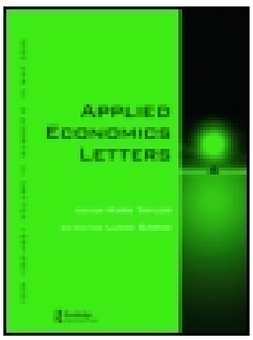

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ARTICLE

Do banking system transparency and competition affect nonperforming loans in the Chinese banking sector?

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ABSTRACT

The increasing importance of transparency practices and the improving status of bank competition in China are rarely explored in nonperforming loans (NPLs) literature. Thus, the purpose of this study is to examine banking system transparency and competition along with macroeconomic and bank-specific variables as determinants of NPL. We use the two-step system GMM dynamic panel model for Chinese banks based on annual data from 2000 to 2014. Our results indicate that high transparency in the Chinese banking system decreases poor-quality assets but not in the case of government-owned banks, whereas increase in competition increases NPL. Moreover, we find mixed results in the context of macroeconomics and bank-specific variables. Our study has practical implications in risk management practices and macro prudential policies.

KEYWORDS

Banking system transparency; nonperforming loans; determinants; competition

JEL CLASSIFICATION

G21; G28; C23

1. Introduction

Research on nonperforming loans (NPLs) reported the adverse effect of such loans on banking economy; these studies emphasized the reduction of NPLs to maintain the sound financial stability of banking systems (Ghosh 2015; Barseghyan 2010; Zeng 2012). The proportion of NPLs in the banking sector is dependent, to a large extent, on the policies of regulators (Ghosh 2015). Consistent and progressive reforms in the Chinese banking sector, such as the country's entry to the WTO and implementation of the Basel Accord, have facilitated the renewed outlook of banks and the competitiveness and transparency of practices. However, the empirical results of such reforms and its effects on NPLs are missing from the literature. The current study investigates the effect of transparency practices and competition along with macroeconomic and bank-specific variables on the NPLs of Chinese banks.

The recent world financial crisis highlighted the importance of transparency practices in the banking sector. Transparency practices enhance the financial stability of banks (Nier 2005). Bellver and Kaufmann (2005) argued that transparency is the process of revealing information related to banking operations to enable market agents to make an appropriate assessment on the stability and fundamental activities of a bank. In recent years, scientific research on transparency has gained significant attention in some world economies (Chen and Hasan 2006; Leuz and Wysocki 2008; Landier and Thesmar 2011; Moreno and Takalo 2012).

The implementation of the Basel Accord in the Chinese banking sector in 2000 revitalized the importance of mandatory disclosure. High transparency practices work in two directions. On the one hand, it enables depositors and regulators to maintain a check on a bank's lending operations. On the other hand, the banking staff is bestowed with the high responsibility of risk if approved loans do not perform well. The Basel Accord has been fully implemented in the Chinese banking sector. However, academic assessments of transparency and NPLs in the Chinese banking industry remain scarce. Therefore, the main purpose of this research is to examine the effects of transparency practices on NPLs.

The literature on 'franchise value' suggests that competition erodes the franchise value of banks by engaging in risky loan practices (Jiménez, Lopez, and Saurina 2013). High competition threatens market concentration and compels banks to pursue risky

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lending practices to maintain profitability. Such loan practices enhance the chances of NPLs. Consequently, stiff competition in the banking sector hinders the stability of banking systems. By contrast, low competition enhances profits because banks only consider high-quality borrowers who *skim the cream*; banks avoid potentially risky customers that ultimately reduce the proportion of NPLs and improve the financial stability of banks (Beck, Demirgüç-Kunt, and Levine 2006).

Scientific inquiry on the banking competition in China is surprisingly lacking in academic literature (Fungáčová, Pessarossi, and Weill 2013). A plausible reason for such paucity is the noncompetitiveness in the Chinese banking market prior to reform implementation. However, the profound build-up reforms made in the last two decades have remarkably changed the Chinese banking system and facilitated improved competitiveness. These reforms include the inception of recapitalization process for NPLs in the late 1990s, China's entrance to the WTO in early 2001 and the implementation of the Basel Accord. A clear indication of increasing competition can be deduced from the status of the market concentration of five major banks in China,[1] which was reduced from 83.41% (2001) to 45.86% (2013).[2] The current situation of the Chinese banking sector indicates emerging trends of competitiveness. Thus, the second purpose of this research is to investigate the effects of competition and NPLs. Following empirical literature, we used macroeconomic and bank-specific determinants. These determinants are obtained from recent empirical studies (Dimitrios, Helen, and Mike 2016; Ghosh 2015; Louzis, Vouldis, and Metaxas 2012).

