

HOW FOREIGN OWNERSHIP AND COMPETITION AFFECT THE CREDIT GROWTH OF COMMERCIAL BANKS: EVIDENCE FROM A TRANSITIONAL ECONOMY

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Abstract

This study examines the relationship between foreign ownership and market competition, proxied by bank market power, affecting the credit growth of 32 commercial banks in Vietnam from 2010 to 2020. The Random Effects Model and the Dynamic System Generalized Method of Moments were used to analyze an unbalanced panel of 278 annual observations. The findings report that foreign ownership reduces credit growth, with each percentage increase in foreign ownership reducing credit growth by 0.74%. The results indicate an inverse U-shaped relationship between competitive advantage and credit growth, with a turning point of 0.46. The main findings were found to be robust after employing an alternative market power proxy. The study recommends that bank managers and policymakers limit foreign ownership and control commercial banks' market power to promote sustainable credit growth.

JEL classification: G20, G21

Keywords: credit growth; foreign ownership; market power; non-linearity; Vietnam

1. INTRODUCTION

The lending activities of commercial banks in Vietnam significantly contribute to local economic development (Duong et al., 2022). Bank credit is a channel for providing capital to businesses and households for expanding production and consumption. Credit growth also plays a decisive role in commercial banks' monetary policy and

strategy (Al-Khouri & Arouri, 2016). Credit growth also helps to increase banks' profitability by increasing interest income (Korkmaz, 2015). Additionally, because credit is growing too quickly, there is an increase in demand for goods and services, which leads to higher costs and inflation. Interest rates, exchange rates, and commodity prices fluctuate due to rapid loan growth. This increased borrowing raises the risk of default,

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as borrowers might not be able to repay their loans. Rapid credit growth without proper risk management may cause a financial crisis due to banks utilizing excessive leverage and taking extreme risks (Ghenimi et al., 2017).

Previous studies indicate the mixed impact of the ownership structure and credit growth of commercial banks. Al-Khouri and Arouri (2016) suggested that banks with higher state ownership experience higher credit growth. These banks must support the local government to implement quantitative easing packages to revive the local economy. State-owned banks may enjoy less stringent regulatory scrutiny than their private counterparts and thus face less pressure if they violate regulations. Cull and Pería (2013) pointed out that state-owned banks expanded their lending activities faster than private and foreign banks in Latin America during the financial crisis. In addition, Clarke et al. (2006) indicated that foreign banks provide easier access to credit with lower financing than state-owned banks.

Prior studies have also reported that market power also affects credit growth. Vo (2018) indicated that commercial banks compete fiercely to gain a greater market share in Vietnam through technological innovations and service diversification. Segev and Schaffer (2020) suggested that banks with less market power have fewer chances to diversify funding sources than larger banks, subsequently rescaling credit activities. Market power ensures efficient allocation of resources and capital, translates into a better credit portfolio, and prevents commercial banks from increasing credit costs and household access to credit for families and businesses. Brei et al. (2020) argued that competition will increase credit growth. However, increasing competition further reduces the net interest margin and banking stability.

This study was conducted in Vietnam for a variety of reasons. According to the State Bank of Vietnam, the current goal is to boost credit growth to a higher level to ensure banking stability, control inflation, and foster economic development. According to

information from the State Bank of Vietnam, the average credit growth of commercial banks in Vietnam from 2016 to 2019 was above 16%, higher than the 15.1% per year demonstrated in the previous period. 2011-2015. In addition, Circular No. 19/2017/TT-NHNN from the State Bank of Vietnam stipulates that all credit institutions must enhance credit quality and capital management to meet the Basel II standards and ensure safety in credit activities. Basel II is a set of international banking regulations introduced in 2004 to provide a framework for banks to manage their risk and capital more effectively. Basel II affects credit growth by requiring banks to hold more capital against their loans to mitigate the risk of default. Therefore, implementing Basel II motivates banks to improve lending quality, significantly affecting credit growth.

Secondly, Hoang (2022) suggests that Vietnam has transitioned from a centralized economy to a market economy. The new economic structure encourages competition, the development of the private sector, and international integration. According to current regulations, the foreign ownership ratio of commercial banks in Vietnam does not exceed 30% of charter capital. This limitation makes it difficult for commercial banks to raise capital from foreign investors to foster lending activities. Our sample descriptive statistic reports that the average value of foreign ownership in Vietnamese commercial banks is 10%, much lower than in other countries. For instance, China's average foreign ownership of commercial banks is 20.41% (Lin & Zheng, 2021). Moreover, ownership restriction also reduces the participation of foreign institutions in corporate decisions. Therefore, it is worth testing whether foreign ownership and bank competition affect credit growth in Vietnam.

