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Research article

Banking market structure, lending behavior, and profitability in China

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Abstract: Bank competition is complex because it occurs simultaneously in deposit markets and loan markets. Most governments regulate the banking industry more than other private-sector industries, and some intervene in the banking industry in ways that would be unthinkable in other sectors of the economy. These features of the banking market sector result in characteristics that vary substantially across countries, with bank behavior and decision-making highly dependent on local conditions. Banks also play an important role in policy transmission and economic development, which makes understanding banking market structures and their influence crucial. This study examines banking market structure and the influence of market power on bank behavior in a highly regulated environment—the Chinese market. Using financial report data, this research analyzes how market structure and power affect profitability and lending decisions. The results show that, as in many other banking markets, concentration in the lending market contributes positively to profitability by increasing loan rates, while deposit markets experience lower deposit rates in more concentrated settings. However, market power in China exhibits different competitive features compared with other countries. Banks compete on loan quality by offering lower loan rates, relying on higher leverage, and reducing bad debt to generate greater profits, rather than maximizing profits through higher loan rates when they hold more market power. Smaller banks, however, cannot compete in this way because a larger scale is required to cover monitoring and operating costs. For smaller banks, such strategies are infeasible, forcing them to charge sufficiently high loan rates to generate enough profit to cover operating expenses.

Keywords: bank competition; banking regulation; market structure; market power; efficiency; bad debt, profitability

JEL Codes: G20, G21

1. Introduction and background

Market power and market structure are critical factors in the banking industry, which is typically highly regulated. Capital requirements and direct government interventions are common, aiming to stabilize the banking system and avoid crises (Boyd and De Nicolo, 2005; Tchana, 2012). Market structure influences banks' profitability, transmits monetary policy to the economy, and facilitates firms' access to funding (Avdjiev and Hale, 2019). The loan–deposit spread affects the welfare of both depositors and borrowers.

Banks' risk-taking is shaped by interest rates, money markets, and broader macroeconomic conditions, and is reflected in loan growth (Jiménez et al., 2013). Risk-taking behavior is also linked to the level of market competition, with strategies often depending on bank size and the scale of deposit and loan markets (Tabak et al., 2012). Efficiency is closely tied to competition. From a macro perspective, when considering industry stability and the welfare of depositors and borrowers, no consensus has yet been reached on whether greater banking competition is optimal. A more competitive banking market may enhance depositor and borrower welfare (Ho, 2010), but it can also encourage risk-seeking behavior and aggressive loan growth (Caminal and Matutes, 2002). Such outcomes may increase the likelihood of bank failure, reducing overall social welfare (Shy and Stenbacka, 2004).

Banks also aim to minimize costs by improving efficiency and reducing operating expenses. Loan monitoring and borrower selection are particularly costly in the banking sector, with loan maturity and spreads often correlated (Gustafson et al., 2021). Bank size and market scale can significantly affect monitoring efficiency and profitability (Maudos and De Guevara, 2007). Importantly, banks can enhance profitability by lowering lending rates to attract higher-quality borrowers, thereby reducing bad debt.

China provides a useful case for exploring how interest rate regulation in an emerging market shapes competition, in contrast to the findings from more developed markets. The Chinese market is highly policy-driven: most banks are partially or wholly state-owned, and both deposit and lending rates are subject to benchmark guidance (Fu et al., 2015). The People's Bank of China has historically set upper limits on deposit rates and floors on lending rates to prevent excessive competition and preserve market stability (People's Bank of China, 2012). For instance, in 2012, deposit rates could not exceed 110% of the benchmark, and loan rates could not fall below 80% of the standard (People's Bank of China, 2012). These rules were eased in 2015 to allow more market-based pricing (People's Bank of China, 2015). In addition, government directives often require banks to support specific industries or restrict lending to others, granting state-owned enterprises (SOEs) privileged access to credit (Firth et al., 2009). Such interventions reshape risk appetite and competition in China's banking market.

From the perspective of market structure and economic cycles, large banks may use their market power to select moderately risky borrowers and charge higher interest rates during periods of strong economic performance (Ruckes, 2004). Conversely, when credit standards tighten, they may compete

on loan quality by lowering rates to attract safer borrowers (Arping, 2017). This research investigates these dynamics by analyzing how deposit market structure and power relate to loan market behavior. We further examine profitability outcomes to assess whether banks with market power adopt effective competition strategies.

In this paper, we begin by testing the effect of banking competition on profitability, focusing on both individual bank market power and overall loan market structure. We then exploit the connection between deposit and loan markets, using deposit market competition as an instrumental variable to retest these relationships. Moving beyond profitability, we analyze how market competition influences deposit and loan rates. Our findings show that banks with greater market power tend to offer lower loan rates, indicating that competition centers not on raising rates but on attracting safer borrowers. This is further supported by evidence that banks with higher market power experience smaller bad debt losses. Finally, we demonstrate that increases in market power are associated with significant reductions in loan rates among large banks, reinforcing our hypothesis that, in the Chinese financial market, banks primarily compete for borrower quality rather than through pricing strategies.

This paper makes three main contributions. First, it extends traditional analyses of market structure to a highly regulated setting, where deposit competition is tightly constrained, and competition occurs primarily in the loan market. Second, it highlights the role of deposit market power as an instrumental variable for measuring loan market competition. Finally, it shows that in China, banks with greater market power compete on loan quality rather than by raising loan rates—a result that contrasts with outcomes in many less-regulated markets.

2. Literature review and hypotheses

The market structure and its level of concentration can directly shape banking competition. Banks take into account both overall market conditions and their own market share when determining strategies. Traditionally, more concentrated market structures reduce incentives for risk-taking (Bourke, 1989), and banks may engage in noncompetitive behavior (Hannan, 1991). From the perspective of bank stability, recent studies show that market structure and concentration are positively correlated with financial stability (Shim, 2019). Market structure also affects the supply of loans and influences whether firms prefer bank loans or bond issuance (Leary, 2009). Moreover, regulation in the banking industry has a strong impact on banks' strategic decisions, efficiency, and the rates offered to clients (Hassan, 2019).

