



Research on the Relationship Between Stock Price Volatility and Bank Credit —Based on Constructive Model and Granger Causality Test

Mufan Yang

King's College London, Business school, London, UK
2653438806@qq.com

Abstract

With the improvement of capital business sectors and advances in monetary development, the relationship between resource value unpredictability and the genuine economy has been demonstrated by scholars on many occasions. The rapid growth of the stock market today, accompanied by dramatic volatility, and the consequent large swings in new bank credit, demonstrates the extremely high correlation between stock prices and bank credit. Therefore, studying the impact of stock price volatility on the scale of bank credit can help reduce the effect of stock price volatility on the macro-economy and is of great significance for optimizing regulatory indicators and maintaining financial stability. Based on the theoretical analysis, this paper uses model building and Granger causality tests to empirically analyse the specific linkages. The model is based on data from a number of commercial banks, which shows that when the value of stocks rises, firms will further expand their investments and the demand for bank loans will increase; the Granger causality test also predicts the causal relationship between stock prices and bank credit. The test results show that there is a long-run stable equilibrium positive association between stock price and bank credit, proving that stock price is the Granger cause of bank credit, while bank credit expansion is not the cause of stock price increase, and providing a theoretical, trend and empirical analysis of the relationship between the two.

Keywords-*stock prices; bank credit; financial crises; financial market*

1. INTRODUCTION

The interlaced monetary irregular characteristics brought about by the sharp ascent and fall of resource costs and the extension and compression of bank credit, which have been unmistakable wonders in the worldwide macroeconomic field for over twenty years, are one of the main drivers of financial insecurity [3]. The relationship between the two has been the focus of research, and the sub-prime mortgage crisis, which began in the United States in 2007, hit national economies hard as the housing bubble burst and the crisis spread rapidly around the world. It is a typical fact that there is a high correlation between stock prices and bank credit, and their sharp rise and fall will increase the uncertainty of the overall economy" (Stylized Facts) [8]. This paper will explore the impact of stock prices on bank credit size through a combination of theoretical and empirical analysis, using financial data of 52 commercial banks and constructing a panel data model for empirical research. The paper aims to empirically investigate how stock price volatility has

an impact on the size of bank credit in China, and to make suggestions from multiple perspectives.

2. LITERATURE REVIEW

Allen et al. have proposed a three-stage cycle theory of financial crises [1], which suggests that a typical financial crisis goes through three stages [2]: In the first stage, stock markets begin to fall and people start to flee risky assets and buy safe-haven assets, believing that the fall is only temporary. Credit expansion occurs, accompanied by a continued rise in equity and real estate prices, and an asset price bubble is created, which can last for several years. The second stage is a further rapid fall in equity markets, which leads to an increasing number of investors blowing up their positions, which results in margin calls, causing investors to start selling safe-haven assets in tandem. At this time, risky assets are sold off further, asset price bubbles burst and prices collapse, a process that is more elastic in duration; in the third stage, various assets fall in tandem and companies begin to

default and go bankrupt; the liquidity of buyers such as funds dries up causing financial institutions such as banks and brokerage firms in the market to also experience liquidity crises and the risk is further transmitted to other sectors in the economy and society. It is additionally

obvious from this hypothesis that stock costs and bank credit assumed a significant part in the monetary emergency, and it is of incredible hypothetical and down to earth significance to contemplate the connection between the two in the post-financial crisis era.



Figure1: Overall chart of the economic crisis in 2008

With the in-depth study of bank credit and the stock market by Chinese and foreign scholars, the research results have been divided into three perspectives. The first view is that stock prices are positively related to bank credit allocation. Ibrahim [5] led an exact examination on Malaysian information using a VAR model. He found that stock price volatility in Malaysia has a significant positive impact on bank credit allocation, but the effect of bank credit on stock prices is minimal. Therefore, Ibrahim points out that expansion of bank credit does not fundamentally stimulate the real economy to achieve recovery and growth, that development of bank credit to rescue the stock market in the event of a financial crisis is ineffective, and that the credit channel of monetary policy does not exist. The second view is that stock prices and bank credit are mutually reinforcing, with rising stock prices prompting banks to expand credit. In turn, the expansion of bank credit stimulates further increases in stock prices. Bank credit size has a significant positive impact, while changes in bank credit size also have a positive feedback effect on stock prices, and this phenomenon persists over time [4]. The third finding is that there is no significant relationship between stock price volatility and bank credit. It is difficult for monetary policymakers to influence the size of credit and hence the real economy through intervention in the stock market.

