The Role of Bank Competition in influencing Bank Liquidity Creation: Evidence from China

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ABSTRACT

Does increased competition among banks improve or deteriorates the liquidity creation by banks? This paper studies the impact of bank competition on banks liquidity creation. Understudy phenomena are of great interest because of the far-reaching implications on liquidity creation from pro-competitive or financial liberalization policies adopted by countries. Thus, present study will contribute to both bank competition and determinants of banks liquidity creation. To study said phenomena we used dynamic GMM panel estimations on Chinese banking dataset from 2006 to 2017. This study finds that competition (measured by Lerner index) reduces the bank's liquidity creation. We explain this finding in terms of the impact of increased bank competition on the financial fragility of banks, which leads banks to reduce their lending and deposit activities. The evidence suggests that banking industry is different from others and pro-competitive policies in the banking industry can reduce liquidity provision by banks.

1. INTRODUCTION

Liquidity creation is one of the main functions provided by banks. Besides bank liquidity creation, banks also provide risk transformation (Grubel, 2014). Past literature provides abundant empirical evidence about the role of banks in risk transformation. However, there is limited evidence of how bank competition influences bank liquidity creation. Commercial banks function as a critical liquidity provider by financing relatively illiquid assets with relatively liquid liabilities. Banks create liquidity when they

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advance illiquid loans to borrowers while allowing depositor the liberty to withdraw funds at par value at an instant notice (Holmström & Tirole, 1998; Kashyap, Berger, & Bouwman, 2009, Horvath & Schindler, 2016). For the stability of financial system and macro-economy, bank liquidity creation remains exceptional and becomes even more significant during financial crises (Laeven, Levine, & Michalopoulos, 2015).

Given the significance of the bank liquidity creation, it is imperative to examine what are the significant determinants of bank liquidity creation and what are the significant factors which influence banks to create liquidity (Berger, 2016). Past studies proclaim that bank capital, credit policy, bank governance and macro-economic factors (monetary and fiscal policy, government interventions) remain major determinants of bank liquidity creation (Berger & Bouwman, 2017). In line with these trends, increasing diversification of banking operations around the globe has surged a debate about the possible role of bank completion. The impact of bank competition on credit policy (Ruckes, 2004), capital structure (Chang, 2006), financial product, (Cornaggia, Mao, Tian, & Wolfe, 2015), financial stability (Allen & Gale, 2004), and economic growth (Berger & Bouwman, 2017) have been thoroughly examined.

However, the ongoing literature provides limited empirical evidence about the role of bank competition and bank liquidity creation (Berger, 2015). Besides risk transformation, central role of commercial banks is to provide liquidity to the economy. However, this critical function of the banks has been overlooked in the literature for several years. Subsequently, though liquidity creation is an important function comprehensive empirical measure of this construct remained absent until the seminal work pioneered by Berger and Bounwman (2009), which advocates a novel approach to measure bank's bank liquidity creation. This work opens the avenue for an emerging strand of literature directed toward the antecedents and consequences of bank's liquidity creation by banks. The comprehensive measures have been postulated by Berger and Bounwman (2009), making it possible to address a range of questions relevant to the research and policy interest. These questions include how much liquidity does the bank create? What is the optimal limit of bank liquidity creation? What is the value implication of bank liquidity creation? In line with the emerging trends, the research question of how bank competition impacts bank liquidity creation remains overlooked and there is limited empirical evidence which shed light on this issue.

The modern theory of financial intermediation signifies liquidity creation as an exceptional role of banks, and it is essential for the macroeconomy. The study contributes by a better understanding of the relationship between banks competition and liquidity creation in China. The banking sector of China is moving through policy level transformation and intense competition. Therefore it would be worthwhile to examine the competition nexus with bank liquidity creation in the context of Chinese banking sector. Moreover, the findings of the study will clarify whether bank stability or bank fragility hypothesis holds in the context of the Chinese banking sector.