2.1. Market structure and market power

Market structure can significantly influence industry-wide profitability. In more concentrated financial markets, larger firms have greater control over pricing. Scarcity of resources allows suppliers to raise prices while reducing consumers' bargaining power (Araujo et al., 2018). High concentration may also encourage price collusion, with suppliers forming alliances (Gupta, 2002). When demand is inelastic, concentrated markets benefit suppliers by maintaining downward price rigidity and upward price flexibility (Neumark and Sharpe, 1992). Such pricing behavior is often observed in financial and energy markets. Market structure also affects the speed of price adjustments, which tends to increase with the number of firms in the market (Martin, 1993; Oladunjoye, 2008).

In financial markets, higher concentration reduces banks' solvency risks (Berger et al., 2009; Shim, 2019) and raises average profitability (Mirzaei et al., 2013). Other aspects are also influenced, including efficiency, service quality, and incentives for innovation (Maghyereh and Awartani, 2014). Easier profits can discourage improvements in service and the development of new products (Raider, 1998).

H1: A more concentrated loan market increases bank profitability.

Market share has also been found to reflect bank market power, distinguishing it from market structure, which captures the overall competitive landscape. Market share indicates the benefits that individual banks gain when holding greater market power, including higher profitability and improved cost efficiency (Li et al., 2019; Rhoades, 1985). Greater market power also allows stronger pricing ability. In oligopolistic settings, smaller firms typically follow dominant banks in setting prices (Chu and Lim, 1998). These dynamics are central when regulators consider monetary policy, financial stability, and other interventions (Dalla and Varelas, 2019).

Bank competition, however, differs from that in traditional product markets. Banks may compete on loan rates and borrower risk profiles (Boyd and De Nicolo, 2005). They are incentivized to charge higher loan rates to maximize profits while also lowering portfolio risk, given the spread between loan and deposit rates (Santos and Winton, 2019). Reducing portfolio risk helps limit bad debt, which in turn enhances profitability. Because competition involves both rates and risk, banks must decide how to allocate effort between the two dimensions (Paligorova and Santos, 2017). Banks with larger market power may choose to focus on one dimension or compete on both. Recent evidence shows that competition can reduce nonperforming loans and increase profitability (Goetz, 2018), but this relationship is less clear in China, where rates are heavily regulated and banks cannot freely set them (He and Wang, 2012). Most Chinese banks are state-owned and follow policy guidance (Yeung, 2021).

H2: A higher market share increases bank profitability.

2.2. Competition strategies based on size

Banks employ various strategies to maximize profits. Loan spreads are a primary income source, but as noted above, banks must balance loan rates against borrower risk to optimize returns (Thierie and De Moor, 2019). Aggressive loan growth may indicate weaker lending standards and can reduce profitability (Foos et al., 2010). Loan spreads are influenced by regulation, monetary policy, and government interventions Orzechowski, 2017). In China, regulatory ceilings and floors on lending rates shape competition differently than in unregulated markets (Xu et al., 2016). Under such conditions, banks may compete for lower-risk borrowers by offering reduced loan rates rather than raising spreads, leveraging their market power and the scarcity of loans (Tan et al., 2017).

Larger banks are better positioned to adopt this strategy. Competing for safer borrowers often requires lowering loan rates, which reduces spreads; large banks can absorb these narrower margins because of economies of scale. Monitoring is an essential value-added activity in banking (Akhigbe and McNulty, 2011), but smaller banks must cover higher per-unit monitoring and operating costs, requiring them to maintain higher spreads. Cost minimization through operating efficiency also plays a role (Goddard et al., 2013). While competition has been shown to improve efficiency in some markets (Casu and Girardone, 2006), evidence from China is weak (Fungáčová et al., 2013), likely due to binding regulations and tight controls.

H3: Large banks compete for higher-quality, lower-risk projects by offering lower loan rates.

H4: Smaller banks cannot effectively compete on loan quality by lowering rates to attract low-risk borrowers, because of scale and cost constraints.

Banks compete in both deposit and loan markets (Arping, 2017). In China, however, deposit market competition is more constrained. Banks can only marginally raise deposit rates to attract funds (Chen et al., 2013), so competition in deposits centers on factors such as convenience and service quality rather than rates (Dick, 2008). Because deposit rates are relatively fixed, the cost of funds is similar across banks, with little impact on lending decisions. For this reason, we use deposit market share and structure as instrumental variables for loan market competition. Without sufficient deposits, banks cannot expand their lending. Employing deposit market share and concentration as instruments helps mitigate endogeneity concerns and strengthens causal interpretation.

3. Data and methodology

3.1. Data

This study draws on data from the China Stock Market and Accounting Research Database (CSMAR). Bank balance sheets and income statements were collected for the period 2010–2022. These two datasets were matched to form an unbalanced panel. Using financial reports, we calculated loan and deposit market shares as well as the Herfindahl–Hirschman Index (HHI) for both markets. Variable definitions are provided in Table 1, and summary statistics are shown in Table 2.

As indicated in Table 1, the dispersion of deposit rates is much smaller than that of loan rates, reflecting the tighter regulatory controls in deposit markets compared with loan markets.

Table 1. Variable definitions.

Variable	Units	Symbol	Variable treatment
Loan rate	%	loanrate	Interest income/loan amount
Loan share	%	loanshare	The bank's loan amount is divided by the total sum of all banks' loans in that year
Deposit rate	%	depositrate	Interest expense/deposit amount
Deposit share	%	depositshare	The deposit amount of the bank is divided by the total sum of all deposits of all banks in that year
Herfindahl–Hirschman Index loan market	Numerical	HHIL	The square sum of all banks' loan market shares
Herfindahl–Hirschman Index deposit market	Numerical	HHID	Square sum of all banks' deposit market shares
Loss estimation	%	loss	Loss preparation fund/loan amount
Level of aggressive loan lending	Numerical	agg	Bank I's loan market share; its deposit market share
Return on equity	%	ROE	Net income/total equity
Return on asset	%	ROA	Net income/total asset
Branch propensity	%	branch	Number of branches of the bank divided by all bank branches in that year
Operating expense per each staff	Thousand Yuan	expstaff	The operating expense is divided by the number of employees of the bank in that year

Table 2. Summary statistics.