2. Theoretical background

Transparency practices refer to the set of information disclosure requirement in Basel II and the third Pillar of Basel II. Depositors tend to avoid maintaining funds in banks with risk-oriented practices, and instead switch to banks with high reliability. Thus, funds are redistributed from risky banks to reliable banks (Semenova 2012). NPLs are prime indicators of bank riskiness (Jiménez, Lopez, and Saurina 2013). Industrial–organizational theory suggests that transparency leaves little room for organizational members to make haphazard decisions that might yield negative outcomes because they need to make mandatory disclosure afterward. Thus, lending practices indicate that risky loans are starting to decline. To streamline banking sector practices, the OECD (1998) report on the Australian banking sector suggests mandatory disclosure practices to curb fraudulent and unfair practices. Barth et al. (2009) reported that information sharing practices reduce the chances of fraudulent lending practice in banks.

Early work on competition and loan practices (Marcus 1984; Chan, Greenbaum, and Thakor 1986) reported that increased competition erodes banks' profits by losing high-quality borrowers, forcing banks to consider potentially risky customers, which ultimately increase NPLs. Later research reported similar results that high competition threatens bank stability by pursuing high lending proportion to low-quality borrowers (Marquez 2002). Low-competition banks have relatively secured stability and less chances of systematic crisis. Beck, Demirgüç-Kunt, and Levine (2006) conducted a study on 69 countries covering a 20-year period and found that highly concentrated banking systems are stable with low chances of systemic crisis. To complete our empirical model, we added macroeconomic and bank-specific determinants according to the recent literature (Us 2016; Ghosh 2015; Louzis, Vouldis, and Metaxas 2012).

3. Methodology, data and dynamic model estimation

To examine the determinants of NPLs for Chinese banking system, we specify the following econometric equation:

$$NPL_{it} = \alpha_0 + \gamma_1 NPL_{i,t-1} + \gamma_2 TI_t + \gamma_3 LER_t + \gamma_4 DUM_{i,t} + \gamma_5 BIS_{i,t} + \gamma_6 MEC_t + \mu_i + \nu_{i,t} \quad (1)$$

where NPL_{it} is the NPL ratio of bank i at time t, α_0 is the constant term and $NPL_{i,t-1}$ is the lagged dependent variable; TI_t and LER_t are the Transparency Index and Lerner Index, respectively, $DUM_{i,t}$ is the

[1] https://fred.stlouisfed.org/series/DDOI06CNA156NWDB
[2] 5-Bank Asset Concentration for China https://fred.stlouisfed.org/series/DDOI06CNA156NWDB

dummy variable for bank i at time t; BIS_{it} is a vector for banking industry-specific variables for bank i at time t; and MEC_t denotes the macroeconomic conditions for China at time t.

3.1. Transparency index

First, we introduce the use of *TI* and bank competition on the right-hand side of our econometric specification, which are lacking in empirical literature on the determinants of NPLs. We use mandatory information disclosure as a proxy for banking system transparency, which led us to hypothesize that high transparency reduces poor asset quality. The data used to construct the transparency index are taken from the World Bank Banking Regulation and Supervision Survey[3] following the methodology of Semenova (2012) and Andrievskaya and Semenova (2016).

Supervision survey questions for measuring the level of bank disclosure and transparency are given as follows:

Q1 Are off-balance sheet items disclosed to public?

Q2 Must banks disclose their risk management procedures to the public?

Q3 Is an outside licensed audit obligatory for a bank?

Q4 Are bank directors legally liable if information disclosed is erroneous or misleading?

The answer of each question is in term of 1 or 0 in case of positive or negative, respectively, which leads to a maximum score of 4. We proxy the value of the survey year to the subsequent years as the same in survey year until the next survey has been conducted to construct the time series for transparency index.