2. LITERATURE REVIEW

The significance of the banking system is well-documented; banks play a vital role in the economic system by mobilizing resources. Banks function as a bridge between surplus unit and deficit unit. Banks act as an agent to meet long-term borrowings from

short-term financing (Jiang, Levine, & Lin, 2019). This results in financing liquid liabilities from illiquid assets and is termed as liquidity creation. Apart from risk transformation and mobilizing savings, liquidity creation is one of the most important functions which is rendered by commercial banks towards the economy (Badarau, & Lapteacru, 2019). The following section provides substantive view of the theories relevant to the concept and measure of liquidity creation employed in the past.

There are two conflicting perspectives regarding the potential impact of bank competition and bank liquidity creation. First "fragility channel" view of competition holds the view that bank competition adversely affects bank liquidity creation and reduce the bank's profit. This view is reinforced by (Petersen & Rajan, 1995). In line with this view, increased banking competition diminishes credit supply due to tightened credit policy. The opposing view of fragility channel posits that competition positively influences banking activities leading to decreased loan rates and increased deposit rates (Sahyouni & Wang, 2019). Consequently, both parties (deficit unit & surplus unit) are being positively benefited. Bank competition stimulates loan demands by removing financing obstacles (Perera & Skully, 2010).

There "are some empirical evidence which explicitly examines the nexus between bank competition and bank liquidity creation in the context of developed open economies (Berger, 2009). However, the economies which are tightly regulated by governments remain overlooked and to-date there is not a single study which examines the potential impact of bank competition on bank liquidity creation (Joh & Kim, 2012). Moreover, empirical evidence on the potentially reciprocal relationship between bank competition and bank liquidity creation, particularly in the context of emerging economies such as China remains rare. China's banking system occupies a dominant position in the Chinese financial system and a key liquidity provider to the macro-economy and the financial system. Though incredible progress has been made by China to reform its banking and financial sector, however, reforms in the banking sector have lagged behind those in other developed economies (Chatterjee, 2018). China's banking sector is still under robust supervision, and the primary source of bank's profit remains the traditional asset-liability operations (Podpiera, 2006; Brandt & Zhu, 2007). From a cross-sectional viewpoint, banks that lack market power hold more liquid assets and are net lenders in the interbank market.

In contrast, dominant banks hold less liquid assets and are net interbank borrowers. For a given level of market power, ceteris paribus, banks in the developed countries hold less asset liquidity and obtain more interbank funding liquidity than their counterparts in the developing countries (Nguyen, Perera, & Skully, 2017). Extending this notion, liquidity creation function is also relatively constrained under the current banking regulatory regime. Accompanied by various other challenges relevant to commercial banking activities and regulations, bank competition is supposed to surge at a rapid pace in the Chinese banking sector due to its large expansion of the economy.

The study of Lei and Song (2013), tests the so-called "financial fragility-crowding out" hypothesis and the "risk absorption" hypothesis on Chinese banks and finds out that bank capital is negatively related to liquidity creation, which supports the financial fragility-crowding out hypothesis. The financial stability theory has been rejected which signifies that liquidity creation negatively impacts economic growth. Similarly, the study of Horvath, Seidler & Weill, (2016) avers that bank liquidity creation results in higher

credit risk and increases the chances of default risk. Moreover, the study also asserts that regulatory pressure informing of demand deposit results into a lower level of bank liquidity creation.

This study examines the potential influence of bank competition and bank liquidity creation using a comprehensive dataset of Chinese banks, from 2006-2017 accessed through Fitch Solutions. The scope of the study is limited to a single country because measurement of liquidity creation following Berger and Bounwman (2009), requires extensive balance sheet data including off-balance sheet items. Accordingly, the explanatory variable of the study has been operationalized by using the Lerner index, an individual measure of bank competition. As compared with concentration indices, Lerner index has the added benefit of apprehending the effective behavior of banks rather than presuming that concentration is negatively correlated with competition. Moreover, Lerner index makes it possible to exploit bank-level variations in market power in our analysis. The significance of bank competition and its role in determining liquidity creation is of great importance due to its vibrant implications of policy. Regulators may be keen to boost the bank competition to increase the welfare of bank consumers and any adverse effect of liquidity would reflect the presence of a policy trade-off. Therefore, this study aims to advance understanding of the determinants of bank liquidity creation and the consequences of bank competition in the context of China. Rest of the study is organized as follows; section 2 outlines the detail about data and methodology, section 3 briefly explains result, and section 4 concludes the study.