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
depositrate	3426	2.765	1.191	0.331	1.960	3.343	17.790
loanrate	3426	9.410	3.092	1.941	7.368	10.639	34.501
loss	3390	3.052	10.677	0.007	2.006	3.153	477.213
loanshare	3448	0.377	1.721	0.00001	0.011	0.089	17.992
depositshare	3449	0.377	1.735	0.0001	0.012	0.097	19.361
HHIL	3476	796.259	100.915	686.386	712.728	877.850	1040.715
HHID	3476	807.704	104.094	720.607	739.163	844.097	1106.889
branch	3476	0.374	2.117	0.000	0.020	0.101	29.478
expstaff	2836	760.897	1734.905	12.405	475.133	879.808	8572.840
ROA	3475	0.875	0.563	−8.320	0.589	1.125	4.219
ROE	3474	10.956	5.840	−17.080	7.325	14.449	38.659
agg	3476	−0.000	0.209	−3.798	−0.007	0.0003	3.257

3.2. Methodology

Following earlier studies, this research uses the HHI to measure market structure (Berger et al., 2009). Unlike some past work, we separate the deposit and loan markets to better capture differences in regulation and competition. Salop's circle theory provides a theoretical basis for depositor behavior, as residents tend to choose banks located nearby. The availability of branches and office sites therefore plays a significant role in determining deposit market share (Ho and Ishii, 2011; Simpson and Buckland, 2016). Similarly, the physical distance between a bank and a firm can influence lending incentives and loan rates (Degryse and Ongena, 2005).

Our analysis proceeds in several steps. First, we test how loan market structure and bank-level market power affect profitability. Deposit market share and structure are then used as instrumental variables to address potential endogeneity. Next, we examine the impact of market competition on deposit and loan rates. Finally, we assess how market structure and power influence expected loan losses and conduct heterogeneity analysis by separating large and small banks.

3.2.1. Market structure and market power effects on profitability

Profitability is measured by return on equity (ROE) and return on assets (ROA). Loan market concentration is captured by the HHI, while individual banks' loan market shares serve as proxies for market power. Equations (1) and (2) specify the baseline models.

$$ROE_{i,t} = \beta_0 + \beta_1 HHIL_t + \beta_2 loanshare_{i,t} + \beta_3 branch_{i,t} + \beta_4 expstaff_{i,t} + \sum IND + \varepsilon_{i,t} \quad (1)$$

$$ROA_{i,t} = \beta_0 + \beta_1 HHIL_t + \beta_2 loanshare_{i,t} + \beta_3 branch_{i,t} + \beta_4 expstaff_{i,t} + \sum IND + \varepsilon_{i,t} \quad (2)$$

To validate the use of deposit market structure and shares as instrumental variables, we regress them on loan market shares and loan market HHI, controlling for additional variables. As expected, these instruments are statistically significant. Equations (3)–(6) describe these tests.

$$depositshare_{i,t} = \beta_0 + \beta_1 HHIL_{i,t} + \beta_2 branch_{i,t} + \beta_3 expstaff_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$depositshare_{i,t} = \beta_0 + \beta_1 loanshare_{i,t_{i,t}} + \beta_2 branch_{i,t} + \beta_3 expstaff_{i,t} + \varepsilon_{i,t} \quad (4)$$

$$HHID_{i,t} = \beta_0 + \beta_1 HHIL_{i,t} + \beta_2 branch_{i,t} + \beta_3 expstaff_{i,t} + \varepsilon_{i,t} \quad (5)$$

$$HHID_{i,t} = \beta_0 + \beta_1 loanshare_{i,t} + \beta_2 branch_{i,t} + \beta_3 expstaff_{i,t} + \varepsilon_{i,t} \quad (6)$$

Once validated, deposit market structure and shares are applied in two-stage least squares (2SLS) estimations to replace loan market structure and shares.

3.2.2. Competition strategies based on size

Next, we investigate how market structure and bank market power affect loan rates. Since deposit rates are tightly controlled, they are largely unaffected by market share or structure. Equations (7) and (8) test these relationships, with 2SLS again employed using deposit market structure and shares as instruments.

$$depositrate_{i,t} = \beta_0 + \beta_1 HHID_{i,t} + \beta_2 depositshare_{i,t} + \beta_3 branch_{i,t} + \beta_4 expstaff_{i,t} + \sum IND + \varepsilon_{i,t} \quad (7)$$

$$loanrate_{i,t} = \beta_0 + \beta_1 HHIL_{i,t} + \beta_2 loanshare_{i,t} + \beta_3 branch_{i,t} + \beta_4 expstaff_{i,t} + \sum IND + \varepsilon_{i,t} \quad (8)$$

We also examine the loss provision fund as a proxy for bad debt, since only exchange-listed banks disclose nonperforming loan data. While regulations require reserves of at least 1% of total loans, the actual provision depends on banks' risk perceptions. Equations (9) and (10) capture these relationships.

$$loss_{i,t} = \beta_0 + \beta_1 HHIL_{i,t} + \beta_2 loanshare_{i,t} + \beta_3 branch_{i,t} + \beta_4 expstaff_{i,t} + \sum IND + \varepsilon_{i,t} \quad (9)$$

$$loss_{i,t} = \beta_0 + \beta_1 HHID_{i,t} + \beta_2 depositshare_{i,t} + \beta_3 branch_{i,t} + \beta_4 expstaff_{i,t} + \sum IND + \varepsilon_{i,t} \quad (10)$$

Aggressiveness in lending is measured by the difference between a bank's loan and deposit market shares. Equation (11) tests how this aggressiveness affects profitability, loan and deposit rates, and expected loan losses. Note that the outcome term in equation (11) represents five different dependent variables: ROE, ROA, deposit rate, loan rate, and the expected bad debts.

$$outcome_{i,t} = \beta_0 + \beta_1 HHIL_{i,t} + \beta_2 loanshare_{i,t} + \beta_3 branch_{i,t} + \beta_4 expstaff_{i,t} + \sum IND + \varepsilon_{i,t} \quad (11)$$

3.2.3. Heterogeneity analysis

To explore differences between large and small banks, we construct two subsamples using propensity score matching (PSM). Banks with the largest and smallest loan market shares are matched with others of similar deposit market share to create large-bank and small-bank groups. We then re-estimate the effects of market structure and market power on profitability, loan and deposit rates, and expected loan losses within each group. This allows us to assess whether strategies differ systematically by bank size.

4. Results

4.1. Market structure and market power effects on profitability

The results for profitability are presented in Tables 3 and 4. In both, loan market structure (measured by the HHI) shows positive and significant coefficients. Individual banks' market power (loan market share) has a positive and significant effect only in the pooled OLS model; once individual effects are controlled for, the contribution disappears. This suggests that while overall loan market concentration benefits profitability, it is primarily large banks that can take advantage of size-related benefits.

