

Monetary policy and liquidity risk

- Evidence from Chinese banks

Du Jinmin
JiNan University
Guang Zhou, China
tjmd@jnu.edu.com

Wang Junlong
JiNan University
Guang Zhou, China
970179197@qq.com

lv Han
JiNan University
Guang Zhou, China
lvhanmail@gmail.com

Abstract: With the wide use of fair value accounting, it is generally believed that the growth of the economy will be inhibited by the accounting accelerator effect, however in the economic downturn, whether systematic risk from the bank's liquidity reduction will be expanded, and whether the economy can be suppressed continued downward in the relaxed monetary policy. The study selects the banking industry as the research sample, and empirically studies the bank measured at fair value, at the same time liquidity risk and monetary policy have also been taken into account, research on the impact of currency effects accounting accelerators. The study finds that in the economic downturn, banks liquidity lowering effect on economic growth is limited, but when measured at fair value, bank liquidity risks to economic growth have a significant negative effect, but a more relaxed monetary policy to a certain extent mitigate this effect.

Keywords: *Liquidity risk; Monetary policy; Measure fair value; Economic growth; pro-cyclical effects*

I. INTRODUCTION

Since 2006, following the implementation of China revised accounting standard, fair value accounting has been increasingly widely used. However, with the outbreak of the financial crisis in 2007, fair value accounting has become the focus of discussion. In this paper, the banking financial institutions in China as the research object, in years 2008 - 2012 as a research section, in the empirical study of the economic downturn, Whether the fair value accounting will bring side effect to economic growth. While banking system liquidity will further amplify the effect, We introduce monetary policy variables to study whether the relaxed monetary policy will diminish the magnitude of the procyclical effects of fair value accounting. We find that during a period of economic downturn, fair value accounting will reduce the economic growth rate, and will produce a stronger negative effect through bank liquidity risk, but to some extent, a relaxed monetary policy can alleviate the pro-cyclical effects of fair value. Empirical evidence shows that the bank's liquidity risk obstacle to economic growth, measured at fair value, but monetary policy can produce some inhibitory effect.

II. THEORETICAL ANALYSIS AND RESEARCH HYPOTHESIS

A. Fair Value Accounting and Economic Fluctuations

More and more scholars began to study the role of fair value accounting and its pro-cyclical effects of the financial crisis. On the one hand, foreign scholars focus on the fair value accounting is how to spread the financial crisis. Robert (2007)、Plantin et al. (2008)、Allen and Carlett (2008)、Khan (2008)、Barth (2010) hold that fair value accounting information and the downward spiral of asset prices have some relevance, it will therefore increase the vulnerability of the financial system and deepen the impact of the financial crisis^[1]. On the other hand, domestic scholars found that the impact caused by the pro-cyclical effects of fair value to China is not obvious when they study economic body will produce what kind of impact under different conditions or different subjects^[2]. In general, previous academic circles have more focus on the causes of the effect of the fair value in the financial crisis and the impact on the company level, but it is very rare for fair value accounting to study whether the economic fluctuation and the macro adjustment policy will affect the fluctuation range and so on. Based on the above literature and theoretical analysis, we propose hypothesis 1:

H1: In the economic depression period, the use of fair value measurement is negatively related to economic growth.

B. Fair value accounting and liquidity risk conduction mechanism -- Taking bank as an example

Research on bank's liquidity risk can be traced back to Minsky (1982) proposed "financial instability hypothesis", the related research that financial crisis and the economic cycle use are highly correlated, more important is that it closely related with the intrinsic characteristics of the financial^[3]. When the economy is down, the borrower solvency decreased, an event of default occurs frequently, etc, which will lead banks are facing the risk of bankruptcy, and, due to the inherent instability of banks led to their suffering continued impact of the economic cycle crisis, its financial intermediation function not only it does not function properly, but the vulnerability of infection to the entire financial system and economic level will further deepen the economic crisis. In recent years, more and more

scholars began to study the impact of banks' liquidity risk and macroeconomic performance^[4]. Wahyoe Soedarmono、Fouad Machrouh and Amine Tarazi (2011) studied in a sample of 12 Asian countries' commercial banks, found that the greater the market power in the banking sector, the greater the instability, while the higher economic growth would help offset greater risks and higher liquidity risk^[5]. Ghosh Saibal (2010) studied the relationship between credit growth, bank stability and financial fragility, and analyzed that higher credit growth would expand the bank's liquidity risk^[6], and pointed out that relatively stable banks will increase credit supply. Wang Miao (2013) found that the stability of the bank in the short term will have a negative impact to economic growth, and the judgment of the stability of the bank is from the bank's stable operation^[7]. The stable operation of the bank has a certain degree of resistance and absorption of internal and external shocks, and to some extent can reduce the liquidity risk, thereby reducing the impact of the financial system to the real economy^[8].

