

An Empirical Study on Emerging Interbank Business and Risk-Taking in China

Xiaolong Hua^{1,a,*}, Mao Wu^{1,b}

¹*School of Finance, Inner Mongolia University of Finance and Economics, 185 North Second Ring Road, Hohhot, China*

^a*hxl@imufe.edu.cn*, ^b*303566708@qq.com*

^{*}*Corresponding author*

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Abstract: In recent years, emerging interbank business has become the main means for banks to make profits. This paper uses buy-back and sell-back to measure the emerging interbank business, analyzes the impact channels of the emerging interbank business, selects the annual data of 157 Chinese commercial banks from 2012 to 2021, establishes a dynamic unbalanced panel regression model, and empirically analyzes the relationship between emerging interbank business and bank risk-taking. The results show that the expansion of emerging interbank business significantly increases bank risk-taking. It is suggested to revitalize the stock of interbank business, strictly control the increment, improve the risk weight coefficient of interbank business, and enrich the regulatory system.

1. Introduction

In the rapid development of new inter-bank business, its business has penetrated into all fields of the financial system. In 2020, with the outbreak of the epidemic, the rise of global economic inflation, and the slump of the real estate industry due to regulation, China's economy is facing unprecedented tests. The consequences of the banks' past break-even expansion are starting to show. On August 6, 2020, Baoshang Bank formally filed for bankruptcy due to a huge insolvency gap - becoming the fourth Chinese bank to fail in nearly two decades - exposing many underlying risks in China's banking sector. In 2022, there were five rural banks in Henan Province, involving millions of depositors, and tens of billions of deposits disappeared, which attracted wide attention at home and abroad. What is more worrying is that high-risk interbank business, which had previously developed quietly amid strict regulation, exploded in 2020 at the beginning of the epidemic.

This paper focuses on the individual risks of commercial banks and deeply discusses the relationship between the inter-bank business of commercial banks and banks' risk-taking, which is not only conducive to the standardized development and operation transformation of the inter-bank business of commercial banks, but also helps to maintain the national financial security and firmly guard the bottom line of no systemic financial risks. The structure of this paper is arranged as follows: the second part is the theoretical mechanism of emerging interbank business affecting bank risk-taking; The third part is the research design; The fourth part is the empirical results and analysis; The fifth part is the conclusion and policy recommendations.

The marginal contributions of this paper are as follows. Secondly, this paper selects buy-back and sell-back as explanatory variables, uses the data of China's commercial banks from 2012 to 2021, and uses the dynamic panel model to empirically analyze the impact of emerging commercial banks' inter-bank business on banks' risk-taking from the perspectives of assets and liabilities.

2. Theoretical mechanism of emerging interbank business affecting risk taking

Specifically, in theory, emerging interbank business can affect commercial banks' risk-taking through the following segmented channels:

Credit risk. Xu (2014) believed that non-standard assets were packaged as typical inter-bank assets by introducing bridge enterprises and bridge banks into the financial assets account of bank purchase and resale. However, such inter-bank assets are used as "loan-like" business instead of credit assets, and the inclusion of third parties increases the risk exposure of commercial banks and the uncertainty of counterparties compared with credit assets^[1].

Operating leverage. Selling repo business as inter-bank liabilities, the expansion of the scale increases the bank's operating leverage, which not only magnifies the profits of commercial banks, but also magnifies the risks of commercial banks, leading to the increase of commercial banks' risk-taking.

Liquidity risk. Li (2019) argued that the growth of inter-bank assets is often accompanied by maturity mismatch, which will cause liquidity pressure on commercial banks^[2]. Selling repurchased financial assets Once the underlying liabilities depreciate sharply, commercial banks may sell assets to obtain liquidity, resulting in a vicious cycle of liabilities reducing asset sales (Schnabel.(2004))^[3].

Avoiding supervision. Emerging inter-bank business includes various explicit or implicit guarantees (Zhu et al., 2016), and emerging business moves between on-balance-sheet and off-balance-sheet, resulting in huge costs of traditional supervision and distortion of regulatory indicators^[4].