Both market structure and market power enhance profitability, with larger marginal effects on ROE than on ROA, reflecting the high leverage typical of the banking sector. The control variable, operating cost per staff—serving as an inverse measure of efficiency—negatively affects profitability. These baseline results strongly support hypotheses H1 and H2.

Table 3. Loan market structure and power on ROE.

	Dependent variable			
	ROE			
	OLS	*panel linear*	*OLS*	*panel linear*
	(1)	(2)	(3)	(4)
HHIL	0.027***	0.027***	0.026***	0.027***
	(0.001)	(0.001)	(0.001)	(0.001)
loanshare			0.242***	−0.067
			(0.083)	(0.423)
branch	0.142***	−0.011	−0.017	−0.010
	(0.039)	(0.092)	(0.067)	(0.098)
expstaff	−0.0001***	−0.0001*	−0.0001**	−0.0001
	(0.0001)	(0.00004)	(0.0001)	(0.00004)
Constant	−9.539***		−9.381***	
	(0.743)		(0.742)	
IND	N	Y	N	Y
Observations	2834	2834	2812	2812
R^2	0.234	0.345	0.235	0.345
Adjusted R^2	0.233	0.236	0.234	0.235
Residual std. error	4.901 (df = 2830)		4.882 (df = 2807)	
F statistic	288.441*** (df = 3; 2830)	426.682*** (df = 3; 2429)	215.139*** (df = 4; 2807)	317.010*** (df = 4; 2407)

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%; standard errors are shown in parentheses.

Table 4. Loan market structure and power on ROA.

	Dependent variable			
	ROA			
	OLS	*panel linear*	*OLS*	*panel linear*
	(1)	(2)	(3)	(4)
HHIL	0.001***	0.002***	0.001***	0.002***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
loanshare			0.017**	−0.004
			(0.008)	(0.036)
branch	−0.001	−0.015*	−0.012*	−0.016*
	(0.004)	(0.008)	(0.007)	(0.008)
expstaff	−0.00002***	−0.00001*	−0.00002***	−0.00001
	(0.00001)	(0.00000)	(0.00001)	(0.00000)
Constant	−0.204***		−0.189***	
	(0.073)		(0.073)	
IND	N	Y	N	Y
Observations	2835	2835	2813	2813
R^2	0.086	0.229	0.083	0.226
Adjusted R^2	0.085	0.101	0.082	0.097
Residual std. error	0.481 (df = 2831)		0.481 (df = 2808)	
F statistic	89.123*** (df = 3; 2831)	240.656*** (df = 3; 2430)	63.879*** (df = 4; 2808)	176.245*** (df = 4; 2408)

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%; standard errors are shown in parentheses.

Table 5 confirms that deposit market structure and shares are valid instrumental variables for loan market structure and shares. Deposit market share and structure are both positively and significantly related to their loan market counterparts, consistent with the logic that deposit-taking capacity is a prerequisite for lending.

Table 6 reports the 2SLS results, using deposit market structure and shares as instruments. Since deposit rates in China are tightly controlled, banks cannot offer below-benchmark rates, making deposit market variables suitable instruments. Table 7 presents results using a linear combination of deposit market structure and shares as instruments. Across both specifications, results remain consistent with the baseline models, confirming robustness.

Table 5. HHIL and loan share represented by HHID and deposit share.

	Dependent variable			
	depositshare		HHID	
	(1)	(2)	(3)	(4)
HHIL	0.0003*		0.998***	
	(0.0002)		(0.005)	
loanshare		0.877***		3.351*
		(0.002)		(1.757)
branch	0.723***	0.126***	0.203	−0.031
	(0.008)	(0.002)	(0.224)	(1.421)
expstaff	0.00002	−0.00000	−0.001*	−0.001
	(0.00001)	(0.00000)	(0.0003)	(0.001)
Constant	−0.114	−0.0005	12.539***	808.893***
	(0.145)	(0.003)	(4.214)	(2.189)
Observations	2812	2801	2836	2814
R^2	0.751	0.995	0.928	0.004
Adjusted R^2	0.751	0.995	0.928	0.003
Residual std. error	0.955 (df = 2808)	0.135 (df = 2797)	27.823 (df = 2832)	103.675 (df = 2810)
F statistic	2,824.567*** (df = 3; 2808)	186,604.800*** (df = 3; 2797)	12,190.720*** (df = 3; 2832)	3.597** (df = 3; 2810)

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%; standard errors are shown in parentheses.

Table 6. The 2SLS results, deposit market share, and structure as instruments on profitability.

	Dependent variable					
	ROE			ROA		
	(1)	(2)	(3)	(4)	(5)	(6)
	Deposit shares as IV	HHID as IV	Deposit shares as IV	Deposit shares as IV	HHID as IV	Deposit shares as IV
HHIL	0.118*	0.026***		0.007	0.001***	
	(0.063)	(0.001)		(0.004)	(0.0001)	
loanshare			0.347***			0.021**
			(0.098)			(0.009)
branch	−0.040	0.144***	−0.036	−0.012	−0.001	−0.012
	(0.154)	(0.039)	(0.081)	(0.011)	(0.004)	(0.007)
expstaff	−0.0001	−0.0001***	−0.0001**	−0.00002*	−0.00002***	−0.00002***
	(0.0001)	(0.0001)	(0.0001)	(0.00001)	(0.00001)	(0.00001)
Constant	−82.817*	−9.123***	11.612***	−4.710	−0.165**	0.933***
	(49.999)	(0.771)	(0.117)	(3.564)	(0.076)	(0.011)
Observations	2811	2834	2800	2811	2835	2800
R^2	−2.469	0.234	0.012	−1.187	0.086	0.005
Adjusted R^2	−2.473	0.233	0.011	−1.190	0.085	0.004
Residual std. error	10.434 (df = 2807)	4.902 (df = 2830)	5.552 (df = 2796)	0.744 (df = 2807)	0.481 (df = 2831)	0.502 (df = 2796)

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%; standard errors are shown in parentheses.

Table 7. The 2SLS results, deposit market share, and structure linear combination as instruments.