Based on the above analysis, we propose hypotheses 2:

H2: In the period of economic downturn, combined effect of fair value accounting and bank liquidity risk and economic growth will be negatively correlated.

C. Influence of Monetary Policy on Fair Value Accounting Pro-cyclical Effects

Monetary policy is the most important tool of regulating macroeconomic by central bank. Most research on monetary policy consider that changes in monetary policy in the next two or more years can influence the total output of the economy^[9]. The influence of monetary policy on macroeconomic regulation is mainly worked through two basic channels: monetary channels and credit channels^[10]. Currency channel is to analyze the impact of interest rates, changes in exchange rates on the macro-economy, such as the typical Keynesian analytical framework, believes that interest rates can indirectly exert influence on the level of economic output through exerting influence on the planned investment and net exports^[11]. However credit channels mainly analys that changes of enterprise, family financial situation and bank credit conditions can produce impacts on macroeconomic, in this channel, monetary policy can not only affect interest rates and financing costs, may also affect the bank's credit lines, thus to achieve the purpose of the regulation of the real economy^[12].

Although how the implementation of monetary policy impacting on macroeconomic has been controversy, no matter whatever regulation channel, ultimately economic output and monetary policy will produce changes in the same direction^[13]. Tighter monetary policy will decrease the economic outputs, conversely loosen policy will increase economic output. Therefore, when in a tight economy, due to the use of fair value accounting, the "Accounting accelerator" effect will reduce economic output, so that the economy fluctuates downward^[14]. When a more relaxed monetary policy is taken, it will be added to economic output, so that the economy fluctuates upward, thereby slowing down economic volatility^[15], and playing a counter-cyclical effect. Based on the above analysis, we propose hypotheses 3:

H3: In the economic downturn, the more relaxed monetary policy can weaken the negative influence of the

economic fluctuation caused by the fair value accounting through the bank liquidity risk.

III. STUDY DESIGN

A. Variable selection

1) Extent of the Use of Fair Value Accounting

The equation of the extent of fair value measurement using can be expressed as the following:

The extent of fair value measurement (FV) = (financial assets measured at fair value + financial liabilities measured at fair value) / (total assets + total liabilities).

II) bank liquidity risk (BLR)

The article uses factor analysis to construct the risk of bank liquidity.

First, we select the following types of indicator index system: (1) indicators of reflecting the bank's profitability: return on assets and the cost to income ratio; (2) indicators of reflecting the bank's capital adequacy: total capital adequacy ratio and core capital adequacy ratio; (3) indicators reflecting the bank's asset quality: doubtful loan ratio and provision coverage; (4) indicators of reflecting the banks' liquidity: the ratio of deposits to loans.

Then, the factor analysis method is adopted to determine the weights of the indexes of bank liquidity risk (BLR). The results of factor analysis are as follows:

$$BLR = 0.58 * B1 + 0.48 * B2 + 0.95 * B3 + 0.92 * B4 + 0.09 * B5 + 0.73 * B6 + 0.47 * B7$$

From the process of constructing the bank liquidity risk and the contents of the various sub-indexes we can see that the greater the BLR value, the greater the bank liquidity risk.

III) Economic Cycle

To clearly identify the economic downturn, the economic cycle of China from 2012 to 2000 is divided, as shown in Table 1.

Economic Prosperity	2002	2003	2004	2005	2006	2007
	9.1%	10%	10.1%	11.3%	12.7%	14.2%
Economic Depression	2008	2009	2010	2011	2012	
	9.6%	9.2%	10.45%	9.24%	7.7%	

From table 1, we can find that between 2002 and 2007, China's GDP growth rate rose from 9.1% to 14.2%, which interval belongs to the economic prosperity cycle; However, from 2008 GDP growth began to fall to 9.6%, and then in 2009 down to 9.2%, although in 2010 a transient rebounding to 10.45%, but in 2011 and 2012 they presented a stronger downward trend. Therefore, this interval should be regarded as the period of economic depression. So in this thesis we study the economic depression during the period from 2008 to 2012.

B. Model Setting

According to the models designed by Yaniv and Panos(2014) when they studied the relations between Accounting Earnings and GDP and they would be interpreted as variables GDP, accounting earnings will grow as explanatory variables to examine whether accounting earnings can effectively predict future GDP growth. They explain that the company's profit is a component of the GDP and is likely to have a close relationship with the rest of the GDP (Fischer and Merton, 1984; BEA, 2004), while the overall accounting earnings growth is the driving force of economic growth (BEA, 2004). Therefore, in this study, they used the macro variables GDP as the explanatory variables, and the accounting earnings of the micro enterprises as the explanatory variables for the study.