3. METHODOLOGY

This section first outlines the sources of data and sample of commercial banks to determine the impact of bank competition on liquidity creation. Next, a brief operationalization of crucial variables and the econometric technique of the study is postulated.

3.1. Data Sources

Data collection was preceded by the population of commercial banks in China from 2006- 2017. Secondary data was accessed through ORBIS Bank Focus (online database). 12-year cross-sectional time-series data was collected, and the range of data was limited to only twelve years. The data set includes only 12 years due to data availability issues. As the data was collected through online database (i.e. ORBIS Bank Focus). Only commercial banks were considered because these are the main source of liquidity creation and key providers of liquidity to the macro-economy (Berger & Bouwman, 2011; Horvath, Seidler, & Weill, 2016). While data for the macroeconomic variable has been extracted from World Bank Development Indicators (WDI).

3.2. Measure of Bank Competition

The arguments for the role of competition in the context of the banking industry are usually derived by applying standard industrial organization (IO) approach. According to traditional IO approach, market structure test is postulated to examine bank competition based on structure conduct performance (SCP) model. Structure conduct performance model adheres to the notion that increased concentration results into lower

level of bank competition and boost bank's financial performance. According to traditional IO approach, competition is measured by concentration index measured through HHI (Herfindahl-Hirschman Index). However, in many aspects, concentration is more divergent than competition, and it is a market base measure of bank competition rather than bank-level measure. Alternatively, the new IO approach holds the view that non-structural tests are best to measure the intensity of bank competition. The non-structural measure is not based upon market structure, rather it directly assesses bank behavior. In line with new IO approach, this study has employed Lerner index, bank-level measure of competition for each cross-section. Most of the recent studies expounded in literature have used this model to examine the influences of bank competition. High-value indices of Lerner model reflect higher market power. Price is the average price of bank output (measured total revenue to total assets) (Horvath et al., 2016). Marginal cost is approximated by using trans-log cost function of total assets and their input (price, labor, price of physical capital and price of borrowed funds). The specification of inputs is adopted from the seminal work of Turk-Ariss (2010).

$$TC = \partial_0 + \partial_1 \ln x + \frac{1}{2}\partial_2(\ln x)^2 + \sum_{j=1}^{3} \beta_{jk} \ln q_j + \sum_{j=1}^{3} \sum_{j=1}^{3} \beta_{j_k} \ln q_j \ln q_k + \sum_{j=1}^{3} \Upsilon_j \ln x \ln q + \varepsilon$$

Where the TC represents total cost, x is total assets, q_1 is the price of labor (the ratio of staff expenses to the number of employees), q_2 is the price of physical capital (the ratio of general and administrative expenses, other operating expenses, and depreciation divided by fixed assets), and q_3 is the price of borrowed funds (the ratio of the cost of borrowed funds to borrowed funds). X represents the total asset of the respective banks. Therefore, the total cost is the summation of general and administrative expenses, staff expenses, depreciation, operating expenses, and costs of borrowed funds. The estimated coefficients of the cost function are used to calculate the marginal cost:

MC = TCST

After calculating the marginal cost, the Lerner index for each bank and time can be calculated. Table 1 shows the Lerner indices for each year. There are two main findings that emerge from the analysis of reported measures. First, the declining value in comparison to other studies in different countries, suggests a low market power in China. The only exception is (Horvath et al., 2016) is the banking industry of Czech Republic where banks find average values of Lerner index ranging from 44% to 56%, which shows a low level of the competitive market whereas an analysis of a sample of EU (Carbo et al., 2009) shows the mean Lerner index value to be ranging from 10% to 21%. Whereas, the mean value of the Lerner index in the Chinese market is 37.8% (Fungacova et al., 2013).

Second, the level of competition in China over the study period keeps increasing which suggests that big changes have occurred in the market structure of these banks.