This study contributes to the growing literature that examines the impacts of ownership structure and competition on credit growth. This study extends the work of Vo (2018) and Nguyen and Dang (2020) who also explored the determinants of credit growth in Vietnam. However, Vo (2018), and Nguyen

and Dang (2020) focused on something other than the effects of foreign ownership and competition on credit growth. This study complements the former studies of Vo (2018) and Nguyen and Dang (2020) by focusing on the non-linearity of market power and credit growth and the relationship between foreign ownership and credit growth. Finally, this study is the first to analyze the non-linearity between market power and credit growth in Vietnam. It further extends prior literature by conducting robustness tests before and after the implementation of Basel II in Vietnam. The study also tests whether the findings are robust after employing an alternative market power proxy.

The remainder of the research is structured as follows. Section 2 provides the literature review. Section 3 illustrates an overview of the data and methodology. Section 4 provides empirical results and a discussion, and section 5 the conclusion.

2. LITERATURE REVIEW

2.1. Credit Growth

Credit is an activity between a borrower and a lender. This can be between commercial banks, or credit institutions, and the businesses or individuals who need loans. Credit plays a vital economic role due to its capital mobility function. Credit growth represents increased capital turnover and utilization, an indirect measure of the efficiency of banking operations and the economy in general. Investors and researchers believe credit growth is essential to the economy's health and the stability of the banking sector (Korkmaz, 2015). Al-Khouri and Arouri (2016) suggested that active lending promotes economic growth by converting savings into investments. Higher credit growth also significantly improves banks' profitability by increasing interest income. The credit growth rate also shows the efficiency of the bank's credit operations when the amount of capital mobilized from the population is pushed to the market, to those with capital needs, ensuring the role and ability of capital

mobility banks. Besides this, loans and interest earned on loans are essential sources of income allowing banks to maintain and expand their business. Credit growth is a concept that reflects the increase of the credit outstanding balance at a point in time compared to the previous period, expressed as a percentage. Usually, the timelines included in such studies are quarters or financial years. Credit growth is an indicator used to measure the change in total outstanding loans, expressed as a percentage (Danisman et al., 2020; Vo, 2018).

2.2. Foreign Ownership and Credit Growth

Prior studies report the mixed impacts of foreign ownership on credit growth. Feyen et al. (2014) argue that higher foreign ownership discourages massive credit growth because foreign shareholders impose stricter monitoring on local banking operations. Therefore, bank managers may need to tighten lending policies to improve loan quality, reducing credit growth.

In contrast, other studies report a positive relationship between foreign ownership and credit growth. Foreign institutional investors help commercial banks increase their equity capital, increase financial capacity, and diversify credit activities (Giannetti & Ongena, 2012). Misman et al. (2015) argued that the bank's foreign capital investment also helps reduce the credit risk, and funding costs. Ehsan and Javid (2018) suggest that foreign investors frequently possess efficient managerial, technological, and human resources to improve banking efficiency. This also supports the development of a regulatory framework and banking supervision (Lee & Hsieh, 2014). As prior studies report the mixed impacts of foreign ownership on credit growth, the following hypothesis is proposed:

Hypothesis 1: Foreign ownership is positively related to credit growth in Vietnam.

2.3. Market Power and Credit Growth

Competition in the banking industry is a

critical factor in attracting investment and economic expansion. The ability of commercial banks to preserve and improve their competitive advantages to maintain and expand market share is known as market power (Brei et al., 2020). Higher market power also ensures an efficient allocation of resources and capital, translates into a better credit portfolio, and prevents commercial banks from increasing credit costs or limiting access to credit for households and businesses. Martin-Oliver et al. (2020) argued that competition between commercial banks will increase credit growth by increasing bank branch density to capture market share among banks. Commercial banks with greater market power can seek to expand their activities and market share by improving their credit growth. Higher market power allows banks to serve more customers, generate more revenue and gain a competitive advantage over smaller competitors. Commercial banks with more market power may monopolize lending in a particular market, allowing them to charge higher interest rates and make higher profits. Thus, commercial banks continuously expand their credit portfolio to capitalize on their market position and optimize revenues (Brei et al., 2020).

Recently, Brei et al. (2020) reported the non-linearity between market power and credit growth, implying that changes in market power do not necessarily result in proportional changes in credit growth. Banks may experience higher credit growth as they can leverage their market power to attract customers and increase lending. However, as the bank becomes more dominant in the market, it may become more risk-averse and cautious in its lending practices, reducing credit growth (Ariss, 2010). Additionally, regulatory authorities may impose stricter rules and regulations on the bank as it gains more market power, which can also reduce credit growth. Furthermore, banks with higher market power may also have greater market concentration, which can reduce competition and result in higher interest rates. As interest rates increase, demand for credit may decrease, which can lead to a reduction in credit growth (Ariss, 2010). The following

hypothesis is proposed accordingly:

Hypothesis 2: The non-linearity of market power has an inverse U-shape relationship with credit growth.

