

Business Data Analysis of the Influence of Capital Supervision on Bank Credit Risk-Taking Behavior

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Abstract: Financial supervision exists with the financial crisis. The main purpose of financial supervision is to prevent the financial crisis. Some people have vividly compared the relationship between them to “cat and mouse”. The purpose of bank capital supervision is to establish the business growth mode and resource allocation mode with capital constraint as the core, so as to realize the growth mechanism of coordinated benefit and risk and create a modern banking system with steady development. In the past, there were few empirical studies on the process of bank credit risk taking behavior in stages, and the selected indicators to measure credit risk and capital supervision level need to be enriched. In this paper, the main methods used to study the relationship between governance and risk-taking behavior of commercial banks in China under capital supervision are theoretical derivation and empirical test. The empirical analysis of the paper shows that: (1) For prior risk-taking propensity, the enhancement effect of leverage on bank risk behavior is more obvious when the shareholding ratio of the largest shareholder in a joint-stock bank is higher. (2) For post asset risk, capital adequacy ratio and leverage ratio regulation have a more significant impact on G-SIFIs as equity concentration increases. Therefore, it is proposed that banks should continue to improve their internal governance structure, and regulators should implement differentiated supervision for different types of banks and strengthen leverage ratio supervision.

1. Introduction

Banks are important financial media and financial market participants. On the one hand, banks provide loans for enterprises and individuals, and bank credit channels have become an important communication channel of national macro-control policies; On the other hand, banks participate in financial market activities with their own capital and depositors' deposits [1]. However, banks are special enterprises that manage money, and they mainly rely on liabilities to increase their assets, with low self-owned capital ratio and high asset-liability ratio. Only when assets and liabilities match and maintain sufficient liquidity, their operating status is stable. The more prosperous the economy is, the more optimistic people will be about the future expectations, and the more relaxed they will be in preventing risks. In this excellent market, capital began to spread to the risk field in pursuit of profits [2].

The bursting of the foam in the US real estate market in 2008 has caused great damage to the global financial market like an avalanche. This crisis has made people see the devastating and catastrophic nature of the financial crisis, which has caused great damage to financial institutions and financial markets. The global real economy has been hit hard. At the same time, the banking risk problems hidden under the financial crisis have gradually emerged. Capital regulation is the most important way for China's financial regulatory authorities to supervise commercial banks [3]. Since its release in 2010, the Basel III Agreement has gradually added new content that conforms to the realistic environment. The final plan was formed in 2017 and officially implemented in January 2022. The amendments and adjustments to the credit risk measurement methods in the final plan reflect the high importance that the Basel Committee attaches to credit risk [4]. The capital regulatory standards issued by regulatory authorities in various countries and regions are generally

higher than those in the Basel Accord. The impact of higher required capital regulatory levels on commercial banks' credit risk taking behavior is a question worthy of study and discussion [5].

Although in recent years, the non-performing loan ratio of banks has generally shown a downward trend, the risk management system is still facing challenges. Before the credit expansion, the banks' capital was generally in a relatively surplus state, but after the credit expansion, with the continuous invasion of capital, banks faced more and more capital constraints [6].

The main topic of this article is bank risk behavior, which regards the bank's choice of risky assets as a proactive behavior of the bank, and is an ex ante measure of bank risk. The reality is that it is difficult to consider the relationship between the two separately. This article draws on the research methods of domestic and foreign scholars, uses the latest data from 17 banks in China, and based on the income situation of the global systemically important banks (GSffis) directory of global banking regulators - so far, the four state-owned banks of China's Communist Party of China, Agriculture, Industry, and China Construction have been included in the GSffis directory, The sample banks are divided into two categories: global systemically important banks and joint-stock banks, and corresponding empirical analysis is conducted accordingly.

2. Mechanism Analysis of the Impact of Bank Credit Risk Bearing Behavior

2.1 Research Framework and Research Assumptions

The particularity of bank capital and capital structure determines that commercial banks take “risk” as their business object [7]. Generally speaking, the credit decision and risk decision of commercial banks are influenced by five factors: first, the deposit insurance system; Second, regulatory factors; Third, the bank market structure and industry competition; Fourth, the bank's capital scale and capital buffer; Fifth, the bank's capital cost and credit decision [8]. In order to better understand how these factors affect the bank's risk-taking behavior, combined with the particularity of bank's capital supervision, this paper focuses on the analysis of implicit deposit insurance system, industry competition, market constraints, capital scale, bank's capital cost and credit decision [9]. Due to the unique position of the banking industry in the economy and its high-debt operation characteristics, banks meet the minimum registered capital requirements, which is often a higher absolute amount. Without sufficient capital, they cannot enter the banking industry. Therefore, banks obtain the approval of the regulatory authorities and obtain a banking license, that is, they obtain the Bank franchise value [10].