3.3. Measure of Bank Liquidity Creation

The study has utilized two category-based measures adopted from seminal work of Berger & Bouwman (2009); they first categorize each on and off-balance sheet item as a liquid, semiliquid and illiquid. Second, they assign weight to each category. Appendix 1 outlines how the bank balance sheet items are categorized, and weights are assigned.

Table1

Descriptive statistics of Banks Competition

Year	All			Big 5		
	Obs.	Mean	Std.	Obs.	Mean	Std.
2006	37	0.338	0.102	5	0.346	0.116
2007	61	0.405	0.122	5	0.443	0.014
2008	76	0.376	0.114	5	0.401	0.061
2009	76	0.375	0.100	5	0.439	0.050
2010	75	0.421	0.098	5	0.482	0.035
2011	61	0.376	0.075	5	0.449	0.047
2012	90	0.372	0.103	5	0.493	0.025
2013	110	0.382	0.097	5	0.512	0.065
2014	130	0.310	0.112	5	0.531	0.073
2015	160	0.302	0.097	5	0.551	0.047
2016	170	0.281	0.107	5	0.570	0.034
2017	170	0.279	0.080	5	0.589	0.052

Theses weight presumes that $1 of liquidity is created when $1 of illiquid (liquid) assets or off-balance sheet items is converted into $1 of liquid or illiquid liabilities. Berger & Bouwman (2009) propose model of bank liquidity creation which is also known as cat-fat and cat-not-fat measure of liquidity creation. Most of the recent studies also term these measures as narrow and broad measure of bank liquidity creation. This study used both narrow and broad measure of bank liquidity creation to assess its dependency on bank competition. The main difference between broad and narrow measure of bank liquidity creation exists due to off-balance sheet activities. The broad measure of bank liquidity creation includes both on and off-balance sheet activities. On the other hand, narrow measure which is also termed as Cat-Not-fat discard off-balance sheet activities (Berger & Bouwman, 2017). Cat-fat and cat-not-fat differ from each other due to the fact that former measure contains only on-balance sheet items while later contain off-balance sheet items. The list of variables to calculate bank liquidity creation and formulas have been provided in annexure 1.

Annexure 1 enlists the balance sheet items which are categorized into illiquid assets, semiliquid assets and liquid assets respectively. Similarly, the liabilities have also been categorized as illiquid liabilities, semiliquid liabilities and liquid liabilities. After such categorization, proper weights have been assigned as recommended by Berger &Bownman (2009). According to the adopted model, weights for liquid assets and illiquid liabilities are -½, and ½ for illiquid assets and liquid liabilities, and semiliquid assets and liabilities are assigned zero weight. Section B of Annexure 1 contains formulas for calculating cat-not-fat and cat-fat measures of bank liquidity creation.

Table 2 shows mean liquidity by banks over the sample period. It shows a strong positive trend over the period, suggesting banks increase their liquidity creation over time. The mean value of LC to asset ratio has grown between 2011 and 2017 from 9% to

28% when measured through the broad measure and from 12% to 32% using the narrow measure of liquidity measure.

Table 2

Broad and Narrow Measure of Liquidity Creation

This table shows the mean and standard deviation for the liquidity creation measures adopted in the estimations. These measures are ratios of liquidity creation (both the broad measure and the narrow measure of liquidity creation) to total assets.

Year	Liquidity Creation-Broad Measure		Liquidity Creation-Narrow Measure	
	Mean	Std. dev.	Mean	Std. dev.
2006	0.09	0.30	0.12	0.01
2007	0.11	0.40	0.14	0.16
2008	0.10	0.45	0.12	0.30
2009	0.11	0.30	0.13	0.28
2010	0.12	0.28	0.15	0.21
2011	0.13	0.26	0.16	0.17
2012	0.15	0.26	0.18	0.21
2013	0.2	0.27	0.22	0.18
2014	0.24	0.32	0.26	0.19
2015	0.27	0.26	0.31	0.21
2016	0.29	0.21	0.32	0.24
2017	0.28	0.26	0.32	0.18

