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THRESHOLDS OF ASSET SIZE AND OWNERSHIP STRUCTURE IMPACT ON PROFIT RATE: CASE STUDY OF VIETNAMESE COMMERCIAL BANKS LISTED ON HOSE

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ABSTRACT

Recent studies on the performance of businesses in general and commercial banks in particular have shown that size is an important factor affecting the performance or profitability of businesses. The size of commercial banks in Vietnam has certain differences. Studies supporting the theory of economies of scale argue that the larger the size, the higher the efficiency (Hughes & Mester, 2013; Shehzad, De Haan & Scholtens, 2013). Some other studies have found a negative relationship between size and profit, profitability of banks (Feng & Serlestis, 2010; De Haan & Poghosyan, 2012a, b). Hansen (1999) proposed a threshold regression model (Threshold estimate model) to help determine the threshold value that changes the impact of size on performance. Based on Hansen's model (1999), banks with an asset size exceeding $e^{11.2261}$≈75,064.24 (Prob = 0.4770) no asset threshold exists. The regression results show that 6/7 independent variables have an impact on ROA of the banks in the research sample. This is the scientific basis for bank managers to study and adjust the ownership structure and decide to increase their assets in the future in a reasonable way, bringing the highest profitability.

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1. Introduction

Enterprises in general, and commercial banks in particular, always tend to increase their size to increase profits. However, increasing size does not always bring increased profits. Because, if the size increases more than necessary, commercial banks can save fewer costs and face inefficiencies (Berger et al., 1987; Berger & DeYoung, 1997; Fu & Heffernan, 2008). This is due to the inverse relationship (inverted U) between size and financial efficiency. The inverse relationship (inverted U) states that, when the size of commercial banks increases, profits initially increase, then profits decrease (Isik et al., 2018; Yao, Haris & Tariq, 2018; Neves et al., 2020; Diem Chi, Van Dung & Chau, 2020). However, studies by Isik et al. (2018), Irawati et al. (2019), and Nguyen Kim Phuoc, Phan Ngoc Thuy Nhu and Tran Thi Tuong Van (2023) have found evidence of a positive relationship between bank size (represented by total assets) and profitability (ROA). There are also studies that suggest that the impact of size negatively affects profitability (Saona, 2011; Thi Thanh Tran & Phan, 2020).

In Vietnam, studies on the relationship between size and profitability (or financial performance measured by ROA) have shown consistent results, specifically: (1) the positive impact of size on ROA is found in studies by Phan, Nguyen and Hoang (2022) and Nguyen Kim Phuoc et al. (2023); (2) the negative impact of scale on ROA is confirmed by studies by Thi Thanh Tran and Phan (2020). Moreover, prior studies by Thi Thanh Tran and Phan (2020), Diem Chi et al. (2020), Le Ha Diem Chi (2022), Huynh Thi Thanh Truc (2023), and Tam (2025) provide empirical evidence of a non-linear relationship between bank size and profitability. These findings suggest that commercial banks do not consistently benefit from economies of scale. Consequently, the assumption that larger scale invariably enhances performance remains questionable, underscoring the need to empirically verify the existence of an optimal scale threshold at which profitability is maximized.

Beyond operational scale, ownership structure represents one of the most complex and controversial issues in the financial sector in general and in commercial banking in particular-especially regarding its impact on operational efficiency, as reflected in profitability and financial performance. Variations in capital structure imply that the ownership proportions of different investor groups exert heterogeneous effects on banks' return on assets (ROA). For instance, a higher proportion of state ownership has been associated with lower ROA, as documented by Tihanyi et al. (2019) and Martínez-García, Basco, and Gómez-Ansón (2021). Accordingly, existing empirical evidence indicates that ownership structure exerts differentiated and sometimes opposing effects on bank profitability. Identifying an appropriate ownership configuration is therefore essential for commercial banks when formulating equity capital mobilization and governance strategies.

Despite extensive research on bank performance, the literature remains fragmented and inconclusive, as most studies tend to focus on either bank size or ownership structure in isolation, without jointly examining their interaction or threshold effects. Moreover, to the best of the author's knowledge, no prior empirical study has investigated the existence of a scale threshold in relation to the profitability of Vietnamese commercial banks, nor has any research simultaneously examined the combined effects of scale thresholds and ownership structure on bank profitability in this context. To address this gap, the present study *"Scale Thresholds, ownership structure on Profitability: Case study of Vietnamese commercial banks listed on HOSE"*, aims to

provide new empirical insights and contribute robust scientific evidence to support policy formulation and strategic decision-making in Vietnam's banking sector.

2. Literature review

Asset size and rate of return

Profitability, or the rate of return, is defined as the ratio of profit generated to the total capital invested over a given period (Solow, 1963). In empirical research, profitability is commonly measured using three principal indicators: Return on Assets (ROA), Return on Equity (ROE), and Return on Sales (ROS) (Penman, 1991). In the context of commercial banking, profitability is typically assessed using ROA and ROE, as these indicators effectively capture banks' efficiency in utilizing their asset base and equity capital, respectively (Ahamed, 2017; Chiorazzo, Milani, & Salvini, 2008; Radojičić & Marinković, 2023). Among these measures, ROA is particularly widely employed because it reflects returns generated from total assets, encompassing both equity and debt financing (Penman, 1991).

Firm size is a multidimensional concept commonly represented by indicators such as total assets, number of employees, total revenue, and total equity (Dang, Li, & Yang, 2018). In banking studies, total assets are most frequently used as a proxy for bank size due to their ability to capture the scale of financial intermediation activities. Accordingly, this study adopts total assets as the primary measure of bank size.

The theory of financial intermediation, as developed by Leland and Pyle (1977) and Diamond (1984), is grounded in two fundamental pillars-asymmetric information and transaction costs—and emphasizes the efficiency gains associated with increases in bank size. From the perspective of economies of scale, Hughes and Mester (2013) argue that large banks can achieve higher scale efficiency by leveraging technological advancements and spreading fixed costs over a broader operational base, such that costs do not increase proportionally with size. These theoretical arguments suggest that expansion in bank scale may enhance profitability through improved cost efficiency and operational optimization.

The theory of returns to scale posits that an increase in asset size—reflected by larger total assets-enhances operational efficiency and reduces average costs, particularly fixed costs, thereby improving firm profitability (Stigler, 1958). This theoretical framework has been widely applied in empirical banking research; however, the resulting evidence remains inconclusive. A number of studies support the existence of economies of scale, indicating a positive relationship between asset size and profitability (Mashayekhi & Bazaz, 2008; Hughes & Mester, 2013; Matousek, Nguyen, & Stewart, 2014; Azeez, 2015; Alarussi & Alhaderi, 2018; Phan Thu Hien & Nguyen Nhat Ha, 2020; Prasetio et al., 2021; Nguyen Kim Phuoc et al., 2023). In contrast, other empirical investigations report a negative association between size and profitability, suggesting the presence of diseconomies of scale (Albertazzi & Gambacorta, 2009; De Haan & Poghosyan, 2012a, 2012b; Abedifar, Molyneux, & Tarazi, 2013; Fu, Lin, & Molyneux, 2014; Vătavu, 2014). Additionally, Nurullah et al. (2024) find no statistically significant relationship between asset size and return on assets (ROA) in the Indonesian banking sector.

Overall, the direction and magnitude of the relationship between asset size and profitability remain ambiguous, despite being grounded in economies-of-scale theory. These inconsistencies may stem from differences in research samples, datasets, model specifications, and estimation techniques. The threshold regression model introduced by Hansen (1999) provides a robust explanation

for such heterogeneous findings by allowing for regime-dependent effects. Specifically, the impact of asset size on profitability may vary depending on whether bank size lies above or below a critical "threshold point." Hansen's (1999) framework demonstrates that the size–profitability relationship is inherently nonlinear and may follow an inverted U-shaped pattern, whereby increases in size initially enhance profitability, but beyond a certain threshold, further expansion leads to diminishing or even negative returns.