Based on the above measure of the major variables, we set the following models to test the above three hypotheses:

$$GDP = \alpha_0 + \alpha_1 FV + \alpha_2 BLK + \alpha_3 M2 + \alpha_5 CPI + \alpha_6 YEAR + \varepsilon \quad (1)$$

$$GDP = \alpha_0 + \alpha_1 FV + \alpha_2 BLK + \alpha_3 M2 + \alpha_4 FV * BLK + \alpha_5 CPI + \alpha_6 YEAR + \varepsilon \quad (2)$$

$$GDP = \alpha_0 + \alpha_1 FV + \alpha_2 BLK + \alpha_3 M2 + \alpha_4 FV * BLK * M2 + \alpha_5 CPI + \alpha_7 YEAR + \varepsilon \quad (3)$$

In Yaniv and Panos (2014) study basis, GDP index will break out the financial industry accounts for gross domestic product (GDP), and therefore the amount of the dependent variable FGDP represented a financial value added in GDP index. The FV represents financial assets and financial liabilities measured at fair value, which is calculated as: the degree of fair value measurement (FV) = (financial assets measured at fair value + financial liabilities measured at fair value) / (total assets + total liabilities); BLR represents the bank liquidity risk; M2 represents the growth of broad money in circulation to reflect the tightness of monetary policy; The control variables include the consumer price index (CPI), and the year numbers, which are dummy variables.

Model (1) is used to test hypothesis 1. According to the above theoretical analysis, the coefficient of FV is significantly negative, and the expected M2 coefficient is significantly positive due to the interaction between M2 and FGDP; FV and BLR cross terms are added to Model (2), and if the coefficient of cross terms is significantly negative, the negative effect of the bank liquidity risk will increase the fair value accounting to the GDP growth rate, then the hypothesis 2 is established; FV, BLK and M2 cross terms are added to Model (3), if the cross-multiplication coefficient is significantly positive, indicating a more relaxed monetary policy can weaken the negative effects of fair value accounting by banks' liquidity risk factors FGDP generated, then the assumption 3 holds.

C. Sample Selection and Data Description

The sample adopted by this thesis is banking financial institutions, including both policy banks, such as the China National Development Bank, China Export-Import Bank, and commercial banks. The period for study is from 2008 and 2012. In the process of the sample selection, we take the following actions: (1) reject the samples with incomplete or missing data; (2) and all continuous

variables were processed by 1% level of tails. After the processing, 144 valid observations are left.

IV. EMPIRICAL RESULTS AND ANALYSIS

After the text edit has been completed, the paper is ready for the template. Duplicate the template file by using the Save As command, and use the naming convention prescribed by your conference for the name of your paper. In this newly created file, highlight all of the contents and import your prepared text file. You are now ready to style your paper.

Table 2 reports the results of the regression analysis of the three models.

As for model (1) of the regression equation, the coefficient of the extent of fair value measurement (FV) is -1.201, significantly at the 1% level, indicating that GDP growth rate is negatively correlated with it. It can be explained that when the economy is in a downward phase, the greater the degree of fair value measurement, the more slowly GDP grows. This explains that the systemic risk of fair value accounting existing, which verifies the hypothesis (1). The coefficient of bank liquidity risk index (BLK) is -4.162 that is not significant, which may indicate that the bank liquidity risk does not directly contribute to the GDP growth much. The broad money growth coefficient (M2) is 0.299, significantly at the 1% level, indicating that there is a strong positive correlation between GDP growth and monetary policy, which is one of the effective tools of macro-economic regulation.

For model (2) of the regression equation, the cross-multiplication coefficient of FV and BLK is -0.481, significantly at the 10% level, indicating that during the period of economic downward, bank liquidity risk will strengthen the negative impact of the fair value on GDP growth, that is, the systemic risk will amplify pro-cyclical effect through the bank. So the hypothesis 2 has been verified. The FV still has some negative correlation with GDP growth, but not significantly. Meanwhile BLK coefficient is -7.53 and M2 coefficient is 0.797, significantly at 1% level, which are similar as model (1).

In model (3) of the regression equation, the cross-multiplication coefficient of FV * BLK * M2 is 9.384, significantly at the 5% level, and the FV*BLK coefficient is -3.02, which indicates that under the influence of M2 monetary policy, the negative impact of fair value measurement on GDP growth through bank liquidity risk weakens, namely the more accommodative monetary policy, the less negative the impact on the GDP growth rate, which is also related with the execution of more lenient monetary policies within the sample period. A relaxed monetary policy working on the macroeconomic regulation can offset most of the pro-cyclical effects of fair value. Also we note that at the moment FV has no significant negative impact on GDP growth (coefficient of -1.23, not significant), which verifies hypothesis 3. Similarly, BLK coefficient is -6.611 still not significant, and M2 coefficient is 0.281, significantly at 1% level, which are consistent with the results of the formal two models.