3.4. Bank Specific Micro Variable

Based on substantive literature, the study incorporates total asset as the size of the bank (log of the total asset). According to (Fungacova, Pessarossi & Weill, 2013), size of the bank is positively correlated with bank liquidity creation. Bank efficiency is operationalized as operating profit to total asset ratio. Credit risk is measured by using nonperforming loan proxy. The intensity of credit risk increases/decreases as the bank creates lower or higher-level bank liquidity creation. The result proclaimed in past literature remains divergent about the possible impact of credit risk on bank liquidity creation REF. Accounting base measure of return on equity was used to calculate bank's profitability. The relation between bank profitability and liquidity remains unclear. As posited by Berger et al., (2016) that ROE is negatively correlated with bank liquidity creation. Therefore, ROE is incorporated as a measure of profitability to examine its potential impact on bank liquidity creation in the context of China. To measure the bank stability Z-score measure is utilized. The Z-score measure is commonly employed by past studies to assess bank stability risk (Horvath et al., 2016). Z-score is measured via summation of return on average assets and equity to total assets, by dividing the number by standard deviation of return on average assets. A higher index of Z-score reflects a

lower level of risk and vice versa. It is expectedly based on past studies (Diamonf & Rajan,2001, Berger et al., 2009; Horvath et al., 2016;) that Z-score may have a negative relationship with liquidity creation.

3.5. Control Variable

Past studies relevant to bank liquidity creation also used macroeconomic variables as control variables. This study also uses several macro-economic variables as proposed by past studies (Horvath et al., 2016; Berger & Bouwman, 2017). Inflation rate and the unemployment rate were used as a control variablesin this study to control for the possible macroeconomic environment because the macroeconomic environment in an economy directly affects banks liquidity creation (Berger & Bouwman, 2011).

3.6. Relationship between the Lerner Index and Liquidity Creation

To examine the statistical relationship between competition and bank liquidity creation the study estimates the following econometric equation:

$$LC = f\left(Lerner_{i,t}, Liquidity creation_{i,t}, Inflation\ rate_t, Unemployment\ rate_t\right) + \varepsilon_{i,t} \ldots (1)$$

Where Z represents the control variable, the subscript "i" represents bank, t denotes the time dimension and € represents error term. Liquidity creation, being the ratio of liquidity creation to assets, is the most important dependent variable in this study. Moreover, there could be an endogeneity problem like omitted variables and reverse causality. For example, banks with high market power create more liquidity. Moreover, it could be the case that there are many other factors which could affect both banks competition and liquidity creation. Thus, the present study employs GMM estimators, so that the potential issue of endogeneity can be relaxed following (Arellano & Bover, 1995).

4. RESULTS AND DISCUSSION

The results of the study are based on the broader measure (cat-fat) of liquidity creation because this measure contains detail on and off-balance sheet items. However, the study also employs a narrow measure of bank liquidity creation to check the robustness of results. Besides such testing, two additional tests were carried out by including or excluding the macroeconomic control variable. The result of the study adheres to the bank fragility notion that increased competition diminishes liquidity creation. Findings of the study suggest that higher market power increases liquidity creation and, as a result, increased bank competition reduces bank liquidity creation. According to financial fragility viewpoint, competition increases fragility whereas under this view the increased competition decreases the ratio of bank capital and diminishes bank. Moreover, bank competition increases the chances of credit risk due to less tightened credit policy.

Table 3

Results of Main Estimation

Two-step GMM is used with "Windmeijer's (2005) corrected std. errors mentioned in brackets. While *,**, and *** show that P-value is less than 0.1,0.05 and 0.01, respectively. The Sargan/Hansen test of the over-identifying restrictions for the GMM estimators is the null hypothesis that instruments used are not correlated with the residuals, and hence the over-identifying restrictions are valid. The Arellano–Bond (AB) test is used to test whether the residual at first difference exhibits second-order auto-correlation or not. To test whether the sum of lagged term is not different from zero, variable total learner is used for this purpose and its estimated coefficient is mentioned against it. Values in brackets represent P-value.