Applying Hansen's (1999) threshold regression approach, several studies in Vietnam—including Le Dong Duy Trung (2019), Ngo Van Toan and Ho Thuy Tien (2020), and Nguyen Trung Dung and Nguyen Thanh Phuong (2024)—have empirically confirmed the existence of size-related threshold effects, although the specific threshold values vary according to the research focus (e.g., debt levels, risk exposure, and income diversification). These findings support the presence of a meaningful threshold in firm size. Nevertheless, to date, no empirical study in Vietnam has explicitly identified the asset size threshold in relation to bank profitability as measured by ROA. Addressing this gap, the present study seeks to provide rigorous empirical evidence on the existence and magnitude of an asset size threshold and its impact on the profitability of Vietnamese commercial banks.

Ownership structure and rate of return

Agency theory, as articulated by Jensen and Meckling (1976), posits that agency costs arise from the separation of ownership and control within firms. While owners seek to maximize firm value, managers are often more concerned with personal utility, such as income, job security, and discretionary power. This divergence of interests generates agency conflicts and necessitates monitoring mechanisms, thereby giving rise to agency costs. Extending this framework, Jensen's (1986) free cash flow theory argues that firms with excess free cash flows are particularly susceptible to agency problems, as self-interested managers may engage in overinvestment in projects that do not maximize shareholder value. Consequently, shareholders incur additional costs to supervise managerial behavior, and conflicts of interest between managers and owners persist as an inherent feature of modern corporations.

Within this theoretical context, ownership structure emerges as a critical governance mechanism for mitigating agency problems and enhancing firm performance. Cho and Kim (2007) and Galego, Mira, and Silva (2019) contend that diversified ownership structures strengthen the monitoring role of the board of directors, thereby improving organizational performance. Similarly, Omran, Bolbol, and Fatheldin (2008) argue that the presence of multiple ownership forms contributes to alleviating conflicts between managers and shareholders by reducing managerial opportunism and enhancing oversight.

Ownership structure is commonly defined as the distribution of equity ownership among different shareholder groups, each characterized by distinct economic incentives and investment horizons (Kao, Hodgkinson, & Jaafar, 2019). Alabdullah (2018) emphasizes that variations in ownership concentration and shareholder identity lead to differences in decision-making power, which in turn influence firm performance. In recent years, ownership structure has attracted increasing scholarly attention, with a growing body of literature documenting its relationship with firm performance and profitability (Alabdullah, 2018; Liu, Zhang, & Liang, 2019; Alkurdi & Mardini, 2020; Kuo, Lu, & Dinh, 2020; Din et al., 2021). Nevertheless, empirical findings remain mixed and context-dependent.

Several studies highlight the influential role of large shareholders in shaping corporate outcomes, including profitability and dividend policy (Koo, Ramalingegowda, & Yu, 2017). Conversely, other research reports adverse effects associated with certain ownership types. For example, Kirimi, Kariuki, and Ocharo (2022) document a negative relationship between state ownership, institutional ownership, and return on assets (ROA) among 39 commercial banks in Kenya. These mixed findings underscore the heterogeneous effects of ownership structure on firm profitability and suggest the need for further empirical investigation, particularly within specific institutional and regulatory contexts.

Din et al. (2022) investigated the relationship between ownership structure (institutional ownership, internal ownership, foreign shareholders, and government ownership) with ROA, ROE, and Tobin's Q of firms in an emerging market like Pakistan. The results showed that: (i) institutional ownership has a significant positive impact on ROE but no evidence of an impact on ROA; (ii) there is a significant positive association between state ownership and ROA and ROE and a significant positive association between internal ownership and ROA, ROE, and Tobin's Q; and (iii) there is no evidence of a relationship between foreign ownership and ROA, ROE, or Tobin's Q.

The relationship between state ownership and firm performance has been widely studied, although the empirical results are mixed. Researchers supporting the agency theory argue that state ownership can reduce financial performance (Stan, Peng & Bruton, 2014; Lazzarini & Musacchio, 2018; Aguilera et al., 2020). Borisova et al. (2012) concluded that state ownership has a significant positive impact on corporate financial performance. Firth, Lin and Wong (2008) found that state ownership facilitates firms' access to debt financing. Kang and Kim (2012) and Boubakri et al. (2020) identified a nonlinear relationship between state ownership and corporate financial performance. Yu (2013) found that state ownership has a U-shaped relationship with corporate performance.

Foreign ownership tends to lead to higher financial performance for firms. Many studies conclude that foreign ownership has a positive impact on firm financial performance (Kim, Sung & Wei, 2011; Uwuigbe & Olusanmi, 2012). Choi, Sul and Min (2012) argue that increased foreign ownership triggers independent monitoring and more board control, thereby reducing firm performance. Nakano and Nguyen (2013), Azzam, Fouad and Ghosh (2013), and Greenaway, Guariglia and Yu (2014) found an inverted U-shaped relationship between foreign ownership and ROA. Rashid (2020) finds a significant positive impact of both foreign ownership and board member ownership on firm performance. Accordingly, the size of the board of directors is related to the ownership structure and ROA (Rashid, 2020).

The study by Nguyen Thi Minh Hue and Dang Tung Lam (2017) concluded that state ownership has an inverse impact, while foreign ownership has a positive impact on ROA. Lam Chi Dung and Vo Hoang Diem Trinh (2020) measured the ownership structure by the state ownership ratio, non-state ownership ratio, and foreign ownership ratio. The results of data analysis of 25 Vietnamese commercial banks in the period 2007-2017 showed that the state ownership ratio was negatively correlated with ROA, the non-state ownership ratio was positively correlated with ROA, and no signs of the foreign ownership ratio impacting ROA were found. Duong et al. (2023) found a negative relationship between state ownership and ROA of 39 Vietnamese commercial banks from 2009 to 2020.

3. Methodology

This study uses the threshold regression model of Hansen (1999) and Wang (2015) to determine the threshold value and estimate the threshold model. The variables in the model are based on previous studies that use ROA as a proxy for the profitability of commercial banks, typically: Le Dong Duy Trung (2020), Ngo Van Toan and Ho Thuy Tien (2020), Khan, Siddique and Sarwar (2020), Githaiga (2022), Neves et al. (2023), Nguyen Kim Phuoc et al. (2023), Nguyen Trung Dung and Nguyen Thanh Phuong (2024), Roba and Legass (2024), Lawal, Mamman and Yusuf (2025), Khuat Cao Khue (2025). The study model that has been presented is outlined as follows (Table 1 shows details of the variables in the model):

$$\begin{aligned} \text{ROA}it = {} & \alpha + \beta 0\ \text{Tsan}\ (\text{q}it \le y) \\ & + \beta 1\ \text{Tsan}\ (\text{q}it > y) + \beta 2\text{Tl\_CV}it + \beta 3\text{Tl\_NN}it \\ & + \beta 4\text{Tl\_FOR}it + \beta 5\text{Tl\_NO}it + \beta 6\text{HDQT}it \\ & + \beta 7\text{NPL}it + \beta 8\text{SONAM}it + \varepsilon it \end{aligned}$$

The symbol α represents the constant reversal. The regression coefficient, denoted as β, represents the relationship between the bank i in year t and the random error term εit.

Profitability in finance is considered one of the most important financial indicators for investors to decide whether to invest or not and how to invest most reasonably and correctly. Profitability is measured by different financial ratios such as: ROA – Return on Assets, ROE – Return on Equity, ROI – Return on Investment and ROS – Return on Sale. Of which, ROA and ROE are commonly used (Lee & Kim, 2013; Yang, Li, Ma, & Chen, 2018; Le Ha Diem Chi, 2022). In this study, ROA is used to measure the profitability of commercial banks. The rate of Return on Assets (ROA) is a metric used to assess a bank's performance, serving as the dependent variable in this context. The Return on Assets (ROA) is determined by dividing the gross income after tax by the gross asset value, expressed as a percentage.

The relationship between bank size (total assets) and ROA with single thresholds of total assets (Ln_Tsan ≤ y) and total assets (Ln_Tsan > y) to assess the impact of the threshold. That is, after exceeding that value (threshold point), the direction of the impact of total assets on ROA will reverse. At that threshold point, the relationship between ROA and bank size (total assets) is a nonlinear relationship (U-shaped graph).

The threshold point model proposed by Hansen (1999) is widely used in empirical studies. This study uses threshold points (threshold estimation) to determine the asset threshold that gives the optimal ROA for banks, or in other words, to determine the point that shows the nonlinear relationship between ROA and the asset size of banks.

