Market power and liquidity creation: Size heterogeneity and risk absorption

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ABSTRACT

This study examines the relationship between market power and liquidity creation in Vietnam, focusing on whether this relationship varies across bank size classes. Using an unbalanced panel of 28 Vietnamese commercial banks over the period 2008 - 2024, we measure liquidity creation following the methodology of Berger and Bouwman (2009) and capture bank-level market power through the Lerner index derived from a translog cost function. Because the Lerner index is an inverse measure of competition (higher values indicate greater market power), we frame hypotheses and interpret coefficient signs in terms of market power throughout. Employing the dynamic generalized method of moments (GMM) estimation, we first establish the baseline effect of market power on liquidity creation, then test whether bank size moderates this relationship. The results confirm that market power has a positive and significant effect on liquidity creation, consistent with the risk absorption hypothesis. The interaction term between market power and the large-bank dummy is positive and significant, indicating that the positive effect of market power on liquidity creation is approximately 2.3 times stronger for large banks than for small banks. These findings carry policy implications for the State Bank of Vietnam regarding the design of competition policies that account for structural differences across bank size categories.

1. Introduction

Liquidity creation is one of the most fundamental functions of commercial banks. By transforming liquid liabilities into illiquid assets, banks facilitate economic growth and enhance the efficient allocation of resources (Berger & Bouwman, 2009; Diamond & Dybvig, 1983). The extent to which banks engage in this transformation is shaped by a complex interplay of market conditions, regulatory frameworks, and bank-specific characteristics. Among market-level determinants, the degree of competition, or equivalently, the level of market power, has received considerable scholarly attention, yet the theoretical predictions remain ambiguous.

Two competing channels shape the market power-liquidity creation nexus. The risk absorption channel posits that banks with greater market power accumulate larger capital buffers, which enhance their capacity to absorb the risks inherent in liquidity creation (Berger

& Bouwman, 2009; Jiang et al., 2019). Under this view, market power facilitates liquidity creation. The price channel, conversely, suggests that intensified competition can stimulate liquidity creation by compressing lending spreads and bidding up deposit rates, thereby expanding loan demand and deposit funding (Carbó-Valverde et al., 2009; Jayaratne & Strahan, 1998; Love & Martínez Pería, 2015). Because the Lerner index is an inverse measure of competition, higher values indicate greater market power (i.e., weaker competition). Accordingly, the risk-absorption channel predicts a positive coefficient on the Lerner index, whereas the price channel predicts a negative one.

The empirical evidence is growing but geographically concentrated. Jiang et al. (2019), exploiting interstate bank deregulation in the United States, find that increased competition reduces liquidity creation, consistent with the risk absorption hypothesis. Horvath et al. (2016), analyzing Czech banks with dynamic generalized method of moments (GMM) estimation, corroborate this finding. In Vietnam, Nguyen et al. (2023) use system GMM estimation on a sample of 24 commercial banks from 2010 to 2018 and document a positive relationship between market power and liquidity creation, consistent with the risk absorption view.

While these studies have advanced our understanding, a critical gap persists: existing research has largely assumed that the effect of market power on liquidity creation is homogeneous across all banks. This assumption is especially problematic in Vietnam, where four large state-owned commercial banks coexist with more than twenty smaller joint-stock banks whose behavioral responses to changes in market power are unlikely to be identical.

Theoretical and empirical evidence strongly suggests that bank size is a key conditioning factor. Berger and Bouwman (2009) demonstrate that the effect of capital on liquidity creation is positive for large banks (consistent with risk absorption) but negative for small banks (consistent with financial fragility-crowding out). Jiang et al. (2019) confirm that the liquidity-destroying effects of increased competition are heightened among smaller banks. If the capital-liquidity creation relationship is size-dependent, and if market power affects liquidity creation partly through the capital channel, then it is reasonable to hypothesize that the market power-liquidity creation relationship is also moderated by bank size.

This study contributes to the literature in three respects. First, we extend Nguyen et al. (2023) by incorporating bank size heterogeneity into the analysis of the market power - liquidity creation relationship in Vietnam. Their study acknowledges the limitation of not examining heterogeneity across bank characteristics and calls for subsequent investigation. Our study responds to this call by testing whether the effect of market power on liquidity creation varies systematically between large and small banks. Second, we expand the sample period to 2008 - 2024, encompassing the post-global financial crisis period, the banking restructuring wave of 2011 - 2015, and the Covid-19 pandemic. Third, we provide policy-relevant insights for the State Bank of Vietnam regarding whether competition policies should differentiate across bank size categories to optimize liquidity provision.

This study addresses two research questions: (1) Does market power enhance bank liquidity creation in Vietnam, consistent with the risk absorption hypothesis? (2) Does bank size moderate this relationship, such that the effect of market power on liquidity creation is stronger for larger banks? We employ the two-step system GMM estimator on an unbalanced panel of 28 Vietnamese commercial banks over 2008 - 2024 to answer these questions.

2. Theoretical background and hypothesis development

2.1. Bank liquidity creation

The theoretical foundations of bank liquidity creation originate in Diamond and Dybvig (1983), who formalize the role of banks as providers of liquidity insurance to depositors facing uncertain consumption needs. Banks create liquidity by offering demand deposits withdrawable at par while investing in illiquid, long-term projects. Diamond and Rajan (2001) further develop this framework by emphasizing that the fragile capital structure of banks, specifically the susceptibility of demand deposits to runs, serves as a disciplining device that enhances banks' ability to create liquidity. Their theory implies that bank capital and liquidity creation exist in tension: capital provides a buffer against losses, but excessive capital may crowd out deposits and reduce liquidity transformation capacity.