3.2. Data

We used annual data from 2000 to 2014 to construct unbalanced panel for 116 Chinese main land commercial banks. The banks having less than 3 years of data and missing values were excluded from the sample. Bank-level data were obtained from Bank Scope, whereas country-level data were obtained from the World Bank and the Federal Reserve Bank of St. Louis. The brief construction of variables is given in Table 1.

Table 1. Description of variables.

Variable name	Measurement
Nonperforming loans	Impaired loans/gross loans (NPLs was transformed using log odd transformation method following the methodology of Jiménez, Lopez, and Saurina (2013) and Salas and Saurina (2002))
Lerner index	Calculated learner taken from Federal Reserve Bank of St. Louis
Transparency index	World Bank Banking Regulation Survey (TI)
Listed	Dummy 1 for listed banks, otherwise 0
SOB	Dummy 1 for state-owned banks, otherwise 0
GOBL	Dummy 1 for banks sate-owned and listed, otherwise 0
Global Financial Crisis (GCRISIS)	Dummy 1 for 2007–2009, otherwise 0
Credit growth (CG)	Total loans divided by total assets
Bank profitability	Return on assets (ROA) ratio
Cost-to-income ratio (CIR)	Operating expenses to operating income
Size	Natural log of total assets
Net interest margin (NIM)	Interest income-interest expense/total assets
Inflation rate (INF)	CPI
Unemployment rate (UNEMP)	Unemployment rate
Real interest rate (RIR)	Bank Prime Loan rate charged on loan to business/firms
Real GDP growth %	Real GDP growth % (RGDP)
Fiscal	Budget deficit as a % of GDP

We estimate the Arellano and Bond's (1991) two-step system GMM dynamic panel to estimate six models. To cope with any endogeneity issue in our data, we instrument all the independent variables first lags as instruments. Sargen/Hansen test validates our instruments and there are no identification issues. AR (1) and AR (2) p-values show no issue of serial correlation in all our specifications.

4. Empirical findings and discussion

The results of our specifications are given in Table 2. Lagged NPL is significant and positive; it is persistent showing that NPLs in previous periods are affecting NPLs in the next period. The coefficient of transparency index is negatively significant in almost all our specifications. This finding suggests that increased transparency leads to decreased NPLs. The Basel Accord II was implemented in 2007 in the Chinese banking sector which emphasizes on mandatory disclosure requirements. As it can be seen from Figure 1,

[3] http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTGLOBALFINREPORT/0,,contentMDK:23267421~pagePK:64168182~piPK:64168060~theSitePK:8816097,00.html

Table 2. Dynamic panel-data estimation, two-step system GMM results.

	M1	M2	M3	M4	M5
NPL it-1	0.7838***	0.7656***	0.8274***	0.8334***	0.8260***
	[0.0012]	[0.0808]	[0.0031]	[0.0043]	[0.0069]
TI	−0.1176***	−0.5783*	−0.6321***	−0.5464***	−0.5609***
	[0.0006]	[0.1267]	[0.0025]	[0.0037]	[0.0108]
LISTED					−0.1349***
					[0.0217]
SOB					0.0358**
					[0.0188]
GOBL					0.1434***
					[0.0169]
LERNER				2.0288***	2.2850***
				[0.2177]	[0.3231]
GCRISIS	0.0683***	0.6186***	0.6661***	0.5095**	0.5307**
	[0.0007]	[0.1282]	[0.0045]	[0.0066]	[0.0101]
NIM	0.0170***		−0.0046	−0.0053	−0.0103
	[0.0009]		[0.0051]	[0.0045]	[0.0109]
CIR	0.0029***		0.0019**	0.0019**	0.0022***
	[0.0001]		[0.0003]	[0.0004]	[0.0005]
CG	−0.2444		0.0877**	0.1554*	0.0207
	[0.0179]		[0.0337]	[0.0864]	[0.0928]
ROA	−0.0207***		−0.0638**	−0.0542**	−0.0723*
	[0.0023]		[0.0056]	[0.0047]	[0.0250]
SIZE	0.0402***		0.0197**	0.0179**	0.0183*
	[0.0007]		[0.0018]	[0.0020]	[0.0040]
INF		0.815***	0.4030***	0.4037**	0.4040***
		[0.0528]	[0.0021]	[0.0016]	[0.0043]
RIR		0.2216***	0.2202***	0.2254**	0.2273***
		[0.0284]	[0.0017]	[0.0021]	[0.0035]
UNEMP		−0.2919*	−0.2996***	−0.2084**	−0.2051***
		[0.0583]	[0.0012]	[0.0135]	[0.0171]
RGDP		0.0000***	0.0000***	0.0000**	0.0000***
		[0.0000]	[0.0000]	[0.0000]	[0.0000]
FISCAL		−0.2277**	−0.2761***	−0.2822**	−0.2838***
		[0.0527]	[0.0021]	[0.0054]	[0.0065]
Constant	−1.5038***	−0.0780	−0.4391***	−1.5390**	−1.6278***
	[0.0317]	[0.2433]	[0.0333]	[0.0929]	[0.1911]
AR (1) *p*-value	0.018	0.017	0.015	0.015	0.015
AR (2) *p*-value	0.739	0.984	0.826	0.792	0.817
Sargen/Hansen *p*-value	0.793	0.747	0.988	0.988	0.981
Number of observations	569	569	569	569	569
F-Statistics *p*-value	0.000	0.000	0.000	0.000	0.000