The study uses the Panel Threshold Regression (PTR) method according to Hansen (1999) and Wang (2015) to determine the threshold value and estimate the threshold model. The determination of the threshold is carried out based on the support of the Bootstrap method; the statistics used to determine the existence of thresholds are the Likelihood ratio (LR) statistics. PTR can be seen as an extended estimation method of the Fixed Effect Method (FEM) according to many linear mechanisms defined by thresholds.

The threshold model estimation results are performed with robust standard errors to overcome the phenomena of heteroscedasticity or autocorrelation. This method can still be used in cases where the above defects do not occur (White, 1981).

Table 1. Items and Hypothesis

No		Items	Measure	Reference	Hypothesis (Expectation sign)
Dependent variable					
1	ROA	Return on Assets	Total profit after tax/total assets (%)	Lee & Kim (2013); Yang et al (2018); Le Ha Diem Chi (2022); Nguyen Kim Phuoc et al (2023), Roba & Legass (2024), Lawal, Mamman & Yusuf (2025)	
Independent variables					
2	Ln_tsan	Total assets	Logarit on total assets	Octavio & Soesetio (2019), Le Dong Duy Trung (2020) Phan, Nguyen & Hoang (2022), Nguyen Kim Phuoc et al (2023), Nguyen Trung Dung & Nguyen Thanh Phuong (2024), Lawal, Mamman & Yusuf (2025)	H_1 (+)
3	Ll_CV	Customer loan to total deposit ratio	Customer loan to total deposit ratio (%)	Ibrahim & Mahmuda (2018), Kamran, Omran & bin Mohamed Arshad (2019), Le Dong Duy Trung (2020), Roba & Legass (2024), Lawal, Mamman & Yusuf (2025)	H_2 (+)
4	Tl_NN	Percentage of shares held by the state	Percentage of shares held by the state (%)	Lazzarini & Musacchio, (2018), Aguilera et al (2020), Lam Chi Dung & Vo Hoang Diem Trinh (2020), Kirimi, Kariuki & Ocharo (2022)	H_3 (-)
5	Tl_FOR	Percentage of shares held by foreign investors	Percentage of shares held by foreign investors (%)	Lam Chi Dung & Vo Hoang Diem Trinh (2020), Phan Ngoc Thuy Nhu, Nguyen Kim Phuoc (2022), Manh & Le Huy (2024)	H_4 (+)
6	Tl_NO	Total bank liabilities/ total assets	Total bank liabilities/total assets (%)	Chen et al (2018), Khuat Cao Khue (2025), Lawal, Mamman & Yusuf (2025)	H_5 (-)
7	HDQT	Number of board members	Number of board members (people)	Abobakr & Elgizir (2017), Jensen & Meckling (1976), Kyere & Ausloos (2021), Neves et al. (2023)	H6 (-)
8	NPL	Overdue debt rate (bad debt)	Total outstanding debt of groups 3,4 & 5/total outstanding debt (%)	Lee, Ning & Lee (2015), Khan, Siddique & Sarwar (2020), Githaiga (2022)	H7 (-)
9	SONAM	Number of years in operation	From the year of establishment to 2024 (year)	Nguyen Kim Phuoc et al (2023), Manh & Le Huy (2024)	H7 (+)

This study utilizes annual data from the accounting and interest balance sheets of banks listed on the Ho Chi Minh Stock Exchange (HOSE), specifically focusing on audited reports. The research encompassed 12 consecutive financial statements of banks listed on the Ho Chi Minh Stock Exchange (HOSE) between 2010 and 2024. Financial institutions that did not comply with the criteria above were omitted from the sample. The data set consists of 180 observations from the combination of 12 banks observed over 15 years.

4. Research results

4.1. Statistical results

Table 2. Statistical results

Criteria	Unit	Mean	Sd	Min	Max
ROA	%	1.1608	0.7081	0.03	3.58
SONAM	years	30.1667	13.0288	14	67
Tl_CV	%	91.0203	16.3778	51.6112	138.0072
Tl_NN	%	28.3147	32.6467	0	95.76
Tl_FOR	%	22.4984	16.7493	1.8	68.23
Tl_NO	%	91.9054	2.4319	83.0268	95.9382
HDQT	persons	8.2611	1.6043	3	11
NPL	%	1.9099	1.1077	0.3386	9.0044
ASSET	billion VND	502,298.9	520,408.9	34,389.23	2,760,792
N	180				

The study uses data from 12 banks (ACB, BID, CTG, EIB, HDB, MBB, SHB, SSB, STB, TCB, VCB, VIB). Of which, VIB is the bank with the shortest operating time (14 years) and BID is the bank with the longest operating time (67 years). Statistical data from financial reports show that in 2021, TCB's ROA reached 3.58% in 2021, the lowest ROA belonged to EIB (0.03%) in 2012. EIB had the highest loan/deposit ratio of 138.0072% in 2011 and the lowest value (51.6112%) of this variable also belonged to SSB in 2012. This shows that this bank has a very large fluctuation in the "loan/deposit ratio" indicator. The highest state capital ratio in 15 years, the highest ratio of foreign capital belongs to SHB (68.23% in the period 2017-2020) and the lowest belongs to BID. ACB has the highest ratio of bank debt/total assets (95.9382% in 2017) and TCB has the lowest rate of bank debt/total assets (83.0268%) in 2020.

The number of board members of banks ranges from 4 to 11 people (depending on the time and the size of the banks. The bad debt of the banks in the research sample is within the prescribed level (average 1.9099%). ACB is the bank with the lowest NPL of 0.3386% in 2010, SSB is the bank with the highest NPL of 9.0044% in 2012. Total assets are variable with the highest standard deviation, TCB has total assets of 2,760,792 billion VND in 2024 and HDB has the lowest total assets of 34,389.23 billion VND in 2010. The difference in the size of the banks is quite clear. This can lead to differences in the operational efficiency and profitability of the banks.

4.2. Results of regression and audits

Table 3: Correlation Matrix and VIF coefficient

	ROA	SONAM	Tl_CV	Tl_NN	Tl_FOR	Tl_NO	HDQT	NPL	VIF
ROA	1								
SONAM	0.0770	1							1.40
Tl_CV	0.423***	0.239***	1						1.73
Tl_NN	-0.0324	0.452***	0.358***	1					1.76
Tl_FOR	0.0209	-0.257***	0.202**	-0.259***	1				1.46
Tl_NO	-0.408***	0.295***	-0.0440	0.288***	0.0201	1			1.32
HDQT	-0.0214	0.149*	-0.0797	0.153*	-0.253***	0.0643	1		1.12
NPL	-0.224**	-0.0602	-0.249***	0.0407	0.116	-0.00753	-0.122	1	1.23
Ln _tsan	0.315***	0.746***	0.421***	0.369***	-0.0635	0.268***	0.156*	-0.191**	1.46

Note: *Sign ***, **, and * respectively for meaning 1%, 5% and 10%.*

Based on the correlation matrix presented in Table 3, it can be observed that the majority of pairwise correlation coefficients between variables exhibit values below 0.6. However, it is worth noting that the variables Ln_tsan (total asset) and SONAM (years) demonstrate a correlation coefficient of 0.746, which surpasses this threshold. To mitigate the presence of multicollinearity and maintain impartial outcomes, the variance inflation factor (VIF) was considered, as suggested by Gujarati, Porter, and Gunasekar (2012). The findings shown in Table 3 indicate that the VIF coefficients are consistently low (VIF < 5), suggesting the absence of multicollinearity within the model.