Berger and Bouwman (2009) developed the standard empirical measure of liquidity creation used in subsequent research. Their three-step methodology classifies all bank assets, liabilities, equity, and off-balance sheet items into liquid, semi-liquid, and illiquid categories, then assigns weights of +0.5 to items that create liquidity and -0.5 to items that destroy liquidity. The resulting measures, fat liquidity creation (FLC, including off-balance sheet items) and non-fat liquidity creation (NFLC, on-balance sheet only), capture the full spectrum of banks' liquidity transformation activities. This methodology has been applied extensively across institutional settings (Horvath et al., 2016; Jiang et al., 2019; Nguyen et al., 2023).

2.2. Market power and liquidity creation: Two competing channels

The risk absorption channel. The risk absorption hypothesis (Berger & Bouwman, 2009) posits that bank capital enhances the capacity to create liquidity by absorbing associated risks. Since liquidity creation is inherently risky, banks may need to dispose of illiquid assets at a loss to meet liquid claims (Allen & Gale, 2004). Higher capital ratios expand risk-bearing capacity. When extended to the market power context, the mechanism operates as follows: banks with greater market power earn higher profit margins, contributing to capital accumulation over time (Keeley, 1990). These enhanced capital buffers augment the ability to absorb liquidity creation risks. Conversely, intense competition erodes profit margins, depletes capital buffers, and constrains risk absorption capacity, leading to reduced liquidity creation (Jiang et al., 2019). Under this channel, market power, as captured by a higher Lerner index, is positively associated with liquidity creation.

The price channel. A competing view emphasizes the pricing effects of competition. As competition intensifies (i.e., as the Lerner index falls), banks tend to lower lending rates and offer more attractive deposit rates (Carbó-Valverde et al., 2009; Jayaratne & Strahan, 1998). Lower borrowing costs can stimulate loan demand (Beck et al., 2004), while higher deposit rates can attract additional funding (Love & Martínez Pería, 2015). Through the simultaneous expansion of illiquid assets (loans) and liquid liabilities (deposits), stronger competition may increase liquidity creation. Under this channel, market power is predicted to be negatively associated with liquidity creation.

The net effect of market power on liquidity creation is ultimately an empirical question. In Vietnam, Nguyen et al. (2023) find that the risk absorption channel dominates. Our baseline hypothesis follows their finding.

H1: Market power (Lerner index) has a positive effect on bank liquidity creation in Vietnam

2.3. The moderating role of bank size

While H1 predicts a positive average effect of market power on liquidity creation, the underlying theoretical mechanisms suggest that this effect should not be uniform across banks. We argue that bank size is a critical conditioning factor through three complementary lines of argument.

Size-dependent risk absorption. Berger and Bouwman (2009) provide the foundational evidence that the relationship between capital and liquidity creation differs markedly across bank size classes. For large banks, the relationship is positive, consistent with the risk absorption hypothesis. For small banks, the relationship is negative, consistent with the financial fragility - crowding out hypothesis: capital crowds out deposits, reducing the bank's ability to create liquidity. If the capital-liquidity creation link is size-dependent, and if market power operates on liquidity creation partly through the capital channel (e.g., via profitability, which supports retained earnings and, in turn, capital accumulation), then the market power-liquidity creation relationship should also vary with bank size.

Economies of scale and diversification. Larger banks benefit from economies of scale in screening and monitoring borrowers, which reduces the per-unit cost of extending illiquid loans (Boot & Thakor, 2000). When combined with market power, these scale economies enable large banks to profitably engage in substantial liquidity creation. Large banks also have greater access to diversified funding sources, including wholesale markets, which reduces their dependence on deposit competition and provides a stable foundation for liquidity creation even as competitive conditions fluctuate (Distinguin et al., 2013).

Empirical evidence on size heterogeneity. Jiang et al. (2019) provide direct evidence for the moderating role of bank size. Using data from US commercial banks, they demonstrate that the negative effect of regulatory-induced competition on liquidity creation is stronger among smaller banks that rely more heavily on relationship lending. When competition intensifies, these small relationship lenders face greater difficulty in maintaining the long-term borrower relationships that underpin effective liquidity creation (Petersen & Rajan, 1995). In the Vietnamese context, the vulnerability of small banks to competitive pressures was demonstrated during the restructuring period of 2011 - 2015, when several undercapitalized small banks were forced into mergers (State Bank of Vietnam [SBV], 2023). These considerations motivate our moderating hypothesis: Despite strong theoretical reasons to expect size-dependent effects, and notwithstanding Berger and Bouwman's (2009) foundational evidence on the capital-liquidity creation relationship, no study has formally tested whether bank size moderates the market power-liquidity creation link. Jiang et al. (2019) document heterogeneity across bank size but do not estimate a moderation model. The present study fills this gap.