From the above literature review, it can be seen that scholars have conducted many studies on the relationship between the stock market and commercial banks' credit size from theoretical to empirical evidence. However, there are still some shortcomings. For example, the

literature has analyzed the relationship between stock prices and bank credit from a macro perspective while ignoring bank categories and their micro characteristics. In this paper, the empirical study of the issue of stock price volatility affecting bank credit takes complete account of the specificities of each type of bank, provides empirical evidence at the micro level for a deeper understanding of the issue and makes relevant recommendations on this basis. Thus the work in this paper adds something to the existing studies at the micro-level.

3. MODEL CONSTRUCTION AND EMPIRICAL ANALYSIS

3.1. Model construction

The above theory infers that bank credit is positively correlated with stock price volatility, but factors other than stock prices affect bank credit placement. The main factors affecting the demand for bank credit are variables that affect borrowers' ability to borrow, with the main aim of controlling for changes in borrowers' income and the cost of borrowing. In this paper, real GDP, the customer value list CPI and the one-year benchmark loaning rate R distributed by the national bank are picked as intermediary factors for request. Components influencing the inventory of credit essentially allude to factors influencing the capacity and readiness of business banks to concede credit. In this paper, three variables are selected to reflect commercial banks' solvency and credit risk, including the total assets $Asset$, the leverage ratio

Lever and the non-performing loan ratio Npl. All the above variables are put into the model as control variables in this paper to eliminate the influence of these factors on bank credit. Based on the above assumptions, this paper draws on the study of Xin Binghai et al [7], and constructs the model in the following form

$$\begin{aligned} \ln(\text{loan})_{it} = & \beta_0 + \beta_1 \ln(\text{stock})_{t-1} \\ & + \beta_2 \ln(\text{GDP})_t + \beta_3 \text{CPI}_t + \beta_4 R_t \\ & + \beta_5 \ln(\text{Asset})_{it-1} + \beta_6 \text{Lever}_{it-1} \\ & + \beta_7 \text{Npl}_{it-1} + \varepsilon_{it} \end{aligned}$$

TABLE 1: FULL SAMPLE ESTIMATION RESULTS

	Coef	Std
Instock_lag1	0.3094**	0.1301
InGDP	0.3204***	0.1605
CPI	-0.0580**	0.0202
R	0.0959*	0.0491
InAsset_lag1	0.6635***	0.0585
Lever_lag1	-0.0059***	0.0011
Npl_lag1	-0.0140***	0.0073
_cons	-4.6475*	2.8215
N	410	
Wald chi2(7)	2098.41	

According to table 1, stock prices positively impact bank credit at a significant level of 5 percent, with a 1 percent increase in stock prices leading to a corresponding 0.3094 percent increase in bank credit allocation, a result consistent with the theoretical hypothesis. When the stock price rises, the firm's asset and liability position improves, the value of the stock rises, it is easier to obtain loans from the bank, and the firm further expands its investment, thus increasing the demand for bank loans.

3.2. Granger causality test

The Granger causality test is a method used to analyse Granger causality between variables. In this paper, loans and share prices are selected as two variables, and if loans and share prices are mutually causal, i.e. there is unidirectional causality from loans to share prices and also a unidirectional causality from share prices to loans. If the coefficient estimates of the lagged x in equation (1) are statistically significant and non-zero overall, while the coefficient estimates of the lagged share price in equation (2) are statistically significant and non-zero overall, then a feedback relationship, or two-way causality, is said to exist between loan and share price.

$$y_t = \sum_{i=1}^q \alpha_i x_{t-i} + \sum_{j=1}^q \beta_j y_{t-j} + u_{1t} \quad (1)$$

$$x_t = \sum_{i=1}^s \lambda_i x_{t-i} + \sum_{j=1}^s \delta_j y_{t-j} + u_{2t} \quad (2)$$

This paper uses Granger causality test to verify the causal relationship between variables and the following

In this model i and t denote each bank and year respectively, β_0 is the constant term, β_i is the parameter coefficient, ε_{it} is the error term and loan it denotes the credit size of bank i in year t. In this paper, the total year-end loans of each bank are selected and the data are taken from the Bankscope database. In this paper, the relevant financial data of 184 commercial banks were derived from the Bankscope database and the regression results are shown below.

table reflects the relationship between loans and share prices.