	Dependent variable			
	ROE	ROA	ROE	ROA
	(1)	(2)	(3)	(4)
	Deposit shares + HHID as IV			
HHIL	0.347***	0.021**		
	(0.098)	(0.009)		
loanshare			0.026***	0.001***
			(0.001)	(0.0001)
branch	−0.036	−0.012	0.148***	−0.001
	(0.081)	(0.007)	(0.040)	(0.004)
expstaff	−0.0001**	−0.00002***	-0.0001**	−0.00002***
	(0.0001)	(0.00001)	(0.0001)	(0.00001)
Constant	11.612***	0.933***	-9.109***	−0.159**
	(0.117)	(0.011)	(0.771)	(0.076)
Observations	2800	2800	2811	2811
R^2	0.012	0.005	0.234	0.083
Adjusted R^2	0.011	0.004	0.233	0.082
Residual std. error	5.552 (df = 2796)	0.502 (df = 2796)	4.904 (df = 2807)	0.481 (df = 2807)

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%; standard errors are shown in parentheses.

4.2. Market structure and market power effects on rates

As expected, deposit rates are minimally affected by market structure and power because of strict regulatory controls. Table 8 shows that deposit market power has a small, insignificant effect, while market structure has a slight negative impact. Overall, deposit rates remain highly uniform across banks, reflecting policy restrictions.

Table 8. Deposit market structure and market power effects on deposit rates.

	Dependent variable			
	depositrate			
	OLS	*panel linear*	*OLS*	*panel linear*
	(1)	(2)	(3)	(4)
HHID	−0.001**	−0.003***	−0.001**	−0.003***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)
depositshare			0.047	0.182
			(0.040)	(0.218)
branch	−0.042**	0.033	−0.075**	0.013
	(0.017)	(0.046)	(0.033)	(0.052)
expstaff	0.00003	0.00001	0.00002	0.00001
	(0.00002)	(0.00002)	(0.00002)	(0.00002)
Constant	3.489***		3.495***	
	(0.298)		(0.298)	
IND	N	Y	N	Y
Observations	2798	2798	2798	2798
R^2	0.005	0.028	0.005	0.028
Adjusted R^2	0.004	−0.134	0.004	−0.134
Residual std. error	2.005 (df = 2794)		2.005 (df = 2793)	
F statistic	4.449*** (df = 3; 2794)	23.074*** (df = 3; 2398)	3.683*** (df = 4; 2793)	17.478*** (df = 4; 2397)

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%; standard errors are shown in parentheses.

Turning to loan rates, Table 9 shows that loan market concentration (HHI) has a positive and significant impact, indicating that dominant banks can raise average loan rates due to credit scarcity. By contrast, individual market power (loan share) has a negative and significant effect, meaning that larger banks lower loan rates to attract safer borrowers. These findings highlight a distinctive competition strategy in China: large banks use their scale and leverage to compete on loan quality rather than price.

Table 10 provides robustness checks using deposit market variables as instruments. Results are consistent with Table 9, confirming the robustness of these relationships.

Table 9. Loan market structure and market power effects on loan rates.

	Dependent variable			
	Loanrate			
	OLS	*panel linear*	*OLS*	*panel linear*
	(1)	(2)	(3)	(4)
HHIL	0.009***	0.009***	0.009***	0.009***
	(0.001)	(0.0005)	(0.001)	(0.0005)
loanshare			−0.359***	−0.952***
			(0.048)	(0.262)
branch	−0.133***	0.029	0.101***	0.103*
	(0.023)	(0.057)	(0.039)	(0.061)
expstaff	0.0001***	0.0001***	0.0001***	0.0001***
	(0.00003)	(0.00003)	(0.00003)	(0.00003)
Constant	2.135***		2.083***	
	(0.435)		(0.431)	
IND	N	Y	N	Y
Observations	2807	2807	2807	2807
R^2	0.104	0.123	0.122	0.128
Adjusted R^2	0.103	−0.024	0.121	−0.019
Residual std. error	2.858 (df = 2803)		2.830 (df = 2802)	
F statistic	108.763*** (df = 3; 2803)	112.672*** (df = 3; 2403)	97.132*** (df = 4; 2802)	88.232*** (df = 4; 2402)

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%; standard errors are shown in parentheses.

Table 10. The 2SLS results, deposit market share, and structure as instruments on loan rate.

	Dependent variable				
	loanrate				
	(1)	(2)	(3)	(4)	(5)
	Deposit shares as IV	HHID as IV	Deposit shares as IV	Deposit shares + HHID as IV	
HHIL	−0.096	0.008***		0.008***	
	(0.065)	(0.001)		(0.001)	
loanshare			−0.287***		−0.287***
			(0.053)		(0.053)
branch	0.070	−0.131***	0.070	−0.142***	0.070
	(0.160)	(0.023)	(0.044)	(0.024)	(0.044)
expstaff	0.0001	0.0001***	0.0001***	0.0001***	0.0001***
	(0.0001)	(0.00003)	(0.00003)	(0.00003)	(0.00003)
Constant	86.144*	3.077***	9.557***	3.065***	9.557***
	(51.630)	(0.452)	(0.063)	(0.452)	(0.063)
Observations	2794	2807	2794	2794	2794
R^2	−12.073	0.103	0.025	0.104	0.025
Adjusted R^2	−12.088	0.102	0.024	0.103	0.024
Residual std. error	10.924 (df = 2790)	2.860 (df = 2803)	2.983 (df = 2790)	2.859 (df = 2790)	2.983 (df = 2790)

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%; standard errors are shown in parentheses.

Table 11 examines the effect of loan market structure and power on estimated losses, proxied by loan loss provisions. Both deposit and loan market concentration reduce expected losses, supporting the view that larger banks attract higher-quality borrowers. This reinforces our earlier finding that large banks compete by offering lower loan rates to safer clients, rather than by exploiting market power to raise rates.

Table 11. Loan market structure and market power effects on estimated loss.

	Dependent variable			
	Loss			
	(1)	(2)	(3)	(4)
HHIL			−0.003***	
			(0.0002)	
loanshare	−0.201**		−0.107	
	(0.097)		(0.090)	
HHID				−0.003***
				(0.0002)
depositshare		−0.121		0.079
		(0.103)		(0.095)
branch	0.007	−0.001	0.032	0.013
	(0.023)	(0.026)	(0.022)	(0.024)
expstaff	0.00001	0.00001	0.00001	0.00001
	(0.00001)	(0.00001)	(0.00001)	(0.00001)
IND	Y	Y	Y	Y
Observations	2766	2755	2766	2755
R^2	0.002	0.001	0.130	0.148
Adjusted R^2	−0.166	−0.168	−0.017	0.004
F statistic	1.915 (df = 3; 2366)	1.023 (df = 3; 2355)	88.347*** (df = 4; 2365)	102.622*** (df = 4; 2354)

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%; standard errors are shown in parentheses.