Motivation distortion. Emerging interbank business has the effect of liquidity relief, which may encourage banks to increase risk taking. In the model constructed by Acharya and Naqvi (2012), the increase in liquidity prompts bank managers to pursue high risks^[5].

Risk contagion. In addition to banks, other financial institutions such as insurance, funds and securities are also important participants in the emerging inter-bank business, which improves the risk correlation among financial institutions, and ultimately increases the probability of contagion among financial institutions, thus increasing banks' risk-taking.

3. Experimental analysis

3.1. Model Building

3.1.1. Variable Selection

This paper sets the dynamic panel model as follows:

$$Z_{i,t} = \beta_0 + \beta_1 L.Z_{i,t} + \beta_2 INNA_{i,t} + \beta_3 INNLI_{i,t} + \beta_4 LNSIZE_{i,t} + \beta_5 ROA_{i,t} + \beta_6 ER_{i,t} + \beta_7 DLR_{i,t} + \beta_8 OC3_{i,t} + \mu_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$Z_{i,t} = \beta_0 + \beta_1 L.Z_{i,t} + \beta_2 INNLI_{i,t} + \beta_3 INNLI_{i,t} + \beta_4 LNSIZE_{i,t} + \beta_5 ROA_{i,t} + \beta_6 ER_{i,t} + \beta_7 DLR_{i,t} + \beta_8 OC3_{i,t} + \mu_{i,t} + \varepsilon_{i,t} \quad (2)$$

Where i represents the individual bank, t represents the year, $Z_{i,t}$ represents the bankruptcy risk of bank i in year t , $L.Z_{i,t}$ represents the lagged term of bank bankruptcy risk, $\mu_{i,t}$ represents the

unobservable individual fixed effect, and $\varepsilon_{i,t}$ represents the random disturbance term.

This paper refers to the existing literature (Luo (2013); Liu (2016) adopted Z-value to measure banks' risk-taking. The calculation formula of Z value is as follows:

$$Z = [\text{ROA} + \text{ER}] / \sigma(\text{ROA}) \quad (3)$$

Where ROA is the bank's return on assets, ER is the bank's own capital level, and $\sigma(\text{ROA})$ is the standard deviation of return on assets.

We take buy-back and its corresponding item sell-back as the measurement of emerging inter-bank business. Finally, the explanatory variables used are buy-back/total assets (INNA) to represent emerging interbank asset business, and sell-back/total liabilities (INNL) to represent emerging interbank liabilities.

Bank size (lnSIZE). The variable is measured as the logarithm of total assets. Profit status (ROA), ROA is used to measure, the calculation formula is: $\text{ROA} = \text{net profit} / \text{total assets}$. Liquidity (loan-to-deposit ratio: DLR, liquidity ratio: LQ): Loan-to-deposit ratio is the ratio of total loans to total deposits. Equity ratio (ER): Equity ratio is measured by the amount of owner's equity/total assets. The higher the ratio of bank capital, the higher the safety of the bank. Ownership concentration (OC3): This paper will choose the ownership concentration of the top three shareholders to measure ownership concentration.

3.1.2. Data Selection

The original data selected in this paper are the commercial bank data from 2012 to 2021 in Guotai Junan database, and the observed values of 157 banks. In this paper, all variables are winsorized at the level of 1%. The empirical results in this paper are based on Stata16 software. The descriptive statistical results of main variables are shown in Table 1.

Table 1: Descriptive Statistics.

Variable	Obs	Mean	Std.Dev.	Min	Max
Z	1,148	399.261	645.034	17.270	3,529.410
Nplra	1,141	1.515	0.687	0.230	4.200
INNA	1,148	0.042	0.049	0.000	0.252
INNL	1,148	0.050	0.041	0.001	0.223
SIZE	1,148	1.450e+12	4.280e+12	1.170e+10	3.520e+13
ROA	1,148	0.853	0.343	0.058	1.883
ER	1,148	7.337	1.443	4.432	12.267
DLR	1,148	1.531	0.340	0.941	2.894
LQ	1,148	58.988	18.890	30.260	127.620
OC3	1,148	38.371	19.220	11.560	94.780
CAR	1,147	13.4261	2.499574	2.33	54.09

It can be seen from the statistical results that during the sample period, there is a large gap in the level of bank risk-taking among banks. The proportion of buy-back and sell-back business is basically equal, and the development of the two businesses is relatively synchronous in general.