TABLE 2: GRANGER CAUSALITY TEST RESULTS

Granger Causality Tests			
H0	F	P	Result
Bank loans are not the Granger cause of stock price fluctuations	0.8466	0.6549	Accept assumption
Stock price fluctuation is not the Granger reason for bank loans	4.7557	0.0927	Reject assumption

The results of the test show that the size of bank credit is not the Granger cause of stock price volatility, while stock price volatility is the Granger cause of bank credit. It is worth noting that the conclusion of the Granger causality test is only a prediction, a measurable feeling of "Granger causality", as opposed to the genuine feeling of causality, and can't be utilized as a reason for certifying or denying causality. Obviously, regardless of whether Granger causality isn't equivalent to real causality, it doesn't prevent its reference esteem. Since in financial matters, Granger causality in the factual sense is likewise significant can in any case be of some utilization for monetary gauging.

3.3. Discussion of the findings

During the stock market boom, at the demand level, the sustained rise in stock prices stimulated optimistic expectations among investors, who were eager to seize the next opportunity to build a multi-level capital market, thus triggering a herding effect among borrowers and an influx of funds into the stock market, including bank credit funds, resulting in an increased demand for bank credit. In addition to individual investors, companies also took the time to expand and develop the corporate bond market and the Growth Enterprise Market. As a result, a large number of companies will be looking to banks for loans. From a supply perspective, as stock prices rise, the number of assets of borrowers increases, the value of collateral increases and banks will be more willing to lend to them and increase the number of loans. In addition, as stock prices rise, indicators such as bank leverage improve, and banks themselves are relatively less indebted, so they are in a better position to increase the size of their credit.

From the perspective of the stock market, there are limited investment channels in the financial market. Stocks as an introductory investment channel attract a large number of investors and in order to maximize profits, the stock market has seen the emergence of many speculators looking to make profits with smaller amounts of capital. Speculators frequently move in and out of the stock market, buying low and selling high, not seeking dividends from stocks but only seeking to profit from the difference in stock prices, causing some stocks to change in price by an increased margin. Such speculative behavior disrupts the normal functioning of the stock market and undermines the rights and interests of normal investors. From the perspective of banks, when stock prices rise, borrowers' demand for bank credit increases and banks tend to expand credit as their asset and liability positions improve; while when stock prices fall, the value of credit collateral falls and the net value of banks' assets decreases. To reduce risk, banks will tighten credit, market liquidity will be insufficient and the breakage of a large number of corporate capital chains will trigger a more serious economic crisis.

4. CONCLUSION

This paper conducts an empirical analysis using financial data of commercial banks to study the impact of stock price volatility on the credit size of commercial banks in China and further conducts a group econometric analysis on the sample to check the impact of the nature of equity and whether commercial banks are listed or not on their credit sensitivity. Through the empirical study, the paper draws the following conclusions: stock price volatility positively affects bank credit, but growth in

bank loans does not necessarily cause a significant increase in stock prices, which is one of the crucial factors affecting bank credit expansion. In this environment, the government has to resolutely resist speculation in the stock market. Also, the education of investors should be strengthened so that they cannot blindly take out loans to enter the market. The opposite of high returns is high risk and operating in a volatile stock market can easily lead to losses. Therefore, government departments should strengthen the publicity of relevant knowledge so that investors can have a clearer understanding of the stock market, raise their awareness of risk prevention, enhance their ability to identify risks, improve the quality of investors and guide them to establish a correct investment philosophy. Similarly, the scale of bank credit is closely related to stock prices. Banks should strengthen their own credit management and establish a comprehensive risk control system to avoid the scale of credit following stock prices and disrupting the market. Banks should not take profit as the first criterion for credit decisions. Before lending, banks should clarify the borrower's intention to lend, so as to avoid credit funds flowing into the stock market and causing losses later. Banks should plan for their credit in the long term, increasing buffer capital to avoid excessive credit expansion when asset prices are rising, and reducing buffer capital accordingly to provide liquidity by increasing credit in moderation when asset prices are falling and liquidity is tightening in the market.

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