Explained Variables"	LC-Broad measure		LC-Narrow measure	
	(1)	(2)	(3)	(4)
LC_{t-1}	0.20*	0.070	0.30***	0.24*
	(0.090)	(0.140)	(0.110)	(0.130)
LC_{t-2}	−0.86*	−0.06	0.13**	0.050*
	(0.090)	(0.130)	(0.060)	(0.080)
$Lerner_{t-1}$	0.19***	0.18**	0.040	0.030
	(0.078)	(0.080)	(0.040)	(0.040)
$Lerner_{t-2}$	0.69***	0.51***	0.17***	0.15*
	(0.006)	(0.180)	(0.060)	(0.080)
Lerner total	2.09***	0.85***	0.29***	0.25*
	(0.000)	(0.010)	(0.010)	(0.070)
Capital	1.16***	−0.08	−0.17	0.160
	(0.0520)	(0.660)	(0.550)	(0.570)
Non-Performing loans	−0.002	−0.001	−0.01***	−0.01***
	(0.001)	(0.001)	(0.002)	(0.001)
Credit	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Z-score	−0.0003***	−0.0003**	−0.0001	−0.0001
	(0.000)	(0.000)	(0.000)	(0.000)
Variation in Earnings	−0.02	−0.01	0.02**	0.02*
	(0.010)	(0.010)	(0.010)	(0.010)
Unemployment		0.003		−0.003*
		(0.004)		(0.002)
Inflation rate		0.006**		0.001
		(0.002)		(0.001)
Observations	869.000	869.000	869.000	869.000
Sargan	17.290	19.980	42.630	26.470
Bond Test AR (1)	−1.89*	−1.66*	−2.84***	−2.39***
Bond Test AR (2)	0.420	0.480	−0.32	0.530

The results of the study are compatible with the past studies conducted in other contexts. The studies of Berger & Bouwman (2009) and Horvath et al., (2016) also reveal that bank competition reduces bank liquidity creation. The study was conducted in the contexts of the banks in the USA and the Czech Republic respectively and used both narrow and broader measures of bank liquidity creation and concludes that increased competition leads to financial fragility and consequently diminishes the bank liquidity creation. However, there are empirical studies which posit that bank competition results in bank stability and lowers the credit obstacles to customer and thus increase the bank stability. Studies expounded in the past literature hold divergent views about the possible impact of bank competition. However, in accordance with bank liquidity creation, results remain negative to a large extent. There is limited empirical evidence about the nexus between bank competition and bank liquidity creation. However, their findings overwhelm the perspective of financial fragility.

The result also remains negative due to the context of the study. Since China's banking sector is more regulated and highly concentrated, so bank competition has a negative correlation with bank liquidity creation. Another finding which has emerged is that bank competition also negatively correlates with bank stability as measured through Z-score and profitability of banks. Moreover, its observed that large size bank is in better position to create optimal bank liquidity creation and less affected by the dysfunctional effect of bank competition. Moreover, it asserted through findings that increased competition negatively affect credit risk. The ratio of nonperforming loan increases as the level of banking competition surges. This finding conforms to the financial fragility viewpoint which advocates that increased competition leads to fragile banking activities.

This study also incorporates macroeconomic variables as a control variable to examine their potential influence on bank liquidity creation. Inflation rate and unemployment rate (only with cat-fat measure) remain positively significant with bank liquidity creation as the liquidity created by banks not only remains pivotal for banks but also for the whole economy. The result also suggests that liquidity creation plays a vital role in stabilizing the economy. While the bank's inefficiency in creating liquidity results into collapse of the whole financial system. Therefore, regulatory bodies pay special attention to the liquidity creation function of the banks. In the context of Chinese banking sector, which is more regulated and closely monitored by government, it remains subject to intense regulation. The regulations are used as a tool by the government to regulate and safeguard the whole financial system form any pitfall. The impacts of regulations on bank liquidity creation have been examined by past studies (Berger & Bouwman, 2009; Kick & Schaeck, 2016).

The findings of the present study have significant managerial and policy implications. First, in the context of China, bank fragility hypothesis holds true which reflects that excessive bank competition results in a negative outcome for banks. Due to increased bank competition along with regulatory pressure, banks find it difficult to create optimal level of liquidity creation. Therefore, Chinese government should closely monitor the bank competition to avoid any economic setback. Excessive bank competition also lessens the credit policy which results in higher credit risk.