3.2. Analysis of regression results

For dynamic panel models, the system GMM estimator combines the difference equation and the level equation to solve the problem of weak instrumental variables in the difference GMM model, which is more effective. Therefore, this paper adopts the system GMM estimation method. The regression results of (1) and (2) are shown in Table 2:

Table 2: Estimation results of system GMM.

	Z	Z
L.Z	0.969*** (1805.646)	0.998*** (2168.640)
INNA	-0.141*** (-2.769)	
INNL		-0.779*** (-9.766)
LQ	0.001*** (15.559)	0.001*** (3.693)
lnSIZE	0.009*** (33.002)	0.011*** (25.723)
ROA	0.188*** (37.312)	0.054*** (9.960)
ER	0.408*** (47.076)	0.230*** (15.539)
DLR	0.201*** (176.583)	0.070*** (24.744)
OC3	0.097*** (11.902)	-0.035*** (-2.816)
_cons	-7.091*** (-48.655)	-2.387*** (-15.835)
N	894	894
Sargan	0.9999	0.3004

Note: The t-values are indicated in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ The section text must be set to 12-point, justified and linespace single.

In the results of the two columns in the above table, sargan is the over-identification test, and the statistics do not reach the significant level, which does not reject the null hypothesis that the instrumental variable is valid. Therefore, all instrumental variables used in system GMM are valid, and two-stage least squares (2SLS or TSLS) can be used for estimation. Among them, the first column is the system GMM estimation result of the ratio of emerging interbank assets to the bankruptcy risk level of commercial banks. The estimated coefficient of the bankruptcy risk level lagged by one period is 0.969, which is significantly positive at the level of 1%, indicating that the risk of the previous period can significantly affect the risk of the current period, indicating that the bank bankruptcy risk has the problem of path dependence. However, the estimated coefficient of INNA for the proportion of emerging interbank assets is -0.141, which is significantly positive at the level of 1%.

The second column shows the regression results of the ratio of emerging interbank liabilities to the bank's bankruptcy risk level. The regression coefficient of the ratio of emerging interbank liabilities INNL is -0.779, which is significantly negative at the level of 1%, indicating that the ratio of interbank liabilities will significantly increase the level of bank bankruptcy risk. For every unit percentage increase in the ratio of interbank liabilities, the level of bankruptcy risk will increase by 0.779 percentage points. Compared with emerging interbank assets, interbank liabilities have a greater impact on bank failure risk.

3.3. Test for endogeneity

In order to solve the endogeneity problem in the model, on the basis of the main regression model, this paper selects the first-order and second-order lagged Z value and ROA and year fixed

effects as instrumental variables, adopts the instrumental variable method to solve the endogeneity problem of the model, and conducts over-identification and autocorrelation tests on the regression results.

Table 3: Test for endogeneity.

	Z	Z
L.Z	0.996*** (48.971)	1.001*** (45.144)
INNA	-2.596* (-1.750)	
INNLL		-3.850** (-2.181)
lnSIZE	0.044 (0.565)	0.064 (0.947)
ROA	0.531** (2.018)	-0.160 (-1.472)
ER	0.191*** (4.574)	0.165*** (5.010)
DLR	0.149 (0.574)	0.487** (2.064)
LQ	0.002 (0.919)	-0.002 (-1.159)
OC3	0.003 (0.410)	0.003 (0.410)
_cons	-3.267 (-1.525)	-3.246* (-1.699)
N	894	894
AR(1)	0.023	0.014
AR(2)	0.125	0.198
Sargan	0.124	0.120

Note: The t-values are indicated in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1. The section text must be set to 12-point, justified and linespace single.

