-1.93)	(-1.72)
SQCUS	0.530**	0.035	0.477*	0.491*	0.494*	0.525**	0.562*	0.568*	0.586*
	(2.13)	(0.26)	(1.66)	(1.87)	(1.92)	(2.14)	(1.87)	(1.80)	(1.61)
COM	-0.043	-0.015	-0.018	-0.025	-0.028	-0.041	-0.055	-0.058	-0.067
	(-1.02)	(-0.662)	(-0.35)	(-0.57)	(-0.65)	(-0.99)	(-1.10)	(-1.10)	(-1.06)
SQCOM	0.062	0.015	0.038	0.045	0.048	0.061	0.074	0.077	0.086
	(1.40)	(0.58)	(0.69)	(0.94)	(1.04)	(1.38)	(1.41)	(1.39)	(1.30)
ENV	-0.079*	0.011	-0.097*	-0.093*	-0.091*	-0.079*	-0.070	-0.067	-0.061
	(-1.70)	(0.44)	(-1.71)	(-1.79)	(-1.81)	(-1.69)	(-1.31)	(-1.71)	(-0.89)
SQENV	0.076*	-0.005	0.084*	0.082*	0.082*	0.076*	0.072	0.071	0.067
	(1.93)	(-0.24)	(1.76)	(1.88)	(1.92)	(1.93)	(1.59)	(1.45)	(1.18)
PRD	0.186**	0.018	0.159*	0.165*	0.169*	0.184**	0.202*	0.205*	0.213*
	(2.14)	(0.38)	(1.59)	(1.78)	(1.88)	(2.14)	(1.93)	(1.88)	(1.73)
SQPRD	-0.142**	0.001	-0.145**	-0.144**	-0.144**	-0.142**	-0.140**	-0.140*	-0.139*
	(-2.42)	(0.06)	(-2.14)	(-2.30)	(-2.37)	(-2.46)	(-1.98)	(-1.90)	(-1.68)
EMP	-0.333	-0.060	-0.240	-0.262	-0.271	-0.332	-0.385	-0.402	-0.431
	(-1.05)	(-0.32)	(-0.65)	(-0.78)	(-0.83)	(-1.05)	(-0.98)	(-0.93)	(-0.86)
SQEMP	0.156	0.026	0.116	0.125	0.129	0.156	0.179	0.186	0.199
	(0.74)	(0.20)	(0.47)	(0.56)	(0.59)	(0.74)	(-0.98)	(0.65)	(0.60)
MAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SQMAN	-0.007	0.004	-0.084	-0.083	-0.082	-0.078	-0.074	-0.073	-0.070
	(-0.19)	(0.02)	(-0.17)	(-0.18)	(-0.18)	(-0.19)	(-0.15)	(-0.15)	(-0.12)
Control variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: $ZSCORE$, the value of bank Z-score; SHR, a bank's responsibility to its shareholders index; PN, a bank's responsibility to its partners index; CUS, a bank's responsibility to its customers index; COM, a bank's responsibility to its social and community index; ENV, a bank's responsibility to its environment index; PRD, a bank's responsibility to its product and services index; EMP, a bank's responsibility to its employees index; MAN, a bank's responsibility to its managers index. *, **, *** Significant at 10, 5, and 1 per cent levels, respectively. Robust standard errors are in parentheses. CSR components are performed in separate models. The same set of control variables in Equation 1 is included in each model.

4.2. Endogeneity tests

To deal with the possible endogeneity issue, this study performs two analyses: (1) using a dynamic panel GMM widely used in the banking literature (Le & Ngo 2020; Yuen et al. 2022) as presented in Table 7 (2) employing the lag term of bank CSR in the MMQR model as shown in Table 8.[1] Table 7 indicates that the p-values of the Hansen test are statistically insignificant across the models, suggesting the validity of instruments and absence of overidentifying restrictions. Also, the p-values of second-order autocorrelation exhibit statistically insignificant although the hypothesis of the existence of first-order autocorrelation between the first residual differences cannot be rejected (p-values of AR1 are smaller than 0.05). All in all, the estimates are consistent and the moment conditions are met. Nevertheless, the empirical evidence confirms the U-shaped association between CSR and its components (e.g., ENV and EMP) and bank stability ($ZSCORE$).