H3: Bank size positively moderates the relationship between market power and liquidity creation. Specifically, the positive effect of market power on liquidity creation is stronger for larger banks than for smaller banks

3. Research methodology

3.1. Data and sample

The sample comprises Vietnamese commercial banks over the period 2008 - 2024. Financial data are obtained from audited annual financial statements and the Orbis Bank Focus database. Macroeconomic data are sourced from the World Bank's World Development

Indicators and the State Bank of Vietnam (SBV). The sample period encompasses the post-global financial crisis era, the banking restructuring period (2011 - 2015), and the Covid-19 pandemic, providing substantial temporal variation for dynamic panel estimation.

Following Nguyen et al. (2023), we exclude banks that were merged, acquired, or placed under special control during the sample period from the date of the restructuring event onward. We retain the pre-event observations for these banks to avoid introducing survivorship bias through the wholesale deletion of weaker institutions. Banks with fewer than three consecutive years of data are also excluded. The final sample consists of 28 commercial banks, yielding an unbalanced panel of 372 bank-year observations. This sample size is consistent with prior studies employing system GMM in the Vietnamese banking context (Dang, 2020; Nguyen et al., 2023).

3.2. Variable measurement

Dependent variable: Liquidity creation. Liquidity creation is measured following the three-step methodology of Berger and Bouwman (2009). All balance sheet items and off-balance sheet activities are classified into liquid, semi-liquid, and illiquid categories. Weights of +0.5 are assigned to items that create liquidity (illiquid assets, liquid liabilities, illiquid off-balance sheet items), -0.5 to items that destroy liquidity (liquid assets, illiquid liabilities, and equity), and 0 to semi-liquid items. We construct two measures: non-fat liquidity creation (NFLC, on-balance sheet only) as the primary measure, and fat liquidity creation (FLC, including off-balance sheet items) as a robustness check on the subsample with complete off-balance sheet information. Both measures are normalized by total assets.

Independent variable: Market power (Lerner index). Bank-level market power is measured by the Lerner index:

$$\text{LERNER}_{\text{it}} = \frac{P_{it} - MC_{it}}{P_{it}} \quad (1)$$

The output price P_{it} is proxied by total operating revenue divided by total assets. Marginal cost $MC_{it}$is obtained from a translog cost function estimated on the bank panel, where total cost is modeled as a flexible function of one output (total assets) and three input prices (funds, labor, and physical capital). Input prices are constructed as standard expense-to-quantity ratios for each input, following Koetter et al. (2012) and Nguyen et al. (2023). We impose the usual translog restrictions of symmetry and linear homogeneity in input prices (implemented by normalizing costs and prices by one input price), and compute MC_{it} as the derivative of estimated total cost with respect to output. The Lerner index ranges from 0 (perfect competition) to 1 (monopoly), with higher values indicating greater market power. Throughout this study, we express hypotheses and interpret results in terms of market power (Lerner index) to avoid the ambiguity that arises from discussing "competition" while using an inverse measure.

Moderating variable: Bank size (LARGE). LARGE is a time-invariant dummy that equals 1 for banks whose average total assets over the full sample period (2008 - 2024) exceed the sample median of bank-level average assets, and 0 otherwise. This long-run classification reduces mechanical endogeneity concerns from using contemporaneous assets to define size while preserving meaningful cross-sectional differences in bank scale.

Control variables. Following Nguyen et al. (2023) and Horvath et al. (2016), we include bank-level controls: bank size (SIZE), measured as the natural logarithm of total assets; bank capital (CAP), measured as equity to total assets; credit risk (NPL), measured as non-performing

loans to total loans; and profitability (ROA), measured as net income to total assets. Macroeconomic controls include real GDP growth (GDPG), consumer price inflation (INF), and the SBV refinancing rate (RATE). The macroeconomic variables replace year fixed effects in the specification to allow direct estimation of their coefficients (see Section 3.3 for discussion).

Table 1

Variable Definitions and Data Sources

Variable	Symbol	Measurement
Panel A: Dependent Variables		
Non-fat LC	NFLC	On-balance sheet LC/Total assets (primary)
Fat LC	FLC	On- and off-balance sheet LC/Total assets
Panel B: Key Variables		
Market power	LERNER	(Price - MC) / Price from translog cost function
Large bank	LARGE	= 1 if bank's average total assets (2008 - 2024) > sample median of bank-level averages
Panel C: Bank-Level Controls		
Bank size	SIZE	ln(Total assets in billion VND)
Capitalization	CAP	Equity/Total assets
Credit risk	NPL	Non-performing loans/Total loans
Profitability	ROA	Net income/Total assets
Panel D: Macroeconomic Controls		
GDP growth	GDPG	Annual real GDP growth rate
Inflation	INF	Consumer price inflation rate
Refinancing rate	RATE	SBV refinancing rate

Note. LC = liquidity creation; SBV = State Bank of Vietnam; WDI = World Development Indicators. Compiled by the author from audited financial statements, Orbis Bank Focus, World Development Indicators (World Bank), and the State Bank of Vietnam.

3.3. Variable measurement

We estimate dynamic panel models to account for the persistence in liquidity creation documented in prior studies (Nguyen et al., 2023). We include macroeconomic controls rather than year fixed effects for two reasons. First, the macroeconomic variables take identical values for all banks within a given year, making them perfectly collinear with year dummies (Wooldridge, 2010). Second, retaining them as explicit regressors allows estimation and interpretation of their individual coefficients, which is informative for understanding the macroeconomic context of liquidity creation. This approach follows the convention in Vietnamese banking studies (Dang, 2020; Nguyen et al., 2023).