3. DATA AND METHODOLOGY

3.1. Data

Data were collected from the annual financial statements and reports of Vietnamese commercial banks from 2010 to 2020. Macroeconomic data, including the gross domestic product (GDP), growth rate, and inflation rate, of Vietnam were also collected from the World Bank. The study method follows Duong et al. (2023) in mitigating the effects of outliers by winsorizing variables at the 5% and 95% levels. The study method also follows Duong et al. (2022) in removing observations without sufficient financial information or missing domestic and foreign ownership percentages. The final sample consisted of an unbalanced panel with 278 observations from 32 commercial banks in Vietnam from 2010 to 2020.

3.2. The Lerner Index

Prior studies such as Brei *et al.* (2020), and Huynh and Dang (2021) employed the Lerner index as a popular measure of market power or competition among banks. The Lerner index ranges between zero and one. As competition intensifies, the index approaches zero, signifying diminishing market power. Conversely, as market power strengthens, the index ascends, reaching a maximum of one.

However, the Lerner index has certain conceptual drawbacks. Shaffer and Spierdijk (2020) noted that the Lerner index measures the ratio of the difference between the output price and the marginal cost to the output price, in case of perfect competition. This highlights why the Lerner index can become skewed if inaccuracies exist in estimating price or marginal cost. The Lerner index may not incorporate rate risk premiums in the prices of products and services, limiting its ability to fully represent the association between

market power and the size of monopoly rents. A notable limitation of the Lerner index method is that the available bank balance-sheet data do not correspond to the prices and costs for index computation. In the banking context, the Lerner index captures both the impact of pricing power on the asset and funding side of the bank. Therefore, this study follows the approach of Huynh and Dang (2020) in estimating the Lerner index in this study. The output price is calculated by the ratio of total revenue to total assets of each bank. The Lerner index is estimated as follows:

$$\text{Lerner}_{it} = \frac{P_{it} - C_{it}}{P_{it}}$$

where P_{it} is the price of total assets proxied by the ratio of total revenues (interest and noninterest income) to total assets for bank i at time t . C_{it} is the marginal costs for bank i at time t .

3.3. Variable Definitions

The variables discussed in this study include credit growth (LGR), foreign ownership (FOR), bank competition (LERNER), the logarithm of the total assets (SIZE), bank capital ratio (CAP), bank funding diversity (BDF), and liquidity (LIQ). Macroeconomic variables include the annual GDP growth rate (GDP) and the annual inflation rate (INF). All variables are discussed in Appendix A

3.4. Research Methodology

A traditional panel estimation approach was employed, such as Ordinary Least Squares (OLS), Fixed Effect Model (FEM), and Random Effect Model (REM), to examine the effects of foreign ownership and bank competition on credit growth. The Hausman test was then implemented to determine whether the REM or FEM were preferred and the Breush-Pagan Test was used to choose between the REM and OLS model. The Wald test was conducted to check whether REM estimation violated the heteroskedasticity assumption. The study therefore follows Vo

(2018), Danisman (2020), Duong et al. (2023), and Tran et al. (2022) in using the Dynamic System Generalized Method of Moments (GMM) to mitigate endogeneity, heteroscedasticity, and autocorrelation issues.

3.5. Model Constructions

This study analyzes the effect of foreign ownership and competition on credit growth in Vietnam. A baseline model was first constructed to examine the impact of foreign ownership and market power on credit growth. Following Vo (2018), the study calculates LGR by the annual percentage change in the total outstanding loans of individual banks. Following Mirzaei et al. (2021) and Hawtrey and Liang (2008), the study adds foreign ownership (FOR) and market power, proxied by the Lerner index (LERNER). The study method also follows Duong et al. (2022) in adding bank size (SIZE) and bank capital (CAP) into the model. Vo (2018) is followed in adding the bank funding diversity (BFD) as the difference between one and the sum of the ratios of the square of every bank source to total funding. Other control variables include liquidity (LIQ), GDP growth rate (GDP), and inflation rate (INF). Therefore, the baseline model is as follows:

$$\text{LGR}_{i,t} = \alpha + \beta_1 \text{FOR}_{i,t} + \beta_2 \text{LERNER}_{i,t} + \beta_4 \text{Controls}_{i,t} + \alpha_i + \alpha t + \epsilon_{i,t} \quad (1)$$

Model 2, which tests the non-linearity between market power and credit growth was also performed:

$$\text{LGR}_{i,t} = \alpha + \beta_1 \text{FOR}_{i,t} + \beta_2 \text{LERNER}_{i,t} + \beta_3 \text{LERNER}_{i,t}^2 + \beta_4 \text{Controls}_{i,t} + \alpha_i + \alpha t + \epsilon_{i,t} \quad (2)$$

where $\text{LGR}_{i,t}$ is expressed as a measure of credit growth. The leading independent variables are foreign ownership (FOR) and market power (LERNER). Controls represent the control variables, including bank size (SIZE), bank capital (CAP), bank funding diversity (BFD), liquidity (LIQ), annual GDP

growth rate (GDP), and inflation rate (INF). The sign of “i” indicates a firm fixed effect, and the notation of “t” is a period fixed effect, while “ α ” stands for intercept, and “ ε ” is the error term.