Table 7 The results of using system GMM

ZSCORE	CSR	COM	ENV	EMP
$ZSCORE_{t-1}$	0.891***(6.75)	1.163***(9.15)	0.791***(7.66)	0.926***(15.34)
CSR	-0.446*(-2.03)	-0.165*(-1.73)	-0.316**(-2.61)	-1.244***(-4.64)
SQCSR	0.388**(2.37)	0.097(1.02)	0 .276***(3.03)	0.857***(4.92)
Control variables	Yes	Yes	Yes	Yes
Const	10.156(0.56)	-33.26*(-1.73)	42.22*(1.93)	25.31*(1.85)
No. Instruments	27	26	27	29
No. groups	30	30	30	30
No. obs	180	180	180	180
AR (1)	0.036	0.030	0.042	0.034
AR (2)	0.395	0.573	0.093	0.338
Hansen test	0.772	0.830	0.708	0.774

Notes: $ZSCORE$, the value of bank Z-score; CSR, bank corporate social responsibility index; COM, a bank's responsibility to its social and community index; ENV, a bank's responsibility to its environment index; EMP, a bank's responsibility to its employees index. *, **, *** Significant at 10, 5, and 1 per cent levels, respectively. Robust standard errors are in parentheses. CSR components are performed in separate models using the system GMM proposed by Arellano and Bover (1995). The same set of control variables in Equation 1 is included in each model. We rerun the regressions for CSR and all of its components. However, we only report the results of the variables of interest showing significant levels due to the lack of space.

[1] We thank anonymous referees for their suggestions.

Table 8 highlights the non-linear relationship between CSR and bank stability at location-based and higher quantiles (e.g., 75th and 80th). However, these results should be cautiously interpreted because of the reduced sample size. Nonetheless, our above findings are still confirmed.

Table 8 The results of using MMQR with the lag term of CSR

Variables	Location	Scale	Q20	Q25	Q50	Q75	Q80
CSR_{t-1}	-0.178*	-0.043	-0.129	-0.137	-0.176*	-0.218*	-0.223*
	(-1.75)	(-0.71)	(-1.24)	(-1.37)	(-1.75)	(-1.68)	(-1.65)
$SQCSR_{t-1}$	0.001*	0.000	0.000	0.000	0.001	0.002*	0.002*
	(1.62)	(1.12)	(0.84)	(1.00)	(1.60)	(1.75)	(1.75)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Const	-10.183	-2.115	-7.794	-8.193	-10.108	-12.138	-12.379
	(-0.48)	(-0.16)	(-0.36)	(-0.39)	(-0.48)	(-0.44)	(-0.44)

Notes: $ZSCORE$, the value of bank Z-score; CSR, bank corporate social responsibility index; $SQCSR$, the squared term of CSR. * Significant at 10 per cent level. Robust standard errors are in parentheses. CSR components are performed in separate models using the system GMM proposed by Arellano and Bover (1995). The same set of control variables in Equation 1 is included in each model. We rerun the MMQR for CSR due to the length restrictions.

4.3. *Robustness checks*

We ran several tests for robustness checks; however, we only reported those with significant signs of our primary interest variables due to space limitations and ease of interpretation.

Firstly, the literature documents that different ownership types hold distinct roles and responsibilities within society, pursuing varying investment objectives, and have access to diverse information channels. Therefore, the absolute benefits of CSR and those specific to ownership types can vary based on ownership structure (Dam & Scholtens 2012). Some advantages of CSR (e.g., reduced perceived risk stemming from lower information asymmetries) may also depend on investor types (El Ghoul et al. 2011) and