Aggressiveness in lending, measured by the difference between loan and deposit market shares, is analyzed in Table 12. Results show that aggressive strategies do not raise profitability and are unrelated to deposit rates. Instead, they reduce both loan rates and expected losses. These results further support the conclusion that Chinese banks compete on loan quality rather than on higher spreads.

Table 12. Aggressiveness and competition.

	Dependent variable				
	ROE	ROA	depositrate	loanrate	loss
	(1)	(2)	(3)	(4)	(5)
agg	−0.637	−0.011	0.035	−0.702***	−0.137
	(0.421)	(0.035)	(0.286)	(0.268)	(0.107)
branch	0.001	−0.014**	0.036	0.048	0.030
	(0.087)	(0.007)	(0.046)	(0.048)	(0.020)
expstaff	−0.0001**	−0.00001**	−0.00001	0.00004	−0.00001
	(0.00004)	(0.00000)	(0.00002)	(0.00002)	(0.00001)
IND	Y	Y	Y	Y	Y
Year	Y	Y	Y	Y	Y
Observations	2834	2835	2798	2807	2766
R^2	0.003	0.004	0.0003	0.004	0.002
Adjusted R^2	−0.168	−0.168	−0.172	−0.168	−0.173
F statistic	2.708** (df = 3; 2417)	2.999** (df = 3; 2418)	0.245 (df = 3; 2386)	3.511** (df = 3; 2391)	1.367 (df = 3; 2354)

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%; standard errors are shown in parentheses.

4.3. Heterogeneity analysis

To investigate size effects, we conduct a heterogeneity analysis using propensity score matching. Table 13 presents the results for large banks. Consistent with baseline findings, market power reduces expected losses, confirming that large banks compete by offering lower loan rates to safer borrowers. Their size and leverage allow them to sustain profitability despite narrower spreads.

Table 14 shows results for small banks. Unlike large banks, small banks charge higher loan rates, and their market power does not reduce rates or expected losses. Although small banks may wish to attract safer borrowers with lower rates, they lack the scale to implement this strategy effectively. Thus, market power does not enhance profitability for smaller banks. These findings strongly support hypotheses H3 and H4.

Table 13. PSM subsample for large banks.

	Dependent variable				
	ROE	ROA	depositrate	loanrate	loss
	(1)	(2)	(3)	(4)	(5)
HHIL	0.028***	0.001***		0.008***	−0.003***
	(0.001)	(0.0001)		(0.001)	(0.0002)
loanshare	0.200***	0.029***		−0.428***	−0.099***
	(0.070)	(0.005)		(0.051)	(0.015)
HHID			−0.002***		
			(0.0002)		
depositshare			−0.041**		
			(0.019)		
branch	0.010	−0.014***	−0.039**	0.151***	0.040***
	(0.056)	(0.004)	(0.016)	(0.041)	(0.012)
expstaff	0.001**	−0.00005**	0.001***	0.002***	0.0004***
	(0.0003)	(0.00002)	(0.0001)	(0.0002)	(0.0001)
Constant	−11.529***	−0.316***	4.478***	2.277***	4.486***
	(0.952)	(0.071)	(0.220)	(0.694)	(0.188)
Observations	1222	1223	1217	1223	1208
R^2	0.365	0.235	0.168	0.156	0.189
Adjusted R^2	0.363	0.233	0.165	0.153	0.186
Residual std. error	4.041 (df = 1217)	0.302 (df = 1218)	0.956 (df = 1212)	2.946 (df = 1218)	0.794 (df = 1203)
F statistic	174.943*** (df = 4; 1217)	93.790*** (df = 4; 1218)	61.111*** (df = 4; 1212)	56.301*** (df = 4; 1218)	70.069*** (df = 4; 1203)

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%; standard errors are shown in parentheses.

Table 14. PSM subsample for small banks.

	Dependent variable				
	ROE	ROA	Depositrate	loanrate	loss
	(1)	(2)	(3)	(4)	(5)
HHIL	0.021***	0.001***		0.011***	−0.002***
	(0.002)	(0.0002)		(0.001)	(0.001)
loanshare	3.656	−0.760		−4.749	0.438
	(7.626)	(0.849)		(3.021)	(1.960)
HHID			0.0004		
			(0.0004)		
depositshare			−0.654		
			(0.818)		
branch	−0.407	0.068	1.689	0.670*	−0.021
	(0.944)	(0.105)	(1.824)	(0.374)	(0.242)
expstaff	−0.0001**	−0.00001*	−0.00001	0.00004	−0.00001
	(0.0001)	(0.00001)	(0.00001)	(0.00003)	(0.00002)
Constant	−4.756***	0.024	1.780***	0.781	4.247***
	(1.711)	(0.190)	(0.300)	(0.678)	(0.436)
Observations	974	975	968	974	958
R^2	0.087	0.033	0.003	0.147	0.012
Adjusted R^2	0.084	0.029	−0.001	0.143	0.007
Residual std. error	5.814 (df = 969)	0.647 (df = 970)	0.987 (df = 963)	2.297 (df = 969)	1.458 (df = 953)
F statistic	23.225*** (df = 4; 969)	8.205*** (df = 4; 970)	0.733 (df = 4; 963)	41.661*** (df = 4; 969)	2.781** (df = 4; 953)

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%; standard errors are shown in parentheses.

5. Conclusions and discussion

This study uses Chinese banks' financial statements to examine market structure and competitive behavior. The results show that market structure in China influences banks in ways similar to other countries, but with important differences. In most markets, greater market power allows banks to raise loan rates. In China, however, competition in the lending market takes a different form: banks with more market power lower loan rates to attract lower-risk borrowers. Larger banks benefit from reduced bad debt and higher profits, while smaller banks struggle to compete. Their limited scale forces them to balance operating costs against loan pricing, making it difficult to reduce losses unless they can offer sufficiently low loan rates to attract safe borrowers.

These findings align with the view that banking competition strategies are shaped by market concentration (Boyd and De Nicolo, 2005). Market structure significantly affects the loan rates banks offer, and bank-level market power helps explain how monetary policy is transmitted to borrowers (Wang

et al., 2022). Consistent with prior research on emerging markets, larger banks in China use their market power to enhance profitability, while controlled competition does not undermine financial stability (Ariss, 2010). Our study further contributes to the literature by linking deposit market power with loan market behavior, showing that deposit capacity reflects banks' ability to compete in loan markets.