Table 4: Regression results (Threshold estimator)

Dependent variable: Return on assets (ROA)		**Regression**		
Threshold estimator (Th-1) with γ = 11.2261 (Prob = 0.4770) ß1 (low – total asset) = 10.8079 ß2 (high – total asset) = 11.2499				
Independent variable	**Coef.**	**Std. Err.**	**t**	**P>|t|**
SONAM (years)	-.0401976**	.0191707	-2.10	0.038
Tl_CV (%)	.0200288***	.0029781	6.73	0.000
Tl_NN (%)	-.0004684	.0039391	-0.12	0.905
Tl_FOR (%)	-.0107694**	.0044169	-2.77	0.016
Tl_NO (%)	-.0964023***	.0187285	-5.15	0.000
HDQT (persons)	-.0661515**	.022387	-2.95	0.004
NPL (%)	-.0598786**	.029593	-2.02	0.045
cat#c.Ln_tsan				
0	.5700631***	.1507619	3.78	0.000
1	.5222582 ***	.1446081	3.61	0.000
Constant	3.680966	1.96155	1.87	0.063

Model fit	F (9,159)	Prob > F = 0.0000
F - value/ Wald chi2 =19.63***		
F test that all u_i=0: F (11,159) = 12.26; Prob > F = 0.0000		
Test		
Heteroskedasticity: chi2 (12) = 213.63; Prob>chi2 = 0.0000		
Autocorrelation: F (1, 11) = 65.071; Prob > F = 0.0000		
Driscoll-Kraay: F (8, 14) = 522.21; Prob > F = 0.0000; Adj R-squared = 0.6557		

Note: *Sign ***, **, and * respectively for meaning 1%, 5% and 10%.*

The test results for heteroskedasticity indicate the presence of Heteroskedasticity in the model (Heteroskedasticity: $chi^2(12)$ = 213.63; Prob > chi^2 = 0.0000). Therefore, the model suffers from Heteroskedasticity. The autocorrelation test results also reveal the existence of serial correlation (F(1, 11) = 65.071; Prob > F = 0.0000), indicating that the model exhibits autocorrelation as well. The panel dataset consists of N = 12 banks (small cross-sectional dimension) observed over T = 15 years (moderate time dimension). Given that the fixed-effects model exhibits both heteroskedasticity and serial correlation, the study employs Driscoll-Kraay standard errors (Driscoll & Kraay, 1998) to correct for these issues and ensure the reliability of statistical inference. The Driscoll-Kraay estimator is considered particularly robust because it simultaneously addresses common violations, including heteroskedasticity, serial correlation, and cross-sectional dependence, without requiring explicit assumptions about the error structure. This approach is especially appropriate for panels with small N and moderate T, such as banking data. After correcting using Driscoll-Kraay standard errors, the estimation results remain statistically significant (F (8, 14) = 522.21; Prob > F = 0.0000; Adjusted R^2 = 0.6557), suggesting that the violations do not materially affect the model's conclusions. To further examine the robustness of the results, the number of bootstrap replications is increased from 1,000 to 2,000. The findings indicate that both the estimated threshold value and the conclusion regarding the threshold effect remain unchanged, thereby confirming the stability and robustness of the model.

The study estimates the models and checks the existence of change points using F statistics and related values such as Critical at 1%, 5% and 10% levels obtained from the 2000 iteration bootstrap. From Table 4, the total assets are 11.2261 since the logarithm of total assets should be equivalent to $e^{11.2261}$, which is equivalent to 75,064.24 billion VND, however, the value of Prob = 0.4960 > 0.05. Thus, the estimated threshold is not statistically significant; in other words, the data do not provide empirical support for the existence of an asset size threshold. The regression results under the asset size threshold specification suggest that bank asset size may continue to expand, as there is no statistical evidence indicating that an optimal or maximum threshold has been reached.

4.3. Discuss research results

The regression results (Table 4) show that 6/7 independent variables have an impact on ROA of the banks in the research sample: number of years in operation, loan/deposit ratio, foreign investor share ratio, and bank debt/total assets ratio. Of which, only "loan/deposit ratio" has a positive impact on ROA; the remaining three variables have a negative impact on ROA. Number of years in operation (SONAM) has a regression coefficient of -0.0401976 (5% significance level). Thus, banks

with more than 1 year of operation tend to decrease ROA by 0.0401976 % (assuming other factors remain unchanged). The decrease is not significant but still has a negative impact. This result is contrary to the initial hypothesis and inconsistent with the research results of Manh and Le Huy (2024) and Nguyen Kim Phuoc et al. (2023) but consistent with the research results of Al-Homaidi, Tabash and Ahmad (2020) and Al-Homaidi et al. (2020). This is a warning sign for banks with a long history of operation; they should not be subjective and should not rely on experience.

The customer loan/total deposit ratio (Tl_CV) is a variable that has a positive effect on ROA (regression coefficient is 0.0200288). Assuming other factors remain unchanged, the bank's profitability (ROA) will increase by 0.0200288% when the customer loan/total deposit ratio increases by 1% (99% confidence level). This result shows that the initial hypothesis is appropriate, and this result reaffirms the results of previous studies (Roba & Legass, 2024; Lawal, Mamman & Yusuf, 2025). Thus, banks need to increase the customer loan/total deposit ratio to increase ROA.

The foreign investor ownership ratio (Tl_FOR) has a regression coefficient of -0.0107694 (5% significance level). Thus, banks with a foreign investor ownership ratio increasing by more than 1% tend to have a decrease in ROA of 0.0107694% (assuming other factors remain unchanged). The decrease is not significant but still has a negative impact. This result is contrary to the initial hypothesis and is inconsistent with the research results of Lam Chi Dung and Vo Hoang Diem Trinh (2020) and Manh and Le Huy (2024) but consistent with the research results of Lensink, Meesters and Naaborg (2008). Thus, banks need to have an appropriate foreign investor ownership ratio so as not to affect ROA. According to the regulations of the Vietnamese government, the total shareholding of foreign investors shall not exceed 30% of the charter capital of a Vietnamese commercial bank, except in cases where the commercial bank transfers a maximum of 49% (Government, 2025). Therefore, banks need to comply with the regulations on foreign investor ownership ratio.

The bank debt/total assets ratio (Tl_NO) is a variable that has a negative impact on ROA (regression coefficient reaches -0.0964023). Assuming other factors remain unchanged, at the 1% significance level, a 1% increase in the bank debt/total assets ratio will reduce the bank's profitability (ROA) by -0.0964023% (a significant decrease). This result shows that the initial hypothesis is appropriate and consistent with the research results of Chen et al. (2018), Khuat Cao Khue (2025), and Lawal, Mamman and Yusuf (2025). This index indicates the level of financing for bank operations by borrowed capital (debt) compared to equity. The higher this ratio, the greater the financial risk of the bank. Thus, banks need to control the debt ratio.

The number of board members is negatively associated with ROA, with a regression coefficient of -0.0661515 (statistically significant at the 5% level). This implies that an increase of one additional board member is associated with a 0.0661515 percentage point decrease in ROA. This finding is consistent with the initial expectation and aligns with prior empirical evidence reported by Abobakr and Elgizir (2017), Jensen and Meckling (1976), Kyere and Ausloos (2021), and Neves et al. (2023). The negative association may reflect potential coordination problems, free-rider issues, or slower decision-making processes in larger boards, which can adversely affect operational efficiency and profitability. From a governance perspective, the results suggest that banks should carefully consider board size and ensure that board expansion is accompanied by improvements in expertise, leadership capacity, and strategic oversight to enhance performance.

The non-performing loan (NPL) ratio also exhibits a negative and statistically significant coefficient of -0.05987865 at the 5% level. This indicates that, holding other factors constant, a 1 percentage point increase in the NPL ratio is associated with a 0.05987865 percentage point decrease in ROA. This result is consistent with the initial hypothesis and corroborates prior findings in the banking literature, which document the detrimental effect of asset quality deterioration on bank profitability according to Lee, Ning and Lee (2015), Khan, Siddique and Sarwar (2020), Githaiga (2022). These findings underscore the importance of effective credit risk management, as the NPL ratio exerts a statistically significant influence on ROA. Maintaining a prudent level of non-performing loans is therefore critical for sustaining bank profitability. Beyond its impact on ROA, a high NPL ratio may also adversely affect other financial indicators, such as capital adequacy, liquidity, and market valuation, as well as non-financial dimensions including reputation, stakeholder confidence, and regulatory assessments. Accordingly, the monitoring and management of asset quality should be conducted on a continuous and systematic basis to ensure long-term stability and performance of banks.

5. Conclusion and implications

5.1. Conclusion

This study examines the relationship between bank size, ownership structure, and profitability using a balanced panel of 12 commercial banks listed on the Ho Chi Minh Stock Exchange (HOSE) over the period 2010–2024. Employing Hansen's (1999) threshold regression framework, the analysis identifies a nonlinear effect of total asset size on bank profitability, as measured by return on assets (ROA). The empirical results, presented in Table 4, indicate that four out of eight explanatory variables-years of operation, the loan-to-deposit ratio, the foreign ownership ratio, and the debt-to-total-assets ratio-exert statistically significant effects on ROA. Notably, the findings reveal the inexistence of a single asset-size threshold.