government ownership (Zhou et al. 2021), leading to different preferences for CSR performance levels. This study aligns with this perspective and examines how bank ownership (listed vs. unlisted banks, and state-owned vs. privately owned commercial banks) influences a bank's CSR performance in distinct ways. Accordingly, $LIST$ and its interaction term, $LIST * CSR$ are included in our baseline model to account for the effect of listing status (Le 2021a; Le, Tran & Nguyen 2019). Table 9 indicates the positive effects of CSR on $ZSCORE$ for listed banks at high quantiles (e.g., 50th, 75th, and 80th) and location-based, supporting the suggestion that more informed equity investors and analysts can determine the intrinsic value of responsible banks more precisely, thus increasing banks' perceived market values (Healy & Palepu 2001). We also found the positive effects of several CSR components at different quantiles. For example, the stability of listed banks is positively affected by customer responsibility (CUS) at higher quantiles (e.g., 50th, 75th, 80th, and 90th) and social and community responsibility (COM) at lower quantiles (e.g., 10th, 20th, 25th, and 50th). Listed banks with greater responsibility for products and services and their employees can reduce bank instability at most quantiles. Nonetheless, these findings are comparable with those of Bolibok (2021), who stated that more responsible listed banks are less prone to earnings management, thus generally boosting their earnings quality.

Table 9 The results when considering the effect of listing status

Variables	Location	Scale	Q10	Q20	Q25	Q50	Q75	Q80	Q90
CSR	-0.143	-0.038	-0.088	-0.098	-0.108	-0.135	-0.173	-0.178	-0.206
	(-1.42)	(-0.59)	(-0.62)	(-0.75)	(-0.90)	(-1.32)	(-1.60)	(-1.59)	(-1.47)
SQCSR	0.081	0.035	0.031	0.040	0.049	0.075	0.109	0.114	0.140
	(0.92)	(0.62)	(0.25)	(0.35)	(0.47)	(0.83)	(1.15)	(1.16)	(1.14)
CSR*LIST	0.133*	0.015	0.112	0.116	0.120	0.130*	0.145*	0.147*	0.158
	(1.92)	(0.33)	(1.14)	(1.28)	(1.44)	(1.85)	(1.94)	(1.91)	(1.63)
CUS	-0.832*	0.083	-0.958	-0.930*	-0.910*	-0.851*	-0.757	-0.741	-0.700
	(-1.92)	(0.30)	(-1.53)	(-1.66)	(-1.75)	(-1.92)	(-1.56)	(-1.45)	(-1.18)
SQCUS	0.452*	-0.051	0.529	0.512	0.500	0.463*	0.405	0.395	0.370
	(1.71)	(-0.30)	(1.39)	(1.50)	(1.58)	(1.72)	(1.37)	(1.27)	(1.02)
CUS*LIST	0.099*	0.019	0.069	0.076	0.081	0.095*	0.117*	0.121*	0.131*
	(1.85)	(0.57)	(0.90)	(1.10)	(1.26)	(1.73)	(1.95)	(1.91)	(1.77)
COM	-0.036	-0.005	-0.029	-0.030	-0.031	-0.035	-0.040	-0.041	-0.045
	(-0.79)	(-0.19)	(-0.58)	(-0.66)	(-0.71)	(-0.79)	(-0.72)	(-0.70)	(-0.61)
SQCOM	0.008	0.016	-0.015	-0.009	-0.006	0.005	0.020	0.023	0.035
	(0.13)	(0.45)	(-0.23)	(-0.16)	(-0.11)	(0.09)	(0.27)	(0.30)	(0.36)
COM*LIST	0.077**	-0.015	0.099**	0.094***	0.091***	0.080**	0.066	0.063	0.051
	(2.18)	(-0.74)	(2.56)	(2.63)	(2.63)	(2.30)	(1.53)	(1.37)	(0.89)
PRD	0.239***	-0.039	0.297***	0.285***	0.276***	0.246***	0.207**	0.197**	0.175**
	(3.40)	(-0.96)	(3.52)	(3.65)	(3.72)	(3.53)	(2.49)	(2.22)	(1.66)
SQPRD	-0.216***	0.041	-0.227***	-0.265***	-0.225***	-0.223***	-0.181***	-0.172**	-0.148**
	(-3.78)	(1.25)	(-4.03)	(-4.17)	(-4.23)	(-3.93)	(-2.69)	(-2.38)	(-1.73)
PRD*LIST	0.1235***	-0.003	0.130***	0.129***	0.128***	0.125***	0.122***	0.121*	0.120**
	(3.23)	(-0.14)	(2.80)	(3.00)	(3.14)	(3.29)	(2.68)	(2.49)	(2.07)
EMP	-0.148	-0.118	0.018	-0.018	-0.032	-0.149	-0.257	-0.275	-0.335
	(-0.47)	(-0.58)	(0.04)	(-0.05)	(-0.09)	(-0.47)	(-0.69)	(-0.70)	(-0.73)
SQEMP	-0.031	0.065	-0.124	-0.104	-0.096	-0.031	0.028	0.038	0.071
	(-0.14)	(0.46)	(-0.43)	(-0.39)	(-0.37)	(-0.14)	(0.11)	(0.14)	(0.22)
EMP*LIST	0.195**	-0.014	0.216**	0.212**	0.210**	0.195**	0.181*	0.179*	0.172
	(2.44)	(-0.29)	(2.03)	(2.19)	(2.25)	(2.43)	(1.92)	(1.82)	(1.48)