The funds required for the daily operation of a bank are usually composed of debt and equity. The holding of economic capital by commercial banks is first and foremost a necessary measure taken by bank managers to manage the internal risks of banks. Bank managers allocate a certain amount of economic capital to cover unexpected losses based on their own expectations of the bank's future risk bearing and possible losses, to avoid bank bankruptcy. Therefore, risk measurement is the basis for measuring the level of economic capital, and the issue of economic capital allocation is also the issue of measuring risk taking. The operational losses of banks can be divided into two categories: predictable losses and unexpected losses.

Referring to the above research, this paper divides the credit risk-taking behavior into three stages: beforehand (motivation), in-process (decision-making) and afterwards (consequence). The relationship between risk-taking behavior and credit risk-taking behavior is shown in Figure 1. Credit risk taking is the behavioral process that banks make business decisions related to credit transactions in the process of credit risk taking according to their willingness to take credit risks beforehand, and finally take credit risks afterwards.

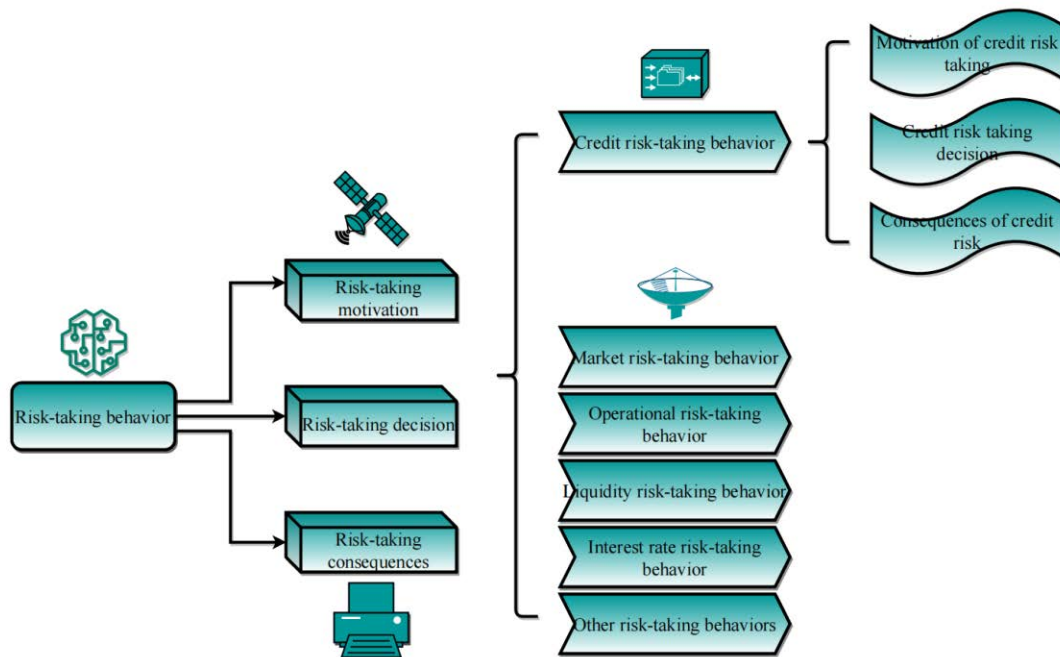


Fig.1 Relationship between Bank Risk-Taking Behavior and Credit Risk-Taking Behavior

The prior commitment of bank credit risk refers to the willingness of banks to pursue excess profits under the influence of existing credit risk levels. When banks have sufficient capital, they tend to invest in projects with higher risks. In order to earn income, they extend loans to lenders with lower credit levels, which increases credit risk, transfers the risk to depositors, and the income belongs to the bank. The regulatory authorities strictly monitor banks, and when they discover that their motivation for credit risk transfer has become stronger, they will review and supervise the banks. By taking certain measures to curb the intention of bank risk transfer, the banks' motivation to transfer credit risk to depositors has been weakened, and they have turned to their own capital to undertake credit risk.