In the consistent estimation, the condition for system GMM is that there is no autocorrelation in the disturbance term. Under the condition that the null hypothesis "there is no autocorrelation in the disturbance term" is valid, the first-order difference of the disturbance term will still have autocorrelation, but there should not be second-order or higher-order autocorrelation. According to the data in Table 3, AR (1) shows that the null hypothesis of no first-order autocorrelation is rejected. In other words, there is first-order autocorrelation in the model; In Tables 3, AR (2) shows that the null hypothesis that there is no second-order autocorrelation is not rejected. However, according to the sargan test results, the fact that the instrumental variables are uniformly valid is verified. However, the coefficients of INNA and INNLL are significantly negative at the level of 10% at least, which is consistent with the previous results.

4. The conclusion and recommendations

The empirical results show that the expansion of interbank business significantly increases the level of bank failure risk. Based on the above research conclusions, this paper puts forward the following suggestions.

First, take positive measures at the micro level to guide the planning and development of inter-bank business. On the one hand, it is necessary to grasp the intensity of supervision. For the inter-

bank business represented by buy-back and sell-back, it is necessary to revitalize its stock assets and strictly control the increment of its assets. On the other hand, the chain of inter-bank transmission should be reduced to avoid capital idling, and standardized operation supervision should be appropriately introduced to better serve the real economy.

Second, improve the regulatory system, raise the risk provision standard of inter-bank business, match the risk weight with the real risk, raise its capital tight requirements, and improve the supervision index system.

Third, we need to strengthen financial regulation. In 2018, China improved the level of financial regulation by establishing the CBRC: first, the CBRC can directly eliminate the inherent deficiencies of domestic separate supervision, so that commercial banks no longer recklessly arbitrage through the asset management function; Moreover, it encourages various regulatory agencies to cooperate and supervise each other, which can effectively control and limit regulatory arbitrage and resist systemic financial risks at the same time. Banks vary in type, geography, and size, and regulators need to take a local approach. For example, the CBRC can strengthen the supervision of banks with a large proportion of inter-bank business to promote the steady development of the financial market.

Fourth, a framework for supervision of new inter-bank business should be built from the policy level, and macro-control should also pay more attention to this field. According to the types of banks, the withdrawal standards of various assets will be adjusted to reflect the corresponding risk weights and strengthen the control of monetary policy. In addition, the regulatory agencies should optimize monetary policy according to the development situation and reduce the possibility of commercial banks avoiding macro-control. Since it is difficult to effectively regulate all banks' evasive behaviors through direct regulation, it is necessary to implement monetary policy by means of open market operations, making it meaningless to use new inter-bank business to evade supervision.

The fifth point is to standardize non-standard inter-bank business. The risks of this kind of business mainly come from two aspects, one is non-standardization, the other is opaque information. Commercial banks cover up some new inter-bank business operations through continuous financial innovation, resulting in the inability to obtain accurate data information through financial statements, and the loss of objectivity and accuracy of regulatory authorities' macro-control. Therefore, the following measures must be taken: first, accelerate the development of asset securitization, take standardization and transparency as important standards for banks to develop asset securitization products, and create an open and transparent development environment for the inter-bank market; Furthermore, improve, refine and standardize the accounting treatment standards of new inter-bank business, beware of using financial accounting to avoid the situation of inter-bank business; Secondly, we should focus on listed commercial banks, constantly improve the information disclosure mechanism of new inter-bank business, and ensure fairness and openness by vigorously disclosing new inter-bank business of commercial banks.

References

- [1] Xu Y. (2014). *An Interbank Perspective on Interbank Liquidity*. *Chinese Finance*, (8), 23-24.
- [2] Li X. (2019). *Research on the Impact of Bank Market Power on Liquidity Mismatch: A Literature Review*. *Study of International Finance*, (12), 1-14.
- [3] Schnabel I., & Shin H. S. (2004). *Liquidity and Contagion: The Crisis of 1763*. *Journal of the European Economic Association*, 2(6), 929-968.
- [4] Zhu J., Li Y., & Zhang Y. (2016). *Influencing Factors and Economic Consequences of Commercial Banks Engaging in Shadow Banking: An Empirical Study on the Financiers of Shadow Banking System*. *Financial Research*, (1), 66-82.
- [5] Acharya V., & Naqvi H. (2012). *The Seeds of a Crisis: A Theory of Banking Liquidity and Risk Taking over the Business Cycle*. *Journal of Financial Economics*, 106(2), 349-366.