There are several limitations to this research. First, our results may capture monetary policy effects, since banks can obtain cheaper capital directly from the central bank. Fiscal policy can also expand money supply, influencing deposit and loan market structures, bank performance, and interest rates. Second, using deposit market structure and market power as instrumental variables raises concerns about omitted variables, such as bank-specific preferences, branch distribution, and geographic concentration. In non-crisis periods when bank runs are unlikely, small reductions in deposit rates may discourage deposits, but banks can often adjust deposit-taking to match lending needs. While this flexibility alleviates some concerns, it does not make the deposit market structure and power a perfect exogenous instrument.

These empirical findings have policy implications. In most markets, greater competition lowers loan rates and improves efficiency, while market power tends to reduce competitiveness and stability. China's case is unique: many large borrowers are state-owned enterprises (SOEs), widely viewed as low risk because of government backing. This raises further questions. Do large banks face lower risk because they lend more to SOEs, or because they have superior borrower selection skills? And since many banks themselves are SOEs, do they possess informational advantages that bias lending toward state-owned borrowers? Understanding these dynamics is critical for assessing the Chinese banking system.

Author contributions

Conceptualization — D.S. and H.M.; Methodology — D.S. and H.M.; Validation — D.S. and H.M.; Formal Analysis — D.S. and H.M.; Resources — D.S. and H.M.; Writing Original Draft — D.S. and H.M.; Writing — Review & Editing —D.S. and H.M. All authors have read and agreed to the published version of the manuscript.

Use of AI tools declaration

The authors declare they have not used Artificial Intelligence (AI) tools in the creation of this article.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

Conflicts of interest

The authors declare no conflict of interest.

Reference

Akhigbe A, McNulty JE (2011) Bank monitoring, profit efficiency and the commercial lending business model. *J Econ Bus* 63: 531–551. https://doi.org/10.1016/j.jeconbus.2011.07.001

Araujo A, Chateauneuf A, Faro JH (2018) Financial market structures revealed by pricing rules: Efficient complete markets are prevalent. *J Econ Theory* 173: 257–288. https://doi.org/10.1016/j.jet.2017.11.002

Ariss RT (2010) On the implications of market power in banking: Evidence from developing countries. *J Bank Financ* 34: 765–775. https://doi.org/10.1016/j.jbankfin.2009.09.004

Arping S (2017) Deposit competition and loan markets. *J Bank Financ* 80: 108–118. https://doi.org/10.1016/j.jbankfin.2017.04.006

Avdjiev S, Hale G (2019) US monetary policy and fluctuations of international bank lending. *J Int Money Financ* 95: 251–268. https://doi.org/10.1016/j.jimonfin.2018.06.013

Berger AN, Klapper LF, Turk-Ariss R (2009) Bank competition and financial stability. *J Financ Serv Res* 35: 99–118. https://doi.org/10.1007/s10693-008-0050-7

Bourke P (1989) Concentration and other determinants of bank profitability in Europe, North America and Australia. *J Bank Financ* 13: 65–79. https://doi.org/10.1016/0378-4266(89)90020-4

Boyd JH, De Nicolo G (2005) The theory of bank risk taking and competition revisited. *J Financ* 60: 1329–1343. https://doi.org/10.1111/j.1540-6261.2005.00763.x

Caminal R, Matutes C (2002) Market power and banking failures. *Int J Ind Organ* 20: 1341–1361. https://doi.org/10.1016/S0167-7187(01)00092-3

Casu B, Girardone C (2006) Bank competition, concentration and efficiency in the single European market. *Manchester Sch* 74: 441–468. https://doi.org/10.1111/j.1467-9957.2006.00503.x

Chen H, Chen Q, Gerlach S (2013) The implementation of monetary policy in China: The interbank market and bank lending, In: *Global Banking, Financial Markets and Crises*, Emerald Group Publishing Limited, 31–69. https://doi.org/10.1108/S1569-3767(2013)0000014005

Chu SF, Lim GH (1998) Share performance and profit efficiency of banks in an oligopolistic market: evidence from Singapore. *J Multinatl Financ Manag* 8: 155–168. https://doi.org/10.1016/S1042-444X(98)00025-5

Dalla E, Varelas E (2019) Regulation and oligopoly in banking: The role of banking cost structure. *J Econ Bus* 104: 105836. https://doi.org/10.1016/j.jeconbus.2019.02.002

Degryse H, Ongena S (2005) Distance, lending relationships, and competition. *J Financ* 60: 231–266. https://doi.org/10.1111/j.1540-6261.2005.00729.x

Dick AA (2008) Demand estimation and consumer welfare in the banking industry. *J Bank Financ* 32: 1661–1676. https://doi.org/10.1016/j.jbankfin.2007.12.005

Firth M, Lin C, Liu P, et al. (2009) Inside the black box: Bank credit allocation in China's private sector. *J Bank Financ* 33: 1144–1155. https://doi.org/10.1016/j.jbankfin.2008.12.008

Foos D, Norden L, Weber M (2010) Loan growth and riskiness of banks. *J Bank Financ* 34: 2929–2940. https://doi.org/10.1016/j.jbankfin.2010.06.007

Fu Y, Lee SC, Xu L, et al. (2015) The effectiveness of capital regulation on bank behavior in China. *Int Rev Financ* 15: 321–345. https://doi.org/10.1111/irfi.12045

Fungáčová Z, Pessarossi P, Weill L (2013) Is bank competition detrimental to efficiency? Evidence from China. *China Econ Rev* 27: 121–134. https://doi.org/10.1016/j.chieco.2013.09.004

Goddard J, Liu H, Molyneux P, et al. (2013) Do bank profits converge? *Eur Financ Manag* 19: 345–365. https://doi.org/10.1111/j.1468-036X.2010.00578.x

Goetz MR (2018) Competition and bank stability. *J Financ Intermed* 35: 57–69. https://doi.org/10.1016/j.jfi.2017.06.001

Gupta S (2002) Competition and collusion in a government procurement auction market. *Atl Econ J* 30: 13–25. https://doi.org/10.1007/BF02299143

Gustafson MT, Ivanov IT, Meisenzahl RR (2021) Bank monitoring: Evidence from syndicated loans. *J Financ Econ* 139: 452–477. https://doi.org/10.1016/j.jfineco.2020.08.017