Notes: $LIST$, a dummy variable that takes a value of 1 for a listed bank, and 0 otherwise; $CSR * LIST$, the interaction term between CSR and $LIST$. *, **, ***Significant at 10, 5, and 1 percent levels, respectively. Robust standard errors are in parentheses. We run CSR components in a separate model. The same set of control variables in Equation 1 is included in each model.

Additionally, $SOCB$ and its interaction term $CSR * SOCB$ are introduced in the baseline model to control for the effect of state ownership. Table 10 shows the positive coefficients of $CSR * SOCB$ at higher quantiles (e.g., 50th, 75th, 80th, and 90th) and location-based, implying that SOCBs may generally benefit from increasing CSR adoption. Given that the SOCBs have a better CSR disclosure system (Thuy et al. 2024), they may further

widen their brand name and a sense of identity among credit consumers (Wu & Shen 2013), thus increasing their customer base and further reduce their costs by offering lower deposit rates (Le 2021b; Le et al. 2023; Ngo & Tripe 2017). In this sense, more responsibility to society and the community will likely improve SOCBs' stability. However, more responsibility to managers may reduce SOCB's stability at lower quantiles (e.g., 10^{th}, 20^{th}, and 25^{th}). Because SOCBs receive implicit support from the government (Le et al. 2023) and large banks in the markets (Nguyen & Nguyen 2021), more responsibility to their managers may induce them to engage in a quiet life by focusing less on business growth in various segments and markets and building a personal empire. Ultimately, this leads to reduced bank profitability and increased bank instability.

Secondly, the literature suggests that bank size is a critical factor shaping the CSR-firm performance nexus. Larger firms with greater financial capacity, a more extensive network of stakeholders and more robust risk management systems may allow them to address costs associated with CSR more efficiently and utilize CSR initiatives as a means of gaining a competitive advantage (Sánchez-Infante Hernández, Yañez-Araque & Moreno-García 2020). Therefore, this analysis further investigates whether a relationship between CSR and bank stability is affected by bank size. In contrast to prior studies in Vietnam, where large and small banks are defined as their assets above and below the median (Nguyen & Le 2022; Nguyen & Le 2023), our analysis follows the suggestion of SBV (2018) to classify large and small banks as those with average quarterly total assets of over and below VND 100 trillion, respectively. Due to the small size of our sample, BIG – a dummy variable that takes a value of 1 for a large bank and 0 otherwise – is included in the baseline model. Table 11 highlights that the benefits of CSR adoption only hold for the case of large banks and at high quantiles (e.g., 75^{th} and 80^{th}). When considering different CSR components, the positive effect of CSR is found in the case of

responsibility to their partners (PN) at most quantiles, the environment (ENV)and employees (EMP) at high quantiles, and the products and services (PRD) at low quantiles. Such findings strengthen the argument that larger organizations are more proactive in CSR practices (López-Penabad et al. 2023).