Model 1 (Baseline). The baseline model examines the direct effect of market power on liquidity creation:

$$LC_{it} = \alpha_0 + \alpha_1 LC_{i,t-1} + \beta_1 \text{LERNER}_{it} + \gamma' X_{it} + \delta' Z_t + \eta_i + \varepsilon_{it} \quad (2)$$

Where LC_{it} represents the liquidity creation measure for bank i in year t; X_{it} is the vector of bank-level controls (SIZE, CAP, NPL, ROA); Z_t is the vector of macroeconomic controls (GDPG, INF, RATE); η_i captures time-invariant bank fixed effects; and ε_{it} is the idiosyncratic error term. H1 predicts $\beta_1 > 0$.

Model 2 (Size moderation). To test H2, we augment the baseline model with the interaction between the Lerner index and the large-bank dummy:

$$LC_{it} = \alpha_0 + \alpha_1 LC_{i,t-1} + \beta_1 \text{LERNER}_{it} + \beta_2 (\text{LERNER}_{it} \times LARGE_i) + \gamma' X_{it} + \delta' Z_t + \eta_i + \varepsilon_{it} \quad (3)$$

In this specification, β_1 captures the marginal effect of market power on liquidity creation for smaller banks (LARGE = 0), while $\beta_1 + \beta_2$ represents the total marginal effect for larger banks (LARGE = 1). H2 predicts $\beta_2 > 0$.

3.4. Estimation strategy

The dynamic panel models present several econometric challenges: (i) the lagged dependent variable creates a mechanical correlation with the fixed effect, leading to Nickell (1981) bias in short panels; (ii) the Lerner index and the interaction term are potentially endogenous due to reverse causality; and (iii) several bank-level controls may be simultaneously determined with liquidity creation. To address these issues, we employ the two-step system GMM estimator (Arellano & Bover, 1995; Blundell & Bond, 1998).

We treat the lagged dependent variable, the Lerner index, and the interaction term (LERNER × LARGE) as endogenous, instrumenting them with their second and third lags (collapsed). Bank-level controls (SIZE, CAP, NPL, ROA) are treated as predetermined and instrumented with lags 2-3 (collapsed). Macroeconomic variables are treated as strictly exogenous. To mitigate instrument proliferation, we apply the collapsing technique recommended by Roodman (2009), restrict the lag depth to 2-3, and ensure the instrument count does not exceed the number of cross-sectional units. We apply the Windmeijer (2005) finite-sample correction.

We retain CAP and ROA as control variables despite their potential role as mediators on the capital channel. Treating these variables as predetermined and instrumenting them with their second and third lags ensures that the controls reflect prior-period conditions, mitigating the mediator-bias concern. The specification is also conservative: any positive effect of market power that survives conditioning on CAP and ROA understates the true total effect, and the approach preserves comparability with prior studies in the literature.

The validity of GMM estimation is assessed through: (i) the Arellano-Bond AR(1) test should reject ($p < 0.05$), while AR(2) should not reject ($p > 0.10$); (ii) the Hansen J-test should not reject ($p > 0.10$); and (iii) the instrument count should remain below the number of groups (Roodman, 2009).

3.5. Robustness checks

We conduct robustness checks along several dimensions. First, we replace NFLC with FLC on the subsample with complete off-balance sheet data (Model 3). Second, we substitute the Lerner index with the Herfindahl-Hirschman Index (HHI), computed annually as the sum of squared asset market shares across banks, as an alternative market concentration proxy (Model 4).

3.6. Diagnostic tests

The two-step system GMM estimator with Windmeijer (2005) correction produces standard errors that are robust to arbitrary heteroskedasticity and autocorrelation within panels, obviating the need for separate heteroskedasticity tests.

Table A1 - Appendix A (online version) reports the pairwise correlation matrix and Variance Inflation Factors. The highest pairwise correlation is 0.48 (between INF and RATE). All VIF values range from 1.36 to 2.43 (mean = 1.87), well below the threshold of 10 recommended by Hair et al. (2019), confirming that multicollinearity does not pose a concern. Notably, the positive correlation between the Lerner index and ROA (r = 0.34) is consistent with the theoretical mechanism linking market power to profitability.

The Pesaran (2015) CD statistics range from 1.24 to 1.42 across models, with all p-values exceeding 0.10 (Table 3), indicating no significant cross-sectional dependence in the residuals. This result is consistent with the heterogeneous asset compositions and regional lending profiles of Vietnamese commercial banks, which limit residual cross-bank spillovers. System GMM estimation remains consistent under moderate cross-sectional dependence when T is small relative to N (Sarafidis & Robertson, 2009).

Although bounded ratios and the use of system GMM render formal stationarity testing unnecessary, we report Fisher-type augmented Dickey-Fuller tests as (Choi, 2001) a complementary verification. All variables reject the null of a unit root at the 5% level (Table A2 - Appendix A - online version), with Fisher statistics ranging from 59 (SIZE) to 94 (ROA), confirming that the panel series are stationary.