*,**,*** denote statistical significance for $p < 0.1$, $p < 0.05$ and $p < 0.01$, respectively. Robust SEs are in parentheses.

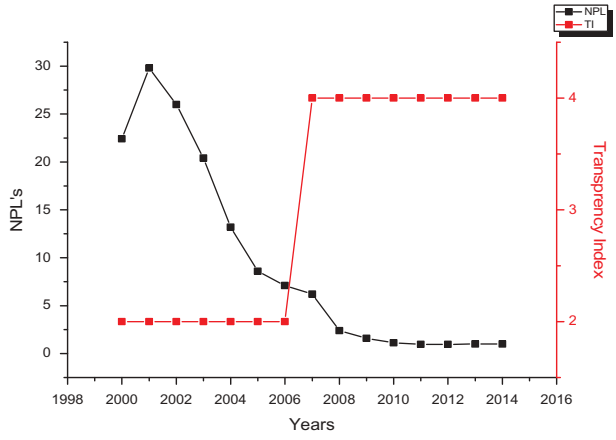

Figure 1. NPL's and transparency index for China.

Chinese banking system was only disclosing two components (Q1 and Q3) up till 2006 and switched to full disclosure of all the components (Q1, Q2, Q3 and Q4) from 2007 which are in accordance with our empirical results. Similarly, our variable Lerner is statistically positive and significant. This finding suggests that high competition in the banking market induces banks to take risky credit policies, which results in high NPLs. Such evidence can be found in study of Jiménez, Lopez, and Saurina (2013).

For robust measures, we used LISTED dummy to investigate whether listed or nonlisted banks behave differently regarding NPLs, the coefficient is negative and significant. The banks listed on stock exchange are obligated to disclose more information to public then nonlisted banks hence reducing NPLs.

Most studies argue that banking system transparency reduces financial fragility and improves market discipline (Bellver and Kaufmann 2005; Nier 2005; Landier and Thesmar 2011; Andrievskaya and Semenova 2016). However, this argument is not always

valid under certain circumstance. Hyytinen and Takalo (2002) argued that in certain conditions banking system transparency increases financial risk. The banking system transparency is costly and has direct and indirect costs. The banks consider trade-off between risk and cost of transparency. Under this assumption, the bank transparency may increase financial fragility. Another condition is that banking system transparency may increase financial risk due to financial safety nets such as deposit insurance schemes. When banks are fully insured with such insurance schemes or backed by government bailouts, banking transparency may not increase market discipline, which we witnessed in 2008 global financial crisis when banks on Wall Street were rescued by government bailouts worth 8.5 trillion US dollars (Sikka 2009).

In case of China, the financial institutions which are government-owned follow a growth-oriented policy in terms of loaning dictated by Beijing irrespective of the financial soundness of the projects being financed (Shih 2004; Okazaki 2007). To check this phenomenon, we used a SOB dummy which is positively significant at 1% suggesting state-owned banks have higher NPLs than other banks. We also checked the banks which are listed and state-owned at the same time using GOBL dummy which is also positively significant at 1%. Chinese banking industry is dominated by government-owned banks. According to China banking regulatory commission report 2010 (see Martin 2012), Chinese banking industry comprised of five big banks that share 49.2% of banking market. These banks are fully supported by government bailout in case of bad times. Chinese government has injected billions of RMB into banking sector to strength their financial position; During 2001–2005, Chinese government wrote of more than 1215 billion RMB worth NPLs with help of asset management companies which did not over all reduce the NPLs dilemma in Chinese banking system (Okazaki 2007), which is also evident from the drastic fall in NPL's during this period in Figure 1.