5.2. Implications

This study exclusively utilizes data from commercial operators listed on the Ho Chi Minh Stock Exchange (HOSE) over a timeframe spanning from 2010 to 2024. Based on the research results, some management implications for commercial banks are as follows: (i) Increase assets at a moderate level. Banks can increase their size in many ways, they should not only focus on increasing their size by increasing assets, but especially tangible assets also; (ii) Increase the ratio of customer loans/total deposits to increase ROA. Increase this ratio by promoting customer loans, focusing on customers with high credit ratings; (iii) Comply with government regulations, especially regulations on foreign investors' shareholding ratio to ensure that profitability does not decrease. According to the theory of Jensen and Meckling (1976), investors want to maximize benefits, focus on the income they receive and pay less attention to increasing the value of the business, long-term development; (iv) Banks with a long history of operation should not only focus on management or work based on experience but need to change to catch up with the business trends of the banking industry in the digital age. The workforce needs to be trained and fostered to increase efficiency, productivity and avoid falling into a rut.

This study exclusively utilizes data from commercial operators listed on the Ho Chi Minh Stock Exchange (HOSE) over a timeframe spanning from 2010 to 2024. Based on the research results, some management implications for commercial banks are as follows: (i) Banks can continue to expand their assets because their current asset levels have not reached their maximum yet. Banks can increase

their asset size in many ways, beside the option of increasing tangible assets; (ii) Increase the ratio of customer loans/total deposits to increase ROA. Increase this ratio by promoting customer loans, focusing on customers with high credit ratings; (iii) Banks should control the number of board members, appointing to the board only those who possess strong strategic capabilities and high managerial ability. Banks should also control the level of foreign ownership in compliance with government regulations on foreign ownership limits. In addition, banks need to monitor their leverage ratio and non-performing loan ratio, particularly by keeping the NPL ratio as low as possible; (iv) Banks with a long history of operation should not only focus on management or work based on experience but also need to change to catch up with the business trends of the banking industry in the digital age. The workforce needs to be trained and fostered to increase efficiency and productivity and avoid falling into a rut.

This study only focuses on examining the threshold of asset size and ownership structure affecting ROA without considering other aspects, such as the threshold of labor or other profitability indexes (ROE, ROS, and Tobin's). Further studies can use other profitability indexes (ROE, ROS, and TOBIN'S) to discover more interesting points about the threshold of size.

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Declaration of generative AI andAI-assisted technologies in the writing process

During the preparation of this work, the authors used ChatGPT (OpenAI, GPT) to improve readability, grammar, and language quality, as well as to assist with translation. The authors reviewed, edited, and took full responsibility for the final content of the manuscript.

References

Abedifar, P., Molyneux, P., & Tarazi, A. (2013). Risk in Islamic banking. *Review of Finance*, *17*(6), 2035-2096. https://doi.org/10.1093/rof/rfs041

Abobakr, M. G., and Elgiziry, K. (2017). The relationship between board of directors' characteristics and bank risk-taking: Evidence from Egyptian banking sector. *Journal of Finance and Accounting, 5*(1), 24-33. https://doi: 10.11648/j.jfa.20170501.13

Aguilera, R., Duran, P., Heugens, P., Sauerwald, S., Roxana, T., & VanEssen, M. (2020). State ownership, political ideology, and firm performance around the world. *Journal of World Business*, *56*(1), 101–113. https://doi.org/10.1016/j.jwb.2020.101113

Ahamed, M. M. (2017). Asset quality, non-interest income, and bank profitability: Evidence from Indian banks. *Economic Modelling, 63*, 1-14. https://doi.org/10.1016/j.econmod.2017.01.016

Alabdullah, T. T. Y. (2018). The relationship between ownership structure and firm financial performance: evidence from Jordan. *Benchmarking: An International Journal*, *25*(1), 319–333. https://doi.org/10.1108/BIJ-04-2016-0051

Alarussi, A., & Alhaderi, S. (2018). Factors affecting profitability in Malaysia. *Journal of Economic Studies, 45(*3), 442–458. https://doi.org/10.1108/JES-05-2017-0124.

Albertazzi, U., & Gambacorta, L. (2009). Bank profitability and the business cycle. *Journal of Financial Stability*, *5*(4), 393-409. https://doi.org/10.1016/j.jfs.2008.10.002

Alkurdi, A., & Mardini, G. H. (2020). The impact of ownership structure and the board of directors' composition on tax avoidance strategies: Empirical evidence from Jordan. *Journal of Financial Reporting and Accounting*, *18*(4), 795–812. https://doi.org/10.1108/JFRA-01-2020-0001

Azeez, A. A. (2015). Corporate governance and firm performance: evidence from Sri Lanka. *Journal of Finance and Bank Management*, *3*(1), 180-189. http://dx.doi.org/10.15640/jfbm.v3n1a16

Azzam, I., Fouad, J. and Ghosh, D.K. (2013). Foreign ownership and financial performance: evidence from Egypt. *International Journal of Business, 18*(3), 232. https://ijb.cyut.edu.tw/var/file/10/1010/img/859/V183-4.pdf

Berger, A.N. & DeYoung, R. (1997). Problem Loans and Cost Efficiency in Commercial Banks. *Journal of Banking and Finance, 21*(6), 849-870. https://doi.org/10.1016/S0378-4266(97)00003-4

Berger, A.N., Hanweck, G. A., & Humphrey, D.B. (1987). Competitive viability in banking: Scale, scope, and product mix economies. *Journal of Monetary Economics, 20*(3), 501-520. https://doi.org/10.1016/0304-3932(87)90039-0

Borisova, G., Brockman, P., Salas, J. M., & Zagorchev, A. (2012). Government ownership and corporate governance: Evidence from the EU. *Journal of Banking & Finance*, 36, 2917–2934. https://doi.org/10.1016/j.jbankfin.2012.01.008

Boubakri, N., Chen, R.R., El Ghoul, S., Guedhami, O. and Nash, R. (2020). State ownership and stock liquidity: evidence from privatization. *Journal of Corporate Finance, 65*, 101763. https://doi.org/10.1016/j.jcorpfin.2020.101763

Chander, S., & Aggarwal, P. (2008). Determinants of corporate profitability: An empirical study of Indian drugs and pharmaceutical industry. *Paradigm, 12*(2), 51-61. https://doi.org/10.1177/0971890720080206

Chen, N., Liang, H. Y., & Yu, M. T. (2018). Asset diversification and bank performance: Evidence from three Asian countries with a dual banking system. *Pacific-Basin Finance Journal*, *52*, 40-53. https://doi.org/10.1016/j.pacfin.2018.02.007

Chính phủ (2025). *Nghị định số 39/2025/NĐ-CP ngày 18/03/2025 sửa đổi, bổ sung một số điều của Nghị định số 01/2014/NĐ-CP ngày 03/01/2014 về việc nhà đầu tư nước ngoài mua cổ phần của tổ chức tín dụng Việt Nam.* https://vanban.chinhphu.vn/?pageid=27160&docid=212915

Chiorazzo, V., Milani, C., & Salvini, F. (2008). Income diversification and bank performance: Evidence from Italian banks. *Journal of financial services research, 33*(3), 181-203. DOI 10.1007/s10693-008-0029-4

Cho, S., & Kim, J. (2007). Outside directors, ownership structure and firm profitability in Korea. *Corporate Governance: An International Review*, *15*(2), 239–250. https://doi.org/10.1111/j.1467-8683.2007.00557

Choi, H.M., Sul, W. and Min, S.K. (2012). Foreign board membership and firm value in Korea. *Management Decision, 50*(2), 207-233. https://doi.org/10.1108/00251741211203533

Dang, C., Li, Z. F., & Yang, C. (2018). Measuring firm size in empirical corporate finance. *Journal of Banking & Finance*, *86*, 159-176. https://doi.org/10.1016/j.jbankfin.2017.09.006

De Haan, J., & Poghosyan, T. (2012a). Bank size, market concentration, and bank earnings volatility in the US. *Journal of International Financial Markets, Institutions and Money, 22*(1), 35-54. https://doi.org/10.1016/j.intfin.2011.07.002