4. EMPIRICAL FINDINGS

4.1. Descriptive Statistics

Table 1 reports that the average annual credit growth for 2010-2020 in Vietnam is about 20%, lower than that reported by Vo (2018) and Nguyen & Dang (2020) due to the different study periods. Vo (2018) used an average credit growth rate of 50.35%, while Nguyen & Dang (2020) reported an average credit growth of 31.35% in Vietnam due to the effort of the government to foster local economic development. The mean value of foreign ownership is 10%, respectively much lower than in other countries. For instance, China’s average foreign ownership of commercial banks is 20.41% (Lin & Zheng, 2021). The mean Lerner index in Vietnam is 0.27, indicating that Vietnamese banks have higher market power than banks in developed countries. For instance, Fungáčová et al. (2014) reported that the average Lerner value for 12 European countries was 0.11. Bank size had a mean value of 14.10 with a high standard deviation of 0.53. The bank capital ratio ranged from 0.04 to 0.19, with an average

value of 0.09. The highest values of bank funding diversity and liquidity were 0.62 and 0.80, respectively. Table 1 also reports the descriptive statistics of the external variables such as GDP and INF rates, with an average value of 6% during the research period.

4.2. Pearson Correlation Matrix

Table 2 presents the Pearson correlation matrix. All the coefficient correlations are moderate without perfect correlation as all the correlation coefficients are less than 0.8. Noticeably, the highest correlation coefficient occurs between SIZE and CAP at 0.688, indicating a possible multi-collinearity issue. Therefore, the VIF ratio was computed to test whether the sample had a multi-collinearity problem. Table 2 also reports that the maximum value of VIF is 2.505, with an average value of 1.731. Accordingly, the study was shown not to have a multi-collinearity problem as the VIF of all variables is less than five (Duong et al., 2023).

4.3. Estimation Results from REM

The Random Effects Model (REM) was employed, after implementing relevant tests such as the Hausman and Breusch-Pagan. The Hausman test, with a P-value of more than 5%, suggests that the REM is more suitable than the FEM model. Moreover, the results of

Table 1 Descriptive Statistics

	Mean	Median	95th Pct	5th Pct	Std. Dev.	Obs
LGR	0.20	0.18	0.56	-0.02	0.14	278
FOR	0.10	0.05	0.30	0.00	0.12	278
LERNER	0.27	0.24	0.75	0.03	0.18	278
SIZE	14.10	14.11	15.06	13.23	0.53	278
CAP	0.09	0.08	0.19	0.04	0.04	278
BFD	0.38	0.38	0.62	0.16	0.14	278
LIQ	0.63	0.66	0.80	0.40	0.11	278
GDP	0.06	0.06	0.07	0.03	0.01	278
INF	0.06	0.04	0.19	0.01	0.05	278

Note. Table 1 displays the descriptive statistics for the main variables of the research. The sample includes 32 listed commercial banks in Vietnam from 2010 to 2020. All variable definitions are displayed in Appendix A. All variables are winsorized at the 5% and 95% levels.

Table 2 Pearson Correlation Matrix

	LGR	FOR	LERNER	SIZE	CAP	BFD	LIQ	GDP	INF
LGR	1								
	-0.130**								
FOR	(0.0302)	1							
	0.205***	0.277***							
LERNER	(0.0006)	(<0.0001)	1						
	-0.027	0.428***	0.134**						
SIZE	(0.655)	(<0.0001)	(0.026)	1					
	-0.102*	-0.155***	0.050	-0.688***					
CAP	(0.0907)	(0.009)	(0.405)	(<0.0001)	1				
	0.188***	-0.162***	0.193***	-0.426***	0.460***				
BFD	(0.0017)	(0.0067)	(0.0012)	(<0.0001)	(<0.0001)	1			
	0.002	-0.024	0.002	-0.116*	0.166*	0.313***			
LIQ	(0.97)	(0.689)	(0.972)	(0.0524)	(0.055)	(<0.0001)	1		
	0.124**	-0.033	-0.032	-0.070	-0.040	0.292***	-0.011		
GDP	(0.038)	(0.583)	(0.5939)	(0.247)	(0.5102)	(<0.0001)	(0.8607)	1	
	-0.005	-0.162***	0.240***	-0.250***	0.253***	0.587***	0.195***	-0.007	
INF	(0.9327)	(0.0067)	(0.0001)	(<0.0001)	(<0.0001)	(<0.0001)	(0.001)	(0.906)	1
VIF		1.380	1.247	2.505	2.251	2.403	1.135	1.239	1.688

Note. Table 2 reports the Pearson correlation coefficients for all variables in the analysis. The data sample was gathered from 32 Commercial banks in Vietnam from 2010 to 2020. The symbols ***, **, and * represent the significance levels of 1%, 5%, and 10%, respectively. P-values are in parentheses.

the F-test also reported a P-value less than 5%, suggesting that REM is more appropriate than OLS.

Table 3 indicates the negative relationship between foreign ownership and credit growth. This implies that higher foreign ownership reduces the credit growth of commercial banks in Vietnam. The result is consistent with Feyen et al. (2014) who found that foreign ownership will reduce the credit growth of commercial banks.