4. Empirical results and discussion

4.1. Descriptive statistics

Table 2 reports the descriptive statistics for all variables. The mean values of NFLC and FLC are 8.2% and 10.5% of total assets, respectively. These figures are closely aligned with those reported by Nguyen et al. (2023), who document mean NFLC and FLC of 7.96% and 10.32% for 24 banks during 2010 - 2018. The consistency across the two studies, despite differences in sample composition and time coverage, lends confidence to the reliability of the liquidity creation measures constructed for the present analysis. The liquidity creation levels in Vietnam remain substantially lower than those documented in the Czech Republic (approximately 20%; Horvath et al., 2016), Malaysia (approximately 17%; Toh et al., 2019), and the United States (22 - 30%; Jiang et al., 2019), which is consistent with Vietnam's emerging-market financial intermediation and the smaller scale of its banking sector.

The distribution of liquidity creation exhibits considerable cross-bank heterogeneity. The interquartile range for NFLC spans from 2.0% at the 25th percentile to 14.0% at the 75th percentile, while the minimum value of -0.185 indicates that some bank-year observations are characterized by net liquidity absorption rather than creation. This negative liquidity creation likely corresponds to banks undergoing restructuring during the 2011 - 2015 period, when several institutions were forced to substantially curtail lending while accumulating liquid assets and equity to meet regulatory requirements.

The Lerner index has a mean of 0.225 with a standard deviation of 0.095, virtually identical to the 0.220 reported by Nguyen et al. (2023) for the 2010 - 2018 period. This stability suggests that the competitive structure of the Vietnamese banking sector has not undergone major shifts during the extended sample period.

Table 2

Descriptive Statistics

Variable	Mean	SD	P25	Median	P75	Min	Max
NFLC	0.082	0.090	0.020	0.078	0.140	-0.185	0.310
FLC	0.105	0.105	0.035	0.100	0.170	-0.180	0.415
LERNER	0.225	0.095	0.155	0.220	0.290	0.000	0.520
LARGE	0.500	0.500	0.000	0.000	1.000	0.000	1.000
SIZE	12.45	0.85	11.88	12.40	13.02	10.30	15.10
CAP	0.090	0.036	0.064	0.084	0.108	0.038	0.260
ROA	0.010	0.007	0.006	0.009	0.014	-0.030	0.035
NPL	0.024	0.017	0.012	0.020	0.030	0.003	0.100
GDPG	0.059	0.019	0.054	0.062	0.071	0.026	0.086
INF	0.060	0.045	0.033	0.047	0.080	0.006	0.230
RATE	0.078	0.033	0.060	0.075	0.095	0.040	0.150

Note. N = 372 bank-year observations for all variables except FLC (N = 300). NFLC and FLC are expressed as ratios of total assets. SIZE is in natural logarithm of billion VND. Author's calculations

Among the bank-level controls, the mean equity-to-asset ratio (CAP) of 9.0% is consistent with the 9.3% reported by Nguyen et al. (2023) and reflects the relatively thin capital cushions maintained by Vietnamese banks prior to the full implementation of Basel II standards. The mean ROA of 1.0% is typical for Vietnamese commercial banks. The mean NPL ratio of 2.4% is higher than the 1.3% reported by Nguyen et al. (2023) for 2010 - 2018, which is attributable to the inclusion of two high-NPL episodes in our extended sample: the post-global financial crisis period (2008 - 2009) and the post-Covid-19 period (2021 - 2023), during which non-performing loans surged due to the real estate market downturn and restructured loan reclassifications. The macroeconomic variables reflect Vietnam's economic dynamics over the extended period: mean GDP growth of 5.9% with a minimum of 2.6% (corresponding to 2020), mean inflation of 6.0% with a peak of 23.0% (corresponding to 2008), and a mean refinancing rate of 7.8% with a maximum of 15.0% (corresponding to the monetary tightening episode of 2008 - 2011).

4.2. Regression results

Table 3 reports the two-step system GMM estimates for four specifications. We first assess model diagnostics. As expected for first-differenced residuals, the AR(1) test is significant ($p < 0.01$), while the AR(2) test fails to reject the null of no second-order serial correlation ($p > 0.34$), supporting the validity of the lagged instruments. The Hansen J-test and Difference-in-Hansen test do not reject the overidentifying restrictions (p-values between 0.331 and 0.401; Diff-in-Hansen $p > 0.39$), which is consistent with instrument validity. The instrument count (21-24) remains below the number of cross-sectional groups (28 in Models 1, 2, and 4; 23 in Model 3), alleviating concerns about instrument proliferation.

Model (1) presents the baseline specification with NFLC as the dependent variable. The lagged dependent variable is positive and highly significant ($\alpha_1 = 0.456, p < 0.001$), confirming that liquidity creation exhibits substantial persistence, consistent with the path-

dependent nature of bank lending and deposit-taking relationships. The coefficient on the Lerner index is positive and significant at the 5% level ($\beta_1 = 0.058$, $p = 0.026$), indicating that a one-unit increase in market power is associated with a 5.8 percentage point increase in NFLC. In terms of economic significance, a one standard deviation increase in the Lerner index (0.095) corresponds to an increase in NFLC of approximately 0.55 percentage points, representing 6.7% of the sample mean. This finding supports H1 and is consistent with the risk absorption channel.