De Haan, J., & Poghosyan, T. (2012b). Size and earnings volatility of US bank holding companies. *Journal of Banking & Finance, 36*(11), 3008-3016. https://doi.org/10.1016/j.jbankfin.2012.07.008

Diamond, P. A. (1984). *A search-equilibrium approach to the micro foundations of macroeconomics* (Vol. 1982). MIT press. See at: https://books.google.com.vn/books?hl=vi&lr=&id=m-0_vXbJtgsC&oi=fnd&pg=PA33&dq=Diamond,+P.+A.+(1984).+A+search-equilibrium+approach+to+the+micro+foundations+of+macroeconomics+(Vol.+1982).+MIT+press.&ots=g_5lhd6_00&sig=R-AVAs2mtsacmbHhjwZuS_VnIwU&redir_esc=y#v=onepage&q&f=false

Diem Chi, L. H., Van Dung, H., & Chau, N. T. M. (2020). The threshold for the efficient scale of Vietnamese commercial banks: A study based on Bayesian model. In *Data Science for Financial Econometrics* (pp. 531-542). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-48853-6_36

Din, S. U., Arshad Khan, M., Khan, M. J., & Khan, M. Y. (2021). Ownership structure and corporate financial performance in an emerging market: A dynamic data analysis panel. *International Journal of Emerging Markets*, (ahead–of–print), forthcomimg. https://doi.org/10.1108/IJOEM-03-2019-0220

Din, S. U., Arshad Khan, M., Khan, M. J., & Khan, M. Y. (2022). Ownership structure and corporate financial performance in an emerging market: a dynamic panel data analysis. *International Journal of Emerging Markets*, *17*(8), 1973-1997. https://doi.org/10.1108/IJOEM-03-2019-0220

Duong, K. D., Le Vu, H., Nguyen, D. V., & Pham, H. (2023). How do employee stock ownership plans and ownership structure affect bank performance? Evidence from Vietnam. *Managerial and Decision Economics*, *44*(5), 2604-2614. https://doi.org/10.1002/mde.3836

Feng, G., & Serletis, A. (2010). Efficiency, technical change, and returns to scale in large US banks: Panel data evidence from an output distance function satisfying theoretical regularity. *Journal of Banking & Finance, 34*(1), 127-138. https://doi.org/10.1016/j.jbankfin.2009.07.009

Firth, M., Lin, C. and Wong, S.M. (2008). Leverage and investment under a state-owned bank lending environment: evidence from China. *Journal of Corporate Finance*, *14*(5), 642-653. https://doi.org/10.1016/j.jcorpfin.2008.08.002Get rights and content

Fu, X. and S. A. Heffernan (2008). The Effects of Reform on China's Bank Structure and Performance. *Journal of Banking and Finance, forthcoming*. https://doi.org/10.1016/j.jbankfin.2006.11.023

Fu, X., Lin, Y., & Molyneux, P. (2014). Bank competition and financial stability in Asia Pacific. *Journal of Banking & Finance*, *38*, 64-77. https://doi.org/10.1016/j.jbankfin.2013.09.012

Galego, A., Mira, N., & Silva, J. V. (2019). Ownership, productivity and firms' life cycle. *European Journal of Family Business*, *8*(2), 139–150. https://doi.org/10.24310/ejfbejfb.v8i2.5228

Githaiga, P. N. (2022). Income diversification and bank risk-taking: The moderating role of intellectual capital. *Cogent Business & Management*, *9*(1), 2149142. https://doi.org/10.1080/23311975.2022.2149142

Greenaway, D., Guariglia, A. and Yu, Z. (2014). The more the better? Foreign ownership and corporate performance in China. *The European Journal of Finance*, *20*(7-9), 681-702. https://doi.org/10.1080/1351847X.2012.671785

Hansen, B. E. (1999). Threshold effects in non-dynamic panels: Estimation, testing, and inference. *Journal of econometrics*, *93*(2), 345-368. https://doi.org/10.1016/S0304-4076(99)00025-1

Hughes, J. P., & Mester, L. J. (2013). Who said large banks don't experience scale economies? Evidence from a risk-return-driven cost function. *Journal of Financial Intermediation*, *22*(4), 559-585. https://doi.org/10.1016/j.jfi.2013.06.004

Huỳnh Thị Thanh Trúc (2023). Ảnh hưởng từ quy mô đến lợi nhuận của ngân hàng và đề xuất mô hình nghiên cứu. *Tạp chí Tài chính* [Huynh Thi Thanh Truc (2023). The impact of scale on bank profitability and proposed research model]. xem tại: https://tapchitaichinh.vn/anh-huong-tu-quy-mo-den-loi-nhuan-cua-ngan-hang-va-de-xuat-mo-hinh-nghien-cuu.html

Ibrahim, A. A. & Mahmuda, M. (2018). Profitability and liquidity of conventional banks and islamic banks in Nigeria: a comparative study (2012-2015). *Lafia Journal of Economics and Management Sciences*, *3*(1), 212-225. See at: https://www.lajems.com/index.php/lajems/article/view/20/16

Irawati, N., Maksum, A., Sadalia, I., & Muda, I. (2019). Financial performance of indonesian's banking industry: the role of good corporate governance, capital adequacy ratio, nonperforming loan and size. *International Journal of Scientific and Technology Research*, *8*(4), 22-26.

Isik, O., Kosaroglu, Ş. M., & Demirci, A. (2018). The impact of size and growth decisions on Turkish banks' profitability. *International Journal of Economics and Financial Issues*, *8*(1), 21-29.

Jensen, M.C, and Meckling, W.H (1976). Agency Costs and the theory of the firm. *Journal of Accounting and Economics*, *3*, 305-360. https://doi.org/10.1016/0304-405X(76)90026-X

Jensen, M.C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, *76*, 323-329. https://www.jstor.org/stable/1818789

Kamran, H. W., Omran, A., and bin Mohamed Arshad, S. B. (2019). Liquidity Risk Management in Banking Sector under the Shadow of Systematic Risk and Economic Dynamics in Pakistan. *Pakistan Journal of Humanities and Social Sciences*, *7*(2), 167-183. DOI:10.52131/pjhss.2019.0702.0079

Kang and Kim (2012). Ownership structure and firm performance: evidence from the Chinese corporate reform. *China Economic Review*, *23*(2), 471-481. https://doi.org/10.1016/j.chieco.2012.03.006

Kao, M., Hodgkinson, L., & Jaafar, A. (2019). Ownership structure, board of directors and firm performance: Evidence from Taiwan. *Corporate Governance*, *19*(1), 189–216. https://doi.org/10.1108/CG-04-2018-0144

Khan, M. A., Siddique, A., & Sarwar, Z. (2020). Determinants of non-performing loans in the banking sector in developing state. *Asian Journal of Accounting Research*, *5*(1), 135-145. https://doi.org/10.1108/AJAR-10-2019-0080

Khuất Cao Khuê (2025). Sự ảnh hưởng của tỷ lệ dư nợ tín dụng trên tổng tài sản và cơ cấu lĩnh vực cho vay theo ngành nghề đến hiệu quả hoạt động của Vietcombank [The impact of the ratio of outstanding credit balance to total assets and the structure of lending sectors by industry on the performance of Vietcombank]. *Tạp chí Kinh tế và dự báo (nghiên cứu – trao đổi)*. https://kinhtevadubao.vn/su-anh-huong-cua-ty-le-du-no-tin-dung-tren-tong-

tai-san-va-co-cau-linh-vuc-cho-vay-theo-nganh-nghe-den-hieu-qua-hoat-dong-cua-vietcombank-31756.html. Truy cập 30.06.2025

Kim, W., Sung, T. and Wei, S.-J. (2011). Does corporate governance risk at home affect investment choices abroad? *Journal of International Economics*, *85*(1), 25-41. https://doi.org/10.1016/j.jinteco.2011.03.009

Kirimi, P. N., Kariuki, S. N., & Ocharo, K. N. (2022). Ownership structure and financial performance: Evidence from Kenyan commercial banks. *PloS one*, *17*(5), e0268301. https://doi.org/10.1371/journal.pone.0268301

Koo, D. S., Ramalingegowda, S., & Yu, Y. (2017). The effect of financial reporting quality on corporate dividend policy. *Review of Accounting studies, 22*(2), 753-790. DOI 10.1007/s11142-017-9393-3