In addition, Table 3 reports a nonlinear relationship between market power and credit growth. The result is consistent with Brei et al. (2020), indicating an inverse U-shape between market power and credit growth. The optimal market power that maximizes credit growth is calculated as $|\beta_{Lerner}/(2 \times \beta_{Lerner})|$. The study indicates that the optimal market power that maximizes credit growth is approximately 0.6. Finally, Table 3 reports that the R-square ranges from 16.8% to 21.1%, implying that the variation of independent factors explains up to 21.1% of the variation in the dependent variable.

4.4. Estimation Results from Dynamic System GMM

The results of the Wald test shown in Table 3 indicate that REM has asymptotic efficiency and heterogeneity, resulting in biased conclusions (Greene, 2005). Therefore, the study method followed Vo (2018), Duong et al. (2023), Tran et al. (2022), and Danisman (2020) in employing the GMM to mitigate endogeneity, heteroscedasticity, and autocorrelation issues. The estimation results are reported in Table 4. In this case, the Probability of the Hansen J test is 0.395 and 0.314, implying that the instruments are correctly specified. The model's fit can be considered reasonable based on the data.

Table 4 documents a negative relationship between foreign ownership and credit growth. The findings indicate that each percentage increase in foreign ownership reduces credit growth by 0.74%. Banks with higher foreign ownership may have stricter risk management policies and procedures, resulting in lower credit growth. These banks may be more cautious about lending money to

borrowers due to the potential risks of lending in a foreign market. In addition, banks with higher foreign ownership may have higher capital requirements imposed by the foreign government or regulatory authorities. This regulation could limit the amount of credit the bank can extend to borrowers and thus result in lower credit growth. The findings support Feyen et al. (2014) and Cull and Pería (2013). However, the result does not support hypothesis 1.

The findings demonstrate an inverse U-shaped relationship between market power and credit growth for commercial banks in Vietnam. The study indicates that the optimal market power that maximizes credit growth is 0.46. When market power increases by 1% toward the optimal level, credit growth increases by 0.943%. Banks with higher market power may monopolize lending in a particular market, enabling them to set higher interest rates and earn higher profits. Thus,

Table 3 Regression Results from REM Estimation

Variables	Model 1	Model 2
FOR	-0.277*** (0.008)	-0.253** (0.011)
LERNER	0.246*** (<0.001)	0.622*** (<0.001)
LERNER_SQUARED		-0.517*** (<0.001)
SIZE	-0.029 (0.360)	-0.051* (0.098)
CAP	-1.025*** (0.003)	-1.259** (<0.001)
BFD	0.303*** (0.002)	0.277*** (0.004)
LIQ	0.059 (0.460)	0.060 (0.438)
GDP	0.218 (0.757)	0.263 (0.702)
INF	-0.778*** (<0.001)	-0.746*** (<0.001)
C	0.532 (0.262)	0.819 (0.076)
Turning point		0.602
R ²	0.168	0.211
Adj R ²	0.143	0.184
F-statistic	6.798	7.956
F-statistic (Prob)	<0.001	<0.001
Hausman test (Prob)	0.3325	0.1569
Breusch-Pagan Lagrange (Prob)	<0.001	<0.001
F-test (Prob)	<0.001	<0.001
Durbin-Watson test	1.637	1.606
Wald Test (prob.)	<0.001	<0.001
N	278	278

Note. Table 3 reports the regression results from REM analysis. The sample includes 32 listed commercial banks in Vietnam from 2010 to 2020. All variable definitions are displayed in Appendix A. The symbols ***, **, and * represent the significance levels of 1%, 5%, and 10%, respectively.

Table 4 GMM Regression Results

Variables	Model 1	Model 2
LGR (-1)	0.058* (0.083)	0.017 (0.706)
FOR	-0.516 (0.165)	-0.704** (0.033)
LERNER	0.118* (0.083)	0.943*** (<0.001)
LERNER_SQUARED		-1.027*** (<0.001)
SIZE	-0.271*** (0.004)	-0.378*** (<0.001)
CAP	-2.446*** (0.003)	-3.144*** (0.000)
BFD	0.335*** (0.001)	0.302*** (<0.001)
LIQ	-0.130 (0.350)	-0.224 (0.156)
GDP	-0.445 (0.324)	-0.504 (0.201)
INF	-1.246*** (<0.001)	-1.163*** (<0.001)
Cross-section fixed (first differences)	Yes	Yes
Turning point		0.46
AR (1)	<0.0001	<0.0001
J-statistic	23.120	23.586
Prob(J-statistic)	0.395	0.314
Instrument rank	31	31
N	214	214

Note. Table 4 presents the results of employing the dynamic system GMM estimations. The sample consisted of 32 listed commercial banks in Vietnam from 2010 to 2020. All variable definitions are displayed in Appendix A. The symbols ***, **, and * represent the significance levels of 1%, 5%, and 10%, respectively. P-values are shown in parentheses.

commercial banks have motivations to increase their credit growth to capitalize on their market position and maximize their profits. Moreover, Banks with higher market power may seek to expand their business and increase their market share by increasing their credit growth. Higher market power enables them to serve customers, generate more revenue, and gain a competitive advantage over smaller banks.