2.2 Motivation for Commercial Banks to Take Risks

As an enterprise, commercial banks have the risk-taking motivation of ordinary enterprises. From the point of view of profit, the risk-taking of an enterprise is compensated by the profits it obtains, and profit maximization is the goal that every enterprise pursues. As Marx once said: If capital has a profit of 50%, it will take risks; if it has a profit of 100%, it will dare to trample on all human laws; if it has a profit of 300%, it will dare to commit any crime and even risk being hanged. Banks play an important role in a country's financial system, which is mainly reflected in the accumulation of a country's capital and the improvement of productivity. First of all, the primary function of banks is to effectively allocate the surplus of depositors and the shortage of borrowers. Through intermediary services, banks promise to compensate depositors for delayed consumption and provide financing opportunities for those who are short of funds.

As a provider of liquidity in the economy, banks' behavior enhances social welfare, while also achieving risk sharing with depositors. Secondly, banks have lower transaction costs than depositors in collecting and evaluating borrower information. As the residual claim holders of capital flows, shareholders benefit from upward risk investment. From this perspective, banks can be seen as the representative of depositors for review. Third, banks are the protagonists of a country's payment system. Banks can use their professional skills to easily convert debt processing, borrower repayment ability assessment, etc. into actual purchasing power. In addition to payment, banks also assume other intermediary roles. For example, banks undertake international trade intermediary functions through currency exchange and trade financing. Therefore, compared to creditors, shareholders have a stronger incentive to take risks. Due to the fact that bank management must act in accordance with the wishes of shareholders, commercial banks have a natural risk taking

behavior. Banks can measure their credit risk bearing capacity based on their own business objectives and risk bearing preferences, and issue loans accordingly.

Usually, banks optimize their business decisions by allocating the amount of free funds and adjusting the proportion of asset portfolios. Under the stricter capital supervision policy, banks are committed to improving capital adequacy ratio, but also bring pressure. Banks are highly indebted enterprises, and earn income by charging interest difference. Under the requirement of minimum capital adequacy ratio of capital supervision, in order to keep the capital adequacy ratio at a stable level, banks will implement perfect credit risk management and improve the level of credit risk commitment. When the bank encounters events such as customer default, the high capital adequacy level makes it unnecessary for the bank to rely on high government assistance, but consumes its own capital to bear the losses. Therefore, capital supervision has played a good role in preventing and reducing the credit risk that commercial banks should bear afterwards.

3. Influence Mechanism of Capital Supervision on Credit Behavior of Commercial Banks

3.1 Influence of Capital Supervision on Credit Behavior of Banks with Insufficient Capital

Traditional monetary theory has less consideration of the role of bank capital. The discussion of how monetary policy affects the economy through banks often revolves around deposits and reserve requirements. The classic “credit channel” of monetary policy transmission believes that monetary policy mainly affects the credit behavior of banks by adjusting the deposit reserve ratio. When capital is difficult to increase or cannot be realized in the short term, it is often necessary to reduce the loan scale or even be forced to sell some assets to meet capital regulatory requirements. Due to the cost of “regulatory taxes” imposed on banks by capital regulation, credit businesses with high risk weights for banks themselves will occupy more capital, resulting in a relatively high cost of capital. In addition, capital regulation can promote banks to improve their ability to identify, review, and manage credit risks, and reduce the probability of reducing credit scale due to information asymmetry. Capital regulation will reduce budget soft constraints through banks' long-term behavior, thereby increasing their credit supply. Therefore, in the long run, capital regulation can improve banks' risk management and prevention and control capabilities, alleviate the imperfections of the credit market, and help banks better play the role of credit intermediaries, achieving a balance between borrowers and lenders. As mentioned above, the optimal credit decision of banks depends on the balance between bank risk-taking and bank scale, and bank risk-taking will affect the credit scale of banks. Therefore, the direct effect of capital supervision and restraint on bank risk-taking is inevitable, and it also has an impact on the credit scale of banks. The research objective of this part is to study the dynamic continuity characteristics among independent variables, such as capital supervision pressure, bank credit risk, monetary policy and macroeconomic growth, with the bank credit scale as the dependent variable, to investigate how the capital supervision constraint can produce macroeconomic fluctuation effect through the transmission of its influence on the bank credit scale, and to verify the indirect effect of capital supervision constraint on bank risk taking.