Model (2) introduces the interaction between the Lerner index and the large-bank dummy. The coefficient on the Lerner index, which now captures the marginal effect for small banks only, decreases to 0.041 ($p = 0.089$, significant at the 10% level). The coefficient on LERNER × LARGE is positive and significant at the 5% level ($\beta_2 = 0.052, p = 0.037$). The total marginal effect of market power for large banks is $\beta_1 + \beta_2 = 0.041 + 0.052 = 0.093$, approximately 2.3 times the effect for small banks. This result provides strong support for H2. The main effect of LARGE is statistically insignificant ($\beta = 0.006, p = 0.550$), indicating no detectable level difference in liquidity creation between large and small banks once covariates are controlled; instead, the heterogeneity primarily operates through the interaction term.

Model (3) replaces the dependent variable with FLC, estimated on the subsample of 23 banks with complete off-balance sheet data (300 observations). The Lerner index coefficient increases to 0.073 ($p = 0.019$), confirming that the positive market power-liquidity creation relationship is robust to the inclusion of off-balance sheet activities. The larger magnitude relative to the NFLC specification is consistent with the expectation that market power also facilitates off-balance sheet liquidity provision, such as loan commitments and guarantees.

Model (4) replaces the Lerner index with the HHI, a market concentration proxy, as an alternative measure of industry structure. The HHI coefficient is positive and significant ($\beta = 0.180, p = 0.028$), confirming that the positive relationship between market power and liquidity creation is not an artifact of the particular competition measure employed. The control variable coefficients remain qualitatively unchanged across all four models, attesting to the stability of the specification.

Table 3

Dynamic System GMM Estimates: Market Power and Liquidity Creation

Variables	(1) NFLC Main	(2) NFLC Size mod.	(3) FLC Robust.	(4) NFLC HHI
LC_{t-1}	0.456***	0.441***	0.493***	0.462***
	(0.000)	(0.000)	(0.000)	(0.000)
LERNER	0.058**	0.041*	0.073**	
	(0.026)	(0.089)	(0.019)	
LERNER × LARGE		0.052**		
		(0.037)		
LARGE		0.006		
		(0.550)		
HHI				0.180**
				(0.028)

Variables	(1) NFLC Main	(2) NFLC Size mod.	(3) FLC Robust.	(4) NFLC HHI
SIZE	0.010*	0.009	0.012*	0.011*
	(0.084)	(0.120)	(0.078)	(0.080)
CAP	0.092**	0.085**	0.105**	0.090**
	(0.032)	(0.045)	(0.030)	(0.036)
ROA	1.120***	1.050***	1.380***	1.130***
	(0.001)	(0.002)	(0.000)	(0.001)
NPL	-0.310**	-0.295**	-0.360**	-0.305**
	(0.018)	(0.023)	(0.016)	(0.019)
GDPG	0.210**	0.198*	0.240**	0.206**
	(0.041)	(0.052)	(0.038)	(0.042)
INF	-0.085*	-0.081*	-0.090*	-0.084*
	(0.094)	(0.097)	(0.089)	(0.093)
RATE	-0.140**	-0.132**	-0.160**	-0.139**
	(0.046)	(0.048)	(0.042)	(0.046)
Diagnostics				
Banks (groups)	28	28	23	28
Observations	372	372	300	372
Instruments	22	24	22	21
AR(1) z (p)	-2.90 (0.004)	-2.84 (0.004)	-2.76 (0.006)	-2.89 (0.004)
AR(2) z (p)	0.88 (0.379)	0.94 (0.348)	0.81 (0.417)	0.87 (0.384)
Hansen J (p)	0.362	0.331	0.401	0.371
Diff-in-Hansen (p)	0.411	0.398	0.447	0.420
Pesaran CD (p)	1.41 (0.155)	1.39 (0.167)	1.24 (0.212)	1.42 (0.161)

Note. p-values in parentheses. Windmeijer-corrected robust standard errors. LC_{t-1}, market power variables, and the interaction term are treated as endogenous (lags 2-3, collapsed). Bank-level controls are treated as predetermined (lags 2-3, collapsed). Macroeconomic variables are strictly exogenous. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. The Pesaran (2015) CD test is computed on residuals from a preliminary fixed-effects specification with the same regressors as each GMM model. Author's calculations.

4.3. Discussion

4.3.1. Market power and liquidity creation (H1)

The results provide robust support for Hypothesis 1. Market power is positively associated with liquidity creation when measured by the Lerner index in Models (1) - (3), and the conclusion remains unchanged when market power is proxied by the asset-based HHI in Model (4). Taken together, these findings are consistent with the risk-absorption view that stronger margins and franchise value can enhance banks' capacity to bear risk and extend illiquid credit, thereby increasing liquidity creation. This evidence is consistent with the risk absorption view (Berger & Bouwman, 2009), whereby higher franchise values allow banks to sustain liquidity transformation

by maintaining buffers and stable intermediation relationships (Keeley, 1990). Consistent with this interpretation, capital adequacy and profitability enter positively and significantly in Model (1) (CAP = 0.092, p = 0.032; ROA = 1.120, p = 0.001), indicating that better-capitalized and more profitable banks create more liquidity. While this study does not explicitly estimate how market power affects CAP and ROA, these coefficients suggest that capitalization and earnings capacity are important state variables that are closely linked to banks' liquidity creation capacity.

Our finding corroborates and extends the results of Nguyen et al. (2023), who document a positive market power-liquidity creation relationship for 24 Vietnamese banks during 2010 - 2018. More broadly, it aligns with the international evidence reported by Jiang et al. (2019), who find that increased competition, following US interstate banking deregulation, reduced liquidity creation, and by Horvath et al. (2016), who document a positive Lerner-liquidity creation association in the Czech banking sector. Recent studies have further reinforced this pattern. For example, Toh et al. (2019) show that greater competition is associated with lower liquidity creation among Malaysian banks. The convergence of evidence across these diverse institutional settings strengthens the case that the risk absorption channel is a general feature of banking systems, not confined to advanced economies.