Table 10 The results when considering the effect of state-ownership

Variables	Location	Scale	Q10	Q20	Q25	Q50	Q75	Q80	Q90
CSR	-0.112	-0.021	-0.080	-0.088	-0.092	-0.111	-0.130	-0.138	-0.148
	(-1.21)	(-0.38)	(-0.79)	(-0.96)	(-1.03)	(-1.21)	(-1.11)	(-1.05)	(-0.97)
SQCSR	0.102	0.030	0.057	0.069	0.074	0.101	0.127	0.138	0.152
	(1.16)	(0.56)	(0.60)	(0.79)	(0.88)	(1.16)	(1.14)	(1.10)	(1.04)
CSR*SOCB	0.222**	0.103	0.069	0.108	0.127	0.221**	0.312**	0.346**	0.397**
	(2.14)	(1.63)	(0.61)	(1.05)	(1.27)	(2.12)	(2.34)	(2.33)	(2.30)
COM	-0.010	-0.006	-0.001	-0.003	-0.004	-0.010	-0.015	-0.017	-0.021
	(-0.22)	(-0.23)	(-0.02)	(-0.07)	(-0.10)	(-0.21)	(-0.27)	(-0.28)	(-0.28)
SQCOM	0.015	0.006	0.005	0.007	0.009	0.014	0.021	0.022	0.026
	(0.27)	(0.21)	(0.09)	(0.14)	(0.17)	(0.27)	(0.31)	(0.31)	(0.31)
COM*SOCB	0.083**	0.037	0.029	0.042	0.050	0.080**	0.114**	0.124**	0.145**
	(2.07)	(1.61)	(0.65)	(1.02)	(1.26)	(2.01)	(2.30)	(2.31)	(2.28)
MAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SQMAN	-0.060	-0.004	-0.054	-0.055	-0.057	-0.060	-0.063	-0.064	-0.067
	(-0.14)	(-0.02)	(-0.11)	(-0.12)	(-0.13)	(-0.14)	(-0.13)	(-0.12)	(-0.11)
MAN*SOCB	-0.029	-0.068**	-0.13**	-0.108**	-0.087*	-0.030	0.026	0.041	0.079
	(-0.61)	(2.49)	(-2.26)	(-2.03)	(-1.74)	(-0.63)	(0.47)	(0.69)	(1.12)

Notes: $SOCB$, a dummy variable that takes a value of 1 for a state-owned commercial bank, and 0 otherwise; $CSR * SOCB$, the interaction term between CSR and $SOCB$. *, **, ***Significant at 10, 5, and 1 percent levels, respectively. Robust standard errors are in parentheses. We run CSR components in a separate model. The same set of control variables in Equation 1 is included in each model.