However, banks with excessive market power tend to reduce credit growth. As banks become more dominant in the market, they may become more risk-averse and cautious in

their lending practices. A larger market share means the bank's failure would have a greater and more significant impact on the economy. Therefore, banks with higher market power may reduce credit growth to manage risk exposure and maintain financial stability. Moreover, higher market power means less competition exposure, which can result in dominant banks becoming less responsive to market demand. The outstanding market share can lead to reduced lending as the banks may not need to attract new customers or retain existing ones through credit growth. Furthermore, banks with higher market power

may be subject to greater regulatory scrutiny, resulting in tighter lending standards and reduced credit growth. Regulators may be concerned about the impact of a bank's failure on the economy and, therefore, may impose stricter rules and regulations on the bank's lending practices. The findings of this study support Martín-Oliver et al. (2020), and Brei et al. (2020), and confirm hypothesis 2.

The results shown in Table 4 indicate a significant negative relationship between

bank size (SIZE) and credit growth (LGR). Large commercial banks have greater diversification of services, more resources, and the ability to provide a broader portfolio of financial products and services to meet customer needs. Large commercial banks do not view lending activities as their core business and tend to be more conservative in lending (Vo, 2018). Moreover, larger banks have efficient risk management and credit appraisal procedures, which slowly increase

Table 5 Robustness Test Results before and after Basel II Implementation

Variables	<i>Before Basel II implementation</i>		<i>After Basel II implementation</i>	
	Model 1	Model 2	Model 1	Model 2
LGR (-1)	-0.179 (0.231)	-0.509 (0.249)	-0.025 (0.244)	-0.066* (0.076)
FOR	2.199 (0.298)	4.736 (0.386)	-0.323** (0.048)	-0.238 (0.239)
LERNER	-0.040 (0.859)	4.948 (0.319)	-0.001 (0.980)	1.047*** (0.002)
LERNER_SQUARED		-5.887 (0.332)		-1.225*** (0.003)
SIZE	-0.567 (0.240)	1.644 (0.480)	-0.165*** (0.008)	-0.307*** (<0.001)
CAP	-2.039 (0.347)	6.045 (0.576)	-1.798** (0.029)	-2.379** (0.034)
BFD	-0.103 (0.834)	1.604 (0.307)	0.226*** (0.003)	0.234** (0.011)
LIQ	0.754 (0.208)	-0.973 (0.388)	-0.437*** (<0.001)	-0.682*** (<0.001)
GDP	3.947 (0.253)	13.621 (0.455)	-0.400 (0.141)	-0.630* (0.072)
INF	-0.759 (0.228)	0.956 (0.716)	-1.222*** (<0.001)	-1.379*** (<0.001)
Cross-section fixed (first differences)		Yes		Yes
Turning point				0.427
J-statistic	5.418	2.707	23.853	22.596
Prob(J-statistic)	0.491	0.745	0.300	0.309
Instrument rank	15	15	30	30
N	108	108	106	106

Note. Table 5 reports the robustness test results before and after the Basel II implementation. The sample consists of 32 listed commercial banks in Vietnam from 2010 to 2020. The final data consists of observations from all models. All variable definitions are displayed in Appendix A. The symbols ***, **, and * represent the significance levels of 1%, 5%, and 10%, respectively. P-values are shown in parentheses.

credit growth compared with smaller banks.

The results reported in Table 4 display a negative relationship between bank capital ratio (CAP) and credit growth (LGR). According to Abbas and Ali (2022), holding higher capital is costly, so banks must pay higher lending costs to borrowers. Moreover, banks with higher capital ratios are often subject to stricter regulatory requirements. These requirements may limit their lending ability, resulting in lower credit growth.

The positive and significant coefficient of bank funding diversity (BFD) suggests that a score increase in the BFD index would lead to an increase in LGR by 30.2%. Banks with diverse funding sources may obtain lower financing costs (Abbas & Ali, 2021). Funding diversity offers commercial banks a higher competitive advantage in the market, allowing them to offer lower interest rates to borrowers. In addition, banks with diverse funding sources may also be better equipped to meet the increased demand for credit. Banks with multiple funding sources can quickly scale up their lending activities without funding constraints if there is a surge in loan demand. Our findings are consistent with Dang and Dang (2021).

Table 4 shows a significant negative relationship between inflation (INF) and credit growth (LGR), with a significance at the 1% level. High inflation rates can reduce consumer and investor confidence, making them more cautious about borrowing and investing. Moreover, high inflation rates can also reduce lending capacity because banks are required to reserve more funds to cover potential losses from inflation. Thus, a higher inflation rate can lead to tighter lending standards and reduced credit availability, slowing credit growth. The result is consistent with Vo (2018).