Under the immature conditions of China's interest rates, exchange rate controls, and financial markets, commercial bank loans are mainly affected directly or indirectly by monetary policy operations. The central bank reduces the size of reserves through monetary policy, which to some extent limits the ability of commercial banks to provide loans, thereby causing a decline in bank credit supply; Due to the decrease in the source of loan funds and the increase in loan costs, the funding needs of enterprises and individuals that rely on bank loans cannot be met, and their investment expenditure levels will naturally decline, thereby reducing the overall demand of society. Therefore, expansionary monetary policies cause an increase in the scale of credit, while tightening monetary policies cause a decrease in the scale of credit.

3.2 An Empirical Study on the Impact of Capital Regulation on Commercial Banks' Credit Behavior

In China, loan is the most important asset business of commercial banks. Data show that

commercial banks in China allocate more than half of their assets in loans on average. In addition, according to the Administrative Measures, the risk weighting coefficient of bank loans is the highest among all assets. Therefore, the loan ratio can also be used as a proxy variable to measure the asset allocation behavior of commercial banks. From the control variables, the bank SIZE and the proportion of non-interest net income (NNII) are negatively correlated with the credit risk-taking behavior of commercial banks. China's commercial banks with large assets have high capital compliance rate and credit risk management level, have a more prudent supervision system, do not need to increase their business to achieve the continued expansion of asset scale, and have a lower willingness to bear credit risks in advance. The higher the non-interest net income, the lower the income of the main business (that is, deposit and loan business), the less the total amount of loans, and the weaker the awareness of credit risk taking. With regard to the influence of other control variables, the average return on total assets (ROAA), the ratio of total loans to total assets (L) and the provision coverage ratio (PCR) show positive correlation and negative correlation respectively. After the average rate of return on total assets is reduced for the purpose of profit, in order to improve the overall income of the bank, it is required to make full use of funds and improve the liquidity of funds. At this time, the bank will adopt a more active business strategy and reduce the provision.

Banks with a high proportion of loans adopt decisions that have a high risk appetite and a relatively single business distribution, conducting main businesses that can generate interest income. Banks have fewer funds available for free use, and the provision of funds is correspondingly reduced. Banks with high capital buffers only have a one-way path from capital adjustment to bank risk adjustment, that is, capital increases while reducing risk, but risk increases (or decreases) while having no significant impact on capital adjustment; However, banks with low capital buffers have a two-way effect path, with better effects than banks with high capital buffers in terms of both capital adjustment to risk adjustment and risk adjustment to capital adjustment. That is, low capital buffer banks reduce capital while increasing risk, and reduce risk while increasing capital, with a more significant reduction in risk.

The implementation effect of the capital supervision system is very effective. China's commercial banks have generally achieved capital adequacy, which is manifested in the following aspects: firstly, the average capital adequacy ratio of commercial banks has been increasing in value; secondly, the number of banks with capital standards has been increasing; correspondingly, the number of non-standard banks has been decreasing, and a large number of banks with excess capital have emerged. As shown in figure 2.