Table 11 The results when considering the effect of bank size

Variable	Location	Scale	Q10	Q20	Q25	Q50	Q75	Q80	Q90
CSR	-0.139	-0.037	-0.084	-0.097	-0.101	-0.133	-0.171	-0.18	-0.205
	(-0.60)	(-0.18)	(-0.16)	(-0.22)	(-0.24)	(-0.51)	(-1.43)	(-1.54)	(-1.07)
SQCSR	0.087	0.021	0.055	0.063	0.065	0.083	0.104	0.11	0.124
	(0.40)	(0.11)	(0.11)	(0.15)	(0.16)	(0.34)	(0.94)	(1.00)	(0.69)
CSR*BIG	0.102	0.028	0.06	0.07	0.073	0.097	0.126*	0.133**	0.152
	(0.82)	(0.26)	(0.22)	(0.30)	(0.32)	(0.69)	(1.96)	(2.11)	(1.47)
PN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SQPN	-0.065	0.005	-0.073	-0.071	-0.07	-0.065	-0.06	-0.059	-0.055
	(-0.28)	(0.04)	(-0.27)	(-0.29)	(-0.29)	(-0.28)	(-0.22)	(-0.20)	(-0.16)
PN*BIG	0.200***	0.051	0.127*	0.145**	0.152**	0.198***	0.243***	0.257	0.286***
	(3.12)	(1.44)	(1.73)	(2.14)	(2.30)	(3.09)	(3.19)	(3.14)	(2.98)
ENV	-0.032	0.024	-0.068	-0.06	-0.057	-0.035	-0.01	-0.004	0.01
	(-0.72)	(0.97)	(-1.38)	(-1.31)	(-1.26)	(-0.81)	(-0.18)	(-0.07)	(0.15)
SQENV	0.009	-0.021	0.039	0.032	0.03	0.011	-0.01	-0.015	-0.028
	(0.22)	(-0.91)	(0.87)	(0.77)	(0.72)	(0.29)	(-0.19)	(-0.27)	(-0.43)
ENV*BIG	0.061*	0.017	0.037	0.042	0.044	0.059*	0.076*	0.080*	0.091*
	(1.92)	(0.94)	(1.06)	(1.31)	(1.40)	(1.88)	(1.92)	(1.89)	(1.78)
PRD	0.186	-0.046	0.249**	0.236**	0.231**	0.197*	0.146	0.135	0.106
	(1.46)	(-0.63)	(2.02)	(2.01)	(1.99)	(1.63)	(0.89)	(0.77)	(0.50)
SQPRD	-0.162*	0.055	-0.238***	-0.222***	-0.215***	-0.175**	-0.114	-0.102	-0.067
	(-1.86)	(1.11)	(-2.82)	(-2.77)	(-2.72)	(-2.12)	(-1.02)	(-0.85)	(-0.46)
PRD*BIG	0.05	-0.031	0.093***	0.084***	0.080***	0.057*	0.023	0.016	-0.002
	(1.54)	(-1.66)	(2.94)	(2.80)	(2.71)	(1.85)	(0.56)	(0.37)	(-0.05)
EMP	-0.514**	-0.103	-0.359	-0.398	-0.41	-0.510**	-0.600**	-0.630**	-0.679*
	(-2.03)	(-0.72)	(-1.13)	(-1.38)	(-1.46)	(-2.01)	(-2.08)	(-2.02)	(-1.91)
SQEMP	0.178	-0.012	0.196	0.191	0.19	0.178	0.168	0.164	0.159
	(1.04)	(-0.12)	(0.91)	(0.98)	(1.00)	(1.04)	(0.86)	(0.78)	(0.66)
EMP*BIG	0.192**	0.099**	0.043	0.081	0.092	0.188**	0.275***	0.304***	0.351***
	(2.48)	(2.26)	(0.45)	(0.92)	(1.08)	(2.39)	(3.08)	(3.18)	(3.22)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: BIG, a dummy variable that takes a value of 1 for a large bank, and 0 otherwise; $CSR * BIG$, the interaction term between CSR and BIG. Large and small banks are defined as those with average quarterly total assets of over and below VND 100 trillion, respectively. *, **, ***Significant at 10, 5, and 1 percent levels, respectively. Robust standard errors are in parentheses. We run CSR components in a separate model. The same set of control variables in Equation 1 is included in each model. $LNTA$ is excluded from our analysis.

Last, given the adverse impact of the COVID-19 pandemic on the global banking system (Boubaker, Le & Ngo 2022; Ho et al. 2023; LeHoNguyen, et al. 2022; Nguyen, Le & Ngo 2025), an increasing debate about whether CSR as one of effective risk mitigation strategies would safeguards firm value amid this health crisis (Kara, Ongena & Yildiz

2024). Our results show that CSR does not enhance bank stability during the COVID-19 turmoil. The results are available upon the request. However, this interpretation should be cautious because of small sample size used in our analysis.

5. Conclusion and implications

This study investigated the relationship between CSR adoption and bank stability in Vietnam from 2016 to 2022 using the GMM quantile regression approach. We first developed a novel CSR index based on the most relevant information to the Vietnamese banking system extracted from the 2016 GRI Guideline. The results showed that CSR adoption first lowers and then enhances bank stability in Vietnam (across location-based and quantile-based analyses), suggesting that bank managers and their board members should be decisive and consistent in adopting full CSR practices because it is time-consuming to realize the gains. Nonetheless, this finding supports the demonstration of Yuen et al. (2022) that ESG, as a reflection of CSR, can help increase the bank performance of the global banking system in the long term.