In short, Table 4 presents the following striking results. Firstly, the study finds a negative relationship between foreign ownership and credit growth. Foreign shareholders may support local banks to enhance the risk management system, which improves lending quality. Bank managers are discouraged from approving subprime loans

to maximize their remunerations. Therefore, higher foreign ownership causes a reduction in credit growth as banks embrace higher loan quality. Secondly, Table 4 reports that bank competition, proxied by market power, has an inverse U-shape relationship with credit growth. Banks with higher market power increase credit growth due before the turning point. However, banks with ultimate competitive advantages reduce credit growth. A highly competitive bank may have more customers and higher loan demand than it can safely accommodate without taking too much risk. To maintain a healthy loan portfolio and manage risk, the bank may choose to reduce its credit growth. Moreover, banks with a higher competitive advantage expand their credit activities with a higher market share. These results are consistent with Feyen et al. (2014), Cull and Pería (2013), and Brei et al. (2020).

4.5 Robustness Test

Based on Circular No. 19/2017/TT-NHNN, a limitation, and safety ratio for banking operations, all credit institutions are now asked to cut Tier II capital, which motivates commercial banks to improve lending quality. Under Basel II, banks are required to assess the creditworthiness of borrowers more thoroughly and accurately, using more sophisticated risk assessment techniques. This regulation implies that some subprime borrowers who may have been previously approved for credit may now be denied credit.

The impact of Basel II on credit growth can be positive and negative. On the one hand, by requiring banks to hold more capital against their loans, Basel II helps to prevent excessive lending and reduce the risk of credit bubbles and financial crises. On the other hand, the increased regulatory burden may minimize credit availability, particularly for smaller businesses and individuals who may be seen as riskier borrowers. Therefore, it is worth testing whether the main findings are robust after controlling Basel II regulations.

Table 5 shows that market power and

foreign ownership did not affect credit growth before Basel II implementation. Banking regulations are mainly focused on maintaining the financial system’s stability and ensuring that banks have additional cash to handle the risk (Karmakar & Mok., 2015). Before 2017, the Vietnamese banking sector was primarily dominated by state-owned banks, which held a significant market share. State-owned banks often have inherent advantages, such as government support and preferential treatment, which could limit the influence of market power from private banks or foreign-owned banks. The dominant

position of state-owned banks overshadowed the impact of market power and foreign ownership on credit growth. Secondly, the State Bank of Vietnam maintains strict control over the operations of existing banks, which limits market competition and the foreign ownership percentage for credit growth. The regulations of the State Bank of Vietnam have restricted foreign ownership to a maximum rate of 30%. Moreover, Vietnam was still undergoing economic transformation, and the banking sector was evolving rapidly before 2017. Economic policies, government interventions, and priority sectors

Table 6 Robustness Test Using Other Proxies to Reflect Market Power

Variables	Model 1	Model 2
LGR (-1)	0.115*** (<0.001)	0.090*** (<0.001)
FOR	-0.800*** (<0.001)	-0.911** (<0.001)
MARKET	4.766* (0.087)	19.689*** (<0.001)
MARKET_SQUARED		-88.950*** (0.005)
SIZE	0.042 (0.382)	0.085* (0.065)
CAP	0.100 (0.854)	0.143 (0.683)
BFD	0.500*** (<0.001)	0.484*** (<0.001)
LIQ	-0.216*** (0.041)	-0.223*** (0.016)
GDP	-2.081*** (0.001)	-2.640*** (<0.001)
INF	-1.413*** (<0.001)	-1.504*** (<0.001)
Turning point		0.11
Cross-section fixed (first differences)	Yes	Yes
AR (1)	<0.0001	<0.0001
J-statistic	24.366	24.052
Prob (J-statistic)	0.328	0.291
Instrument rank	31	31
N	211	211

Note. Table 6 reports the robustness test results using market share by bank loans. The sample consists of 32 listed commercial banks in Vietnam from 2010 to 2020. The final data consists of observations from all models. All variable definitions are displayed in Appendix A. The symbols ***, **, and * represent the significance levels of 1%, 5%, and 10%, respectively. P-values are shown in parentheses.

could have substantially impacted credit growth more than market power or foreign ownership in such transitional phases. As a result, foreign investors have limited influence over the bank's operations and cannot significantly influence credit growth.