Hannan TH (1991) Bank commercial loan markets and the role of market structure: Evidence from surveys of commercial lending. *J Bank Financ* 15: 133–149. https://doi.org/10.1016/0378-4266(91)90042-K

Hassan M (2019) How bank regulations impact efficiency and performance? *J Financ Econ Policy* 12(4): 545–575. https://doi.org/10.1108/JFEP-06-2019-0119

He D, Wang H (2012) Dual-track interest rates and the conduct of monetary policy in China. *China Econ Rev* 23: 928–947. https://doi.org/10.1016/j.chieco.2012.04.013

Ho CY (2010) Deregulation, competition and consumer welfare in a banking market: evidence from Hong Kong. *J Regul Econ* 37: 70–97. https://doi.org/10.1007/s11149-009-9106-3

Ho K, Ishii J (2011) Location and competition in retail banking. *Int J Ind Organ* 29: 537–546. https://doi.org/10.1016/j.ijindorg.2010.11.004

Jiménez G, Lopez JA, Saurina J (2013) How does competition affect bank risk-taking? *J Financ Stab* 9: 185–195. https://doi.org/10.1016/j.jfs.2013.02.004

Leary MT (2009) Bank loan supply, lender choice, and corporate capital structure. *J Financ* 64: 1143–1185. https://doi.org/10.1111/j.1540-6261.2009.01461.x

Li Y, Chiu YH, Lin TY, et al. (2019) Market share and performance in Taiwanese banks: min/max SBM DEA. *Top* 27: 233–252. https://doi.org/10.1007/s11750-019-00504-6

Maghyereh AI, Awartani B (2014) The effect of market structure, regulation, and risk on banks efficiency: Evidence from the Gulf Cooperation Council countries. *J Econ Stud* 41: 405–430. https://doi.org/10.1108/JES-05-2012-0067

Martin C (1993) Price adjustment and market structure. *Econ Lett* 41: 139–143. https://doi.org/10.1016/0165-1765(93)90187-H

Maudos J, De Guevara JF (2007) The cost of market power in banking: Social welfare loss vs. cost inefficiency. *J Bank Finance* 31: 2103–2125. https://doi.org/10.1016/j.jbankfin.2006.10.028

Mirzaei A, Moore T, Liu G (2013) Does market structure matter on banks' profitability and stability? Emerging vs. advanced economies. *J Bank Financ* 37: 2920–2937. https://doi.org/10.1016/j.jbankfin.2013.04.031

Neumark D, Sharpe SA (1992) Market structure and the nature of price rigidity: evidence from the market for consumer deposits. *Q J Econ* 107: 657–680. https://doi.org/10.2307/2118485

Oladunjoye O (2008) Market structure and price adjustment in the US wholesale gasoline markets. *Energy Econ* 30: 937–961. https://doi.org/10.1016/j.eneco.2007.09.009

Orzechowski PE (2017) Bank profits, loan activity, and monetary policy: evidence from the FDIC's Historical Statistics on Banking. *Rev Financ Econ* 33: 55–63. https://doi.org/10.1016/j.rfe.2016.11.002

Paligorova T, Santos JA (2017) Monetary policy and bank risk-taking: Evidence from the corporate loan market. *J Financ Intermed* 30: 35–49. https://doi.org/10.1016/j.jfi.2016.11.003

People's Bank of China (2012) Available from: http://www.pbc.gov.cn/goutongjiaoliu/113456/113469/2861204/index.html. (Accessed on 28 Aug 2025)

People's Bank of China (2015) Available from: http://www.pbc.gov.cn/zhengcehuobisi/125207/125213/125440/125835/2812382/index.html. (Accessed on 28 Aug 2025)

Raider HJ (1998) Market structure and innovation. *Soc Sci Res* 27: 1–21. https://doi.org/10.1006/ssre.1997.0608

Rhoades SA (1985) Market share as a source of market power: Implications and some evidence. *J Econ Bus* 37: 343–363. https://doi.org/10.1016/0148-6195(85)90027-X

Ruckes M (2004) Bank competition and credit standards. *Rev Financ Stud* 17: 1073–1102. https://doi.org/10.1093/rfs/hhh011

Santos JA, Winton A (2019) Bank capital, borrower power, and loan rates. *Rev Financ Stud* 32: 4501–4541. https://doi.org/10.1093/rfs/hhz001

Simpson W, Buckland J (2016) Dynamics of the location of financial institutions: who is serving the inner city? *Econ Dev Q* 30: 358–370. https://doi.org/10.1177/0891242416665908

Shim J (2019) Loan portfolio diversification, market structure and bank stability. *J Bank Financ* 104: 103–115. https://doi.org/10.1016/j.jbankfin.2019.04.006

Shy O, Stenbacka R (2004) Market structure and risk taking in the banking industry. *J Econ* 82: 249–280. https://doi.org/10.1007/s00712-003-0053-7

Tabak BM, Fazio DM, Cajueiro DO (2012) The relationship between banking market competition and risk-taking: Do size and capitalization matter? *J Bank Financ* 36: 3366–3381. https://doi.org/10.1016/j.jbankfin.2012.07.022

Tan Y, Floros C, Anchor J (2017) The profitability of Chinese banks: impacts of risk, competition and efficiency. *Rev Account Financ* 16: 86–105. https://doi.org/10.1108/RAF-05-2015-0072

Tchana FT (2012) The welfare cost of banking regulation. *Econ Model* 29: 217–232. https://doi.org/10.1016/j.econmod.2011.09.005

Thierie W, De Moor L (2019) Determinants of bank loan spread in project finance. *Int J Manag Proj Bus* 12: 161–186. https://doi.org/10.1108/IJMPB-12-2017-0154

Wang Y, Whited TM, Wu Y, et al. (2022) Bank market power and monetary policy transmission: Evidence from a structural estimation. *J Financ* 77: 2093–2141. https://doi.org/10.1111/jofi.13159

Xu B, van Rixtel A, Van Leuvensteijn M (2016) Measuring bank competition under binding interest rate regulation: the case of China. *Appl Econ* 48: 4699–4718. https://doi.org/10.1080/00036846.2016.1164818

Yeung G (2021) Chinese state-owned commercial banks in reform: inefficient and yet credible and functional? *J Chin Gov* 6: 198–231. https://doi.org/10.1080/23812346.2020.1772537