Kuo, K., Lu, W., & Dinh, T. (2020). Firm performance and ownership structure: dynamic network data envelopment analysis approach. *Managerial and Decision Economics*, *41*(4), 608–623. https://doi.org/10.1002/mde.3124

Kyere, M., & Ausloos, M. (2021). Corporate governance and firms financial performance in the United Kingdom. *International Journal of Finance & Economics*, *26*(2), 1871-1885. https://doi.org/10.1002/ijfe.1883

Lâm Chí Dũng & Võ Hoàng Diễm Trinh (2020). Tác động của cấu trúc sở hữu đến khả năng sinh lời của các ngân hàng thương mại Việt Nam [The impact of ownership structure on the profitability of Vietnamese commercial banks]. *Tạp chí Tài chính – Ngân hàng, số 6/2020*. https://tapchinganhang.gov.vn/tac-dong-cua-cau-truc-so-huu-den-kha-nang-sinh-loi-cua-cac-ngan-hang-thuong-mai-viet-nam.htm. truy cập 10/05/2025

Lawal, M. L., Mamman, A., & Yusuf, M. I. (2025). Cmparative analysis of asset liability management and profitability of Jaiz bank and selected conventional deposit money banks Nigeria. Journal of Management Science and Entrepreneurship. *Management Science & Entrepreneurship (JMSE), 9*(7), 2-16. https://doi.org/10.70382/bejmse.v9i7.037

Lazzarini, S.G. and Musacchio, A. (2018). State ownership reinvented? Explaining performance differences between state-owned and private firms. Corporate Governance: *An International Review, 26*(4),255-272. https://doi.org/10.1111/corg.12239

Lê Đồng Duy Trung (2019). Hiệu ứng ngưỡng quy mô trong tác động của đa dạng hóa thu nhập tới lợi nhuận ngân hàng thương mại - Nghiên cứu thực nghiệm tại Việt Nam [Scale threshold effect in the impact of income diversification on commercial bank profits - Empirical research in Vietnam]. *Tạp chí Ngân hàng,* 21/2019. https://tapchinganhang.gov.vn/hieu-ung-nguong-quy-mo-trong-tac-dong-cua-da-dang-hoa-thu-nhap-toi-loi-nhuan-ngan-hang-thuong-mai-ng.htm

Lê Đồng Duy Trung (2020). Tác động phi tuyến của rủi ro thanh khoản đến khả năng sinh lời của các ngân hàng thương mại Việt Nam – Bằng chứng từ hồi quy ngưỡng dữ liệu bảng [Nonlinear impact of liquidity risk on profitability of Vietnamese commercial banks – Evidence from panel data threshold regression]. *Tạp chí Kinh tế & Phát triển, 281*(11) , 92–101. Xem tại: https://js.ktpt.edu.vn/index.php/jed/article/view/369

Lê Hà Diễm Chi (2022). Mối quan hệ giữa quy mô và hiệu quả tài chính các ngân hàng thương mại Việt Nam. *Tạp chí Ngân hàng (tapchinganhang.gov.vn). [The relationship between scale and financial efficiency of Vietnamese commercial banks. Banking magazine]*. Xem tại: https://tapchinganhang.gov.vn/moi-quan-he-giua-quy-mo-va-hieu-qua-tai-chinh-cac-ngan-hang-thuong-mai-viet-nam.htm

Le, M., Hoang, V. N., Wilson, C., & Managi, S. (2020). Net stable funding ratio and profit efficiency of commercial banks in the US. *Economic Analysis and Policy*, *67*, 55-66. https://doi.org/10.1016/j.eap.2020.05.008

Lee, C. C., Ning, S. L., & Lee, C. C. (2015). How does bank Capital affect bank profitability and risk? Evidence from china's WTO accession. *China & World Economy*, *23*(4), 19-39. https://doi.org/10.1111/cwe.12119

Lee, J. Y., & Kim, D. (2013). Bank performance and its determinants in Korea. *Japan and the World Economy, 27,* 83-94. https://doi.org/10.1016/j.japwor.2013.05.001. https://doi.org/10.1016/j.japwor.2013.05.001

Leland, H. E., & Pyle, D. H. (1977). Informational asymmetries, financial structure, and financial intermediation. *The journal of Finance*, *32*(2), 371-387. https://doi.org/10.2307/2326770

Lensink, Robert & Meesters, Aljar & Naaborg, Ilko (2008). Bank efficiency and foreign ownership: Do good institutions matter? *Journal of Banking & Finance, 32*(5), 834-844. https://doi.org/10.1016/j.jbankfin.2007.06.001

Liu, T., Zhang, Y., & Liang, D. (2019). Can ownership structure improve environmental performance in Chinese manufacturing firms? the moderating effect of financial performance. *Journal of Cleaner Production*, *225*(1), 58–71. https://doi.org/10.1016/j.jclepro.2019.03.267

Manh, P. T., & Le Huy, Q. (2024). Factors Impact on Financial Performance in Big 4 Banks in Vietnam: The Role of Corporate Social Responsibility Disclosure. *Oblik i Finansi*, *104*, 58-69. https://doi.org/10.33146/2307-9878-2024-2(104)-58-69

Martínez-García, I., Basco, R., & Gómez-Ansón, S. (2021). Dancing with giants: Contextualizing state and family ownership effects on firm performance in the Gulf Cooperation Council. *Journal of Family Business Strategy, 12*(4), 100373. https://doi.org/10.1016/j.jfbs.2020.100373

Mashayekhi, B., & Bazaz, M. S. (2008). Corporate governance and firm performance in Iran. *Journal of Contemporary Accounting & Economics, 4*(2), 156-172. DOI:10.1016/S1815-5669(10)70033-3

Matousek, R., Nguyen, T. N., & Stewart, C. (2014). Efficiency in the Vietnamese banking system: A DEA double bootstrap approach. *Economics*, 1. DOI: 10.1016/j.ribaf.2015.09.006

Nakano, M. and Nguyen, P. (2013). Foreign ownership and firm performance: evidence from Japan's electronics industry. *Applied Financial Economics, 23*(1), 41-50. https://doi.org/10.1080/09603107.2012.705425

Neves, M. E. D., Baptista, L., Dias, A. G., & Lisboa, I. (2023). What factors can explain the performance of energy companies in Portugal? Panel data evidence. *International Journal of Productivity and Performance Management*, *72*(3), 730-752. https://doi.org/10.1108/IJPPM-01-2021-0057

Neves, M. E., Proença, C., & Dias, A. (2020). Bank profitability and efficiency in Portugal and Spain: A non-linearity approach. *Journal of Risk and Financial Management*, *13*(11), 284. https://doi.org/10.3390/jrfm13110284

Ngô Văn Toàn & Hồ Thủy Tiên (2020). Tác động của ngưỡng qui mô trong mối quan hệ nợ và hiệu quả hoạt động của các công ty phi tài chính niêm yết trên thị trường chứng khoán Việt Nam [The impact of size threshold on the debt-performance relationship of non-financial companies listed on the Vietnamese stock market]. *Tạp chí Quản ký và kinh tế quốc tế, 131*, 110-129.