After 2017, the Vietnamese government might have implemented new regulations or policies regarding foreign ownership in Vietnam's banking sector. Additionally, implementing Basel II introduced advanced risk-based capital standards, potentially influencing the sector's appeal to foreign investors. If Basel II mandates higher capital levels for foreign-owned banks, it could discourage foreign investment, possibly reducing credit growth. Such changes may have introduced uncertainties and constraints for foreign investors, perhaps leading to a decline in foreign capital entering the banking industry. However, a negative and insignificant relationship exists between foreign ownership and credit growth. The highlight is that an inverse U-shape relationship between market power and credit growth is robust before and after the Basel II implementation. After implementing Basel II, banks that met the new capital adequacy requirement could increase their lending activities (Beck et al., 2006). With notable market power and limited competition, these banks might transfer elevated capital costs to borrowers through higher rates, potentially impacting credit growth non-linearly, especially for smaller borrowers. Simultaneously, competitors must restructure to meet requirements. If the State Bank of Vietnam tightens antitrust regulations to maintain stability for larger banks, they could lean towards lower-risk borrowers, curtailing credit for specific economic segments. Consequently, larger banks with extraordinary market power may reduce credit growth to prevent non-performing loans (Martín-Oliver et al., 2020; Brei et al., 2020).

This section tests whether the main findings are robust after employing an alternative market power proxy. Specifically, market share by bank loans was used to represent market power. GMM was also

employed to examine the impact of foreign ownership and market share on credit growth. Table 6 confirms that the effects of foreign ownership and market share on credit growth are robust even if we employ an alternative proxy of market power.

5. CONCLUSION

This study examined how foreign ownership and market power affect the credit growth of commercial banks in Vietnam. Data were collected from the financial statements and business results of 32 commercial banks in Vietnam. The sampling period encompassed the years 2010 to 2020. REM and GMM estimations were employed to examine how foreign ownership and market power affect the credit growth in Vietnam.

The results show a negative relationship between foreign ownership and credit growth. It may be that the bank's loan ratio is higher than the deposit level, affecting commercial banks' credit growth. Operation within foreign markets especially will affect the bank's foreign ownership. In addition, the non-linearity of market power has an inverse U-shape relation with credit growth. Higher market power will benefit from economy of scale, expanded market coverage and diversification of service portfolios. The robustness tests in this study report that the main findings are robust after Basel II implementation. The results are also robust after employing an alternative proxy for market power.

The findings support the following implications for bank managers. Feyen et al. (2014) found that having foreign ownership in banks can be affected by factors in foreign markets that negatively affect credit growth. Banks need good credit risk management regarding risk assessment, monitoring, and mitigation techniques (Bekhet & Eletter, 2014). When formulating their strategic plans, bank managers must consider the impact of foreign ownership and market power on credit growth. They should assess the competitive landscape and market dynamics to determine the optimal growth strategies

for their banks. Moreover, managers should implement robust risk management frameworks to monitor and mitigate potential risks arising from credit expansion. Bank managers should develop strong relationships with foreign investors, as foreign ownership can bring access to capital, expertise, and technology. Building relationships with key stakeholders can help banks to leverage the benefits of foreign ownership and navigate potential challenges.

These results contribute essential policy implications for policymakers to develop the banking sector sustainably. We agree with Brei et al. (2020) that market power in banks is considered a vital factor for investment and economic growth, ensuring efficient allocation of resources and capital. Policymakers should foster a competitive environment by promoting market entry and preventing monopolistic practices. Encouraging competition can enhance credit growth by providing consumers with more options, driving innovation, and ensuring efficient allocation of credit resources. However, policymakers must design and implement appropriate regulatory frameworks that balance foreign investment with fair competition and market stability. They should monitor the potential influence of foreign ownership and market power on credit growth and consider implementing measures to mitigate any adverse effects, such as antitrust regulations or capital requirements.

Although this study extends the banking literature in emerging markets, there are data limitations due to the data being concentrated only in Vietnam. Therefore, the findings in this article may differ from those in other countries, countries with economies different to Vietnam. Furthermore, we needed more value issues in capturing innovation data from financial statements. We hope that future research articles can expand the scope of research and analysis of many countries to gain more understanding of this topic. Future research may investigate other factors likely to affect credit growth in commercial banks.

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Appendix A

Acronym	Variable	Definition	References
<i>Dependent variable</i>			
LGR	Credit growth	The annual percentage change in total outstanding loans of each bank in the sample (%).	Vo (2018)
<i>Independent variables</i>			
FOR	Foreign ownership	The ownership of foreign investors for each bank every year as a percentage (%).	Mirzaei et al., (2021)
LERNER	Lerner index	the difference between average revenue and margin cost to average revenue. A higher Lerner index indicates higher market power, competitive advantage, and vice versa (%).	Huynh and Dang (2021)
<i>Control variables</i>			
SIZE	Bank size	The logarithm of total assets at the end of the year	Duong et al. (2022)
CAP	Bank Capital Ratio	The ratio of equity to total assets of a bank (%).	Duong et al. (2022).
BFD	Bank funding diversity	The difference between one and the sum of the ratios of the square of every bank source to total funding. Bank sources include total equity, debt from government and central banks, deposits with other credit institutions, deposits from customers, derivatives and other financial liabilities, funds, entrusted investments, and other funding sources (%).	Vo (2018)
LIQ	Liquidity	Bank liquid assets to total assets ratio (%).	Roulet (2018)
GDP	GDP growth rate	The actual annual growth of GDP (%).	Vo (2018)
INF	Inflation rate	Annual inflation rate (%).	Vo (2018)