4.3.2. The moderating role of bank size (H2)

To our knowledge, this is the first study to provide direct evidence of a statistically significant size-moderation effect in the market power-liquidity creation relationship. While prior studies have documented size heterogeneity descriptively (Jiang et al., 2019) or examined alternative moderators such as profitability (Nguyen et al., 2023), the formal interaction test between market power and bank size for liquidity creation is a novel contribution of this study.

The positive and significant interaction term LERNER × LARGE ($\beta_2 = 0.052$, $p = 0.037$) provides clear support for Hypothesis 2: the positive effect of market power on liquidity creation is significantly stronger for large banks than for small banks. The total marginal effect for large banks (0.093) is approximately 2.3 times the effect for small banks (0.041), indicating a substantial and economically meaningful size-dependent asymmetry.

This finding is consistent with three theoretical predictions developed in Section 2.3. First, it aligns with the size-dependent risk absorption framework of Berger and Bouwman (2009): large banks channel the capital accumulated through market power into expanded risk-bearing and liquidity creation, while small banks may experience a crowding-out effect in which additional capital displaces deposits. Second, large banks' cost advantages in screening and monitoring (Boot & Thakor, 2000) enable them to profitably expand lending in response to enhanced market power, whereas small banks lack the infrastructure to do so at the same pace. Third, the finding is consistent with Jiang et al. (2019) evidence that the liquidity-destroying effects of competition are disproportionately concentrated among smaller relationship lenders that lack the diversified funding and scale economies of larger institutions.

The practical significance of this finding is illuminated by a comparison of marginal effects. For a large bank, a one standard deviation increase in market power would increase NFLC by approximately 0.88 percentage points. For a small bank experiencing the same shift, the increase would be only 0.39 percentage points. This asymmetry suggests that consolidation-driven increases in market power, such as those observed during Vietnam's banking restructuring period of 2011 - 2015, generate proportionally greater liquidity creation gains when they accrue to larger institutions.

The insignificance of the LARGE dummy's main effect (β= 0.006, p = 0.550) is theoretically informative. Conditional on bank size (SIZE), capital (CAP), profitability (ROA), and other controls, being classified above the median size threshold does not independently predict higher liquidity creation. Bank size affects liquidity creation not directly but through its interaction with market power, a genuinely moderating rather than additive effect. This pattern is consistent with our theoretical framework, which emphasizes size-dependent risk absorption capacity rather than a scale effect on liquidity creation per se.

The size-moderation finding extends the existing literature in an important direction. While Jiang et al. (2019) document that the effect of competition on liquidity creation varies with bank size, they employ a different empirical design (regulatory deregulation as an exogenous shock to competition) and do not estimate a moderation model with an interaction term. Nguyen et al. (2023) examine moderation by profitability (high vs. low ROA) but not by bank size. Tran and Nguyen (2024), studying bank liquidity creation in Vietnam, do not examine heterogeneity at all. Our study fills this gap by providing the first direct evidence of a size-moderation effect on the market power-liquidity creation relationship in an emerging market.

4.3.3. Control variables and macroeconomic context

The control variables enter with theoretically expected signs and provide additional context for the main results. Bank size (SIZE) has a marginally significant positive effect on NFLC in Model (1) but loses significance in Model (2), as the size variation is partially absorbed by the LARGE dummy and its interaction with the Lerner index. Bank capital (CAP) is positive and significant across all models, supporting the risk absorption hypothesis at the aggregate sample level and aligning with the international evidence reported by Berger and Bouwman (2009) and Horvath et al. (2016). This finding contrasts with Vu and Ngo (2023), who report a negative capital-liquidity creation relationship for Vietnamese banks using PLS-SEM methodology. Profitability (ROA) is the strongest bank-level predictor of liquidity creation, with coefficients ranging from 1.050 to 1.380; a one percentage point increase in ROA is associated with approximately a 1.1 percentage point increase in NFLC, reinforcing the theoretical mechanism through which market power operates: market power enhances profit margins, which generate retained earnings that contribute to capital accumulation, thereby expanding liquidity creation. The non-performing loan ratio (NPL) has a negative and significant effect (-0.310, p = 0.018 in Model 1), consistent with the regulatory constraint interpretation that loan deterioration triggers tighter provisioning and constrained lending capacity. Among the macroeconomic controls, GDP growth (GDPG) is positive and significant, reflecting the demand-side stimulus to credit and deposit mobilization, while inflation (INF) is marginally negative and the refinancing rate (RATE) is negative and significant, both consistent with standard monetary transmission and the compression of net interest margins under tighter monetary conditions.

4.4. Robustness analysis

The baseline findings are subject to robustness checks along three dimensions, all reported in Table 3. First, replacing NFLC with FLC (Model 3) yields a Lerner coefficient that increases from 0.058 to 0.073, confirming that market power facilitates both on- and off-balance sheet liquidity provision. Second, substituting the Lerner index with the industry-level HHI (Model 4) produces a positive and significant coefficient (0.180, p = 0.028), confirming that the finding is not an artifact of the specific competition measure. Third, the sign, significance, and magnitude of the control coefficients remain stable across all four specifications. Together, these

checks confirm the robustness of the positive market power-liquidity creation relationship and the size-moderation effect.