Over all, the Chinese banking system is adhering to the Basel regulations which increase the information disclosure of financial institutions. However, the NPLs have been politicized in China as to Shih (2004) argued that political leaders politicized NPLs for gaining political and growth-oriented objectives, extensive loans were made for the development of West China and several developmental projects, which political leaders knew that would not be able to repay the principal amount. NPLs are still a threat to Chinese banking system irrespective of the global transparency standards implemented by the Chinese government which is following a credit-fuelled growth model to achieve its growth objectives irrespective of the serious NPLs dilemma.

We also control for the global financial crisis of 2008 by using a crisis dummy which is positively significant (Alqahtani, Mayes, and Brown 2016; Ariff and Luc 2008). The plausible argument of this positive dummy variable is that the Chinese economy invested hugely during the last decade in its infrastructure irrespective of the financial soundness of the projects (Shih 2004) which in return helped in absorbing the financial shock of 2008 financial crisis by lending enormously to develop and invest in Chinese infrastructure.

Bank-specific variables have mixed results. ROA coefficient is significant and in accordance with (Berger and Deyoung 1997) the bad management hypothesis for all of our specifications. These specifications indicate that bank earnings with high profitability have less inclination towards risky lending. Size is positively significant in all specifications. Larger banks have tendency towards having higher NPLs. The largest banks in China are either government-owned or protected by the government in case of bad situations. Larger banks are inclined to take excessive risk following too big to fail hypothesis. Such Chinese banks have high incentive to increase debt-to-equity ratios beyond regulatory and market discipline controls, which in turn increase NPLs in different economies (Ghosh 2015; Stern and Feldman 2004). Cost-to-income ratio is positively significant for Chinese banks which suggest an overall increase in the costs of banks and reduced interest income which indicates a rise in NPLs. Credit growth has a positive and significant relationship with NPLs which refers the fast-growing Chinese economy which follows a credit-fuelled growth model[4] and rapid lending by the financial institutions as dictated by the government which is according to Shih (2004). NIM has mixed results.

[4]http://www.frbsf.org/banking/asia-program/pacific-exchange-blog/china-credit-growth/

Macroeconomic variables have also mixed results. Inflation rate has a positive and significant coefficient thereby suggesting that high inflation causes NPLs to increase. This finding is consistent with the theory that a rise in inflation increases the cost of domestic units and companies and decreases their ability to pay debts (Škarica 2014). RIR is positively significant in most of our specifications at 1%, which indicates that high real interest rates can lead to high debt cost, which could reduce the debt servicing ability of borrowers and lead to defaults (Louzis, Vouldis, and Metaxas 2012; Messai and Jouini 2013). Real GDP has a significant positive relationship with NPLs in all specifications. In the case of China, the growth rate has been very high but due to the government interference and government polices of high infrastructure, investments might be one the reasons that the relationship between RGDP and NPLs is positive. Higher spending on infrastructure-related projects lead to lose credit policies which in turn leads to higher NPLs. Unemployment rate and Fiscal have negative coefficients in all specifications, which is not consistent with the economic rationale.

5. Conclusion

In recent years, NPLs have gained increasing attention in risk management (Chu, Shao, and Lin), financial stability (Zhang et al. 2016b; Chen and Du 2016), credit risk, financial soundness and probability of default (Fu, Lin, and Molyneux 2014; Chiu, Chen, and Hung 2009) especially in China. NPLs have been a consistent issue for Chinese banks. The Chinese government injected billions of RMB to address the NPLs problems of banks. Evidence of capital injections can be found in Zhang et al. (2016a) and Okazaki (2007). This study conducted an empirical testing of the determinants of NPLs in the Chinese banking system. We found that high banking system transparency reduces NPLs but not in the case of government-owned banks, whereas, high competition in the banking market increases NPLs. Macroeconomic determinants have a significant effect on NPLs, especially inflation, real interest rate and real GDP. Finally, bank-specific determinants, such as, bank profitability, and size has a significant effect on NPLs.

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