5. CONCLUSION

This study examines the influence of bank competition on banks liquidity creation. Findings of the study suggest that the banks destroy liquidity due to increased bank competition. The result of the study is in line with the financial fragility perspective in term of competition consequences in the surging bank fragility. The increased bank fragility results in fewer incentives for banks to create liquidity creation. Moreover, it is also examined that the size of the bank remains significant in liquidity creation. Larger banks, in term of total assets, also remain less affected due to dysfunctional impact of increased competition. Likewise, competition also increases the propensity of stability risk and credit risk. We used both narrow and broader measures of bank liquidity creation. The broader measure remains most descriptive because it also contains off-balance sheet item. Off-balance sheet item remains more significant in creating liquidity creation than on-balance sheet items.

Table 4

Results for Robustness Checks

Two step GMM is used with Windmeijer's (2005) corrected std. errors mentioned in brackets. While *,**, and *** show that P-value is less than 0.1,0.05 and 0.01, respectively. The Sargan/Hansen test of the over-identifying restrictions for the GMM estimators is the null hypothesis that instruments used are not correlated with the residuals, and hence the over-identifying restrictions are valid. The Arellano–Bond (AB) test is used to test whether the residual at first difference exhibits second-order auto-correlation or not. To test whether the sum of lagged term is not different from zero, variable total learner is used, and its estimated coefficient is mentioned against it. Values in brackets represent P-value whereas other coefficients are not reported for the sake of brevity. Columns (1)–(4) present the results with 4 lags of the Lerner index, columns (5)–(8) the results for small banks only.

	LC-Broad Measure		LC-Narrow Measure	
	(1)	(2)	(3)	(4)
Lerner total	0.59**	1.27***	0.19**	0.08***
	(0.020)	0.000	(0.040)	0.000
Bank Controls	Yes	Yes	Yes	Yes
Macro Controls	No	Yes	No	Yes
Observations	807	807	807	807
Sargan	17.65	7.71	17.16	7.14
AB test AR (1)	−2.48**	−2.28**	−2.11***	−2.50***
AB test AR (2)	0.29	0.69	−0.34	0.45
Small Banks only				
	(5)	(6)	(7)	(8)
Lerner total	0.27*	1.09*	0.75**	1.51**
	(0.080)	(0.070)	(0.020)	(0.010)
Bank Controls	Yes	Yes	Yes	Yes
Macro Controls	No	Yes	No	Yes
Observations	642	642	642	642
Sargan test	6.17	8.27	9.01	18.33
AB test AR (1)	−2.47**	−2.06**	−1.44	−1.66*
AB test AR (2)	−0.72	0.49	1.24	2.07**

The results of the study have important policy implication due to the economic impacts of bank competition. Bank competition can have a deterrent economic effect through its potential to influence bank liquidity creation. There is a tradeoff between the positive and negative economic impact of bank competition. The increased competition results in consumer welfare as banks offer them lower margins and easy access to credit. However, it negatively impacts liquidity creation.

Moreover, a lower level of bank liquidity creation due to competition has significant repercussions for financial stability. However, the findings of the study can be generalized with caution because this study only focuses upon one country. Therefore, cross-country examination will be more robust to understand the nonlinearities of the impact of bank competition and financial stability.

The Chinese banking sector has unique features with notably a large concentrated market share of government banks. Moreover, the intense regulation and intervention by the government make it controlled the banking system. Therefore, the deterrent effect of bank competition has controlled through regulations. Though China is liberalizing her financial system still there is a trade-off between financial fragility channel and financial stability channel. The liberalization results in intense competition and welfare of the banking customer through lower margins; however, it also lowers the bank's incentives to create liquidity. The lower level of liquidity creation results in fragile banking activities and lower financial stability. Therefore, it has potential policy implications and a sensitive avenue for policymakers to consider the economic effect of bank competition with caution. There are various interesting avenues for future researchers to examine this issue by conducting cross-country analysis and considering the role of bank governance in regulating bank competition and liquidity creation. Moreover, this study will become the part of annual data which can be further enriched by the future studies in their analyses through using quarterly data.

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