5. Conclusion

5.1. Summary of findings

This study examines the relationship between market power and bank liquidity creation in Vietnam, with a particular focus on the moderating role of bank size. Using an unbalanced panel of 28 Vietnamese commercial banks over the period 2008 - 2024 and employing the two-step system GMM estimator, we report three principal findings.

First, market power (measured by the bank-level Lerner index) has a positive and significant effect on liquidity creation, supporting the risk absorption hypothesis and extending the findings of Nguyen et al. (2023) to a longer sample period. A one standard deviation increase in the Lerner index is associated with an increase in on-balance sheet liquidity creation (NFLC) of approximately 0.55 percentage points, representing 6.7% of the sample mean. This result is robust to the use of alternative liquidity creation measures (FLC) and alternative market power proxies (HHI).

Second, bank size positively and significantly moderates the market power-liquidity creation relationship. The positive effect of market power on liquidity creation is approximately 2.3 times stronger for large banks than for small banks. This asymmetry is consistent with Berger and Bouwman's (2009) size-dependent risk absorption framework, Jiang et al.'s (2019) evidence that smaller banks are more vulnerable to competitive shocks, and the theoretical prediction that large banks are better positioned to translate market power into expanded lending through economies of scale in screening and diversified funding sources.

Third, bank profitability (ROA) emerges as the strongest bank-level predictor of liquidity creation, reinforcing the theoretical mechanism through which market power operates on liquidity creation: market power enhances profit margins, which contribute to capital accumulation through retained earnings, thereby expanding risk absorption capacity.

5.2. Summary of findings

The findings carry several implications for the State Bank of Vietnam and banking regulators in emerging economies.

First, the positive market power-liquidity creation relationship suggests that pro-competitive policies, while beneficial for consumer welfare through lower lending rates and higher deposit rates, involve a trade-off with liquidity provision. Regulators pursuing competition-enhancing reforms should be aware that the resulting erosion of market power may constrain banks' capacity to create liquidity for the real economy, particularly among smaller institutions. This trade-off does not imply that competition is undesirable, but rather that competition policy should be calibrated to preserve adequate risk-bearing capacity for liquidity creation.

Second, the size-dependent moderation effect implies that competition policies should differentiate across bank size categories. Policies that reduce market power uniformly across the banking sector may disproportionately harm smaller banks' ability to create liquidity, as these institutions lack the scale economies and diversified funding that enable large banks to sustain liquidity creation under competitive pressure. Targeted measures, such as tiered capital requirements, capacity-building programs that enhance small banks' screening and monitoring capabilities, or the facilitation of inter-bank cooperation arrangements, could help mitigate the adverse effects of competition on small banks' liquidity provision.

From a practical standpoint, the SBV's ongoing consolidation strategy, which has reduced the number of commercial banks from over 40 in 2010 to 28 in 2024, may have inadvertently enhanced liquidity creation by concentrating market power in institutions best equipped to translate it into lending. For small banks, the weaker market power-liquidity creation link suggests that competition-enhancing policies should be accompanied by compensatory measures such as credit guarantee schemes, interbank cooperation platforms, or targeted capacity-building programs to maintain their liquidity provision role.

Third, the strong positive effect of profitability on liquidity creation supports the view that policies promoting bank earnings capacity, such as the reduction of excessive regulatory burdens and the facilitation of non-interest income diversification, indirectly support liquidity provision. Conversely, policies that compress bank profitability (e.g., aggressive interest rate capping) may inadvertently reduce liquidity creation by depleting the earnings base that funds capital accumulation.

5.3. Limitations and future research

This study is subject to several limitations that suggest directions for future research. First, the sample comprises 28 banks observed over 17 years, yielding a panel with a relatively small cross-sectional dimension; while system GMM is designed for small-N panels, the statistical power of the interaction tests remains constrained, and future work could expand the cross-section by adopting a cross-country design pooling Vietnamese bank with comparable Southeast Asian economies. Second, the present study employs a linear moderation framework that assumes a constant marginal effect within each size category; the theoretical arguments do not preclude a nonlinear direct relationship, such as an inverted-U pattern, and a companion study examining quadratic, threshold, or quantile dimensions would complement the linear approach adopted here. Third, while we control for macroeconomic conditions through GDPG, INF, and RATE, these proxies may not fully capture time-varying regulatory and institutional changes, most notably, the phased implementation of Basel II and III standards, and future research could exploit the timing of specific regulatory events as quasi-natural experiments.

SCIENTIFIC CONTRIBUTION

The manuscript clearly identifies a research gap the manuscript extends or refines existing theories; the manuscript proposes a new theoretical or analytical model; the manuscript provides new datasets or empirical evidence; the manuscript presents statistically and practically significant findings; the manuscript offers policy/managerial/technological implications; the manuscript opens new directions for further research.

AUTHOR CONTRIBUTIONS

CRediT: **Vu Huu Thanh**: Conceptualization, Methodology, Software, Validation, Formal Analysis, Investigation, Resources, Data Curation, Writing - Original Draft, Writing - Review & Editing, Visualization, Supervision, Project Administration.

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All authors declare that they have no conflict of interest

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