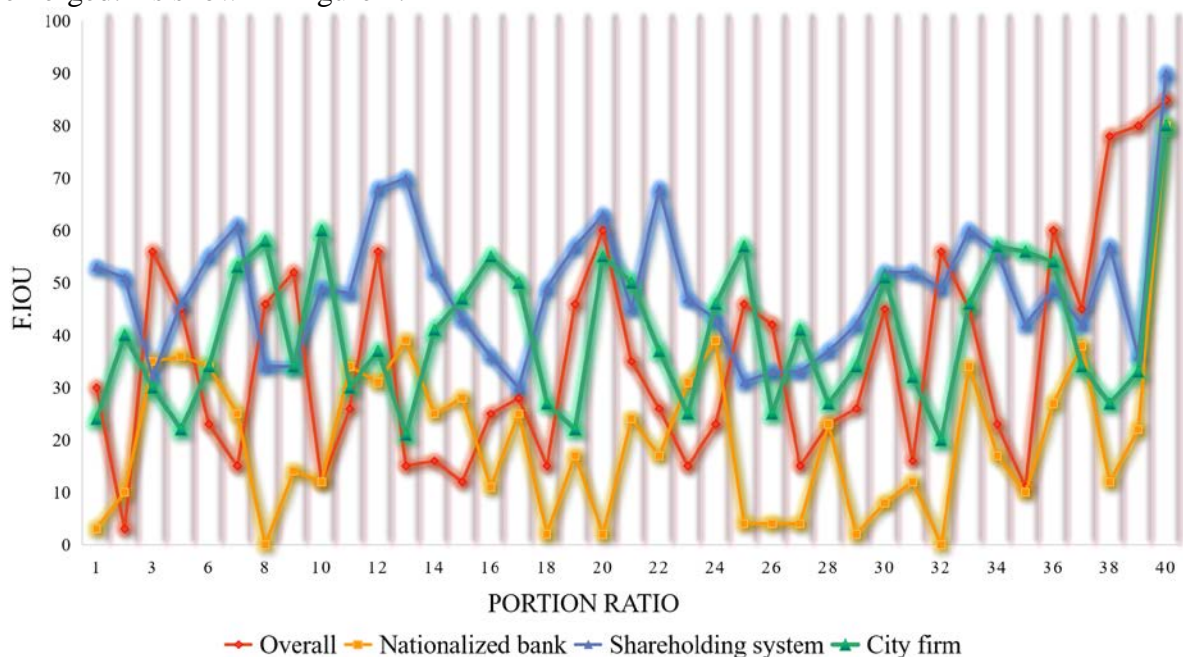


Fig.2 Comparative Analysis of State-Owned Banks and Joint-Stock Banks

Overall, state-owned banks and joint-stock banks have also played an important role in this process, with the increase in credit scale, leading to an increase in risk weighted assets, and a slight decrease in capital adequacy.

4. Conclusions

Under the constraint of capital supervision, whether the capital supervision standard can effectively restrain the bank's risk-taking behavior and the influence mechanism of capital supervision constraint on the bank's risk-taking behavior have always been the core issues in the research of supervision effectiveness and bank risk management. At the same time, the special capital structure of commercial banks also determines that banks are driven by the inherent interests of pursuing profits, and may increase their leverage ratio, expand asset scale and increase earnings per share in their operations. The minimum capital supervision standard is to prevent the possibility of unlimited expansion of banks in pursuit of profit, so that the growth of loans and risky assets can match the growth of their capital, that is, the bank capital constitutes an inherent limit to the uncontrolled expansion of bank assets. This article analyzes the impact of capital regulation on commercial banks' credit behavior from three perspectives: loan size, credit expansion, and loan concentration. Under the condition that the bank can continue to operate and is not subject to regulatory penalties, if shareholders have a significant impact on the bank's risk decision-making, then shareholders' will determines the bank's decision-making; If managers occupy control, their behavior affects bank decisions. In other words, the ultimate risk-taking behavior depends on the characteristics of internal governance of banks under the capital regulatory environment.

References

- [1] Boateng A, Nguyen V H T, Du M, et al. The impact of CEO compensation and excess reserves on bank risk-taking: the moderating role of monetary policy[J]. *Empirical Economics*, 2021,2021(2):3-9.
- [2] Yao, Song. Examining the differences in the impact of Fintech on the economic capital of commercial banks' market risk: evidence from a panel system GMM analysis[J]. *Applied Economics*, 2021,20(1):6-10.
- [3] Chen Z. The Impact of Macroprudential Supervision on the Capital Operation of Commercial Banks[J]. *Journal of Business Finance & Accounting*, 2018, 3(2):56-63.
- [4] Yuan L, Zhong Y, Lu Z. Foreign strategic investors and bank credit risk in China: Disclosure, finance or management effects?[J]. *Pacific-Basin Finance Journal*, 2022, 73(6):11-18.
- [5] Wang F, Ding L, Yu H, et al. Big data analytics on enterprise credit risk evaluation of e-Business platform[J]. *Information Systems and e-Business Management*, 2019,2019(2):26-30.
- [6] Lundtofte F, Nielsen C Y. The effect of stricter capital regulation on banks' risk-taking: Theory and evidence[J]. *European Financial Management*, 2019, 25(5):12-18.
- [7] Zhu J, Liu Y, School B, et al. An Asymmetric Study on the Impact of Bank Income Structure Change on Bank Risk[J]. *Journal of Accounting and Economics*, 2018,66(7):18-23.
- [8] James S, Quaglia L. Why does the United Kingdom (UK) have inconsistent preferences on financial regulation? The case of banking and capital markets[J]. *Journal of Public Policy*, 2019, 39(1):17-20.
- [9] Sui P, Zhou D. Capital Regulation, Bailout and Banking Asset Correlation[J]. *International Review of Finance*, 2018, 19(1):83-93.
- [10] Musah A. The Impact of Capital Structure on Profitability of Commercial Banks in Ghana[J]. *Asian Journal of Economic Modelling*, 2018, 6(1):21-36.