VI. Conclusion and Limitations

In this paper, we take the banking industry financial institutions as the research object, and empirically study whether the fair value accounting of fair value accounting in the economic downturn can product amplification effect through the bank liquidity risk conduction channel. And the monetary policy variable is introduced to study whether

Table 2, Regression Analysis

	Model (1)	Model (2)	Model (3)
FV	- 5.270* * (-2.12)	-1.263 (-0.48)	-1.23 (-0.54)
B	-4.162 (-1.25)	-7.35 (-0.30)	-6.611 (-0.33)
M2	0.299* ** (12.86)	0.797*** (35.15)	0.281*** (8.00)
FV*BLK		-0.481* (-1.42)	-3.02** (-2.43)
FV*M2			1.65 (2.12)
BLR*M2			5.19** (2.62)
FV*BLR* M2			9.384** (2.43)
CPI	0.079* ** (4.76)	0.417*** (4.43)	0.739*** (8.84)
coefficient	14.753 *** (8.70)	-39.063*** (-3.83)	- 31.643*** (-3.83)
YEAR Adjusted- R2	0.34 2	Control 0.394	0.347

注：***，**，*representing significant at 1%，5%，10%。The number in parentheses are T values.

monetary policy would weaken the magnitude of the effects. The study finds that in a period of economic downward, fair value accounting will reduce the economic growth rate, and will have a stronger negative effect through bank liquidity risk factor. A more relaxed monetary policy can alleviate the pro-cyclical effects of fair value accounting. The empirical evidence suggests that

the accelerator effect of fair value accounting exists in China, and it can be amplified through monetary policy conduction channel, but monetary policy has a certain inhibitory action on it. The conclusions in this paper provides reference for further study of fair value accounting pro-cyclical effects and its amplification effect on the economy through banking channel. This paper also provides important empirical evidence on how to mitigate the negative impact of fair value accounting information on economic fluctuations.

ACKNOWLEDGMENT

This work was supported by the National Natural Science Foundation of China (NO.71173091)

REFERENCES

- [1] Allen, F., & Carletti E.. Mark-to-market accounting and liquidity pricing[J]. Journal of Accounting and Economics, 2008,45, 358-378
- [2] Barth, Mary; Taylor, Daniel. In defense of fair value: Weighing the evidence on earnings management and asset securitizations[J]. Journal of Accounting & Economics, 2010,49. 1/2:26
- [3] Boyer, Robert. Assessing the impact of fair value upon financial crises. Social Eco[3]nomic Review[J], SPECIAL ISSUE: The Socio-Economics of Accounting . 2007,5(4), 779-807
- [4] FSF . Report of the Financial Stability Forum on addressing procyclicality in the financial system[J].2 April.2009 .www.fsb.org
- [5] Huang Shizhong. Pro-cyclical Effects of Fair Value Accounting and Coping Strategies [J], Accounting Research, 2009 (11): 23-29
- [6] Kasyap and Stein, "Monetary policy and bank lending", Monetary ploicy , Gregory Mankiw[J] , University of Chicago Press, 1994, 221-256
- [7] Khan, U.. Does Fair Value Accounting Contribute to Systemic Risk in the Banking Indu[8]stry? [J]Michael G. Foster School of Business, Washington University.2008
- [8] Laux, C. & Leuz, C.. The crisis of fair value accounting: Making sense of the recent debate[J]. Accounting Organization and Society .2009
- [9] Liu Hongzhong, Zhao Yujie, Zhou Donghua. Can Fair Value Accounting Amplify Systemic Risk in the Banking System? [J], Financial Research .2011 (4) .82-99
- [10] Plantin, G., Sapra, H., & Shin, H. S.. Fair value accounting and financial stability. Banque de France[J], finan-cial stability review. Special issue on valuation, 2008,No.12
- [11] Rao Pingui. Monetary Policy fluctuations, bank credit and accounting conservatism [J], Financial Research, 2011 (3) 51-71
- [12] Saibal Ghosh. Credit Growth, Bank Soundness and Financial Fragility: Evidence from Indian Banking Sector [J].South Asia Economic Journal, 2010(6):69-98.
- [13] Wahyoe Soedarmono, Fouad Machrouh, Amine Tarazi. Bank market power, economic growth and financial stability: Evidence from Asian banks [J].2011(22):460-470
- [14] Wang Miao. Research on the Shocks of China's Banking Soundness on Macroeconomic [D]. 2013, Jilin University doctoral thesis
- [15] Wallison P., Fair value accounting: a critique.2008.www.aei.org.