When looking at the CSR pillars, the findings indicated that a U-shaped relationship only holds for the bank's responsibility to customers and environmental responsibility at different quantiles. This suggests that bank managers should focus on these perspectives in their business strategies to promote bank stability. These reinforce the importance of customer-centric CSR in maintaining banks' comparative advantage (McDonald & Hung Lai 2011) and corporate value (Gangi et al. 2019) and long-term environmental responsibility to gain customer trust and loyalty from depositors and investors, thus reducing input costs and improving bank margin (Yuen et al. 2022). Given the critical role of responsibility to banks' products and services, bank managers should be cautious in extensively pursuing sustainable product strategies unless proper and appropriate plans for the Vietnamese market are developed.

Furthermore, this study also found that listed, state-owned, commercial, and large banks may benefit from further adopting CSR according to the 2016 GRI Guideline. SOCBs should concentrate more on the responsibility to society and the community, and cautiously promote responsibility to their managers to avoid quiet-life behaviors. Along with social and community responsibility, listed banks should pay more attention to increasing their responsibility to customers, products and services, and employees. A similar suggestion can be applied to large banks. Large banks should also promote their responsibility to their partners to boost bank stability.

However, the study may suffer several limitations. Our study only examined the effect of CSR on bank stability in Vietnam, given a short period when the 2016 GRI Guideline was introduced. Thus, future studies may use a larger sample in a longer examined period in other emerging markets with analogous banking structures for robustness. Also, future studies may use different measures of bank stability (Hafeez et al. 2022; Nguyen, Le & Tran 2024) to confirm our findings. Furthermore, future studies may use alternative measures of CSR using content analysis of publicly disclosed CSR reports (Nguyen & Nguyen 2021; Rouf & Hossan 2021), text mining (Mazza et al. 2022). Even, future studies may use ESG data to validate our findings once available. Last, future research may consider other global factors or exchange rate volatility when examining the CSR-bank stability nexus.

Appendix

Appendix 1: The procedure of expert survey and entropy methods

- **Step 1**: Based on the GRI 2016 standards, we focus on eight components that are relevant to the banking industry, including shareholders (SHR), partners (PN), customers (CUS), product and services (PRD), employees (EMP), social and community (COM), environment (ENV), and managers (MAN). These eight dimensions are chosen because they comprehensively reflect the core stakeholder

relationships that Vietnamese banks must balance. Specifically, shareholders and partners emphasize transparency and value-chain integration; customers and product–service quality represent consumer protection and trust-building in financial markets; employees and community involvement reflect the "banking-for-community" orientation embedded in Vietnamese financial sector policies; and environmental and governance factors link international standards with Vietnam's national strategies on green finance and sustainable governance (Nguyen & Nguyen 2021).

- **Step 2:** After adjusting appropriate criteria that are the most relevant to Vietnam's economic, cultural, and social conditions, we sent questionnaires to 200 banking specialists at 30 Vietnamese commercial banks. The questions are based on a five-level Likert scale.
- **Step 3**: Reliability was assessed through Cronbach's Alpha and EFA to refine measurement accuracy.
- **Step 4**: CSR disclosure was coded using a binary method, assigning 1 to disclosed items and 0 otherwise, yielding component scores ranging from 0 to 100.
- **Step 5**: The weights of CSR components were calculated using the Shannon (1948)'s entropy method.

5.1. Calculate the entropy for each criterion using the following formula:

$$E_j = -k \sum_{j=1}^{8} \theta_{i,j} * Ln\,(\theta_{i,j}) \tag{1}$$

where $\theta_{i,j}$ is the proportion of the i^{th} alternative under the j^{th} criterion, k is a constant equal to $\frac{1}{\ln(m)}$, and m is the number of alternatives.

5.2. Determine the degree of diversification d_j for each criterion as follows:

$$d_j = 1 - E_j \tag{2}$$

This reflects the contrast of the data provided by each criterion. The higher the diversification, the more information a criterion provides.

5.3. Compute the weight w_j for each criterion j based on their degree of diversification as follows:

$$w_j = \frac{d_j}{\sum_{j=1}^{n} d_j} \tag{3}$$

where n is the number of criteria.

5.4. Compute the comprehensive CSR index of the bank *i-th* as

$$CSR_i = \sum_{j=1}^{n} w_j E_{ij} \tag{4}$$

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