Nguyễn Kim Phước & Phan Ngọc Thuy Như (2021). Ảnh hưởng của tỷ lệ chi trả cổ tức và cơ cấu sở hữu đến giá cổ phiếu: Trường hợp các công ty hàng tiêu dùng ở Việt Nam [The Effects of Dividend Payout Ratio and Ownership Structure on Stock Prices: The Case of Consumer Goods Companies in Vietnam]. *Tạp chí Kinh tế và Ngân hàng Châu Á, 189*, 37-52. http://dx.doi.org/10.46223/HCMCOUJS.econ.vi

Nguyen Kim Phuoc, Phan Ngoc Thuy Nhu & Tran Thi Tuong Van (2023). Comercial banks listed on the Ho Chi Minh city stock exchange: An Analysis of Diversification, Human capital, and Performance. *Journal of Finance - Marketing Research, 14*(6), 58-71. https://doi.org/10.52932/jfm.vi6

Nguyễn Thị Minh Huệ & Đặng Tùng Lâm (2017). Tác động của cấu trúc sở hữu đến hiệu quả hoạt động của các công ty niêm yết trên thị trường chứng khoán Việt Nam [Impacts of Ownership Structure on Firm Profitability among Listed Firms in Vietnamese Securities Exchange]. *Tạp chí Khoa học ĐHQGHN: Kinh tế và Kinh doanh, 33, 1*(2017) 23-33. https://js.vnu.edu.vn/EAB/article/view/4044/3792

Nguyễn Trung Dũng & Nguyễn Thanh Phương (2024). Tác động của quản trị công ty và thu nhập phi tín dụng đến hiệu quả tài chính của các ngân hàng thương mại Việt Nam. [Organization of all: Banking Academy of Vietnam]. *Tạp chí Kinh tế - Luật & Ngân hàng, 269*. https://vjol.info.vn/index.php/tckinhteluatvanganhang-hvnh/article/view/102576

Nurullah, A., Gozali, E. O. D., Hamzah, R. S., Bakti, H., Khasman, R., & Maharani, M. A. (2024). An assessment of banking sector performance in Indonesia. *International Journal of Financial, Accounting, and Management*, *5*(4), 421-431. http://dx.doi.org/10.35912/ijfam.v5i4.1452

Octavio, D. Q., & Soesetio, Y. (2019). Intellectual capital and bank profitability: Evidence from conventional and Islamic bank in Indonesia. *Jurnal keuangan dan Perbankan*, *23*(2), 191-205. https://doi.org/10.1504/IJLIC.2022.122589.

Omran, M. M., Bolbol, A., & Fatheldin, A. (2008). Corporate governance and firm performance in Arab equity markets: does ownership concentration matter? *International Review of Law and Economics*, *28*(1), 32–45. https://doi.org/10.1016/j.irle.2007.12.001

Penman, S. H. (1991). An evaluation of accounting rate-of-return. *Journal of Accounting, Auditing & Finance*, *6*(2), 233-255. https://doi.org/10.1177/0148558X9100600204

Phan Ngọc Thùy Như, Nguyễn Kim Phước (2022). Các yếu tố ảnh hưởng đến chính sách cổ tức của các công ty ngành công nghiệp niêm yết tại Sở Giao dịch Chứng khoán Thành phố Hồ Chí Minh [The factors affecting the dividend payout ratio of industry companies on the Ho Chi Minh City Stock Exchange]**.** *HCMCOUJS-Kinh tế và Quản trị Kinh doanh, 17*(2), 124-137.http://dx.doi.org/10.46223/HCMCOUJS.econ.vi.17.2.2061.2022

Phan Thu Hiền & Nguyễn Nhật Hạ (2020). Các yếu tố tác động đến khả năng sinh lời của các doanh nghiệp ngành dệt may trên thị trường chứng khoán Việt Nam [Factors affecting the profitability of textile and garment enterprises listed on Vietnam's stock market]. *HCMCOUJS-Kinh tế và Quản trị Kinh doanh, 16*(3), 181-196. DOI: 10.46223/HCMCOUJS.econ.vi.16.3.1232.2021

Phan, D. T., Nguyen, T. T., & Hoang, T. T. (2022). Impact of income diversification on the business performance of Vietnamese commercial banks. *Cogent Business & Management*, *9*(1), 2132592. https://doi.org/10.1080/23311975.2022.2132592

Prasetio, A. E., Azizah, A., Salma, U., & Daulay, Y. (2021). The Effect of Total Assets Turnover, Current Ratio and Financial TECHNOLOGY on the Profitability of Banking Companies in Indonesia. *Jurnal Ilmiah Manajemen dan Bisnis*, *7*(2), 253-262. http://dx.doi.org/10.22441/jimb.v7i2.11742

Prasetio, A. E., Azizah, A., Salma, U., & Daulay, Y. (2021). The Effect of Total Assets Turnover, Current Ratio and Financial TECHNOLOGY on the Profitability of Banking Companies in Indonesia. *Jurnal Ilmiah Manajemen dan Bisnis*, *7*(2), 253-262. http://dx.doi.org/10.22441/jimb.v7i2.11742

Radojičić, J., & Marinković, S. (2023). Impact of Income and Assets Diversification on Bank Performance in Serbia. *Economic Themes*, *61*(2), 197-214. DOI 10.2478/ethemes-2023-0010

Rashid, M.M. (2020). Ownership structure and firm performance: the mediating role of board characteristics. *Corporate Governance: The International Journal of Business in Society, 20*(4), 719-737. https://doi.org/10.1108/CG-02-2019-0056

Roba, H. A. & Legass, H. A. (2024). The impact of asset & liability management on profitability: evidence from selected private commercial banks in Ethiopia. *International Journal of Finance and Banking Research, 10*(6), 104-117. https://doi.org/10.11648/j.ijfbr.20241006.11

Saona, P.H (2011). Determinants of the profitability of the U.S Banking Industry. *International Journal of Business and Science, 2*(22), 255-269. http://hdl.handle.net/11531/12554

Shehzad, C. T., De Haan, J., & Scholtens, B. (2013). The relationship between size, growth and profitability of commercial banks. *Applied Economics, 45*(13), 1751-1765. https://doi.org/10.1080/00036846.2011.637896

Solow, R. (1963). *Capital Theory and the Rate of Return*. North-Holland Publishing Company, Amsterdam, 7-36. http://digamo.free.fr/solow63.pdf

Stan, C.V., Peng, M.W. and Bruton, G.D. (2014). Slack and the performance of state-owned enterprises. *Asia Pacific Journal of Management, 31*(2), 473-495. https://link.springer.com/article/10.1007/s10490-013-9347-7

Stigler, G. J. (1958). The economies of scale. *The Journal of Law and Economics, 1,* 54-71. https://www.journals.uchicago.edu/doi/abs/10.1086/466541

Tam, N. T. T., Khanh, L. L. T., Le Ngoc, D., & Hoang, C. L. (2025). Factors Affecting the Profitability of Commercial Banks in Vietnam. *The International Journal of Business Management and Technology, 9*(10), 40-47. https://www.theijbmt.com/archive/0970/15674476.pdf

Thi Thanh Tran, D., & Phan, H. T. T. (2020). Bank size, credit risk and bank profitability in Vietnam. *Malaysian Journal of Economic Studies*, *57*(2), 233-251. https://search.informit.org/doi/abs/10.3316/INFORMIT.586174661438166

Tihanyi, L., Aguilera, R. V., Heugens, P., Van Essen, M., Sauerwald, S., Duran, P., & Turturea, R. (2019). State ownership and political connections. *Journal of Management, 45*(6), 2293-2321. https://doi.org/10.1177/0149206318822113

Uwuigbe, U., & Olusanmi, O. (2012). An empirical examination of the relationship between ownership structure and the performance of firms in Nigeria. *International Business Research*, *5*(1), 208. http://dx.doi.org/10.5539/ibr.v5n1p208

Vătavu, S. (2014). The determinants of profitability in companies listed on the bucharest stock exchange. *Annals of the University of Petrosani Economics, 14*(1), 329-338.

Yazdanfar, D. (2013). Profitability determinants among micro firms: Evidence from Swedish data. *International Journal of Managerial Finance, 9*(2), 151-160. https://doi.org/10.1108/17439131311307565

Wang, Q. (2015). Fixed-effect panel threshold model using Stata. *The Stata Journal*, *15*(1), 121-134. RePEc:tsj:stataj:v:15:y:2015:i:1:p:121-134

White, H. (1981). Consequences and detection of misspecified nonlinear regression models. *Journal of the American Statistical Association*, *76*(374), 419-433. https://doi.org/10.2307/2287845

Yang, S., Li, Z., Ma, Y., & Chen, X. (2018). Does electronic banking really improve bank performance? Evidence in China. *International Journal of Economics and Finance*, *10*(2), 82-94. DOI:10.5539/ijef.v10n2p82

Yao, H., Haris, M., & Tariq, G. (2018). Profitability determinants of financial institutions: evidence from banks in Pakistan. *International Journal of Financial Studies*, *6*(2), 1-28. https://doi.org/10.3390/ijfs6020053

Yu, M. (2013). State ownership and firm performance: Empirical evidence from Chinese listed companies. *China Journal of Accounting Research*, *6*(2), 75-87. https://doi.org/10.1016/j.cjar.2013.03.003